STIBO SYSTEMS
MASTER DATA MANAGEMENT

USER GUIDE

System Setup

2024.3 – September 2024

Table of Contents

Table of Contents **2**

System Setup **24**

Prerequisites 24

Accessing Shortcut Menus on PC and Mac 24

Action Sets **25**

Creating Strong User Action Sets **27**

Setup Actions and Error Descriptions **31**

Action Sets 31

Administration 32

Assets 32

Attributes 33

Background Processes 35

Bulk Updates 36

Business Modules 36

Business Rules 37

Change Packages 37

Contexts 37

Cryptographic Keys 37

Data Quality 38

Deduplication 38

Events 38

Integration Endpoints 39

JavaScript 39

Link Types 40

List of Values (LOVs) 40

Object Types 42

Print Publication 43

Purging 43

Reports 44

SDK / API Documentation 44

Tables 44

Tags 45

Units 45

Users & Groups and Privilege Rules 45

Value Search 46

Web UI 46

Workbench 47

Workflows 47

Workspaces 49

User Actions and Error Descriptions **50**

Assets 50

Collections 53

Commercial Lists 54

Data Preparation Functionality 54

Data Quality Functionality 55

eCatalog 55

GDSN Data Pools 56

Products, Classifications, and Entities 56

Publications 64

Translations 69

Web UI 69

Maintaining Action Sets **70**

Creating an Action Set 70
Adding Actions to an Action Set 71
Editing and Removing Action Set 73
Remove actions 73
Remove a reference or attribute from an attribute group 74
Remove a privilege rule completely 74
Action Set Log Tab 74
Setting Up Attribute Groups for Action Sets 76
Considerations for Supplier Privilege Configuration 77
Users and Dimension(s) 77
Creating Attributes Groups Specifically For Use with User Privileges 77
Attributes 83
Attribute Groups 84
Attribute Group Display Sequence 85
Manually Sorted 85
Creating a Customized View 87
Creating an Attribute Group 90
Setting Up Attribute Groups for Action Sets 91
Considerations for Supplier Privilege Configuration 92
Users and Dimension(s) 92
Creating Attributes Groups Specifically For Use with User Privileges 92
Attribute Links 98
Linking Orphan Attributes 100
Linking an Orphan Attribute 100
Linking Specification Attributes 103
Linking Attributes in Product Editor 103
Linking Attributes to Products or Classifications 104
Linking to a Source from Attribute 106
Sorting Linked Attributes 108
Setting a Display Sequence Number on the Attribute 108
Setting a Display Sequence Number under Linked Attributes 109
Setting the Priority of a Product Variant Attribute 111
Setting the Attribute Display Sequence on Publication (Green) Hierarchy Objects 112
Attribute Transformations 113
Creating an Attribute Transformation 115
Create an Attribute Transformation Group 115
Create an Attribute Transformation 116
Configuring an Attribute Transformation 117
Attribute Types 122
Calculated Attributes 124
Calculated Attribute Considerations and Limitations 126
Deciding to Use a Calculated Attribute .. 127
Setting up a Calculated Attribute 129
Using Variables in a Calculated Attribute 132
Optimizing Calculations Using STEPXML 136
Limit Performance Penalties for 137

Calculations .....
Calculated Attribute Use Cases 139
Introduction to Value Templates 140
Attribute Examples 143
Commercial Examples 146
Conditional Examples 148
Date Examples 152
List Examples 154
Number Examples 159
Other Examples 163
Classification Functions 163
Completeness Functions 164
Data Container Functions 164
Hierarchy Functions 165
Lookup Table Functions 169
Object Functions 170
Override Functions 171
Reference Functions 172
Revision Functions 173
Workflow Functions 174
Publishing Examples 175
Prerequisites 175
Sample Formulas and Values 176
Text Examples 183
Escape Functions 183
Identify Functions 183
Modify Functions 184
Regular Expression Functions 188
Representative Text Functions 189
Test Functions 190
Variable Examples 192
Concatenate Function with Variables 193
Find Function with Variables 194
Asset Push File Name Scenario 196
Solution 197
Classification Scenario 199
Get All Classifications 199
Get Classifications Based on Type 199
Get Metadata Value Located on the Link From Classification-to-Product 200
Get CPL Classifications Using Classification Product Links 201
Commercial Data Scenario 202
Price List in a Publication Structure 202
Price List in an eCatalog Structure 202
Comparing Localized Values Scenario 203
Solution 203
Identifying Child Objects Scenario 205
Solution 205
Including Parent Info on Child Scenario 207
Solution Option 1 207
Solution Option 2 208
New Product Indicator Scenario 210
Solution Options 210
Override Scenario 213

Get Overridden By Products 213
Get Overridden Product Objects 214
Get Product Override Parents 215
Product Description Scenario 216
Solution Option 1 217
Solution Option 2 219
Reference Scenario 220
Get List of References 220
Get Value From a Referenced Product 221
Get Metadata Value Located on the Link From Product-to-Product 222
Get Referenced By Using Reference Owner 223
Get Reference Type ID 224
Get Reference Source or Target Product Information on the Link 226
Total Cost of Materials Scenario 228
Solution 229
Units Scenario 231
Creating a Calculated Attribute 234
Overriding and Restoring Calculated Attribute Values 240
Override a Calculated Attribute 240
Restrict Overrides of a Calculated Attribute Value 241
Remove Override Values 242
Restore a Calculated Value 243
Conditional Attribute Display 244
Terminology 244
Creating the Conditional Attribute 244
Activating a Conditional Attribute 245
Configuring Conditionally Valid Attributes 246
Description Attributes 246
Specification Attributes 248
Writing Conditional Expressions 249
Conditional Attribute Example 250
Data Containers 254
Composite Attribute Concept 254
Using Data Containers 255
Setting Up Data Container Types in Workbench 258
Prerequisites 258
Adding Data Container Types 259
Configuring Data Container Types 260
Adding references to a data container type 265
Deleting Data Container Types 266
Data Container Keys 267
Data Container Keys 268
Creating a Data Container Key in the Workbench 268
Using Lists of Values (LOV) in Data Container Keys 271
Check Duplicate Keys 272
Removing Duplicate Keys in Collections 274
Adding and Maintaining Data Container Instances 277
Edit a data container reference 279
Description Attributes 282
Metadata Attributes 282

Linking Description Attributes to an Object Type 283

Attribute Metadata on Attributes 286

Create a Metadata Attribute on an Attribute286

Description Attributes and Object Types 289

Validity on Description Attributes 291

Dimension Dependent Attributes 294

Dimension Dependent Attribute Values 294

Non-Dimension Dependent Attribute Values 295

Setting Dimension Dependency on Attributes 296

Value Inheritance in Dimension Dependent Attributes 298

Showing Source Context (Parent Dimensions) 300

Dimension Dependent Attribute and Attribute Group Recommended Practices 303

Dimension Dependent Attribute Recommendations 303

Dimension Dependent Attribute Warnings 304

Attributes That Need Dimension Dependencies 304

Dimension Dependent Attribute Group Recommendations 304

Dimension Dependent Attribute Group Warnings 305

Using Dimension Dependent LOVs With Attributes 306

Attribute With No Dependency, LOV With a Dependency 306

Attribute With No Dependency, LOV Without a Dependency ....

Attribute With a Dependency, LOV With a Dependency 307

Attribute With a Dependency, LOV Without a Dependency 307

Display Sequence Attribute 308

Display Sequence Attribute Setup 308

Sorting Attributes 310

Selecting a Personal Display Sequence Attribute 312

Display Sequence Attribute and the Product Editor Display 313

Display Sequence Attribute and Classifications 314

Setting the Priority of a Product Variant Attribute 314

Display Sequence Attribute and Tables 315

Setting the Attribute Display Sequence on Publication (Green) Hierarchy Objects 316

Encrypted Attributes 318

Cryptographic Key 318

Password requirements 320

Creating Encrypted Attributes 320

Properties of attributes that cannot be used with encryption 321

Accessing encrypted data 321

Restrictions of Encrypted Data 322

Externally Maintained Attributes 323

Revision Control 323

Sharing LOVs 323

Setting as Externally Maintained 323

Full Text Indexable Attributes **326**

List of Values (LOV) **329**

LOV Features 330

Values by Reference 330

Revision Control 330

Validation Base Type 330

Working with Large LOVs 330

Creating an LOV Group **333**

Creating an LOV **335**

Adding Values to an LOV **341**

Adding a Single LOV Value 341

Adding a Group of LOV Values 342

Exporting the Existing LOV to Create a STEPXML File 343

Modifying the File to Include the New Values 345

Importing New Values Into STEP 347

Adding IDs to Existing Values in LOV **351**

Allowing Value IDs to be Added to an LOV **358**

Consolidating LOVs **361**

Merging LOVs 361

Merge Values in LOV 361

Merging LOV Values in Bulk 361

Merging LOVs **362**

Merging Values in an LOV **366**

Merging LOV Values in Bulk **371**

Creating and Formatting the CSV File 371

Uploading the Merge LOV Values CSV Sheet 373

Monitoring LOV Value Merge Events 375

Deleting LOV Values in Bulk **376**

Prerequisites 376

DeleteValue Tag and XML Attributes 376

Deleting LOVs **378**

Filtering LOVs **380**

Filtering on Attribute and PPH 380

Filtering on Attribute and Classification Hierarchy 385

Combining PPH and Classification Hierarchy LOV Filtering 386

Filtering LOV Values **387**

Filtering by Hierarchy on LOV Attributes **390**

Filter an LOV Based on Hierarchy 390

Workflows and LOVs **394**

Initiate an LOV in a Workflow 394

Remove an LOV from a Workflow 396

Maintaining Attributes **397**

Attribute Value Migration **398**

Prerequisites 398

Technical Migration Details 398

Migration Preparation 399

Running the Attribute Value Migration **402**

Queuing Attributes for Migration 403

Scheduling the Migration 405

Considerations 405

Creating a Schedule 406

Starting the Migration 407
Statistics 408
Completing the Migration 409
Changing an Attribute ID 412
Converting Attributes from Date to ISO Date 416
Merging Attributes 416
Switching Attribute IDs 417
Creating Attributes 418
Attribute ID Considerations 422
Handling Duplicated Attributes in Web UI 424
Create Attribute Group(s) to Hold Attributes Known to Exist in Multiples Groups 424
Setting up Blacklisted Attribute Groups in Web UI 424
Merging Attribute Values 426
Verify Attributes to be Merged 426
Merge Values Using Bulk Update 429
Reparenting Attribute Groups 431
Manual Reparenting 431
STEPXML Reparenting 435
Viewing Attribute Values 448
Mandatory Attributes 451
Standard Mandatory Attributes / Visual Indicator in Workbench 451
Workbench Visual Indicators 451
Verify Mandatory Attribute Values Upon Approval 454
Business Rules for Mandatory Attributes 455
Smartsheet Mandatory Attributes 455
Web UI Mandatory Attributes 456
Workflow Mandatory Attributes 456
Single and Multi-Valued Attributes 457
Editing Attribute Values 459
Inherited and Local Values 461
View Filter Options 461
Attributes with Units 461
Editing 'ISO Date' and 'ISO Date and Time' validation base type 462
Entering Values 462
Overwriting Values 463
Editing Multi-Valued Attributes 464
Unlinking Attributes from Objects 467
Unlink Object from Attribute References Tab 467
Unlink Attribute from Object References Tab 467
Specification Attributes 469
Specification Attribute Facts 469
Inherited Attributes 471
Validity on Specification Attributes 472
Units 474
Unit Groups 474
Unit Conversions 475
Conversion Factor and Conversion Offset 475
Maintaining a Unit 477

Create a Unit 477
Delete a Unit 478
Maintaining a Unit Conversion 481
Creating a Unit Conversion 481
Deleting a Unit Conversion 483
Maintaining a Unit Group 484
Creating a Unit Group 484
Deleting a Unit Group 485
Validation Rules 487
Validation Base Type 491
Editing Validation Rules 498
Custom Validation Error Messages 501
Setting Up a Custom Validation Error Message 502
Using the Custom Validation Error Message 502
Input Masks 504
Example Input Mask Use Cases 504
Definitions of Input Mask Characters 505
Static Mask Characters 507
Background Processes and Queues 507
BGP Execution Management 508
Tracking BGPs 508
Scheduling BGPs 508
Managing BGP Data 508
BGP Execution Management 509
BGP One Queue 510
Priority Mechanism 510
Background Process Execution Overview 511
Servers 512
Running Background Processes 512
Waiting Background Processes 513
Priority Parameter Setting 513
Parallel Processes 514
BGP Legacy Multiple Queues 516
Default Configuration for Legacy BGP Queues 517
Parallel and Multithreading for Legacy BGP Queues 519
Single Application Server and Single Queue Example 520
Two Application Servers Example 521
Single Application Server and Two Queues Example 521
Single OIEP in Parallel Example 522
Understanding config.properties Settings in On-prem Systems 525
Modifying Configuration for Legacy BGP Queues 527
Update Legacy Queue Configuration 527
BGP States and Quarantine Status 529
Queued Processes State 529
Active Processes State 529
Completed with Errors Processes State 530
Ended Processes State 531
Quarantined Status 531
Integration Endpoints 532
Quarantined Status Values 532

Searching for Quarantined BGPs 533
Managing BGP Data 534
Automatic Deletions 534
Manual Deletions 535
Scheduling a BGP 537
Scheduled BGP Properties 538
Deleting a Scheduled BGP 540
Business Module Manager 543
Component Models 545
Dimensions, Dimension Points, and Contexts 548
Dimensions and Dimension Points 549
Dimensions 549
Dimension Points 549
Dimension Dependent Data 550
Dimension and Dimension Points Recommended Practices 552
Language Dimension 552
Country Dimension 553
Business Unit Dimension 553
Market Dimension 554
Dimension Recommendations 554
Dimension Warnings 556
Alternatives to Additional Dimensions ... 557
Maintaining Dimensions and Dimension Points 559
Creating a Dimension 559
Creating a Dimension Point 561
Deleting a Dimension Point 562
Deleting a Dimension 563
Selecting a Dictionary for a Language Dimension Point 564
Adding Dimension Dependency After Loading Data 565
Add Dimension Dependency to Attribute .. 565
Add Dimension Dependency to Reference Type 566
Contexts 568
Dimension Dependent Data 569
Context Recommended Practices 570
Context Recommendations 570
Context Warnings 570
Using a Global Context 571
Deleting a Global Context 571
Contexts in Web UI 571
Context Locales 573
Locale Recommendation 574
Context Mode View 575
Maintaining Contexts 576
Creating a Context 576
Editing a Context 578
Deleting a Context 578
Hidden Values 579
Specifying a Default Context 580
Elasticsearch Setup 583
Elasticsearch Quick Start 585
Searchable Object Types in Elasticsearch 591

Considerations, Limitations, and Recommendations for STEP Privileges 591
Full-text Search Results Can Include Hidden Values 591
Facets Can Include Hidden Attribute Values 592
User Group Permissions for Data Specifications 592
Creating an Elasticsearch Object Type ..593
Creating and Maintaining an Elasticsearch Configuration 596
Prerequisites 596
Creating and Editing an Elasticsearch Configuration 597
Attribute ID Considerations 608
Deleting an Elasticsearch Configuration ...609
Elasticsearch Data Specification Type Examples 610
Node and Child Data Specifications 611
Link Data Specifications 612
Elasticsearch Index Publishing 614
How it Works 614
Elasticsearch Event Processor 614
Elasticsearch Event Processor Performance 615
Monitoring Elasticsearch Event Processor 615
Reindex the Elasticsearch Database 618
Reindexing an Elasticsearch Configuration 619
Monitoring Reindex Processes 621
Republishing Smaller Sets of Objects to Elasticsearch 623
Republish to the Elasticsearch Database ..624
Elasticsearch Indexing Background Processes Scheduling 624
Legacy Background Process Queue Configuration 624
Elasticsearch Indexing Background Processes 624
Elasticsearch Server Indexing Capacity (On-Premises Installations) 625
Elasticsearch Troubleshooting 625
Failure Handling 625
Elasticsearch Outages 625
Error in Background Process 625
Cancellation of Controlling Reindexing Background Process 626
On Premises Elasticsearch Index Management 629
Elasticsearch Indexes and Shards 629
Monitoring and Managing Shards 629
On-Premises Initial Setup for Elasticsearch 631
Events 633
Core Events 634
Prerequisites 634
Core Events and Event Types 634
Core Event Generation 636
Using Core Events 637
Change Flags for Events 638
Change Flag Example 640

Derived Events **644**
Prerequisites 644
Add a Derived Event Type 644
Use a Derived Event Type in a Business Rule 645
Use a Derived Event Type in an OIEP 646
Delete a Derived Event Type 647
Events Not Triggered **649**
Event Processors **650**
Prerequisites 650
Setup Requirements 650
Event Processor Results 651
Processing Plugins **652**
Asset Publisher Processing Plugin Parameters and Triggers **655**
Prerequisites 655
Parameters 655
Event Triggers 660
Republishing Assets 663
Asynchronous Translation Message Processor Processing Plugin Parameters and Triggers **664**
Prerequisites 664
Parameters 664
Event Triggers 666
CASS Certification Report Processing Plugin Parameters and Triggers **667**
Prerequisites 667
Parameters 668
Event Triggers 669
Data Sufficiency Calculator Processing Plugin Parameters and Triggers **671**
Prerequisites 671
Parameters 671
Event Triggers 674
Elasticsearch Indexer Processing Plugin Parameters and Triggers **676**
Prerequisites 676
Parameters 676
Event Triggers 677
Execute Business Action for Event Batch Processing Plugin Parameters and Triggers **680**
Prerequisites 680
Parameters 680
Event Triggers 683
Execute Business Action Processing Plugin Parameters and Triggers **685**
Prerequisites 685
Parameters 685
Event Triggers 689
Expand LOV Value Changes Processing Plugin Parameters and Triggers **692**
Prerequisites 692
Parameters 692
Event Triggers 693
For Use with External Systems 694
Experian Email Validation Processing Plugin Parameters and Triggers **695**
Prerequisites 695

Parameters 695
Event Triggers 697
Image Cache Processing Plugin Parameters and Triggers 699
Prerequisites 699
Parameters 700
Event Triggers 701
Matching Processing Plugin Parameters and Triggers 703
Prerequisites 703
Parameters 703
Event Triggers 707
Matching Recommendations and Retry Logic for Match Recommendation Service Connectivity 709
Troubleshooting 709
Revision Management Processing Plugin Parameters and Triggers 709
Prerequisites 709
Parameters 710
Event Triggers 711
Splitting Processor Processing Plugin Parameters and Triggers 713
Prerequisites 713
Parameters 713
Event Triggers 715
Source Record Data Management Processing Plugin Parameters and Triggers 717
Prerequisites 717
Parameters 717
Event Triggers 719
Initial Setup for Event Processors 720
Prerequisites 720
Create Setup Group Type for Event Processors 720
Link Event Processor Object Types to Setup Group Types 723
Create an Event Processor Setup Group 725
Configure Action Sets and Privileges 726
Create Event Processor Action Sets 726
Configure Event Processor Privileges 727
Creating an Event Processor 729
EP - Identify Event Processor 731
EP - Configure Event Processor 732
EP - Configure Processing Plugin 734
EP - Schedule Event Processor 737
EP - Error Handling and Reporting 740
Automated Retries 743
Running an Event Processor 745
Event Processor Status Options 745
Enable Event Processor 746
Invoke Event Processor 747
Disable Event Processor 748
Generating Events from Main 749
Fail and Retry Exception 749
Maintaining an Event Processor 751
Edit Event Processor 752
Delete Event Processor 752

EP - Event Processor Tab **754**
Description Section 754
Configuration Section 755
Current Background Process Log Section 759
Event Mode: Deduplicate Example 760
EP - Event Triggering Definitions Tab **763**
Event Triggering Definitions 763
Configure Event Triggering Definitions 764
EP - Background Processes Tab **766**
EP - Statistics Tab **768**
EP - Error Log Excerpts Tab **769**
Event Processor Log Flipper 769
EP - Log Tab **770**
Logs 770
Monitoring an Event Processor via External System **771**
Event-Based Event Processor Queued Events **772**
Estimate Unread Events 772
View First Event Batch 772
Event Queues **774**
Creating a New Event Queue **775**
Maintaining Event Queues **778**
Create or Edit Event Consumer **780**
Creating or Editing an Event Consumer 780
Output 783
Lock-free Schema Change **785**
Engaging the LFSC Functionality 785
Using / Switching to LFSC: Considerations 786
Enabling the LFSC Functionality 786
Metrics **788**
Aggregator Metrics **789**
Aggregator Metric Configuration 789
Adding a business function to an aggregator metric 791
Attribute Comparison Metric **794**
Attribute Comparison Metric configuration 794
Validation Errors 798
Attribute Value Analysis Metric **800**
Attribute Value Analysis Metric configuration 800
Validation Errors 805
Business Function Metrics **807**
Business Function Metric Configuration 807
Conditional Attribute Value Metric **809**
Conditional Attribute Value Metric configuration 809
Validation Errors 814
Initial Setup for Metrics **816**
Number of Referenced Target Objects Metric **819**
Number of Referenced Target Objects Metric Configuration 819
PDX Channel Metric **825**
PDX Channel Metric configuration 826
Creating and Editing Metrics **830**
Creating a Metric Object 830
Configuring a Metric 830

Set a Default Metric 833

Completeness Metrics 834

Configuration 834

Migrating Completeness Scores to Description Attributes 837

Migrate Completeness Scores 837

Value Metrics 840

Configuration 840

Business Function Metrics 843

Business Function Metric Configuration 843

Aggregator Metrics 845

Aggregator Metric Configuration 845

Adding a business function to an aggregator metric 847

Metric Visualization 850

View Quality Scores 850

User Privileges 853

Define Completeness Scores 853

Setting Completeness Scores for Data Containers 854

Export Completeness Values 856

Metric Visualization in Web UI 857

Adding the Completeness Meter Component 857

Configuring the Completeness Meter Component 857

Object Types and Structures 859

Attributes Valid for Object Types 863

Setting Validity 863

Autogenerate Using Name Pattern and ID Pattern 864

Defining the Name and ID Pattern 864

Basic Object Types 868

Object Type Dimension Dependencies 871

Setting an Object Type Name to be Language Dimension Dependent 871

Adding a Dependency 872

Setting an Object Name to be Language Dimension Dependent 873

Object Type Icons 874

Editing an Object Type Icon 874

Creating Custom Object Type Icons 877

Maintaining Object Types 878

Creating an Object Type 879

Create an Object Type 879

Deleting an Object Type 881

Unlinking Object Types 884

Updating Object Types from Another Object Type 886

Steps to Update an Object Type from Another Object Type 886

Maintaining Dimension Dependent Object Types 890

Making an Object Type Dimension Dependent 890

Removing Dimension Dependency from an Object Type 891

MIME Types 894

Setting MIME Types for Object Types 901

Editing MIME Types LOV 902

Modifying Manually Sorted **904**

Object Types **906**

Object Type Hierarchy **908**

Classification Hierarchy Structures **909**

Fixed Hierarchy Structure **911**

Variation in Hierarchy Depths **912**

Multiple Parents 913

Creating a Standard Publication Object Type Hierarchy **914**

Creating a Publication Group Object Type **916**

Creating a Publication Object Type **918**

Creating a Publication Section Object Type **920**

Product-Override Object Types and Commercial Object Types **922**

Creating a Commercial List Type **923**

Creating a Product-Override Object Type **925**

Enabling a Product-Override **926**

Owns Product Links on Alternate Classifications Object Type **927**

Owns Product Links Affects STEPXML 928

Changing Owns Product Links **933**

Steps to Change the Owns Product Links 933

Reference Target Lock Policy on Object Types **935**

Strict or Relaxed 935

Revisability on Entity Object Type **937**

Product Variants **940**

Setting Up Product Variants **942**

Add the Object Types to the Component Model 942

Create a Product Variant Priority Attribute 943

Specify Variant and Non-variant Attributes 947

Products Variants List in Workbench **950**

Use the List View 950

Create a Variant 951

Delete a Variant 951

Products Variants List in Web UI **953**

Configure Product Variants List 954

Dimensions 956

Enable Filtering 956

Headers 959

Hide Selection Buttons 959

Selection Screen 959

Sort Column 959

Title 959

Use Immediate Save 959

Actions 959

Prevent Duplicate Creation 960

Preview Variant Combinations 961

Use the List View 961

Create a Variant 962

Product Variants Matrix in Workbench **965**

Use the Matrix View 965

Create a Variant 968

Delete a Variant 968

Product Variants Matrix in Web UI **970**
Configure Product Variants Matrix 971
Initial Hide Empty 973
Title 973
Actions 973
Prevent Duplicate Creation 974
Preview Variant Combinations 975
Use the Matrix View 975
Create a Variant 976
Business Condition: Validate Product Variant **979**
Recycle Bin for System Setup **981**
Resolving Deleted Objects 981
Group actions 981
Individual object actions 984
Reference and Link Types **986**
References 986
Product to Classification Links 987
Product Attribute Links 988
Classification Attribute Links 988
Classification Attribute Link Type **990**
Creating a Classification Attribute Link **992**
Setting Up an Attribute Link Type **995**
Maintaining Attribute Link Metadata Values **998**
Inherited Metadata Values 998
Local Metadata Values 999
Mandatory Linked Attribute Values 1001
Product Attribute Link Type **1003**
Creating a Product Attribute Link **1005**
Setting Up an Attribute Link Type **1008**
Maintaining Attribute Link Metadata Values **1011**
Inherited Metadata Values 1011
Local Metadata Values 1012
Mandatory Linked Attribute Values 1014
Product to Classification Link Types **1016**
Creating a Product to Classification Link Type **1018**
Product to Classification Link Type - Enter ID and Name **1020**
Product to Classification Link Type - Select Valid Product Types **1021**
Product to Classification Link Type - Select Valid Classification Types **1022**
Product to Classification Link Type - Apply Dimension Dependencies **1023**
Product to Classification Link Type - Advanced **1024**
Creating a Product to Classification Link **1026**
Maintaining a Product to Classification Link Type **1029**
Product to Classification Link Type Tab 1029
Validity Tab 1034
Log Tab 1035
Attribute Groups for Reference and Link Types **1036**
Dimension Dependent Reference and Link Types **1039**

Dimension Dependency on the 'Reference-Type' Object Type 1039

Dimension Dependency on a Reference Type 1040

Dimension Dependent Reference Example 1041

Inheritance Example for a Product to Classification Link Type 1044

Metadata Attributes on Reference and Link Types 1052

Add a Metadata Attribute 1053

Edit a Metadata Attribute 1055

Visibility of Reference and Link Types . 1057

Reference Types 1061

Creating a Reference Type 1063

Reference Type - Enter ID and Name ... 1065

Reference Type - Select Valid Source Types 1066

Reference Type - Select Valid Target Types 1067

Reference Type - Apply Dimension Dependencies 1068

Reference Type - Advanced 1069

Creating a Reference 1071

Maintaining a Reference Type 1074

Reference Type Tab 1074

Validity Tab 1080

Log Tab 1081

Attribute Groups for Reference and Link Types 1082

Direction of a Reference 1085

Dimension Dependent Reference and Link Types 1086

Dimension Dependency on the 'Reference-Type' Object Type 1086

Dimension Dependency on a Reference Type 1087

Dimension Dependent Reference Example 1088

Entity Reference Types 1091

Entity to Entity Parent/Child Relation Example 1092

Asset to Entity Reference Example 1093

Inheritance Example for a Reference ... 1095

Metadata Attributes on Reference and Link Types 1098

Add a Metadata Attribute 1099

Edit a Metadata Attribute 1101

Multiple References for the Same Objects 1103

References on Data Containers 1104

Configuring a Reference Type with a Data Container Type as Source Object ... 1104

Editing References on Data Containers .. 1106

Viewing Data Container References via Referenced By Tab 1106

Visibility of Reference and Link Types . 1107

Revisions 1111

Comparing Revisions 1113

Generating Revisions 1116

Maintaining Revisions 1118

Reverting to Past Revisions 1121

Timing for Automatic Revisions **1123**

Setup Groups **1125**

Creating Setup Group Object Types **1127**

Defining Type of Objects to be Stored in Setup Groups **1129**

Creating Setup Groups in System Setup **1132**

Setting Up Privileges Example **1134**

Privilege Setup Steps 1135

Single-Update Mode **1140**

Operations that Cause Single-Update Mode 1141

Single-Update Mode Examples 1142

Guidance for Preventing SUM Activation .1143

Tags **1144**

Tag Systems in STEP 1144

Types of STEP Tags 1144

Working With Tags 1145

Creating Tag Groups and Tags **1147**

Tag Groups 1147

Tags 1148

Configuring Tag Definitions **1150**

Rendering 1152

Configuring Tag Output Formatting **1156**

Output Formatting Flipper 1156

InDesign Output Formatting 1158

Tag Conversion Parameter 1158

Special Character Tags **1162**

Creating a Special Charter 1162

Inserting a Special Character in an Attribute 1164

Character Tags **1167**

< and > Characters 1167

Importing < and > Characters 1167

& and " Characters 1168

Insert a Character Tag 1168

Style Tags **1171**

Insert a Style Tag 1171

Hyperlink Tags **1176**

Insert a Hyperlink 1176

Unique Keys **1179**

Defining Keys 1179

Key Attribute Considerations 1180

Key Example 1180

Key Formula Example 1181

Key Formula Example 1181

Important Notes 1181

Creating and Deleting Keys **1182**

Create a Key 1182

Delete a Key 1184

Activating and Deactivating Keys **1186**

Activate a Key 1186

Deactivate a Key 1187

Checking Keys **1190**

Creating Objects with Active Keys **1191**

STEPXML 1191

Web Services APIs 1193

Web UI Simple Importer 1194
Workbench 1194
Matching Keys During Import 1195
Users and Groups 1197
Group Membership 1197
Working with User Groups 1199
Creating a User Group 1199
Deleting a Group 1200
Working with Users 1202
Creating a User 1202
Bulk Adding New Users 1204
Adding a User to a Group 1206
Duplicating a User 1207
Removing a User from a Group 1208
Deleting a User 1209
Considerations 1211
Changing a User Password 1212
Changing a User Password - System Administrator 1212
Changing a User Password - User 1213
From the workbench 1213
From the Web UI 1214
Multifactor Authentication for SaaS 1216
User Anonymizer 1218
Starting the Anonymization Process 1218
Example: Anonymizing a User 1220
System Settings 1224
Classification Hierarchy Settings 1225
Dimension Dependencies 1225
Image and Document Settings 1228
Dimension Dependencies 1228
Store assets and DTP documents in 1229
DTP asset source 1229
Pregenerate thumbnail cache on upload 1229
Disable auto-cleanup of thumbnail cache 1229
Transformation Lookup Tables follow asset dimension dependency 1229
Asset Import Compatibility Mode 1230
Asset Push Attribute Macro Keys 1231
Calculated Attribute Settings 1232
Cryptographic Keys 1233
Creating cryptographic keys 1233
Password Requirements 1234
Validation Templates 1235
To create a Validation Template: 1235
Product Information Manager Default Settings 1237
Enforce Mandatory Check for Attributes, References and Links 1237
Product Editor, Group attributes by top group 1238
Localize numbers with thousand delimiter when localizing exports 1239
Localize dates when localizing exports 1240
Report Save As CSV Character Set 1240
Default Attribute to use as Display Sequence Attribute 1241
Default Metric 1242

Conditional Validity Attribute 1242

Block Attribute Groups with more than 1000 attributes 1242

Use full pathname for classes on Product References Tab 1242

Pass through unconverted Special Characters and Tags (Y) or discard them on output (N) 1243

Product Attribute Help metadata attribute 1243

Attribute indicating the Priority of Product Variant Attributes 1244

Show both name and ID in the PIM navigator 1244

Comma separated list of node types for which to show both name and ID 1245

Attribute Header Column Width 1246

Reference Type Column Width 1247

Translation Settings 1248

Translation File Pattern 1248

Should "Filter spreadsheet" option be shown in Translation Wizard 1248

Default value for "Filter spreadsheet" option in Translation 1250

Always Excluded Attributes 1250

Terms List Settings 1252

Add the products from the selection list import file directly instead of looking up leaf products 1252

Web Services 1253

Tag format for Web Services and REST APIs 1253

Web UI Settings 1254

Control Override Meta-Attribute 1254

Default Context 1256

Default Workspace 1256

Web UI Supplier Classification Object Type 1256

Web UI Supplier Products Classification Object Type 1256

Assets Classification Object Type 1256

Batches Classification Object Type 1256

Batch Classification Object Type 1257

Supplier Privileges Entity to Classification Reference Type 1257

Web UI Supplier Entity Classification Object Type 1257

Proof View Stylesheet Attribute 1257

Step-users Web UI Batches Folder 1257

Step-users Web UI Assets Folder 1258

Context Help Metadata Attribute 1258

Link Type for Vendor Classification to Product Link 1258

Enable All-view for Users that are a Member of Multiple Suppliers 1258

Primary Image Type 1259

Flatplanner Default Settings 1260

Enable keep layouts for publications 1260

Show frame information on flatplans with layout pickup 1261

Reapply Flatplan rules when adding product to non-empty frame 1262

DTP Settings 1263

Use Publication Name prefix when 1263

naming DTP documents .....
Enable calculation of border rectangle space usage for actual pages 1263
Calculated DTP Table width includes left and right rules 1264
Attribute Display Sequence 1264
Attribute Name Style Meta-attribute and Attribute Value Style Meta-attribute 1264
Asset Order Meta-attribute 1265
Table Cell Skip Empty Cell 1265
JPEG DPI 1265
DTP Page - preview image 1266
Inherit Default Product Template through product hierarchy for Product Overrides. .1266
Proof View Start Page Number 1266
Data Quality Monitoring Settings 1268
Selecting a Data Policies Default Context 1268
Table Defaults 1270
Index Word Settings 1271
Revisability Settings 1272
Threshold (hours) for changes by same user to generate a new revision 1272
Business Rule Approve Overview 1273
Security Policy 1274
GUI Localization 1278
Setting up a GUI Localization for a User ..1279
Privilege Rules 1281
Recommendations for Privilege Rules .1282
Privilege Rule Types 1282
Restricting Actions 1283
Unlimited Number of Privilege Rules 1283
Editing Linked Objects 1284
Access to Classifications and Products ...1284
Read-Only Access 1284
Adding User Privileges for a Group 1285
Add Privilege Rule Options 1286
Adding Setup Privileges for a Group ...1291
Add Setup Privilege Rule Options 1291
Editing Privilege Rules 1294
Edit Privilege Rule Options 1295
Removing a Privilege Rule from a Group 1300
Configuring Workflow Privileges 1301
Workflow State Selector 1302
Editing Privilege Rules with Focus on STEP Workflows 1302
Limitations on Workflow Privileges 1304
Object Creation Privileges 1307
Considerations When Creating New Object 1308
General aspects to Consider 1308
Mass Creation Screen in Web UI 1308
Smartsheets 1308
Importer 1309
Privileges and Security 1309
Granting Access to the SDK and API Documentation 1311
Grant Access to the SDK and API documentation 1311

GUI Setup **1314**

GUI Setup on Groups **1316**

GUI Setup for Users **1320**

GUI Setup Recommended Practices to Restrict Context and Workspace **1322**

Prerequisites 1322

Recommendations 1322

Use Cases 1324

Case 1 1324

Case 2 1326

Log for Users and Groups **1331**

Web UI User Impersonation Setup and Reporting **1333**

Value Generators **1337**

Creating a Value Generator Configuration Type 1338

Algorithm Value Generator **1342**

Prerequisites 1342

Configuring Business Functions to Generate a Value 1343

Configuring a Business Function to Release a Value 1346

Configuring an Algorithm Generator 1347

Configuring a Business Action to Generate / Release Values 1349

List Value Generator **1351**

Configuring a List Value Generator 1351

Importing Values into the List Value Generator 1352

Configuring Business Actions for a List Value Generator 1354

Sequence Value Generator **1357**

Configuring a Sequence Value Generator 1357

Configuring Business Actions for a Sequence Value Generator 1358

Wiki Metadata (Data Catalog Connector) **1361**

Setup Requirements 1361

Additional Information 1361

Initial Setup for Wiki Metadata **1362**

Testing Wiki Metadata 1363

Creating Wiki Metadata Pages **1364**

Bulk Wiki Page Creation 1364

Editing Wiki Metadata Pages **1366**

Viewing Wiki Metadata Pages from Workbench **1369**

Viewing Wiki Metadata Pages from Web UI **1372**

Workspaces **1376**

Standard Workspaces 1377

Considerations 1377

Maintaining Workspaces **1378**

Creating Workspaces 1378

Workspace Log 1378

Deleting Workspaces 1378

System Setup

The System Setup documentation describes the primary configuration elements of the STEP system. Topics in this section primarily deal with functions used by STEP system administrators.

Prerequisites

The guide assumes the following:

- Users are familiar with the **Getting Started** documentation.
- Users have read the **Platform and Software Support** requirements.
- Users have attended or have taken the **MDM Solution Fundamentals** training course.

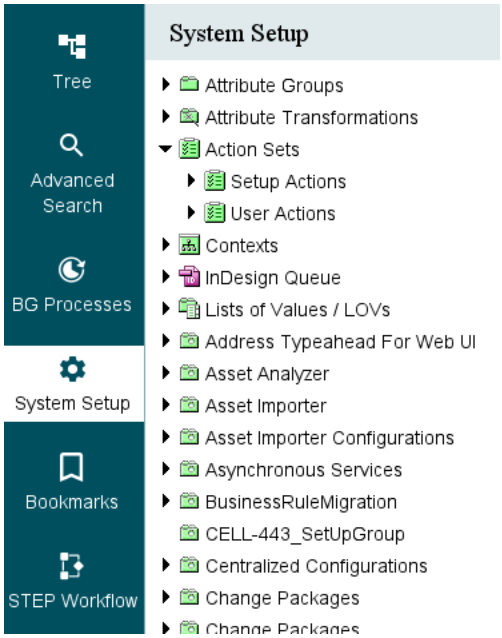
Accessing Shortcut Menus on PC and Mac

You can access shortcut menus by right-clicking on both PC and Mac if you are using a two button mouse. If you are working on a Mac with a one-button mouse, use CTRL-click to access the shortcut menu. This guide uses the term right-click.

Action Sets

Action Sets are used to define the actions or privileges a user or group of users are permitted to perform. Actions are grouped into Action Sets and made available for User Groups under the Users & Groups setup area. For more information, refer to the Users and Groups topic.

Action Sets are maintained in System Setup > **Action Sets**.



Whereas an Action represents a single operation (such as create product, move product, delete product, or view product), an Action Set is a group of actions that contains the set of operations that are necessary to perform one or more tasks. In other words, Action Sets are based on roles and general functions.

An example Action Set could be:

Action Set	Operations
Maintain Products	○ Create Products ○ Move Products ○ Delete Products ○ View Products

The available types of Action Sets include:

1. **Setup Actions:** Actions related to system configuration or system setup. Setup Actions generally define actions that can be performed in the System Setup tab. Many of these actions are considered administrator functions, but some of them may be required for non-administrator users, depending upon what functionality is required for their user roles.

   To maintain Setup Actions easier, it is recommended to create a Setup Action Set for each role, and add the minimum actions needed for that role. For example, when working with workflows, if there are workflows that are to be used only by a subset of roles, create setup groups for each workflow and adjust setup privileges for the concerned roles, using a Setup Action dedicated to workflow privileges. For more information, refer to the **Setup Actions and Error Descriptions** topic.

2. **User Actions:** Actions related to data maintenance. User Actions generally define actions for end users working in the Tree hierarchy and/or Web UI. Nearly all User Actions will fall into a 'general function' category:

   - Approve
   - Classify
   - Create
   - Delete
   - Modify
   - View

Depending upon the user role you are trying to create, it will be necessary to create a combination of Action Set types to facilitate the functions of that role. That is, you may need to create both a 'User Actions' action set and a 'Setup Actions' action set so the user has access to all of the functionality required to perform their specified tasks. For more information, refer to the User Actions and Error Descriptions topic.

For information on how to create strong User Action sets that make maintenance easier, refer to the Creating Strong User Action Sets topic.

Recommendations for Action Sets

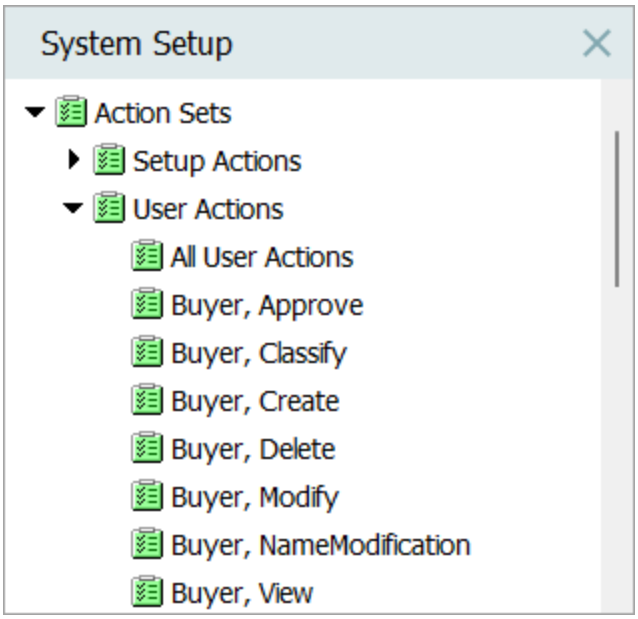
When defining a strategy for Action Sets, design a flexible structure with future maintenance in mind, considering requirements may change in the future. One way to accomplish this is to use separate User Action sets for Approve, Classify, Create, Delete, Modify, and View for each pre-defined user role

- Design for change
- Group by 'general functions' of User Actions (Approve, Classify, Create, Delete, Modify, and View)
- Maintenance is easier without affecting other user roles when each role has its own set of role-based User Action Sets
- Maintain like User Actions in groups with other similarly-named User Actions (Example: Actions starting with 'View' in an Action Set labeled with 'View')
- Use separate attribute groups used for User Privileges across different user roles, because one role may change when the other should not

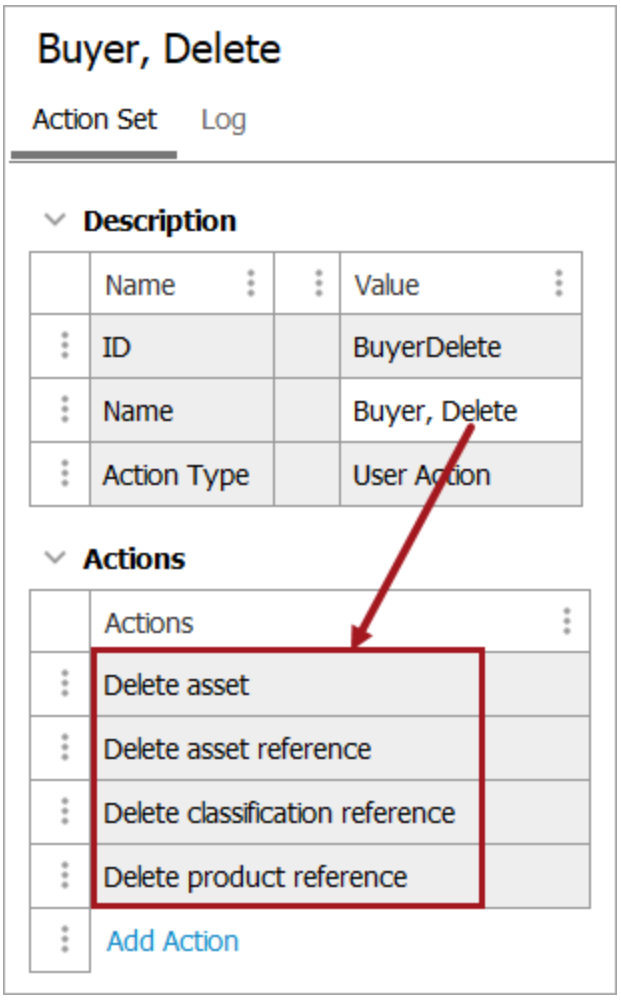
Creating Strong User Action Sets

The following information lists how to create strong User Action Sets that will make maintenance easier, as defined in the Maintaining Action Sets topic.

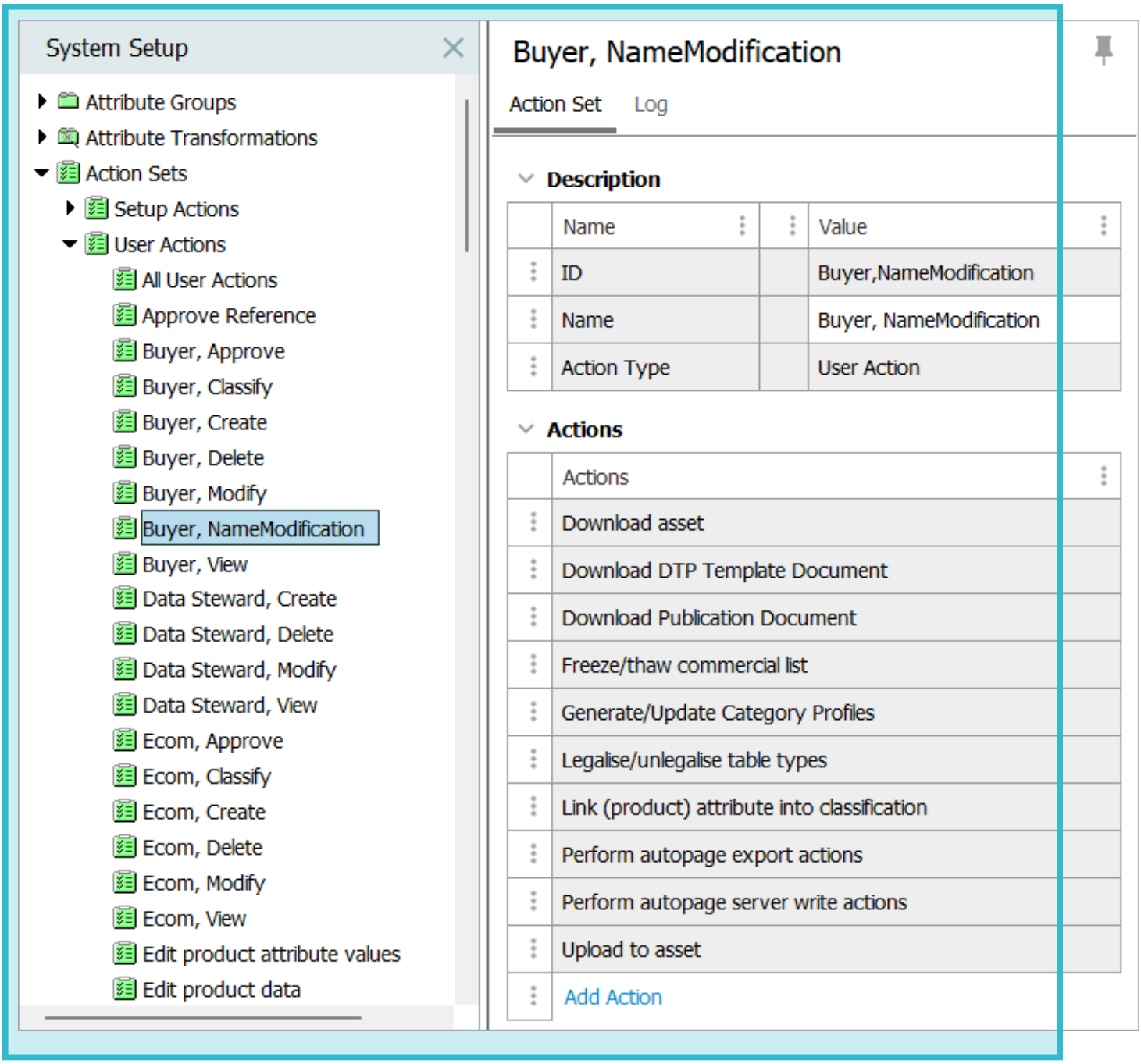
- For each role, create one User Action set per general function, and create only the User Action sets that are needed for the role. For example, a user who works in marketing as someone who approves projects would have the ability to approve, modify, and view approve projects, but would not be able to create new projects. For that reason, they would only have the approve, modify, and view User Action sets created for their role.



- Add all of the allowable actions of the chosen function (either 'Create,' 'Modify,' 'Delete,' or 'View') to the same action set. Since the object types are specified in each privilege rule, add the same actions for assets, products, and classifications to the same group. In the example below, the 'Delete,' action is being created for the Buyer role, and because privilege rules specify object type, a number of the various 'Delete' object types have been added.



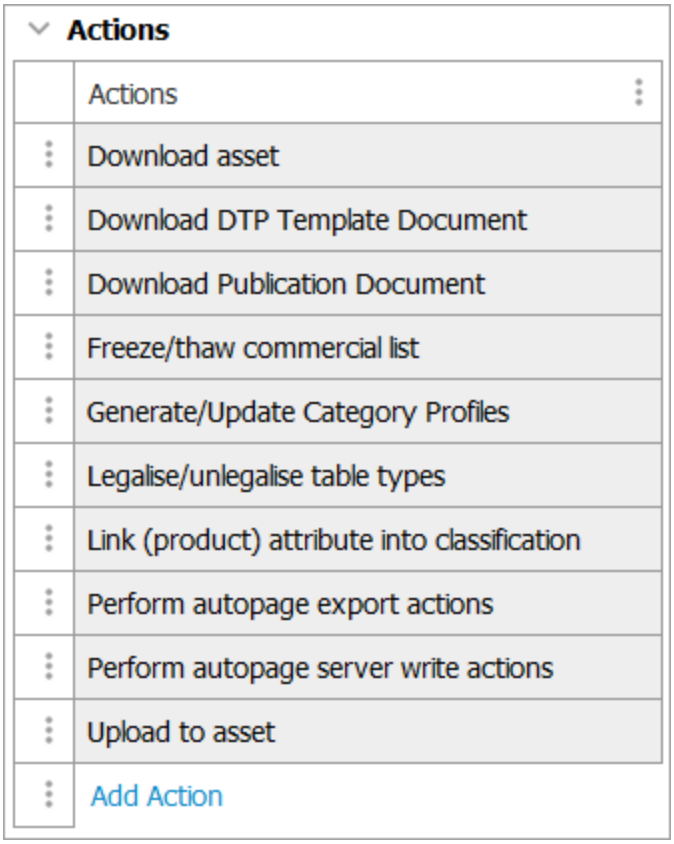
Note: For 'Name' on assets, products, entities, and classifications, it is recommended to create a stand-alone action set, as customers often do not allow users to make changes or modifications to names.



Important: Include only actions for license components obtained on the system.

- There are a few exceptions to alignment between action sets and actions names or labels. If any of these User Actions are needed, use the intent of the action and knowledge of the business requirements to group User Actions that start with a different word than the six listed above. For example, 'Download asset' may be considered a 'View' User Action and 'Upload to asset' may be considered a 'Create' or 'Modify' User Action.

Be consistent across Action Sets when deciding where to group them.



- Download asset
- Download DTP Template Document
- Download Publication Document
- Freeze/thaw commercial list
- Generate/Update Category Profiles
- Legalise/unlegalise table types
- Link (product) attribute into classification
- Perform autopage export actions
- Perform autopage server write actions
- Upload to asset

Setup Actions and Error Descriptions

Setup actions grant users the privileges to view and maintain (create, edit, and delete) the object or task in question. These actions can be added to Action Sets, as defined in the Action Sets topic.

Important: At a minimum, all users must be granted the '**View context**' privilege to log in to STEP.

All visible actions shown to users are for the global system. Some actions are related to licenses that may not be applicable to your system.

When a user is not privileged to perform an action, the BGP Execution Report includes an error like the following:

> Attribute 1: User running import wasn't privileged to do a certain action on attribute with ID 'NUM' at position 29, Attribute 1: The user 'WUSER' is not privileged to add the Attribute 'NUM' to attribute group 'FABDISMedia'. User: WUSER is not permitted to do: ATTRIBUTE_GROUP_ADD_ATTRIBUTE(6210)

The action that is not permitted (ATTRIBUTE_GROUP_ADD_ATTRIBUTE in this example) is included in the following tables in the **Privilege Error Text** column and is related to the **Action** column ('Add attribute to attribute group' in this example). Choose one of the following options to resolve an error:

1. In workbench, add the related privilege action from the **Action** column to the group of the user identified in the error.
2. Have a user from a group with the required privilege run the action.

The error may also be included in the step logs, based on the selected level of logging set in the sharedconfig.properties file, as defined in the Logs topic in the Administration Portal documentation.

Additional information for import errors is included in the Import Error Messages topic of the Data Exchange documentation.

Note: It is important to note that the action sets work together. As an example, in addition to the actions listed below for Integration Endpoints, you also need the following actions described in other areas of this topic: Access Workbench, View Background Processes of Other Users, View context, and View setup group. Review the entire set to verify all privileges are set up if you or other users are not seeing what you expect in the system.

Action Sets

Action	Privileges Granted	Privilege Error Text
Maintain action sets (create, delete, add to, remove from)	• Create action sets	MAINTAIN_ACTION_SETS

Action	Privileges Granted	Privilege Error Text
	• Delete action sets • Add actions to action sets • Remove actions from action sets	

Administration

Action	Privileges Granted	Privilege Error Text
System Administration	Ability to maintain configuration properties, prepare and deploy Extension API extensions, retrieve the STEP system status, and restart the STEP system via the remote system administration REST API. This functionality is only allowed for Stibo Systems SaaS environments. **Important:** The 'System Administration' privilege should only be given to trusted system administration users.	System Administration
View Administration	Ability to access the System Administration pages from the Start Page.	VIEW_ ADMINISTRATION
View System Setup Logs	Ability to view the System Setup Log and Workspace Log (available from View menu Logs option in the workbench) and the Log tab (available in the editor on most System Setup objects). Without this privilege, the System Setup Log option in the View menu Logs option menu is grayed out, and the Log tab is not visible on System Setup objects.	VIEW_SYSTEM_ SETUP_LOGS

Assets

Action	Privileges Granted	Privilege Error Text
Modify dimension dependency of all assets	Set dimension dependency of asset object types:	ASSET_MODIFY_ DIMENSION_DEP

Action	Privileges Granted	Privilege Error Text
	• Add dimension to asset • Remove dimension from asset	
Push Asset	Ability to push assets from within the Tree.	ASSET_PUSH

Attributes

The actions concerning domains are also needed for LOV maintenance.

Action	Privileges Granted	Privilege Error Text
Add attribute to attribute group	Ability to add to and create attributes in attribute groups. **Note:** The 'Create product attribute' action must also be added before users can add attributes to attribute groups.	ATTRIBUTE_ GROUP_ADD_ ATTRIBUTE
Create attribute group	Ability to create attribute groups. **Note:** The action 'Modify name/description of attribute group (also translate)' must also be added before users can create attribute groups.	ATTRIBUTE_ GROUP_CREATE
Create product attribute	Ability to create: • attributes, the actions 'Add attribute to attribute group' and 'Modify definition of product attribute (domain and default unit)' must also be added. • LOV attributes, the actions 'Create domain' and 'Modify definition of domain (validator, etc.)' must also be added.	NORMAL_ ATTRIBUTE_ CREATE
Delete attribute group	Ability to delete attribute groups.	ATTRIBUTE_ GROUP_DELETE
Delete product attribute	Ability to delete:	NORMAL_

Action	Privileges Granted	Privilege Error Text
	• attributes, 'Delete attribute' global privilege must be added. • LOV attributes, the action 'Delete domain' must also be added.	ATTRIBUTE_ DELETE
Maintain validation templates	Create a validation template (validation base type) for attributes and LOVs.	MAINTAIN_ VALIDATION_ TEMPLATES
Remove attribute from attribute group	Ability to remove (unlink) attributes that are linked to other attribute groups as well as add attributes to a group.	ATTRIBUTE_ GROUP_ REMOVE_ ATTRIBUTE
Merge product attributes	Ability to merge attributes.	NORMAL_ ATTRIBUTE_ MERGE
Modify definition of product attribute (domain and default unit)	• Set and edit the validation base type of attributes • Edit the type of attributes (specification and description) • Modify filters on LOV attributes **Note:** The 'Create product attribute' action must also be added to set validation of attributes.	NORMAL_ ATTRIBUTE_ MODIFY_ DEFINITION
Modify dimension dependency of product attribute	Edit the dimension dependencies of attributes.	NORMAL_ ATTRIBUTE_ MODIFY_ DIMENSION_DEP
Modify metadata for product attribute (property value) (also translate)	• Edit values of description attributes linked to attributes • Translate description attribute values linked to attributes	NORMAL_ ATTRIBUTE_ MODIFY_ METADATA
Modify name/description	• Edit the name of attribute groups	ATTRIBUTE_

Action	Privileges Granted	Privilege Error Text
of attribute group (also translate)	• Translate the name and values in attribute groups	GROUP_MODIFY_CONTEXT_NAME
Modify name/description of product attribute (also translate)	• Edit names of attributes • Translate name and values in attributes **Note:** The 'Modify name/description of domain (also translate)' action must also be added to create LOV attributes.	NORMAL_ATTRIBUTE_MODIFY_CONTEXT_NAME
Modify valid (node) types for product attribute	Set the object types for which the attributes should be valid.	NORMAL_ATTRIBUTE_MODIFY_VALID_TYPES
View attribute	Ability to view attributes.	VIEW_ATTRIBUTE
View attribute group	Ability to view attribute groups. The 'View attribute group' action must be added for users to maintain attributes.	VIEW_ATTRIBUTE_GROUP
View metadata for attribute (property value)	View values of description attributes linked to an attribute.	VIEW_ATTRIBUTE_METADATA

Background Processes

Action	Privileges Granted	Privilege Error Text
Delete background-processes	Delete queued, started, and ended background processes.	DELETE_BACKGROUND_PROCESSES
View Background Processes of Other Users	In workbench, while displaying other users' processes via the show all button ( ) , the user can view and download files from	VIEW_BACKGROUND_PROCESSES_

Action	Privileges Granted	Privilege Error Text
	background processes started by any other user. In Web UI, the user can view and download files from the background processes they started. For users without this privilege: • in the workbench, the show all button ( ) on the BG Processes tab is disabled. (For details, refer to the 'BG Processes Displayed' section in the BG Processes Tab topic of the Getting Started documentation.) • in the workbench and Web UI, processes started by other users are not visible • no IIEPs, OIEPs, and event queues are visible (Gateway integration endpoints are visible since they do not have associated background processes.)	OF_OTHER_ USERS

Bulk Updates

Action	Privileges Granted	Privilege Error Text
Perform Bulk Update	Ability to run or schedule a Bulk Update from the File menu.	PERFORM_BULK_ UPDATE

Business Modules

Action	Privileges Granted	Privilege Error Text
Install Business Modules	Activates the Business Module Manager option on the File menu and enables the ability to install business modules that have been activated by Stibo Systems.	Install Business Modules

Business Rules

Action	Privileges Granted	Privilege Error Text
Maintain business-rule	Create, maintain, and delete business rules.	Maintain business-rule

Change Packages

Action	Privileges Granted	Privilege Error Text
Maintain change package	Grants all privileges for change packages, including creation of a change package, deletion, Start Impact Analysis, Updates, and Seal Package.	MAINTAIN_ CHANGE_ PACKAGE
View change package	Grants the privilege to view change packages from the System Setup tab.	VIEW_ CHANGE_ PACKAGE

Contexts

Action	Privileges Granted	Privilege Error Text
Maintain dimensions and contexts	Create and delete dimensions, dimension points, and contexts.	MAINTAIN_DIMENSIONS_ AND_CONTEXTS

Cryptographic Keys

Action	Privileges Granted	Privilege Error Text
Maintain cryptographic keys	Create or delete cryptographic keys and change their passwords.	MAINTAIN_ CRYPTOGRAPHIC_KEYS

Data Quality

Action	Privileges Granted	Privilege Error Text
Maintain unique keys	• Create new keys • Edit existing keys • Activate, deactivate, check, and delete keys	MAINTAIN_UNIQUE_KEYS
Maintain Value Generator	• Create new value generator • Edit value generator • Run value generator	Maintain Value Generator
Modify unique key value	Update locked attribute values used in unique keys.	MODIFY_UNIQUE_KEY_ VALUE

Deduplication

Action	Privileges Granted	Privilege Error Text
Maintain Deduplication Configurations	Create, maintain, and delete 'Match Codes and Matching Algorithms' and maintain deduplication configuration options.	Maintain Deduplication Configurations
Maintain Possible Duplicates	Maintain, merge, and delete possible duplicates.	Maintain Possible Duplicates

Events

Action	Privileges Granted	Privilege Error Text
Maintain Event Processor	• Set up or delete an Event Processor • Enable an Event Processor • Disable an Event Processor • Purge events	MAINTAIN_EVENT_ PROCESSOR

Action	Privileges Granted	Privilege Error Text
	• Publish events	
Maintain event queues	Add, modify, or delete event queues. Removal of this action hides the Event Queues root in System Setup.	MAINTAIN_ EVENTQUEUES
View Event Processor	View event processors.	VIEW_EVENT_ PROCESSOR

Integration Endpoints

Action	Privileges Granted	Privilege Error Text
Maintain Derived Event Types	Configure and maintain derived events. If Maintain Derived Event Types is disabled, there is no option to add one.	MAINTAIN_ DERIVED_ EVENT
Maintain Integration Endpoint	Create, delete, enable, disable, and invoke integration endpoints. Users must also have the 'View Integration Endpoint' privilege to maintain an integration endpoint.	MAINTAIN_ INTEGRATION_ ENDPOINT
View Integration Endpoint	Ability to view integration endpoints.	VIEW_ INTEGRATION_ ENDPOINT

JavaScript

Action	Privileges Granted	Privilege Error Text
Test JavaScript	Allows the user to test JavaScript via the dedicated test endpoints. For more information, refer to the VCSI: Editable Business Rules Format topic in the Configuration Management documentation and the Technical Documentation accessible at [system]/sdk or from the system Start Page.	Test JavaScript

Link Types

Action	Privileges Granted	Privilege Error Text
Maintain Link Type	• Create and delete reference types and product to classification link types • Modify reference types and product to classification link types • Apply description attributes to link types • Set dimension dependencies of link types **Note:** To apply description attributes to link types, these actions are also needed: • View attribute • View attribute group • Modify valid (node) types for product attribute	MAINTAIN_LINK_TYPE

List of Values (LOVs)

Action	Privileges Granted	Privilege Error Text
Create domain	Ability to create LOVs. **Note:** The actions 'Modify name/description of domain (also translate)' and 'Modify definition of domain (validator, etc.)' must also be included to create LOVs.	DOMAIN_CREATE
Create value in hard domain	Create values in LOVs where users are not allowed to add values ('hard' LOVs).	VALUE_CREATE_IN_H_DOMAIN
Create value in medium domain	Create values in LOVs where users are allowed to add values ('medium' LOVs).	VALUE_CREATE_IN_M_DOMAIN
Delete domain	Ability to delete LOVs.	DOMAIN_

Action	Privileges Granted	Privilege Error Text
		DELETE
Delete value in hard/medium domain	Delete values in both types of LOVs: • Where users are not allowed to add values ('hard' LOVs) • Where users are allowed to add values ('medium' LOVs)	VALUE_ DELETE_IN_ HM_DOMAIN
Maintain domain groups	Create and delete LOV groups.	MAINTAIN_ DOMAIN_ GROUPS
Merge entire domain	Ability to merge LOVs.	DOMAIN_ MERGE_ ENTIRE
Merge value in hard/medium domain	Merge values in both types of LOVs: ◦ Where users are not allowed to add values ('hard' LOVs) ◦ Where users are allowed to add values ('medium' LOVs)	VALUE_ MERGE_IN_ HM_DOMAIN
Modify definition of domain (validator, etc.)	Set and edit the validation base type of LOVs. **Note:** The 'Create domain' action must also be added to set validation of LOVs.	DOMAIN_ MODIFY_ DEFINITION
Modify dimension dependency of domain	Edit the dimension dependencies of LOVs.	DOMAIN_ MODIFY_ DIMENSION_ DEP
Modify name/description of domain (also translate)	• Edit name of LOVs • Translate names and values in LOVs	DOMAIN_ MODIFY_ CONTEXT_ NAME
Modify value in hard/medium domain (also translate)	Edit values in both types of LOVs (including the privilege to translate): • Where users are not allowed to add values ('hard' LOVs)	VALUE_ MODIFY_IN_ HM_DOMAIN

Action	Privileges Granted	Privilege Error Text
	• Where users are allowed to add values ('medium' LOVs)	
View domain	Ability to view LOVs. **Note:** The 'View domain' action must be added to maintain LOVs.	VIEW_ DOMAIN
View metadata for domain (property value)	View values of description attributes linked to an LOV.	VIEW_ DOMAIN_ METADATA

Object Types

Action	Privileges Granted	Privilege Error Text
Maintain Data Container Type	Create a data container type.	MAINTAIN_ DATA_ CONTAINER_ TYPE
Maintain Setup Entity	Create a configuration labeled as a 'Setup Entity'. Examples: Completeness Metric, Elasticsearch Configuration, Asset Importer Configuration Type. Refer to the 'Setup Entity' entry in the STEP Terminology topic of the Getting Started documentation.	MAINTAIN_ SETUP_ ENTITY
Maintain setup group	Create a Setup Group Root from the Maintain menu, Insert option, Setup Group Root... option.	MAINTAIN_ SETUP_ GROUP
Maintain system setups	Ability to maintain options under the System Setting tab located on the 'Users & Groups' node in System Setup.	MAINTAIN_ SYSTEM_ SETUP
Maintain type hierarchy (node	• Create object types • Delete object types • 'Save export as template' privilege in Web UI	MAINTAIN_ USER_ TYPES

Action	Privileges Granted	Privilege Error Text
types)	To link attributes to object types, these actions are also needed: • View attribute • View attribute group • Modify valid (node) types for product attribute	
View Data Container Type	View a data container type.	VIEW_DATA_CONTAINER_TYPE
View Setup Entity	View an Entity Root and object type. Example: Completeness Metric.	VIEW_SETUP_ENTITY

Print Publication

Action	Privileges Granted	Privilege Error Text
Maintain promotional pricing	Deprecated	MAINTAIN_PROMOTIONAL_PRICING
Modify frozen publication	Modify a frozen publication. This action is only used with the 'Publishing - Freeze' component model.	MODIFY_FROZEN_PUBLICATION

Purging

Action	Privileges Granted	Privilege Error Text
Empty recycle bin	Ability to delete contents of the Recycle Bin. In case the Recycle Bin contains objects that exist in more than one workspace, users must also have the 'Force Delete and Purge' action enabled to remove those objects.	EMPTY_RECYCLE_BIN
Force	Ability to force purge objects that exist in more than one workspace and objects	FORCE_

Action	Privileges Granted	Privilege Error Text
Delete and Purge	with events triggered. The action enables the 'Force Purge' button in the Empty Recycle Bin background process and the 'Force Delete and Purge' action in the Maintain menu.	DELETE_ AND_ PURGE
Purge revisions	Ability to delete obsolete revisions: • Single revisions • Specified range of revisions, global purging	PURGE_ REVISIONS

Reports

Action	Privileges Granted	Privilege Error Text
Run Reports	Allows users to run reports (including starting a reports background process) from File > Reports in the workbench. Without this privilege, the Reports option in the workbench File menu is grayed out.	RUN_ REPORTS

SDK / API Documentation

Action	Privileges Granted	Privilege Error Text
View SDK Documentation	Ability to view the SDK / API documentation from server/sdk and the Technical Documentation accessible at [system]/sdk or from the system Start Page.	VIEW_SDK_ DOCUMENTATION

Tables

Action	Privileges Granted	Privilege Error Text
Modify table settings	Ability to maintain table settings on table types, row types, column types, rules / line styles, and colors.	MODIFY_TABLE_ SETTINGS
View table types	Allows users to view tables and table types.	VIEW_TABLE_ TYPES

Tags

Action	Privileges Granted	Privilege Error Text
Maintain Tags	• Maintain style tags, special characters, character tags, footnotes, and hyperlinks • Maintain tag groups	MAINTAIN_ TAGS
Use tag	Use tags in the rich text editor, table editor, and in table transformations. To restrict certain users to using certain tags, you must create a tag group that contains these tags and link this tag group into an attribute group. In the User Group editor, the attribute group is applied together with the action set that contains the 'Use tag' action. Users belonging to the user group will only be allowed to use the tags in the tag group linked into the attribute group.	USE_TAG

Units

Action	Privileges Granted	Privilege Error Text
Maintain units	• Create unit groups, units, and unit conversion rules • Edit unit groups, units, and unit conversion rules • Delete unit groups, units, and unit conversion rules	MAINTAIN_ UNITS
View unit	Ability to view units. This is used when linking units to attributes. **Note:** The 'View unit' action must be included to use the 'Maintain units' action	VIEW_UNIT

Users & Groups and Privilege Rules

Action	Privileges Granted	Privilege Error Text
Maintain privilege rules (create,	• Create privilege rules for user groups • Edit privilege rules for user groups	MAINTAIN_ PRIVILEGES

Action	Privileges Granted	Privilege Error Text
delete, modify)	• Delete privilege rules for user groups **Note:** To maintain privilege rules, the action 'Maintain action sets (create, delete, add to, and remove from)' is also needed.	
Maintain users and groups	• Create users and user groups • Duplicate and copy users and user groups • Delete users and user groups	MAINTAIN_ USERS_ AND_ GROUPS
Maintain user password	Ability to change and reset user passwords by displaying the Change User Password link on a User Editor in workbench. Refer to the Changing a User Password topic.	MAINTAIN_ USER_ PASSWORD
Share user settings	Limits whether or not a user can share their user configured views in Web UI.	SHARE_ USER_ SETTINGS

Value Search

Action	Privileges Granted	Privilege Error Text
Enable Value Search/Values in typeahead	Ability to search for attribute values within attributes	VIEW_VALUE_TYPEAHEAD_ AND_SEARCH

Web UI

Action	Privileges Granted	Privilege Error Text
Access Web UI	Ability to access Web UIs on the system. Access to specific Web UI instances can be granted if a Setup Group is defined in the user (group) Setup Privileges, otherwise, this action allows access to ALL Web UI instances on the server.	ACCESS_WEB_ UI
Maintain	Ability to impersonate another user for Web UI support purposes	MAINTAIN_

Action	Privileges Granted	Privilege Error Text
Impersonation		IMPERSONATION
Update Web UI configuration	Access to modify and configure any Web UI	PORTAL_ UPDATE
View context	In addition to granting access to the workbench, 'View context' also grants the ability to access the Web UI.	VIEW_CONTEXT
Web UI Administration	Grants the ability to: • Revert / copy to front • Delete action context menu • Duplicate action context menu • Status tab • Edit Web UI through designer • Edit Web UI through Workbench • Change Web UI ID in the XML	PORTAL_ADMIN

Workbench

Action	Privileges Granted	Privilege Error Text
Access Workbench	Ability to access all the workbench links on the Start Page.	ACCESS_WORKBENCH

Workflows

Action	Privileges Granted	Privilege Error Text
Disable STEP Workflow Auto-initiation in	Ability to disable auto-initiation when importing data	STEP_ WORKFLOW_ DISABLE_

Action	Privileges Granted	Privilege Error Text
Imports		IMPORT_AUTO_INITIATION
Initiate Item in STEP Workflow	Ability to start workflows via the Object context menu and via bulk update. It does not have any impact on auto-initiation. The action can be applied to a setup group and will then only take effect for workflows in that setup group.	STEP_WORKFLOW_INITIATE_ITEM
Maintain STEP Workflow	Ability to create, delete, cut, copy, duplicate, export, and edit workflows. The action can be applied to a setup group and will then only take effect for workflows in that setup group. Users must also have the 'View setup group' privilege to view and maintain workflows.	MAINTAIN_STEP_WORKFLOW
Maintain STEP Workflow Profile	Edit, create, and delete workflow profiles. The action can be applied to a setup group and will then only take effect for workflow profiles in that setup group. Users must also have the 'View STEP Workflow Profile' privilege to access workflow profiles.	MAINTAIN_STEP_WORKFLOW_PROFILE
Remove Item from STEP Workflow	Ability to remove objects from workflows via the Object context menu or the workflow context menu. The action can be applied to a setup group and will then only take effect for workflows in that setup group.	STEP_WORKFLOW_REMOVE_ITEM
STEP Workflow Administrator	• View other users' tasks • Complete / submit tasks not assigned to the current user • Reassign tasks • Edit task deadlines The action can be applied to a setup group and will then only take effect for workflows in that setup group.	STEP_WORKFLOW_ADMINISTRATOR
View STEP Workflow Profile	View workflow profiles. If a user does not have this action, the STEP Workflow navigator tab sub tab 'Profile' will not be displayed. The action can be applied to a setup group and will then only take effect for workflow profiles in that setup group.	VIEW_STEP_WORKFLOW_PROFILE

Action	Privileges Granted	Privilege Error Text
View and use STEP Workflow	View and use workflows. The action can be applied to a setup group and will then only take effect for Workflows in that setup group. It is required to also have the 'View setup group' privilege to view workflows.	VIEW_AND_USE_STEPWORKFLOW
View setup group	Necessary for users to view workflow tasks	VIEW_SETUP_GROUP
View STEP Workflow Advanced tab	This action grants the privilege to view the 'Advanced' STEP Workflow navigator tab sub tab. It is required to also have the 'View setup group' privilege to view workflows.	STEP_WORKFLOW_VIEW_ADVANCED
View tasks assigned to other users in my group(s)	Allows users to view all assigned tasks in all groups in which they are a member. This privilege differs from what is currently provided by the 'STEP Workflow Administrator' setup action in that the 'STEP Workflow Administrator' setup action allows users to view all tasks across all groups.	View tasks assigned to other users in my group (s)

Workspaces

Action	Privileges Granted	Privilege Error Text
Maintain workspaces	Create and delete workspaces	MAINTAIN_WORKSPACES

User Actions and Error Descriptions

Once actions are added to a User Action Set, they are assigned to a user group via the Privilege Rules tab on a user group within the Users & Groups node of System Setup.

Note: All visible actions shown to users are for the global system. Some actions are related to licenses that may not be applicable to your particular system.

Before creating User Action sets, review what makes a strong User Action set that is also easier to maintain by referring to the **Create Strong User Action Sets** topic in this documentation.

When a user is not privileged to perform an action, the BGP Execution Report includes an error like the following:

> User running import wasn't privileged to do a certain action on product with ID '20859' at position 39, Product 2: User 'UserJ' does not have the privilege to create product with ID '1999789'. User: UserJ is not permitted to do: PRODUCT_CREATE on: "20859" for qualifiers: ContextQualifierPredicate: com.stibo.core.domain.impl.ContextImpl: Context1

The action that is not permitted (PRODUCT_CREATE in this example) is included in the following tables in the **Privilege Error Text** column and is related to the **Action** column ('Create product' in this example). Chose one of the following options to resolve an error:

1. In workbench, add the related privilege action from the **Action** column to the group of the user identified in the error.
2. Have a user from a group with the required privilege run the action.

The error may also be included in the step logs, based on the selected level of logging set in the sharedconfig.properties file, as defined in the **Logs** topic in the **Administrator Portal** documentation.

Refer to the **Import Error Messages** topic in the **Data Exchange** documentation.

Assets

Maintain actions for assets allow users to maintain (create, edit, delete) images and documents, image and document references, and description attributes that display on these objects. The relevant **View** actions must be included to maintain these objects.

Action	Privileges Granted	Privilege Error Text
Approve Create	Approve the creation of assets.	APPROVE_ CREATE

Action	Privileges Granted	Privilege Error Text
Approve Modify	Approve the modification of assets. Examples of modifications: moving an object in the hierarchy; changes to products, assets, classifications, tables names, asset content, attribute links, product override relations, deletions, and DTP template linking.	APPROVE_ MODIFY
Approve References	Approve reference links from products, i.e., links from products to products, links from products to assets, and links from products to classifications.	APPROVE_ REFERENCES
Approve Values	Approve the modification of specification and description attribute values of products and assets. This privilege is also subject to the attribute group setting of Privilege Rules on user groups. For example, if a user only has the privilege to approve attributes in a determined attribute group, this user can only approve certain attributes of a product or asset. Also, approving table values depends on the attribute group setting of the Privilege Rules on user groups.	APPROVE_ VALUES
Classify asset (link asset to classification)	Link images and documents to classifications.	CLASSIFICATION_ ASSET_LINK_ CREATE
Create asset	• Create image or document name (placeholder) • Change object type of images and documents • Duplicate images and documents **Note:** The action 'Modify name/description of asset (also translate)' must be included in order to create images and documents.	ASSET_CREATE
Create asset reference	Create product and classification to image / document references and image / document to classification references.	ASSET_ REFERENCE_ CREATE
Declassify asset (unlink asset from	Delete links from assets to classifications.	CLASSIFICATION_ ASSET_LINK_ DELETE

Action	Privileges Granted	Privilege Error Text
classification)		
Delete asset	Delete assets of specified object types.	ASSET_DELETE
Delete asset reference	Remove product and classification to image / document references and image / document to classification references.	ASSET_ REFERENCE_ DELETE
Download asset	Export assets to hard disk.	ASSET_ DOWNLOAD
Modify metadata for asset (property value) (also translate)	Edit and translate values of description attributes linked to assets.	ASSET_MODIFY_ METADATA
Modify metadata for asset reference (link attribute value) (also translate)	Edit and translate description attribute values on asset references.	ASSET_ REFERENCE_ MODIFY_ METADATA
Modify name/description of asset (also translate)	• Edit names of assets • Translate name and metadata attribute values of images and documents	ASSET_MODIFY_ CONTEXT_NAME
Upload to asset	• Import assets to classifications • Replace contents of assets In order to import and replace images and documents, these setup actions must be added to the privileges: • Create value in medium domain • Modify value in hard/medium domain	ASSET_UPLOAD
View asset	View assets. **Note:** The 'View asset' action must be added in order to work with images and documents. To make any of the view actions	VIEW_ASSET

Action	Privileges Granted	Privilege Error Text
	listed below have an effect, the 'View asset' privilege must be a part of the action set. For instance, if the action 'View asset reference' is added and not 'View asset,' the user will not be able to access the image or document and therefore not the references either.	
View Asset reference	View the product to image and document references.	VIEW_ASSET_REFERENCE
View metadata for asset (property value)	View the values of description attributes linked to assets.	VIEW_ASSET_METADATA
View metadata for asset reference (link attribute value)	View description attribute values on asset references. These attributes will display on all product to image or document references on the specified valid asset object types.	VIEW_ASSET_REFERENCE_METADATA

Collections

User actions for collections allow users to view, delete, and create.

Action	Privileges Granted	Privilege Error Text
Create Collection	Create collections.	COLLECTION_CREATE
Create Collection Group	Create collection groups.	COLLECTIONGROUP_CREATE
Delete Collection	Delete collections.	COLLECTION_DELETE
Delete Collection Group	Delete collection groups.	COLLECTIONGROUP_DELETE
View Collection	View collections.	COLLECTION_VIEW
View Collection Group	View collection groups.	COLLECTIONGROUP_VIEW

Commercial Lists

User actions for commercial lists allow users to view, delete, create, and maintain terms lists / prices. The user actions for commercial lists can be applied to publications or eCatalogs.

Action	Privileges Granted	Privilege Error Text
Create Commercial List	Create commercial terms lists of any type.	Create Commercial List
Delete Commercial List	Delete commercial terms lists of any type.	Delete Commercial List
Freeze/thaw commercial list	Enable and disable 'Immutable' status of commercial terms lists.	Commercial list immutability
Modify Commercial Data	Modify the individual terms in commercial terms lists of any type. This action does not grant access to import data. In order to import commercial terms values, the 'Create Commercial List' action is needed.	Modify Commercial Data
Modify Commercial List Name	Provide names for commercial terms lists.	Modify Commercial List Name
Modify Metadata Value Commercial List	Modify metadata attribute values on commercial terms lists.	Modify Metadata Value Commercial List
View Commercial Data	View commercial terms lists of any type.	View Commercial Data
View Metadata Value for Commercial List	View metadata attribute values on commercial terms lists.	View Metadata Value for Commercial List

Data Preparation Functionality

User actions for data preparation functionality allow users to run list processing.

Action	Privileges Granted	Privilege Error Text
Run List Processing	Access to the list processing functionality.	Run List Processing

Data Quality Functionality

User actions for data quality functionality allow users to configure, modify, and generate the available DQ profiles.

Action	Privileges Granted	Privilege Error Text
Generate/Update Category Profiles	Generate and update Category Profiles.	Generate/Update Category Profiles
Merge Products	Merge confirmed duplicates.	Merge Objects
Modify Profile Configuration	Modify the information shown in the Category Profile tab.	Modify Profile Configuration
View Category Profile	View the Category Profile tab on products.	View Category Profile

eCatalog

User actions for eCatalog allow users to create, modify, and view.

Action	Privileges Granted	Privilege Error Text
Modify eCatalog Configuration	Modify eCatalog configurations.	Modify eCatalog Configuration
Modify eCatalog Metadata	Modify the metadata attributes on eCatalogs (Currency, Default Start Date, Default End Date, etc.). Must have 'View eCatalog Metadata' before 'Modify eCatalog Metadata' is enabled.	'Modify eCatalog Metadata **Note:** The single quote mark at the beginning of this text is included in the error.
View eCatalog Metadata	View the metadata attributes on eCatalogs.	'View eCatalog Metadata **Note:** The single quote mark at the

Action	Privileges Granted	Privilege Error Text
		beginning of this text is included in the error.

GDSN Data Pools

User actions required for GDSN data pools.

Action	Privileges Granted	Privilege Error Text
Create context reference	Create a reference type that relates a target market to a context.	CONTEXT_ REFERENCE_CREATE
Delete context reference	Delete a reference type that relates a target market to a context.	CONTEXT_ REFERENCE_DELTE
Maintain GDSN publications	Maintain GDSN publications.	N/A
Maintain GDSN registrations	Maintain GDSN registrations.	N/A
Maintain packaging hierarchy	Remove and add items in the packaging hierarchy.	Maintain packaging hierarchy
Modify metadata for context reference (link attribute value) (also translate)	Modify a reference type that relates a target market to a context.	CONTEXT_ REFERENCE_MODIFY_ METADATA
Send CIC	Send a CIC manually or set up the system to send a CIC automatically.	N/A
View packaging hierarchy	View the packaging hierarchy.	N/A

Products, Classifications, and Entities

Maintain actions for **products** allow users to maintain (create, edit, delete) products, product references, description attributes, and specification attributes in the Tree and the Editor.

Maintain actions for **classifications** allow users to maintain (create, edit, delete) classifications, classification references, description attributes, and specification attributes in the Tree and the Editor.

Note: The relevant **View** actions must be included in order to maintain these objects.

Action	Privileges Granted	Privilege Error Text
Approve Classification Product Links	Approve product classification links.	APPROVE_ CLASSIFICATION_ PRODUCT_LINKS
Approve Create	Approve the creation of classifications, products, and assets.	APPROVE_ CREATE
Approve Data Containers	Approve the modification of data containers.	APPROVE_DATA_ CONTAINERS
Approve Modify	Approve the modification of classifications, products, and assets. Examples of modifications: moving an object in the hierarchy; changes to products, images and documents, classifications, tables names, asset content, attribute links, product override relations, deletions, and DTP template linking.	APPROVE_ MODIFY
Approve References	Approve reference links from products, i.e., links from products to products, links from products to assets, and links from products to classifications.	APPROVE_ REFERENCES
Approve Values	Approve the modification of specification and description attribute values of products and assets. This privilege is also subject to the attribute group setting of Privilege Rules on user groups. For example, if a user only has the privilege to approve attributes in a determined attribute group, this user can only approve certain attributes of a product or asset. Also, approving table values depends on the attribute group setting of the Privileges Rules on user groups.	APPROVE_ VALUES
Classify product (link product to classification)	Link products to classifications.	CLASSIFICATION_ PRODUCT_LINK_ CREATE
Create classification	Create and duplicate classifications of specified object types. **Note:** The action 'Modify name/description of classification (also translate)' must be included in order to create classifications.	CLASSIFICATION_ CREATE

Action	Privileges Granted	Privilege Error Text
Create classification reference	Create classification references.	CLASSIFICATION_REFERENCE_CREATE
Create data container	Adds the 'Add Data Container' action.	DATA_CONTAINER_CREATE
Create entity	Create, change, and duplicate entities. **Note:** The action 'Modify name/description of entity (also translate)' must be included to create entities.	ENTITY_CREATE
Create entity reference	Create entity references.	ENTITY_REFERENCE_CREATE
Create product	• Create products of specified product object types • Change object types of specified products • Duplicate products The action 'Modify name/description of product (also translate)' must be included in order to create products.	PRODUCT_CREATE
Create product reference	Create product to product references.	PRODUCT_REFERENCE_CREATE
Declassify product (unlink product from classification)	Unlink products from classifications.	CLASSIFICATION_PRODUCT_LINK_DELETE
Delete classification	Delete classifications of specified object types.	CLASSIFICATION_DELETE
Delete classification reference	Delete classification references.	CLASSIFICATION_REFERENCE_DELETE

Action	Privileges Granted	Privilege Error Text
Delete data container	Allows the user to delete a data container.	DATA_ CONTAINER_ DELETE
Delete entity	Ability to delete entities.	ENTITY_DELETE
Delete entity reference	Delete entity references	ENTITY_ REFERENCE_ DELETE
Delete product	Delete products of specified object types.	PRODUCT_ DELETE
Delete product reference	Delete product to product references.	PRODUCT_ REFERENCE_ DELETE
Edit Data Container Key Values	Allows the user to edit data container keys within a data container after the data container keys are assigned. **Important:** It is recommended that only select admin users have the 'Edit Data Container Key Values' privilege added to their user profile and that this privilege be used sparingly.	Edit Data Container Key Values
Edit tables	Create and maintain tables in classification and product editors.	EDIT_TABLES
Legalise/unlegalise table types	Ability to legalize tables on classifications and products. 'Legalise/Unlegalise Table Types' does not grant a privilege to also create and maintain tables. This privilege is covered in the action 'Edit tables'.	LEGALISE_ UNLEGALISE_ TABLE_TYPES
Link (product) attribute into classification	Link specification attributes to classifications and products.	CLASSIFICATION_ ATTRIBUTE_ LINK_CREATE
Modify metadata for attribute to classification link (also translate)	Edit and translate description attribute values on specification attributes linked to classifications or products.	CLASSIFICATION_ ATTRIBUTE_ LINK_MODIFY_ METADATA

Action	Privileges Granted	Privilege Error Text
Modify metadata for product (property value) (also translate)	Edit and translate the values of description attributes linked to a product.	PRODUCT_ MODIFY_ METADATA
Modify metadata for classification (property value) (also translate)	Modify the metadata for classifications.	CLASSIFICATION_ MODIFY_ METADATA
Modify metadata for classification reference (link value) (also translate)	Modify the metadata for classification references.	CLASSIFICATION_ REFERENCE_ MODIFY_ METADATA
Modify metadata for data container (property value) (also translate)	Edit description attribute values on data container attributes.	DATA_ CONTAINER_ MODIFY_ METADATA
Modify metadata for entity (property value) (also translate)	Modify the metadata for entities.	ENTITY_MODIFY_ METADATA
Modify metadata for entity reference (link attribute value) (also translate)	Modify the metadata for entity references.	ENTITY_ REFERENCE_ MODIFY_ METADATA
Modify metadata for product classification (link value) (also translate)	Edit and translate description attribute values on attributes linked to products. These attributes will display on all specification attributes that are linked to specified valid product object types.	CLASSIFICATION_ PRODUCT_LINK_ MODIFY_ METADATA
Modify metadata for product	Edit description attribute values on product to product references (including privilege to translate).	PRODUCT_ REFERENCE_ MODIFY_

Action	Privileges Granted	Privilege Error Text
reference (link attribute value) (also translate)	These attributes will display on all product to product references on the specified valid product object types.	METADATA
Modify name/description of classification (also translate)	• Edit names of classifications • Translate names and values in classifications	CLASSIFICATION_ MODIFY_ CONTEXT_NAME
Modify name/description of product (also translate)	• Edit names of products • Translate names and values in products	PRODUCT_ MODIFY_ CONTEXT_NAME
Modify product attribute value (also translate)	Edit and translate values of specification attributes linked to products.	MODIFY_ PRODUCT_ ATTRIBUTE_ VALUE
Modify name/description of entity (also translate)	• Edit the name of an entity • Translate name and values in entities	ENTITY_MODIFY_ CONTEXT_NAME
Modify sub-product list of product-override	Modify, add, and delete sub-products of a product override.	MODIFY_ SUBPRODUCT_ LIST_OF_ PRODOR
Move classification from	Move classification nodes by copying / pasting or dragging / dropping classifications from another classification node within the same object type hierarchy. The 'Move classification to' Action must also be applied.	CLASSIFICATION_ MOVE_FROM
Move classification to	Move classification nodes by copying and pasting classifications to another product node. The 'Move classification from' Action must also be applied.	CLASSIFICATION_ MOVE_TO
Move entity from	Copy and paste entities from another entity node within the	ENTITY_MOVE_

Action	Privileges Granted	Privilege Error Text
	same object type hierarchy. The 'Move entity to' action must also be applied.	FROM
Move entity to	Copy and paste entities to another entity node. The 'Move entity from' action must also be applied.	ENTITY_MOVE_TO
Move product from	Copy / paste and drag / drop products from another product node within the same object type hierarchy. The 'Move product to' action must also be applied.	PRODUCT_MOVE_FROM
Move product to	Copy / paste and drag / drop products to another product node. The 'Move product from' action must also be applied.	PRODUCT_MOVE_TO
Unlink (product) attribute from classification	Remove the link to specification attributes from classifications and products.	CLASSIFICATION_ATTRIBUTE_LINK_DELETE
View attribute to classification link	View the link to specification attributes from classifications and products.	VIEW_ATTRIBUTE_VALIDATION
View classification	Ability to view the classification nodes in the classification hierarchy. **Note:** The 'View classification' action must be added to work with classifications. To make any view action have an effect, the 'View classification' privilege must be a part of the action set. For example: If the action 'View classification reference' is added and not the 'View classification' action, the user will not be able to access the classification and therefore not the references either.	VIEW_CLASSIFICATION
View classification reference	View classification references.	VIEW_CLASSIFICATION_REFERENCE

Action	Privileges Granted	Privilege Error Text
View data container	Allows the ability to view existing data containers on entity objects.	VIEW_DATA_CONTAINER
View entity	Ability to view entities. The 'View entity' action must be added to be able to work with entities. To make any of the view actions listed below have an effect, the 'View entity' privilege must be a part of the action set.	VIEW_ENTITY
View entity reference	View entity references.	VIEW_ENTITY_REFERENCE
View metadata for attribute to classification link (link attribute value)	View description attribute values that have been applied to the reference between the classification or product and the attribute. These attributes will display for all specification attributes that are linked to specified valid classification and product object types.	VIEW_CLASSIFICATION_ATTRIBUTE_LINK_METADATA
View metadata for classification (property value)	View values of description attributes linked to a classification.	VIEW_CLASSIFICATION_METADATA
View metadata for classification reference (link attribute value)	View description attribute values that have been applied to the reference link from the classification. These attributes will display on all classification to classification references on the specified valid classification object types.	VIEW_CLASSIFICATION_REFERENCE_METADATA
View metadata for entity reference (link attribute value)	View link attribute values of attributes that have been applied to the reference type entities. These attributes will display on all specification attributes that are linked to specified valid entity object type.	VIEW_ENTITY_REFERENCE_METADATA
View metadata for data container (property value)	View description attribute values for data container attributes.	VIEW_DATA_CONTAINER_METADATA
View metadata for entity (property value)	View values of description attributes linked to an entity.	VIEW_ENTITY_METADATA

Action	Privileges Granted	Privilege Error Text
View metadata for product classification (link attribute value)	View link attribute values of attributes that have been applied to the link type product attribute validation. These attributes will display on all specification attributes that are linked to specified valid classification object type.	VIEW_CLASSIFICATION_PRODUCT_LINK_METADATA
View metadata for product reference (link attribute value)	View link attribute values of attributes that have been applied to the link type marker edge product. These attributes will display on all specification attribute to product references on the specified valid product object type.	VIEW_PRODUCT_REFERENCE_METADATA
View metadata for product (property value)	View values of description attributes linked to a product.	VIEW_PRODUCT_METADATA
View product	View the product nodes. The 'View product' action must be added in order to work with products. To make any of the view actions listed below have an effect, the 'View product' privilege must be a part of the action set. For example, if the action 'View product attribute value' is added and not the 'View product' action, the user will not be able to access the product and therefore not the attribute values either. This user action gives access to view products both when used for privilege rules applied to a product or applied to a classification. In the latter case, the user action will give access to view products linked in below the classification.	VIEW_PRODUCT
View product attribute value	View the values of specification attributes linked to products.	VIEW_PRODUCT_ATTRIBUTE_VALUE
View product reference	View product to product references.	VIEW_PRODUCT_REFERENCE

Publications

Having user actions for publications allows users to view, delete, create, and maintain publications as well as additional object (node) types used for publications, including publication groups, sections, versions, and planned pages.

Action	Privileges Granted	Privilege Error Text
Create DTP Template Document	Create product templates, page templates, and publication templates (master documents).	Create DTP Template Document
Create Generic Page Template	Create page templates.	Create Generic Page Template
Create Planned Page	Add planned pages into sections.	Create Planned Page
Create Publication	Create publications.	Create PUBLICATION_ CREATE
Create Publication Document	Save mounted (actual) InDesign pages back to STEP.	Create Publication Document
Create Publication Group	Create publication groups.	Create Publication Group
Create Publication Section	Create publication sections.	Create Publication Section
Create Version	Create publication versions.	Create Version
Delete DTP Template Document	Delete product templates, page templates, and publication templates (master documents).	Delete DTP Template Document
Delete Generic Page Template	Delete page templates.	Delete Generic Page Template
Delete Planned Page	Delete planned pages.	Delete Planned Page
Delete Publication	Delete publications.	Delete PUBLICATION_ DELETE
Delete Publication Document	Delete actual pages.	Delete Publication Document
Delete Publication Group	Delete publication groups.	Delete Publication Group

Action	Privileges Granted	Privilege Error Text
Delete Publication Section	Delete publication sections.	Delete Publication Section
Delete Version	Delete publication versions.	Delete Version
Download DTP Template Document	Download product templates, page templates, and publication templates (master documents).	Download DTP Template Document
Download Publication Document	Download actual pages.	Download Publication Document
Import Planned Page	Import planned pages.	Import Planned Page
Maintain Flatplan Content	Change the object assigned to an existing frame.	FLATPLANNER_ MAINTAIN_ CONTENT
Maintain Flatplan Frame	Add, move, delete, and resize frames.	FLATPLANNER_ MAINTAIN_FRAME
Maintain public basket view	Maintain public Flatplanner basket views.	Maintain public basket view
Maintain public financial view	Maintain public Financial Summary views (Print Flatplanner).	Maintain public financial view
Maintain public publication planner view	Maintain public Publication Planner views (Print Flatplanner).	Maintain public publication planner view
Maintain public stickerbook view	Maintain public Sticker Book views (Print Flatplanner).	Maintain public stickerbook view
Manage autopage objects	Manage AutoPage objects.	MANAGE_ AUTOPAGE_ OBJECTS
Manage layout in page inspector	Manage layouts in page inspector (Print AutoPage).	MANAGE_ AUTOPAGE_ LAYOUT

Action	Privileges Granted	Privilege Error Text
Manage pagination rules	Manage pagination rules.	MANAGE_ PAGINATION_ RULES
Modify Basket for Planned Page	Modify Flatplanner baskets at the planned page level.	Modify Basket For Planned Page
Modify Basket for Publication	Modify baskets at the publication level.	Modify Basket PUBLICATION_ MODIFY
Modify Basket for Publication Section	Modify baskets at the section level.	Modify Basket for Publication Section
Modify DTP Template Document	Modify existing product templates, page templates, and publication templates (master documents).	Modify DTP Template Document
Modify Generic Page Template	Modify page templates.	Modify Generic Page Template
Modify Planned Page	Add products or images to planned pages. The following menu actions are also controlled by this privilege: • Set page templates on planned pages • Reuse saved layouts • Stop workflows • Split spreads • Add notes • Remove notes	Modify Planned Page
Modify Publication	Link products and images into publications.	Modify PUBLICATION_ MODIFY
Modify Publication Document	Modify actual pages and insert notes on actual pages	Modify Publication Document

Action	Privileges Granted	Privilege Error Text
Modify Publication Group	Modify the name and object type of publication groups	Modify Publication Group
Modify Publication Section	Add objects to the Flatplanner basket on section nodes.	Modify Publication Section
Modify Version	• Set version as master • Set context and workspace for a version • Set commercial list for a version	Modify Version
Perform autopage export actions	Perform AutoPage export actions.	PERFORM_ AUTOPAGE_READ
Perform autopage server write actions	Perform AutoPage server write actions.	PERFORM_ AUTOPAGE_WRITE
Reorder Planned Pages	Reorder planned pages.	Reorder Planned Pages
View DTP Template Document	View publication templates (master documents), product templates, and page templates.	View DTP Template Document
View Generic Page Template	View page templates.	View Generic Page Template
View Planned Page	View planned pages.	View Planned Page
View Publication	View publications.	View Publication
View Publication Document	View actual pages. **Note:** An actual page is the same thing as a mounted page—a page saved back to STEP from InDesign.	View Publication Document
View Publication Group	View publication groups.	View Publication Group
View Publication Section	View publication sections.	View Publication Section

Action	Privileges Granted	Privilege Error Text
View queued events	View queued events, (Asset push event queues).	View queued events
View Version	View publication versions.	View Version

Translations

Users Action for Translations allows users to change the translation status, etc.

Action	Privileges Granted	Privilege Error Text
Change Translation	Use the Change Translation Setup and Change Translation Status functions.	CHANGE_ TRANSLATION

Web UI

Additional User Actions for specific to the Web UI.

Action	Privileges Granted	Privilege Error Text
Impersonate User	Impersonate a user in a targeted user group in order to troubleshoot issues.	N/A
Share search with group	Share saved searches with specific user groups.	SHARE_SEARCH_ WITH_GROUP
Supplier Web UI functions	Use the Supplier Web UI functions in a supplier item Web UI.	N/A

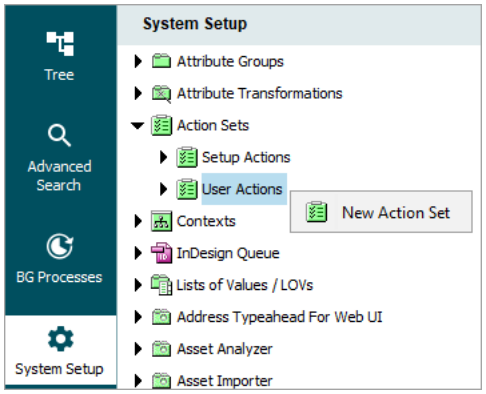
Maintaining Action Sets

An action set allows multiple actions to be added or removed as a group.

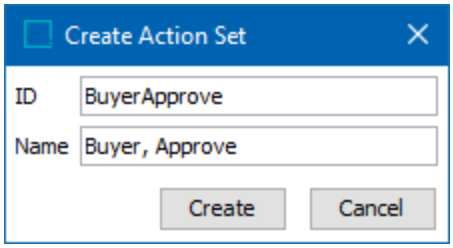
Creating an Action Set

Action Sets are created below either the Action Sets > Setup Actions or the Action Sets > User Actions node.

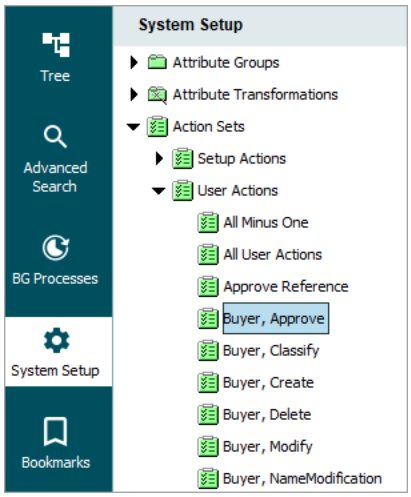
1. In System Setup, open the **Action Set** group and select the relevant main Action Sets folder.
2. Right-click, and then click **New Action Set** (or in the **Maintain** menu, point to **Insert** and then click **Action Set**).



A **Create Action Set** dialog box appears.



3. Type the ID and Name of the Action Set. In this example we will create a 'Buyer Approve' Action Set.
4. Click **Create**.

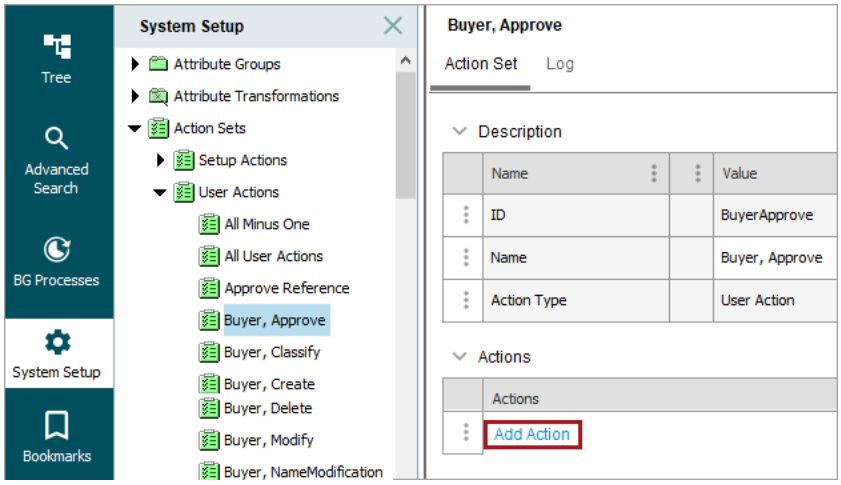


A new Action Set has now been created, and the next step will be to add the specific actions.

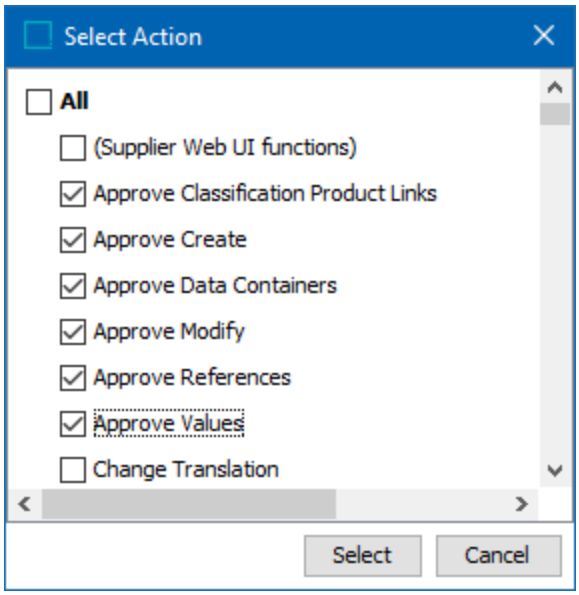
Adding Actions to an Action Set

Actions are added to the Set via the editor Add Action link.

1. In System Setup, open **Action Set**, and then open the relevant main Action Sets folder.
2. Select the relevant Action Set and the **Action Set** Editor appears.

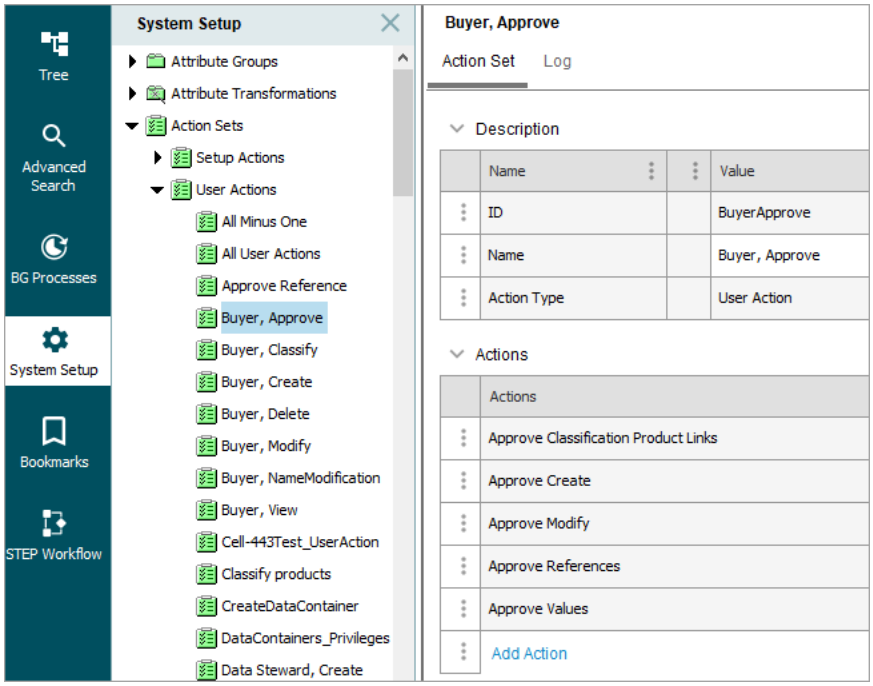


3. Under **Actions**, click **Add Action** and the **Select Action** dialog box appears.



4. Select all, or one or more actions by clicking the relevant check boxes.
5. Click **Select**.

   The selected action(s) appears under **Actions**.



The selected Action Set will now include the added action(s), and when an action set is assigned to a user group, the members will be able to perform all actions in the actions list.

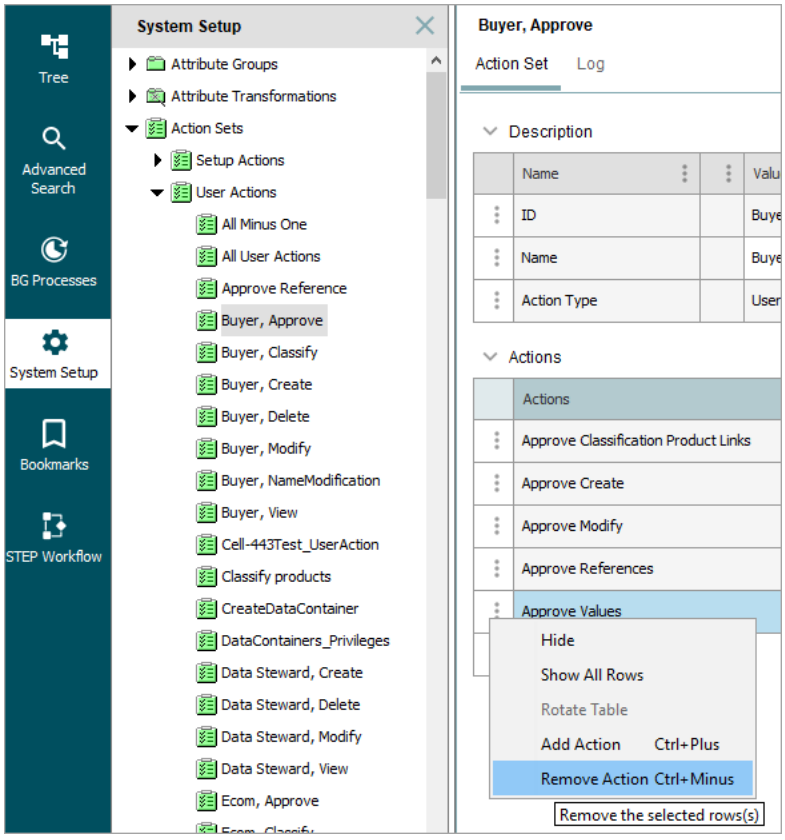
Editing and Removing Action Set

Sometimes it is necessary edit or remove action set because the role has changed. In this case:

- Remove the action(s) from the action set
- Remove an attribute or reference type from a group the action set has access to
- Remove a privilege rule completely

Remove actions

1. In System Setup, open **Action Set**, and then open the relevant main Action Sets folder.
2. Select the relevant Action Set and the **Action Set** Editor appears.
3. Under **Actions**, select the action to be removed from the Action Set.

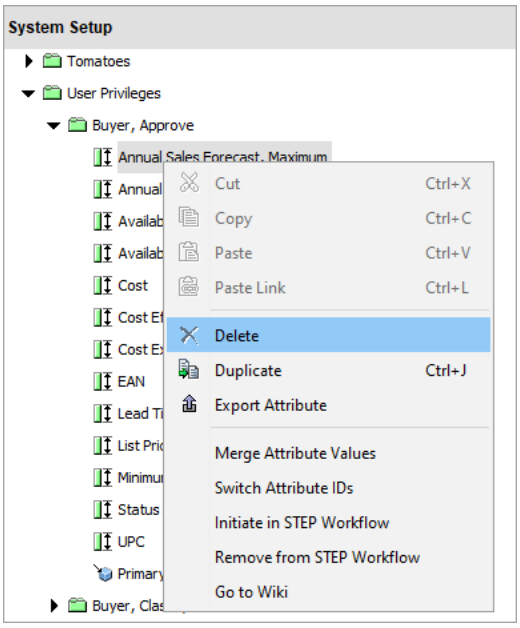


4. Press **Ctrl -** on the keyboard, or right-click the row header ellipses, and click **Remove Action**.

   An action has now been deleted from an Action Set. When a user group is assigned to this Action Set, the members will no longer be able to perform this specific action. Repeat these steps as needed.

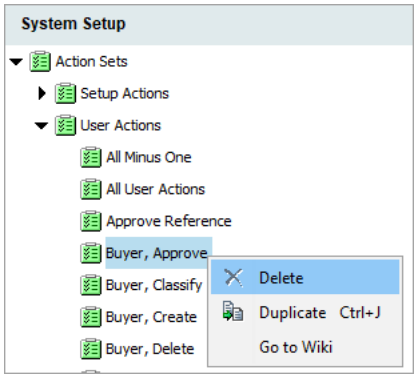
Remove a reference or attribute from an attribute group

1. In System Setup, open the desired attribute group.
2. Right-click on the reference or attribute that needs to be removed, and select **Delete**.



Remove a privilege rule completely

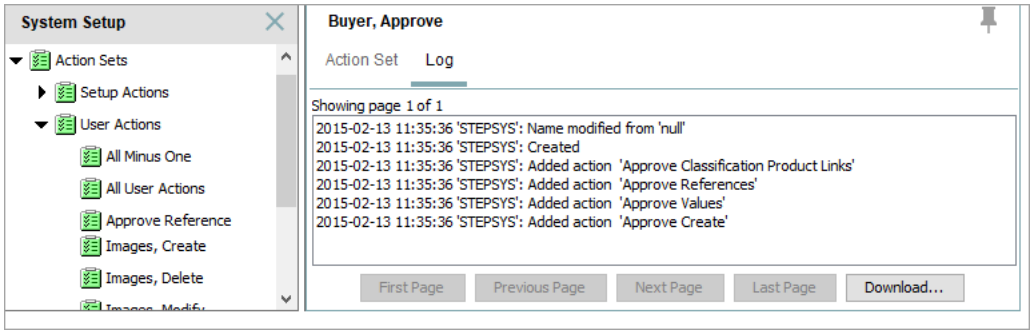
1. In System Setup, open **Action Set**, and then open the relevant main Action Sets folder.
2. Select the relevant Action Set, right-click on it, and select **Delete**.



Action Set Log Tab

Once an action set has been created, the Log tab will display specific details, including who created the action set, when the action set was created, and any changes that have taken place to the action set.

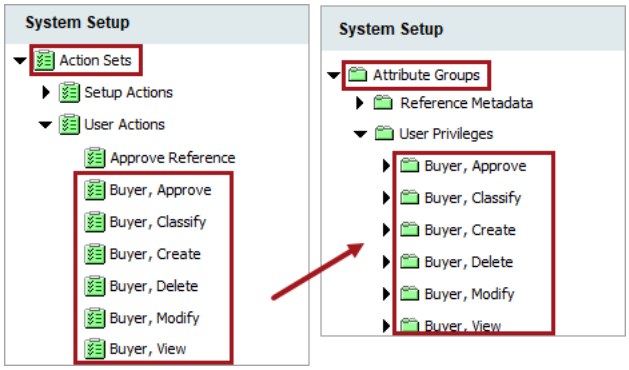
This information is essential for audit purposes, as well as aiding data stewards and/or system architects in setting up and updating the action sets.



Setting Up Attribute Groups for Action Sets

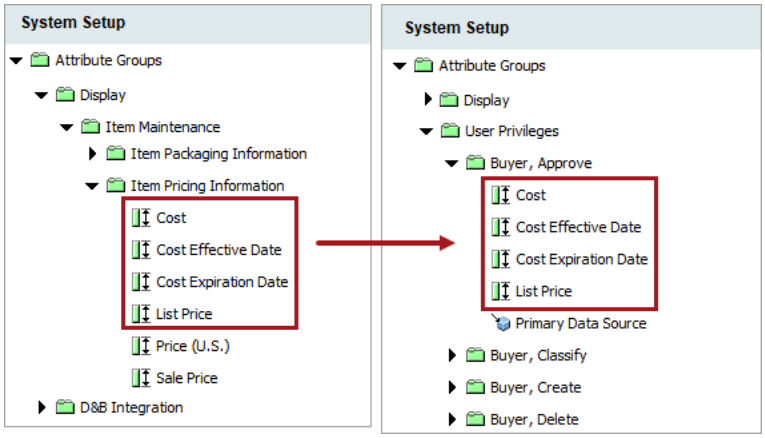
When creating attribute groups to be used with Action Sets, it is important to create the attribute group with a role and general function in mind. Whether this is for a user to enrich items, for a supplier to review items, etc., having an attribute group created specifically for a particular User Action group, creating a one-to-one correspondence, makes maintenance of the group easier.

Note: The exception is if the same role should have the same privileges for different nodes.



It is recommended practice to create only the attribute groups intended for user privilege application and action sets that are valid for the role.

For example, an administrator wants a user to update the 'Cost,' 'Cost Effective Date,' 'Cost Expiration Date,' and 'List Price' for products in the system. They do not want them to touch the 'Price (U.S.),' or the 'Sale Price' attribute for products in the system. The administrator creates the 'Buyer, Approve' attribute group created for user privilege application, links the needed attributes to this group, and applies the necessary user privileges to this group. Now the user is able to access only the necessary attributes to fulfill their role's requirements.



Note: Action sets align almost one-for-one with the attribute groups used for user privileges. The exception is in the case of the Images and Documents groups. For these, there are Action Sets for 'Classify' but no attribute groups for 'Classify.' This is because only attributes and reference types get linked into the attribute groups. With digital assets, there is not a reference type for the asset to classification link. In cases where there are classification reference types or product to classification Link types, create an attribute group for those reference types and link them in.

Setting up attribute groups this way aids in long term maintenance. If a certain role needs to start or stop doing an action, either:

- Add or remove the action(s) from the action set
- Add or remove an attribute or reference type from a group
- Add or remove a privilege rule completely

For more information on how to perform these tasks, refer to the **Maintaining Actions** topic in this documentation.

Considerations for Supplier Privilege Configuration

- If a supplier user is linked into multiple supplier groups, the supplier can review all of the supplier hierarchies that they are a member of.
- If products or assets are linked into a multiple supplier's hierarchies, the supplier will not be able to review them.

Users and Dimension(s)

If User Actions are restricted to a dimension, keep the following in mind:

- Users are only able to modify the dimension-dependent attribute values.
- Users are not able to modify values that have no dimension dependency.

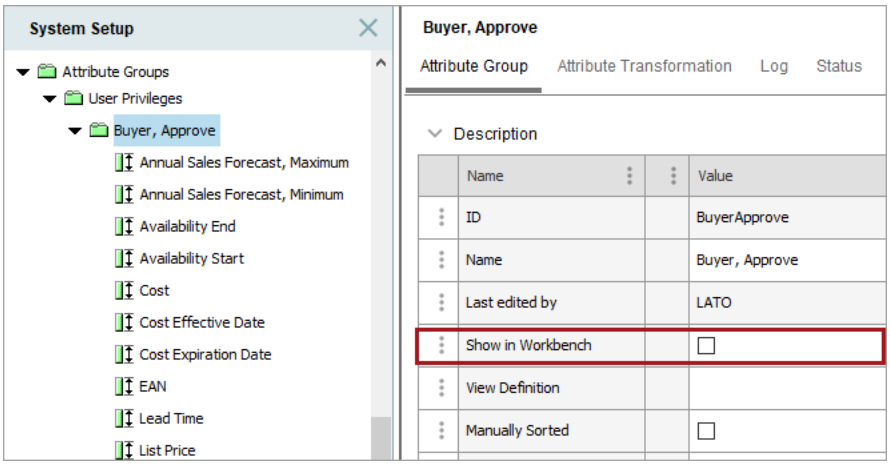
For more information on restricting actions using dimension points, refer to the Privilege Rules topic in the Users and Groups section of the System Setup documentation.

Creating Attributes Groups Specifically For Use with User Privileges

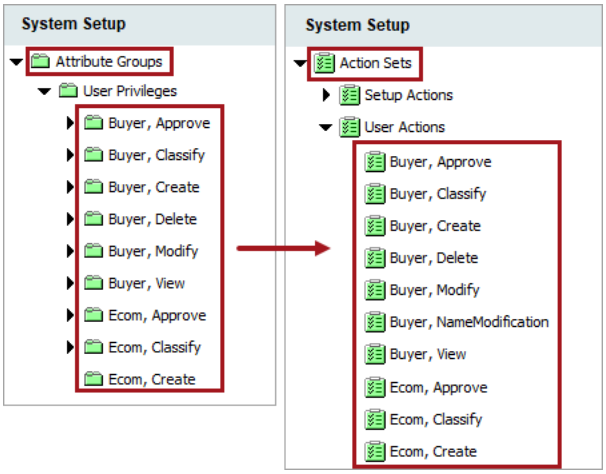
To create attributes groups specifically for use with user privileges, follow the example below.

In this example, the attribute groups and user privileges are being applied to products, but the same concept can be applied for suppliers.

1. Create attribute groups that will be used only for privileges.
2. Deselect the 'Show in workbench' field on the attribute group being created.

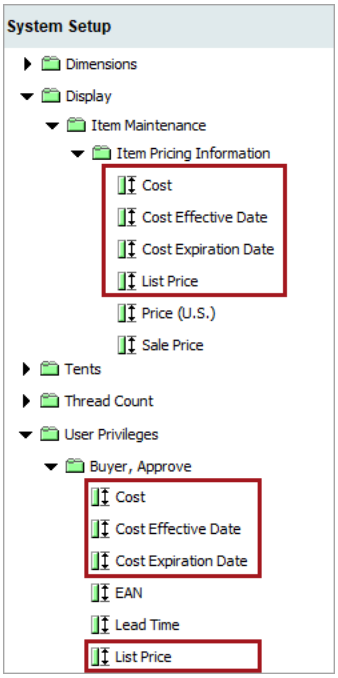


3. Create attribute groups that mirror the Action Sets for each role. Doing this eliminates the problem of trying to make attribute groups intended for display to align with privileges. Attribute groups planned for display were not intended for this use case.

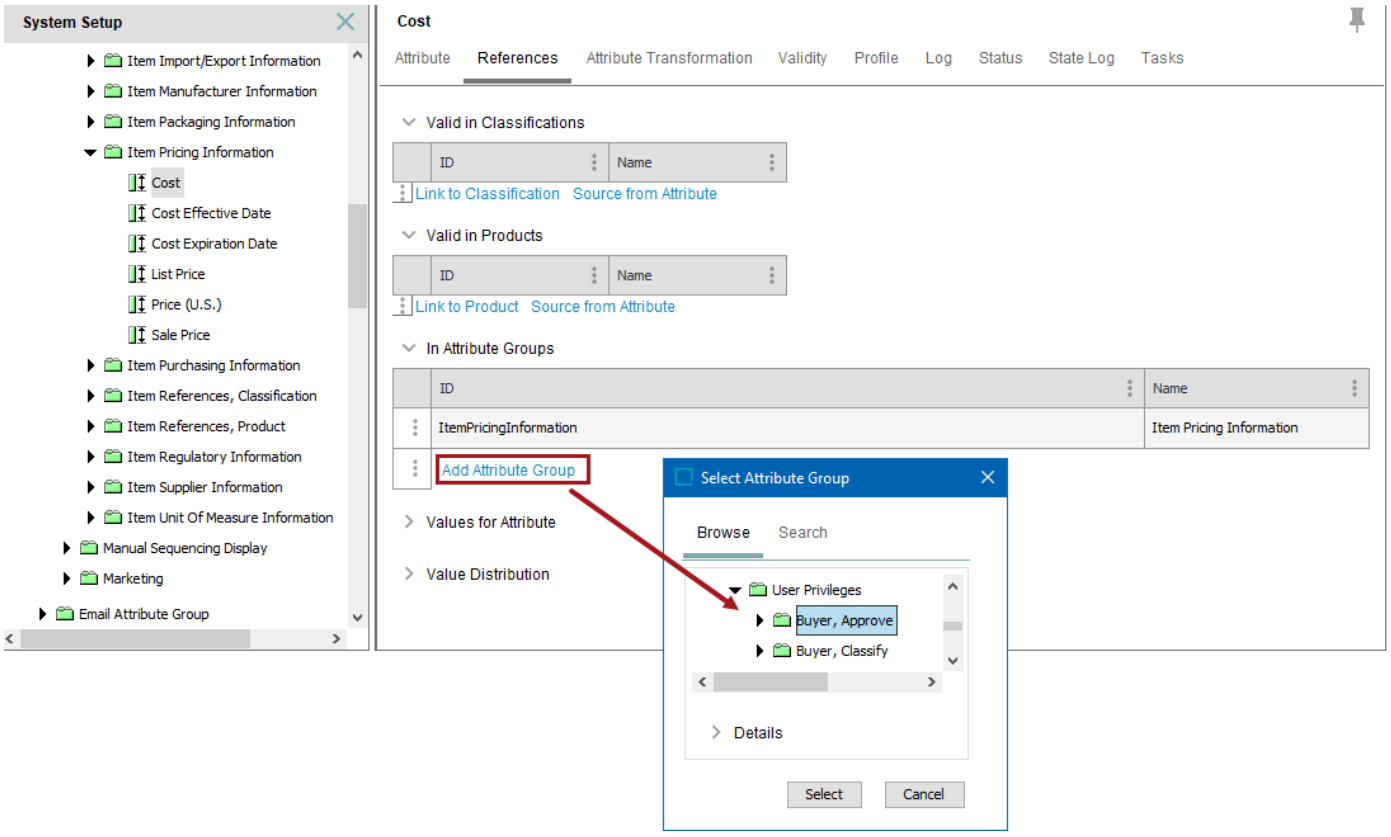


4. Link allowable attributes from their main groupings to the user privilege groupings. To do so, go to System Setup and either:

- Click on the desired attribute and drag it to the new attribute group that it should be a part of.



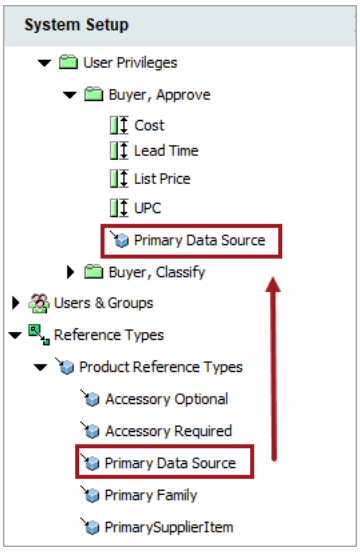
- Click on the desired attribute, go to the References tab, and under the 'In Attribute Group' flipper, click **Add Attribute Group**. Select the desired attribute group to add.



Note: Do not link the Category Specific attributes unless there really are restrictions within this group, since there are a great number of Category Specific attributes. Use separate privilege rule(s) to better handle Category Specific attributes and any sub-groups.

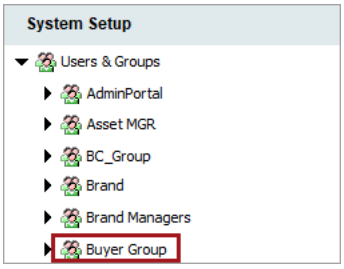
Important: In case of numerous attributes (e.g., if you use standards like ETIM and eCl@ss without merging attributes), be aware that working with groups with more than 10,000 attributes may cause performance issues when updating attribute links to groups. Also note that sub-groups can be defined for each user privilege group. Rules will apply to all attributes linked to sub-groups.

5. Link all allowable reference types to the user privilege attribute groups. For more information on how to link references to attribute groups, refer to the **Maintaining a Reference Type** topic in the **References and Link Types** section of the **System Setup** documentation.

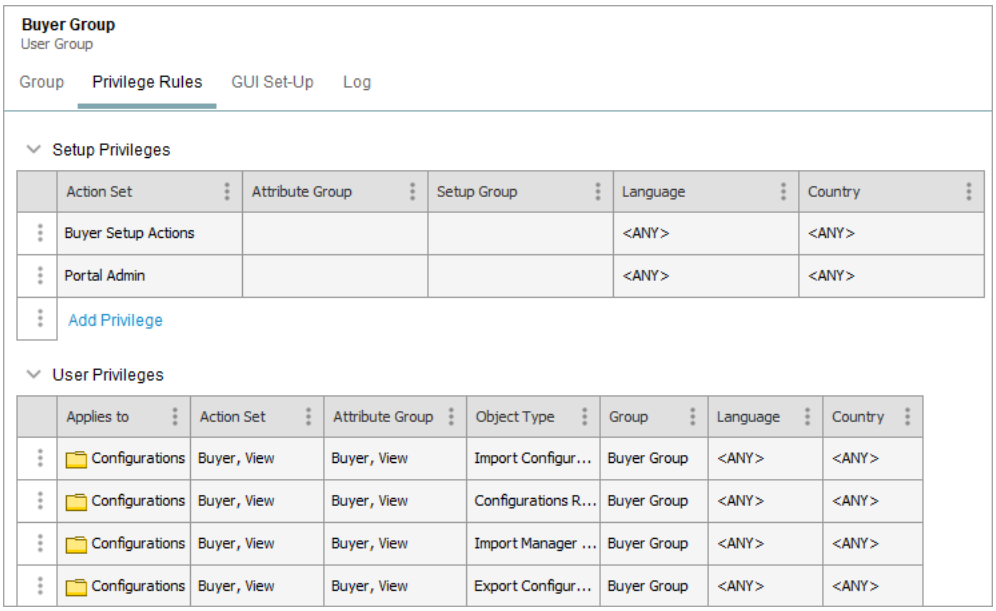


Note: Linking reference types to attribute groups using STEPXML as a template can save time. For more information on STEPXML, refer to the **STEPXML Format** topic in the **Data Formats** section of the **Data Exchange** documentation.

6. Go to the Users and Groups node, and click on the desired User Group. In this example, it is Buyer Group.



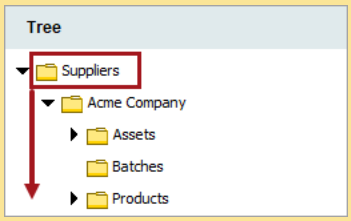
7. Add the necessary privilege rules on the Privilege Rules tab on the desired User Group. For more information on how to configure privilege rules, refer to the **Privilege Rules** topic in the **Users and Groups** section of the **System Setup** documentation.



When creating privilege rules, match up User Action sets with the privilege attribute groups created in the previous steps. Do this for each applicable object type.

Often, privileges should not be valid for all object types, and the rule needs to be repeated for each allowed object type. If the role can perform a general function on all object types below the root, leave the Object Type field blank.

Important: For Suppliers, only apply privilege rules to the supplier root. Individual supplier's privileges are limited to their own products, assets and batches. It is not necessary to apply privileges to each suppliers root.



Note: Privileges on product object types can be defined on classification nodes (for products classified below the given nodes).

Attributes

A STEP attribute is a characteristic or detailed piece of information related to STEP objects (i.e., Products, Image & documents, Classifications, Link types, Data containers).

There are two types of Attributes: Description and Specification. Both types of Attributes are stored within Attribute Groups. For more information, refer to the **Description Attributes**, **Specification Attributes**, and **Attribute Groups** sections of this guide.

Attributes and their values can be maintained in Workbench and/or Web UI. For more information, refer to the **Maintaining Attributes** section of this guide.

Attribute Groups

Using attribute groups, you can group attributes, reference types, link types, and data container types according to their characteristics. An attribute group can also consist of a number of attribute subgroups. This scheme provides a better overview on a larger number of attributes, reference types, and link types.

Examples of main attribute groups could be:

- Technical group
- Price group

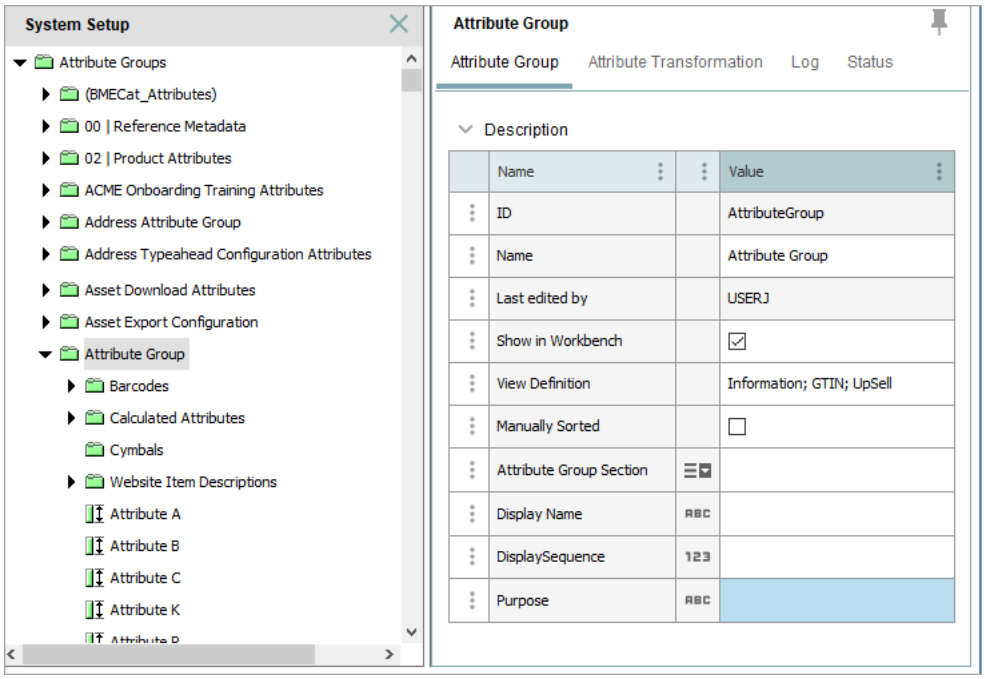
The following are examples of attribute subgroups:

Attribute Main Group	Included Subgroups	Included Attributes
Technical	Dimensions	Length, Depth, Height, Width
	FrameColor	FrameColor, SeatColor
	Temperature	Minimum, Maximum, Outdoor, Indoor, Operating
PriceGroup	Stibo Systems Main	Price Break 1, Price Break 2, Discontinued
	Stibo Systems UK	Price Break 1, Price Break 2, Discontinued
	Stibo Systems US	Price Break 1, Price Break 2, Discontinued

Creating subgroups makes it easier to organize and view related attributes. Typically, you will need to link all (or most) of the attributes in a subgroup, which is done by multi-selecting and linking the selected attributes.

Note: Attribute groups can be specified in privilege rules. For example, specified users can change the values of attributes within the 'PriceGroup' attribute group.

In workbench, attribute groups are housed in System Setup as shown below.



For more information on attribute groups, refer to the following:

- **Attribute Group Display Sequence** (below) defines how to order attribute groups.
- **Creating an Attribute Group** defines how to create a new group.
- **Creating a Customized View** defines the 'Show in Workbench' and 'View Definition' parameters.
- **Manually Sorted** (below) defines how to order attributes with a group.

Attribute Group Display Sequence

By default, attribute groups of a product shown in the Product Editor are in alphabetical order. If an Attribute Display Sequence Attribute has been set on your system, the attribute groups shown in the Product Editor are sorted according to the order set in the Display Sequence attribute. For more information, refer to the **Display Sequence Attribute** topic.

Note: The Display Sequence attribute only has an impact on the attributes shown in the Product Editor. It does not affect the order in which attributes are exported.

Manually Sorted

The 'Manually Sorted' parameter on an attribute group enables you to manually define the order of attributes within an attribute group.

Note: Attribute groups can only be manually sorted if they only have attributes as children—manual sorting of attribute groups, reference types, data containers, etc., are not allowed.

Manually Sorted is configured as follows:

- Not checked means attribute child nodes of this object are ordered alphabetically in the tree hierarchy. The sequence cannot be manually changed by a user.
- Checked means attribute child nodes of this object can have their sequence manually changed in the tree hierarchy. Drag and drop attributes to modify the order of the group.

The 'Manually Sorted' order overrides any other attribute ordering where the attribute group is used, e.g., in an attribute link, when viewing the values of a product below the attribute group flipper for this attribute group. If the attribute is also included in another attribute group, the ordering inside that attribute group is independent of the ordering within this group.

Creating a Customized View

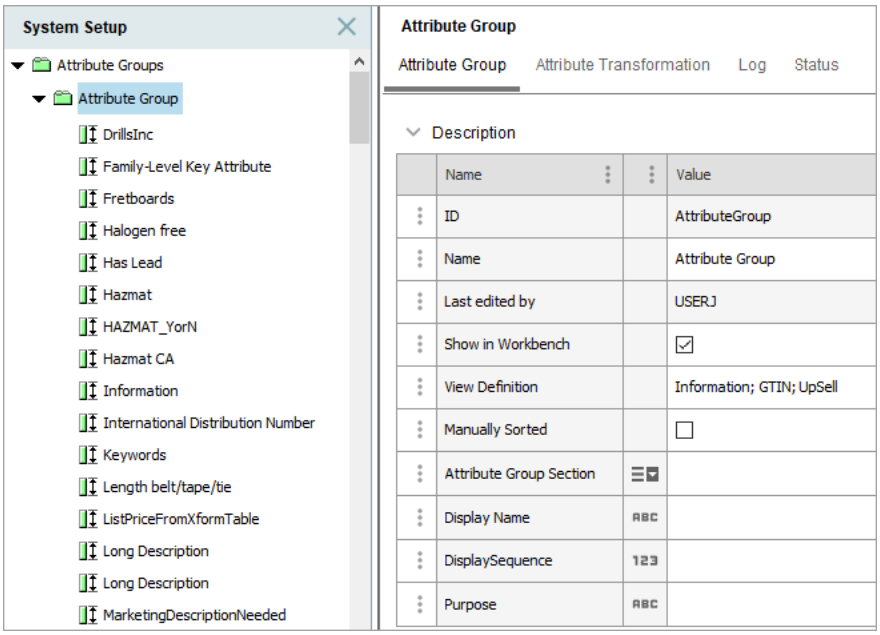
Attribute groups that contain reference types and product to classification link types can have their views defined for display in the workbench (the Web UI is not effected). The customized view defines general aspects, meta data attributes and attributes on referenced objects. These referenced objects appear in the References editor on products, classifications, and assets.

Important: Approving a reference or product to classification link on a product, classification, or asset with a customized view defined approves all general aspects and metadata attributes defined on the reference. Additionally, it also approves all general aspects and metadata attributes defined on the reference type or product-to-classification link type.

In the reference editor on products, classifications, and assets, the view definition is used when the reference types and product-to-classification link types are valid.

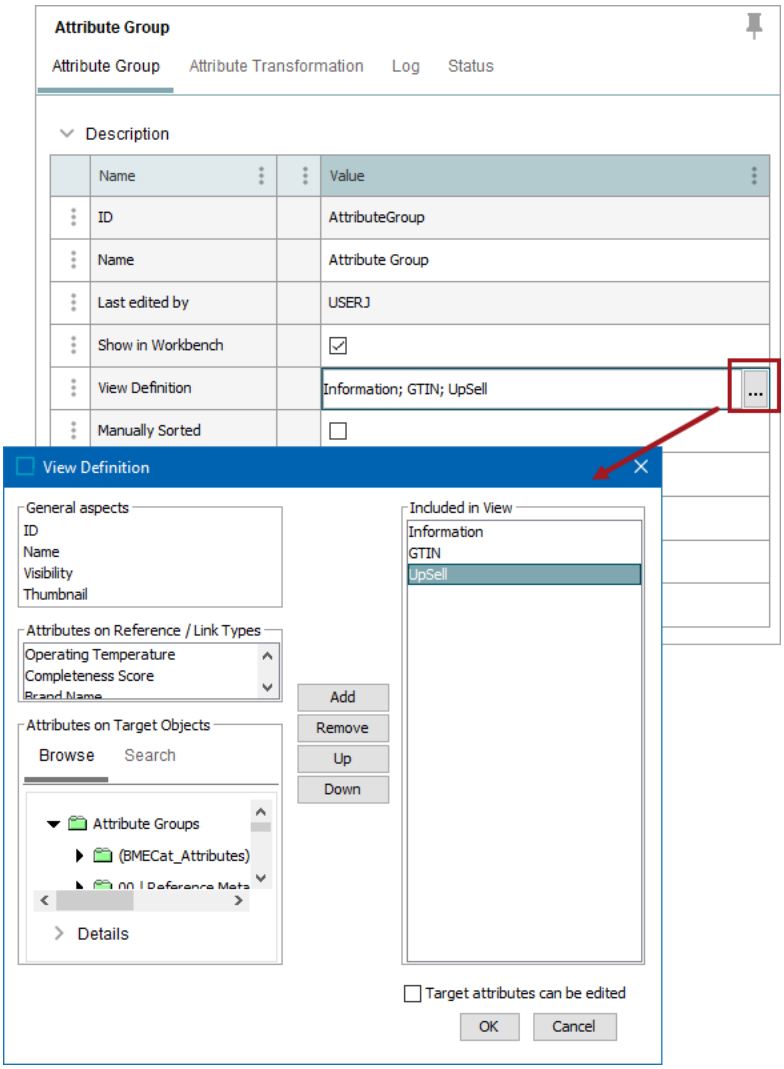
To create a customized view:

1. In **System Setup**, expand **Attribute Groups**, and then select the relevant attribute group. The **Attribute Group Editor** displays.



2. Check **Show in Workbench** if all reference types, product to classification link types, and attributes linked to the Attribute Group should appear on products, classifications, or assets. **Show in Workbench** is typically unchecked if a privilege needs to be applied to the attribute group to prevent the objects from appearing on products, classifications, and assets.

3. In **View Definition**, click into the field to display the ellipsis button (...). Then click the ellipsis button (...) to specify the appearance of reference types and product to classification link types linked into the attribute group. The **View Definition Dialog** displays.



Note: A saved view definition does not influence attributes linked into the attribute group.

4. In the **View Definition** dialog, select an item and click **Add** to list is under the Include in the View panel:

- **General Aspects**

  ID — shows the ID of the referenced / linked object.

  Name — shows the name of the referenced / linked object

Visibility — shows in which contexts a reference or product to classification link is visible. Reference types or product to classification link types that are dimension dependent are editable by users with the required privileges.

Thumbnail — for product-to-product references and product-to-image references, displays a thumbnail of the primary image of the target object.

- **Attributes on References / Link Types**

  Metadata Attributes — applied to the reference types and product-to-classification link types linked into the attribute group.

- **Attributes on Target Objects**

  Description Attributes or Specification Attributes — In Attributes on Target Objects you can search or browse for attributes. When you add an attribute to the view from this field, it displays the attribute value in the reference editor.

  Each reference type establishes the hierarchical position among the referenced objects. The direction will identify one object as the master and the referenced object as the subordinate. A master object is the object that the reference is made from. A subordinate object is the object that the reference is made to. Attributes applied from this field are values from the subordinate object.

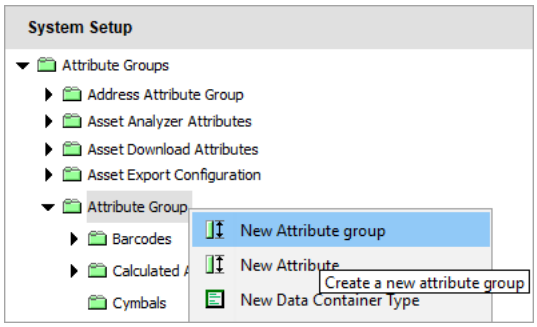
  Checking 'Target Attributes can be edited' enables maintenance of the values of the selected attributes from the reference editor. Editing is allowed in the reference editor if the user privileges allow maintenance of the attribute values.

5. Use the **Add**, **Remove**, **Up**, and **Down** buttons to modify the items listed in the 'Included in View' pane.
6. Click **OK** to save the view.

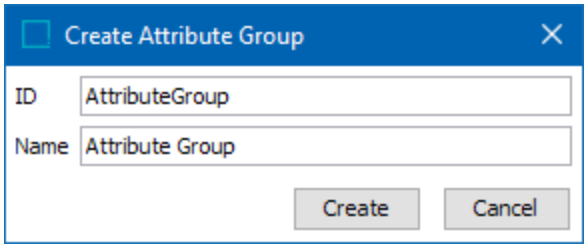
Creating an Attribute Group

Attribute groups allow you to group attributes, reference types, link types, and data container types according to their characteristics. Create attribute subgroups to limit the number of main groups.

1. In System Setup, expand Attribute Groups, and then select the relevant attribute main group folder.
2. Right-click and choose **New Attribute Group** to display the 'Create Attribute Group' dialog.



3. On the 'Create Attribute Group' dialog, enter an ID and a name for the attribute group.

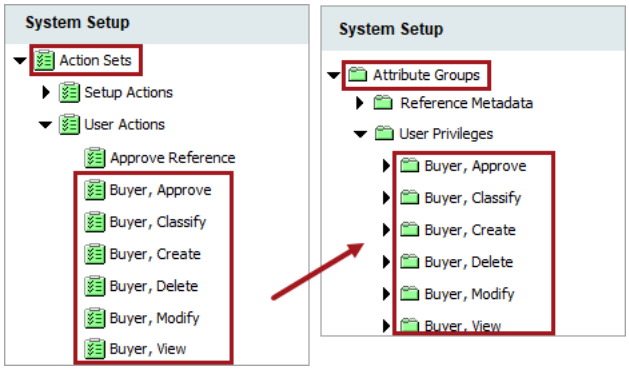


4. Click **Create**. The new attribute group displays in System Setup, below the attribute group where you created it. You can now add attributes, reference types, and product to classification link types to the attribute group.

Setting Up Attribute Groups for Action Sets

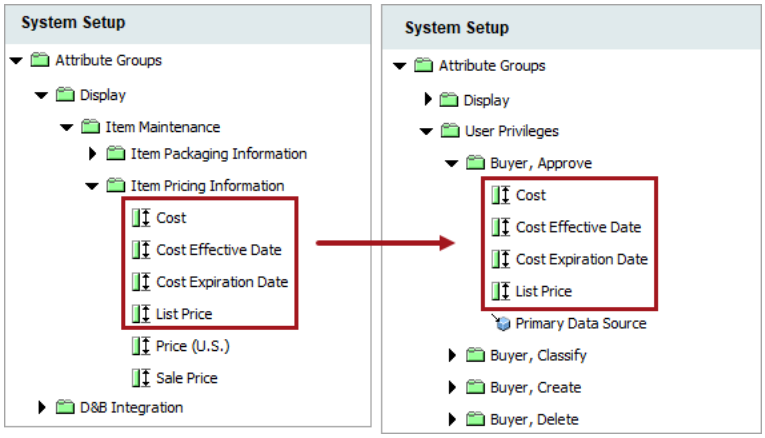
When creating attribute groups to be used with Action Sets, it is important to create the attribute group with a role and general function in mind. Whether this is for a user to enrich items, for a supplier to review items, etc., having an attribute group created specifically for a particular User Action group, creating a one-to-one correspondence, makes maintenance of the group easier.

Note: The exception is if the same role should have the same privileges for different nodes.



It is recommended practice to create only the attribute groups intended for user privilege application and action sets that are valid for the role.

For example, an administrator wants a user to update the 'Cost,' 'Cost Effective Date,' 'Cost Expiration Date,' and 'List Price' for products in the system. They do not want them to touch the 'Price (U.S.),' or the 'Sale Price' attribute for products in the system. The administrator creates the 'Buyer, Approve' attribute group created for user privilege application, links the needed attributes to this group, and applies the necessary user privileges to this group. Now the user is able to access only the necessary attributes to fulfill their role's requirements.



Note: Action sets align almost one-for-one with the attribute groups used for user privileges. The exception is in the case of the Images and Documents groups. For these, there are Action Sets for 'Classify' but no attribute groups for 'Classify.' This is because only attributes and reference types get linked into the attribute groups. With digital assets, there is not a reference type for the asset to classification link. In cases where there are classification reference types or product to classification Link types, create an attribute group for those reference types and link them in.

Setting up attribute groups this way aids in long term maintenance. If a certain role needs to start or stop doing an action, either:

- Add or remove the action(s) from the action set
- Add or remove an attribute or reference type from a group
- Add or remove a privilege rule completely

For more information on how to perform these tasks, refer to the **Maintaining Actions** topic in this documentation.

Considerations for Supplier Privilege Configuration

- If a supplier user is linked into multiple supplier groups, the supplier can review all of the supplier hierarchies that they are a member of.
- If products or assets are linked into a multiple supplier's hierarchies, the supplier will not be able to review them.

Users and Dimension(s)

If User Actions are restricted to a dimension, keep the following in mind:

- Users are only able to modify the dimension-dependent attribute values.
- Users are not able to modify values that have no dimension dependency.

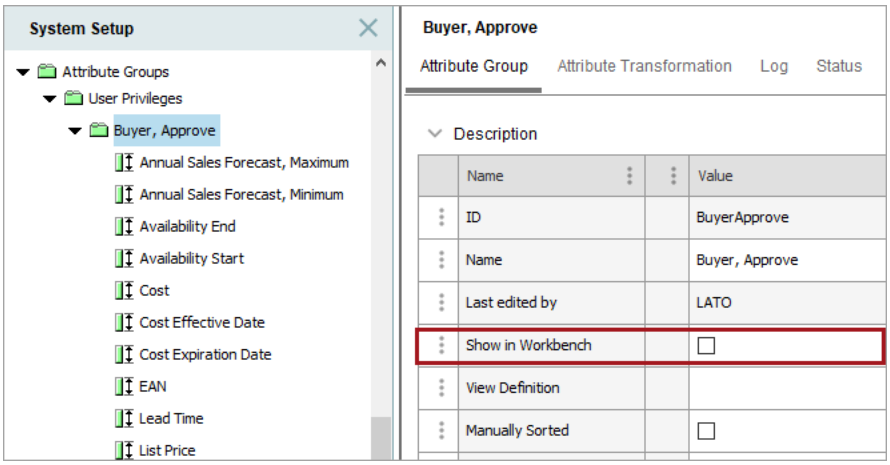
For more information on restricting actions using dimension points, refer to the Privilege Rules topic in the Users and Groups section of the System Setup documentation.

Creating Attributes Groups Specifically For Use with User Privileges

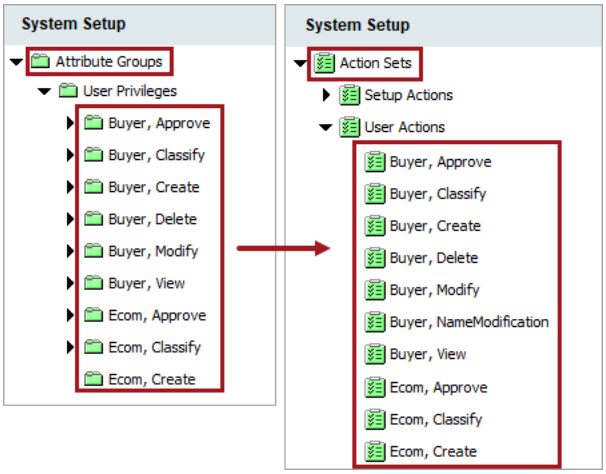
To create attributes groups specifically for use with user privileges, follow the example below.

In this example, the attribute groups and user privileges are being applied to products, but the same concept can be applied for suppliers.

1. Create attribute groups that will be used only for privileges.
2. Deselect the 'Show in workbench' field on the attribute group being created.

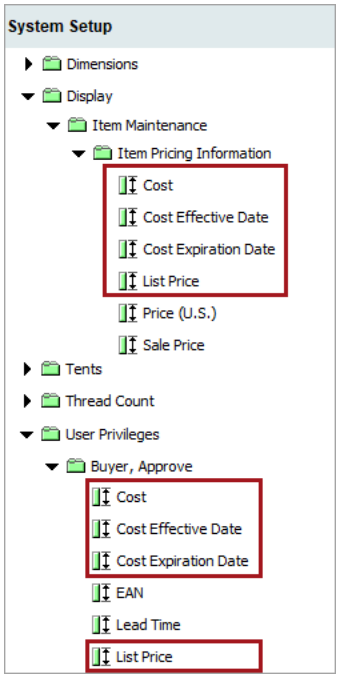


3. Create attribute groups that mirror the Action Sets for each role. Doing this eliminates the problem of trying to make attribute groups intended for display to align with privileges. Attribute groups planned for display were not intended for this use case.

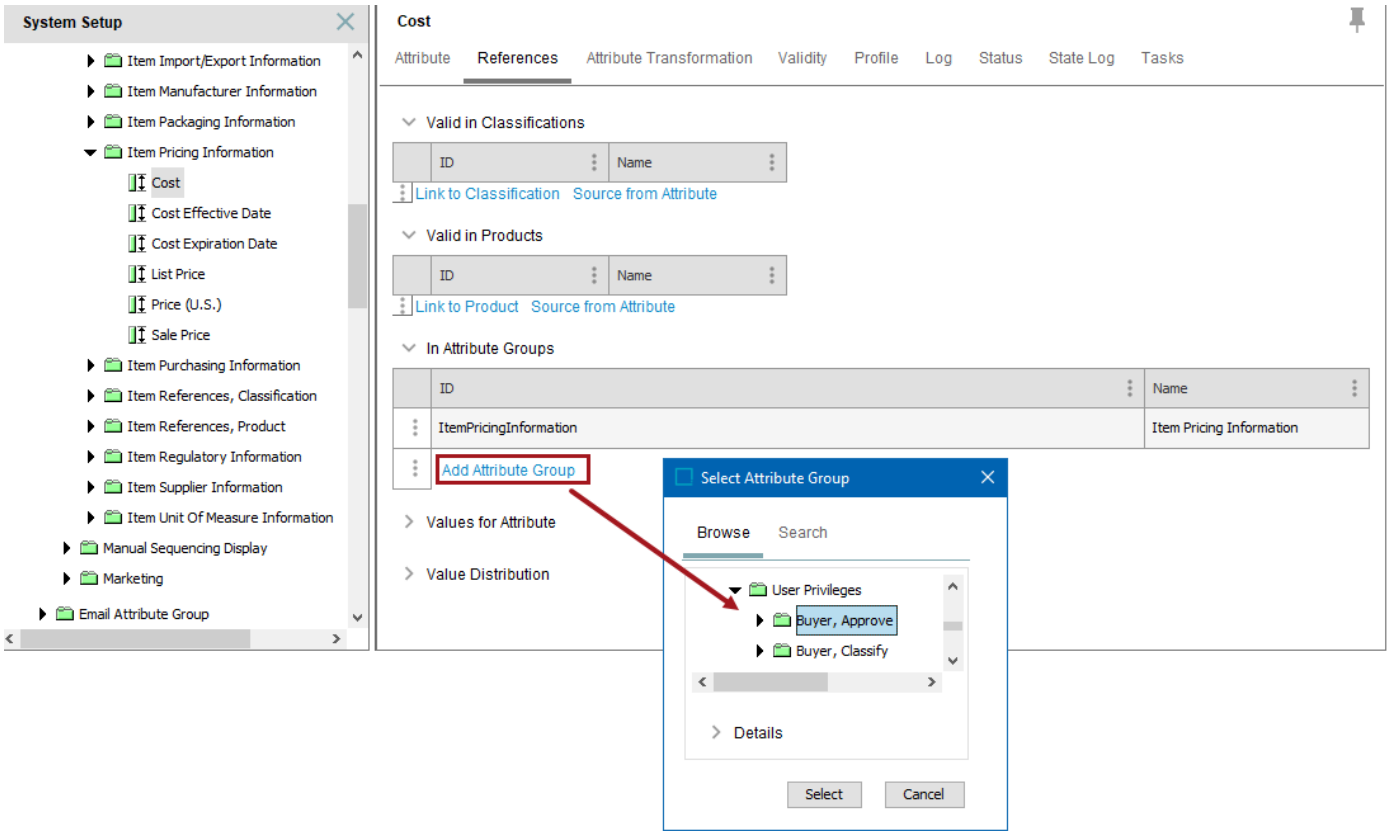


4. Link allowable attributes from their main groupings to the user privilege groupings. To do so, go to System Setup and either:

- Click on the desired attribute and drag it to the new attribute group that it should be a part of.



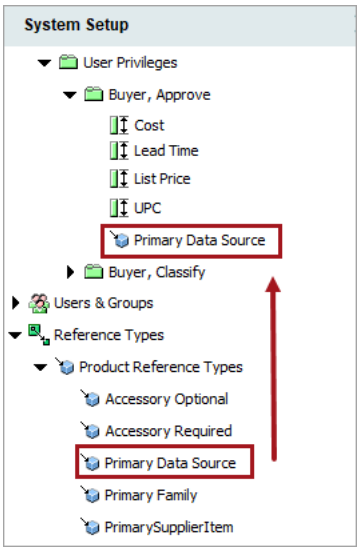
- Click on the desired attribute, go to the References tab, and under the 'In Attribute Group' flipper, click **Add Attribute Group**. Select the desired attribute group to add.



Note: Do not link the Category Specific attributes unless there really are restrictions within this group, since there are a great number of Category Specific attributes. Use separate privilege rule(s) to better handle Category Specific attributes and any sub-groups.

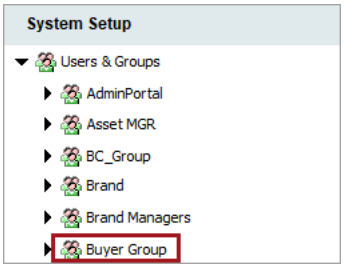
Important: In case of numerous attributes (e.g., if you use standards like ETIM and eCl@ss without merging attributes), be aware that working with groups with more than 10,000 attributes may cause performance issues when updating attribute links to groups. Also note that sub-groups can be defined for each user privilege group. Rules will apply to all attributes linked to sub-groups.

5. Link all allowable reference types to the user privilege attribute groups. For more information on how to link references to attribute groups, refer to the **Maintaining a Reference Type** topic in the **References and Link Types** section of the **System Setup** documentation.

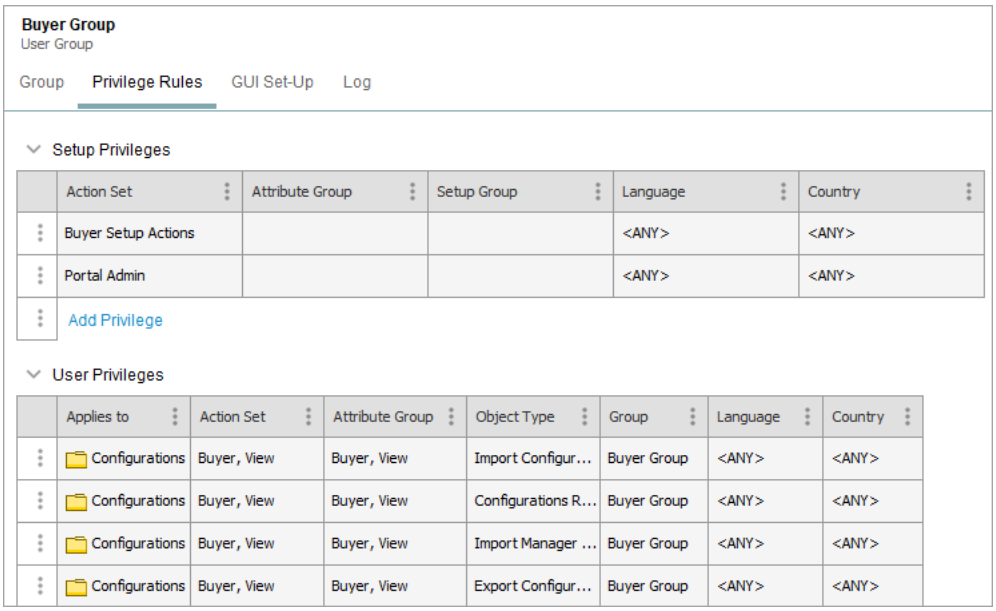


Note: Linking reference types to attribute groups using STEPXML as a template can save time. For more information on STEPXML, refer to the **STEPXML Format** topic in the **Data Formats** section of the **Data Exchange** documentation.

6. Go to the Users and Groups node, and click on the desired User Group. In this example, it is Buyer Group.



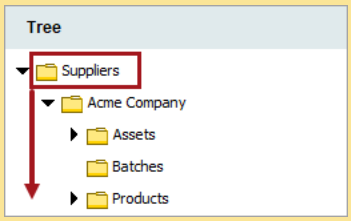
7. Add the necessary privilege rules on the Privilege Rules tab on the desired User Group. For more information on how to configure privilege rules, refer to the **Privilege Rules** topic in the **Users and Groups** section of the **System Setup** documentation.



When creating privilege rules, match up User Action sets with the privilege attribute groups created in the previous steps. Do this for each applicable object type.

Often, privileges should not be valid for all object types, and the rule needs to be repeated for each allowed object type. If the role can perform a general function on all object types below the root, leave the Object Type field blank.

Important: For Suppliers, only apply privilege rules to the supplier root. Individual supplier's privileges are limited to their own products, assets and batches. It is not necessary to apply privileges to each suppliers root.



Note: Privileges on product object types can be defined on classification nodes (for products classified below the given nodes).

Attribute Links

Attributes linked to product and classification nodes are displayed on the References tab of the product and classification of editors.

Attribute linking makes a selection of attributes available to objects that are linked to (or below) the specified node in the classification or product hierarchy.

Before linking attributes, the following issues must be considered:

Where to link an attribute

Before linking attributes, it is very important to consider the scope of these attributes, i.e., for which objects are they supposed to be relevant.

A recommended practice is to organize the Product hierarchy or the Classification hierarchy so similar products, that share the same characteristics, are grouped together. These products will then be able to share a set of attributes by inheritance from the hierarchy.

Which hierarchy levels to link to

If you have a hierarchy where an upper level node has more sub nodes that all share the same characteristics, the attributes should be linked at that upper node level. The attributes will then be inherited to the sub nodes.

If, however, the attributes only are relevant to a sub node, they should be linked there. Read about attribute inheritance below.

Which product object types to link to

It may also be important to specify which type of product the attribute is describing.

For example, attributes such as 'Price' and 'Order Code' will only be relevant to products with object type 'Article'. This means that products with object type 'Product Family' cannot have a 'Price' or an 'Order Code'.

On the other hand, an attribute such as 'Long Description' may be relevant to a 'Product Family', but not to an 'Article'.

Attribute inheritance

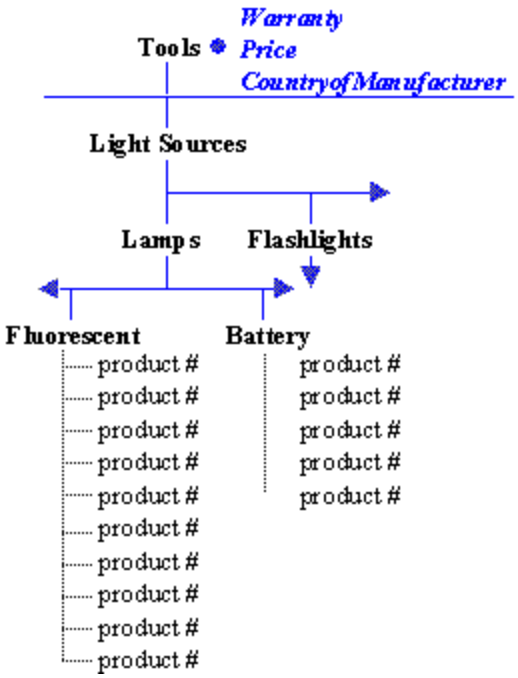
An attribute that is linked to a node in the hierarchy is inherited to the nodes below. This way, attributes are shared among nodes.

As an example, a specification attribute called 'BladeWidth' might be linked at the 'Saws' node (below the ' Power Tools' node). Therefore, the attribute 'BladeWidth' is available to both the sub nodes 'Circular Saws' and 'Table Saws', by inheritance.

This inheritance feature is useful when there are globally used attributes – these are attributes that are 'common' to all products.

Note: The inheritance feature is supported only in specification attributes.

For example, as shown in the image below, 'Warranty', 'Price', and 'CountryofManufacturer' would most likely be global attributes, since each and every product would have a value for these characteristics. Therefore, these attributes would be linked at the top node in the hierarchy, and in doing so, be inherited to all of the nodes below.



Linking Orphan Attributes

Orphan attributes are specification attributes that although have a value for a product or classification, are not specifically linked to that product or classification. To make an attribute no longer an orphan, the attribute must be linked to the product or classification for which it has a value. In the workbench, an orphan attribute displays in italicized text. In the Web UI, orphan attributes display with a warning indicator and explanatory text.

An attribute can become orphaned in several ways:

Cause	Description
Product is moved	A product may have been moved to another node in the product hierarchy, thereby losing the link to its attributes.
Product is imported	A product may have been imported with its attributes and values from another system, and the product is not yet classified.
Attribute link is deleted on higher level	A product has an inherited attribute with a specific value, and the inherited link to the attribute has been deleted. As the attribute has a value, it is not removed from the product, but it has become an orphaned attribute.

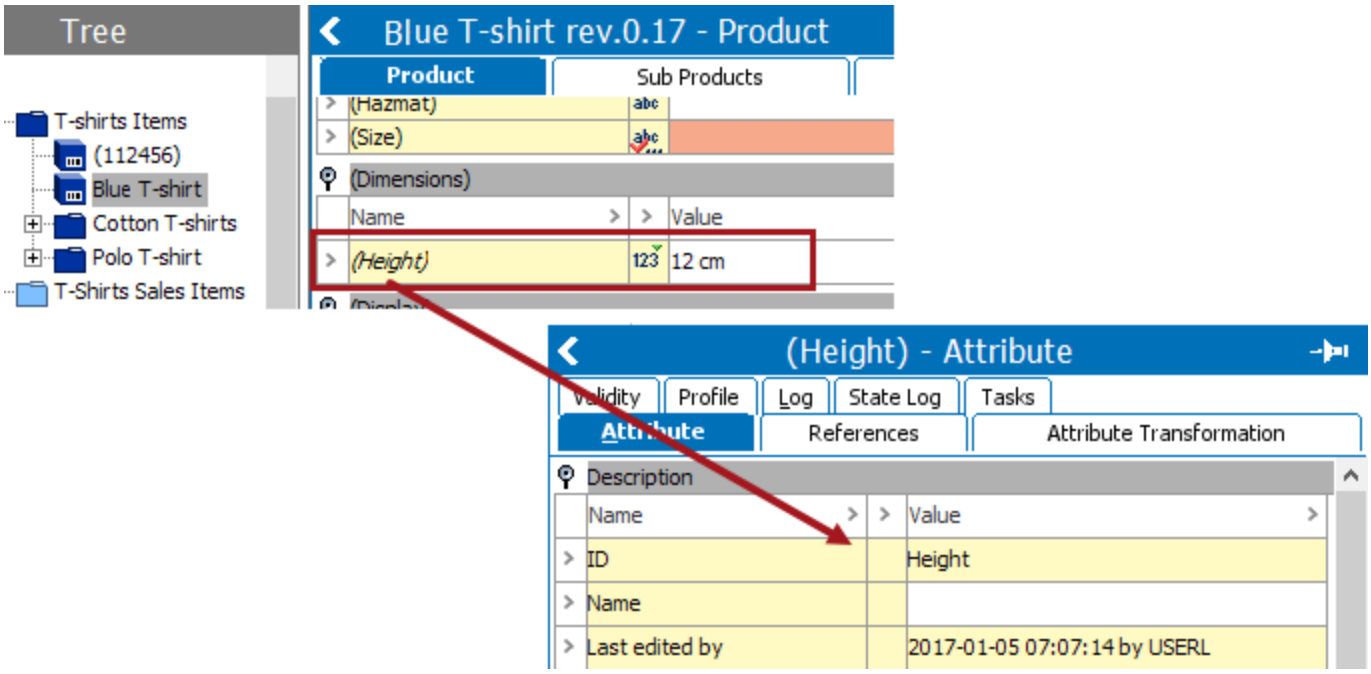
Linking an Orphan Attribute

Orphan attributes are linked in the attribute editor **References** tab. It is also possible to link orphan attributes from the product editor **Product** tab and the classification editor **Classification** tab.

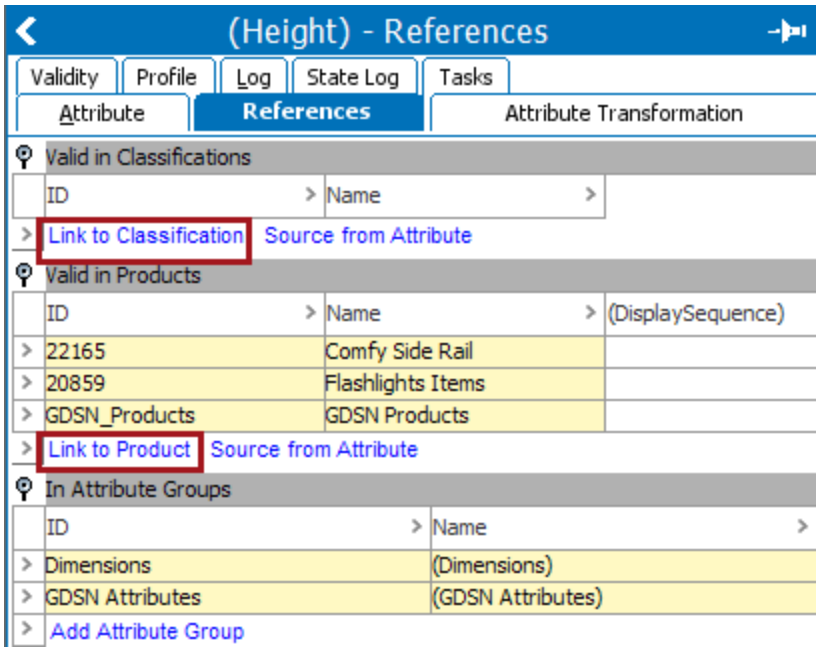
1. In Tree, select the product with the orphan attribute, or alternately, in the Search Result tab, search and select the attribute.

   The **Product** Editor appears.

2. In the product editor, click the **Product** tab.
3. Click the orphan attribute to be linked. The attribute editor appears.

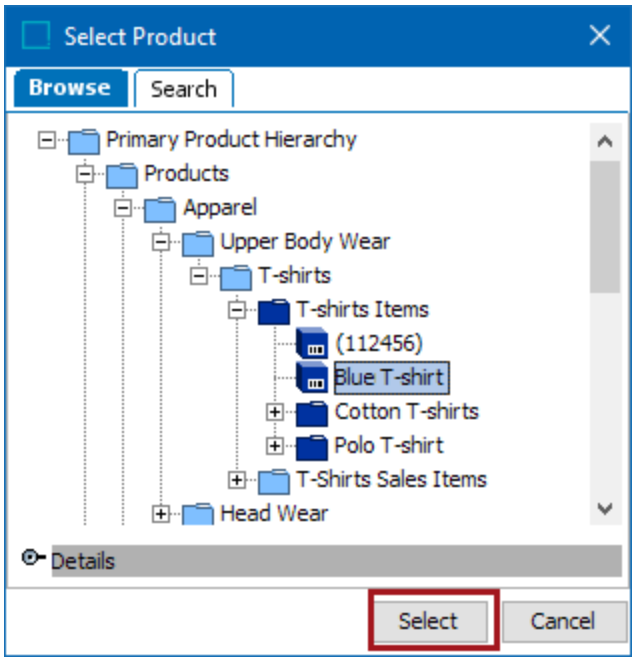


4. In the attribute editor, click the **References** tab.
5. Click **Link to Classification** or **Link to Product**.

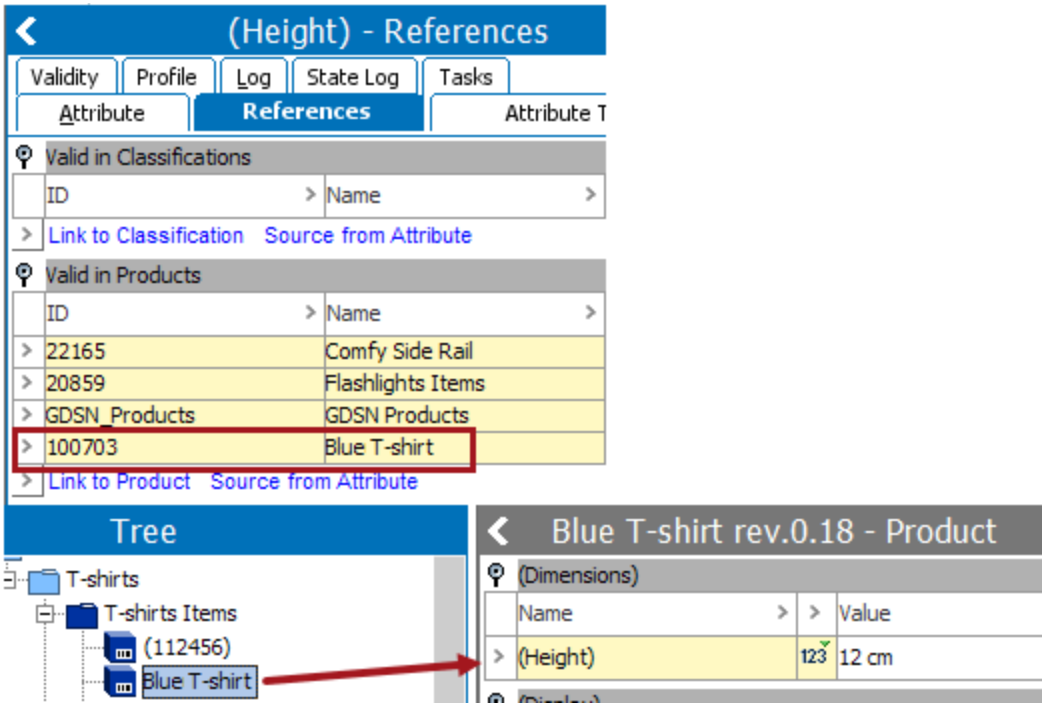


The **Select Classification** dialog box or **Select Product** dialog box appears.

6. Search for or browse the classification or product hierarchy node to link to the needed object, and press **Select**.



The attribute displays under **Valid in Classification** or under **Valid in Products** flippers.



An orphan attribute has now been made valid for the selected classification or product node (and below), and the *italic* indication will disappear from the product editor.

For more information regarding linking specification attributes, refer to the **Linking Specification Attributes** topic.

Linking Specification Attributes

Specification attributes are linked to products or classifications either from:

- Attribute editor **References** tab
- Product editor **References** tab: **Linked Attributes** from product hierarchy field
- Classification editor **References** tab: **Attributes** field

Linking specification attributes is available for:

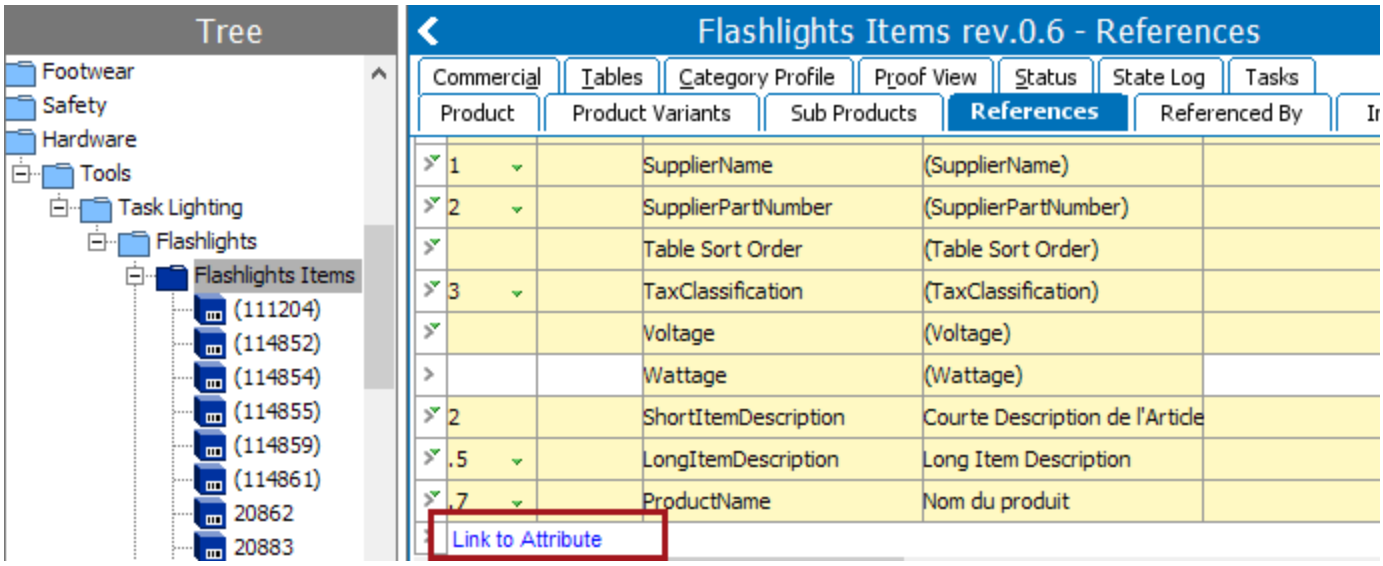
- Classifications
- Products

Description attributes are linked globally to an object type. They will then be automatically displayed in the **Description** fields.

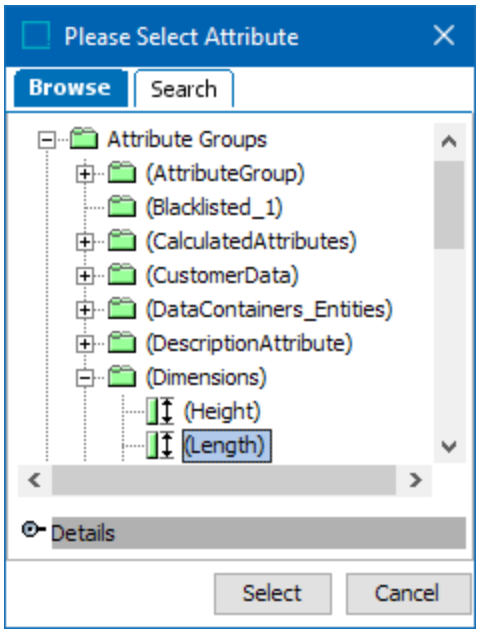
Note: If a specification attribute is not in the list of selectable attributes, it may not be available in the current context.

Linking Attributes in Product Editor

1. In Tree, select the relevant node, click the **References** tab.
2. Under the 'Linked Attributes' flipper, click **Link to Attribute**.

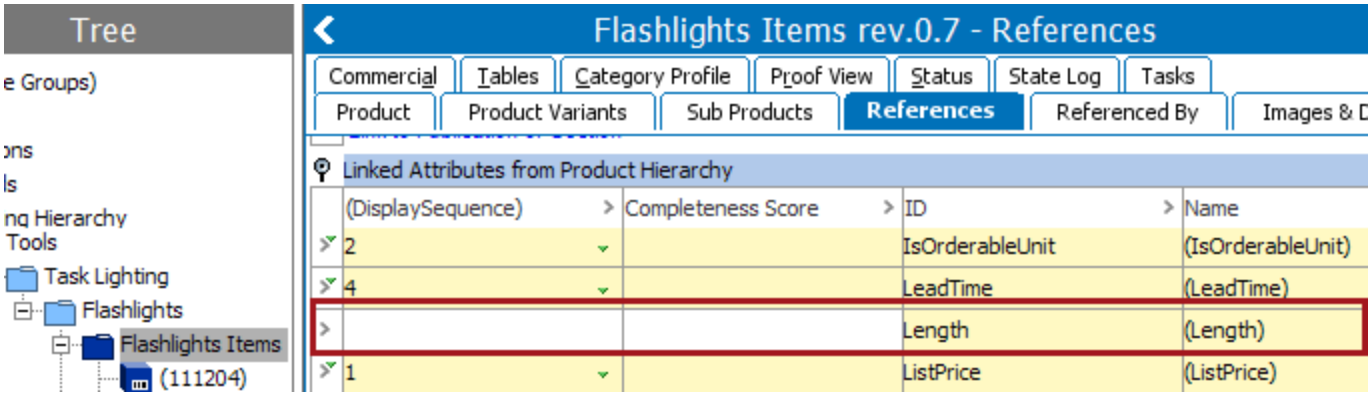


The **Select Attribute** dialog box appears.



3. Search or browse for the attribute group you want to link to, select one or more specification attributes from the group, and then click **Select**.

   The selected attribute(s) will appear in the list of linked attributes.



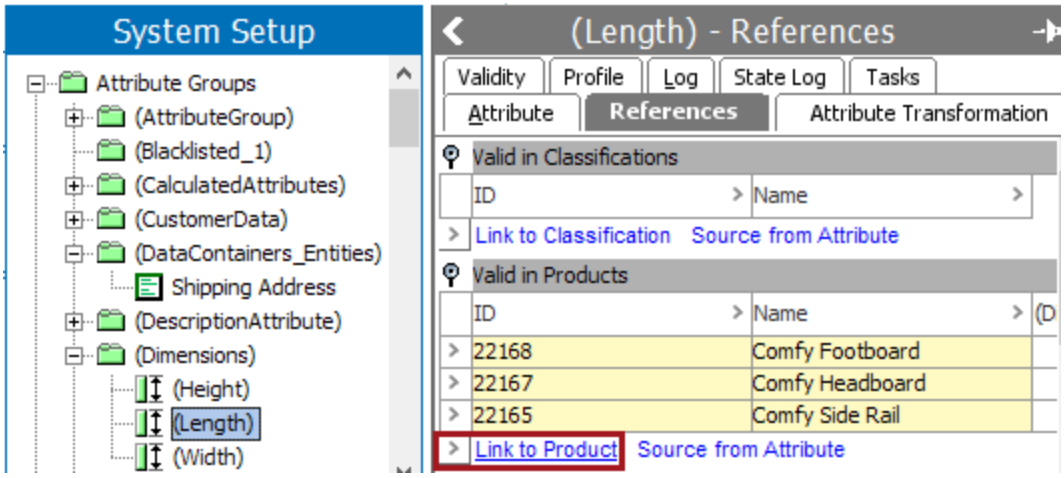
   One or more specification attributes have now been linked to a product or a classification node, and the attribute(s) will be available to the linked products and sub products.

Linking Attributes to Products or Classifications

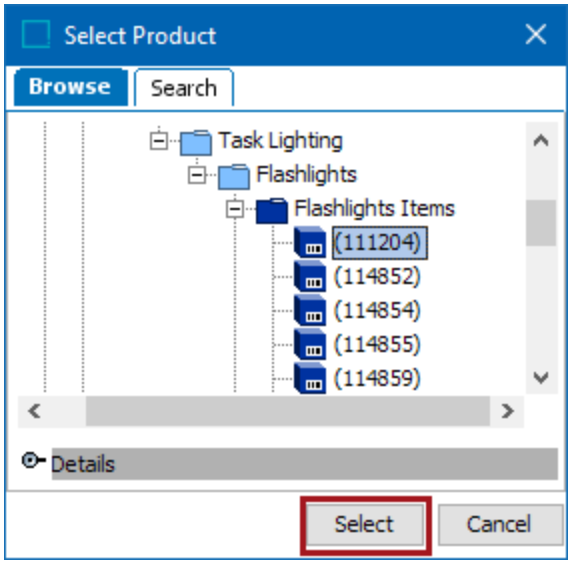
Linking a specification attribute to a classification or product can help in maintaining the object. For example, linking a specification attribute to a classification node could help in handling different price values of the object for different seasons. The example below shows an attribute being linked to a product, but the steps are the same for linking to a classification.

Note: Linking a specification attribute to a classification node requires additional setup to determine inheritance of the specification attribute. Product to classification link types include an 'Inheritance of Links' parameter which determines the ability to set the 'Inheritance of Specification Attributes / Data Container Types' parameter. This is significant since the link type inheritance setting on an attribute determines if the attribute is viewable and/or editable. For more information, refer to the **Inherited Attributes** topic and the **Maintaining a Product to Classification Link Type** topic.

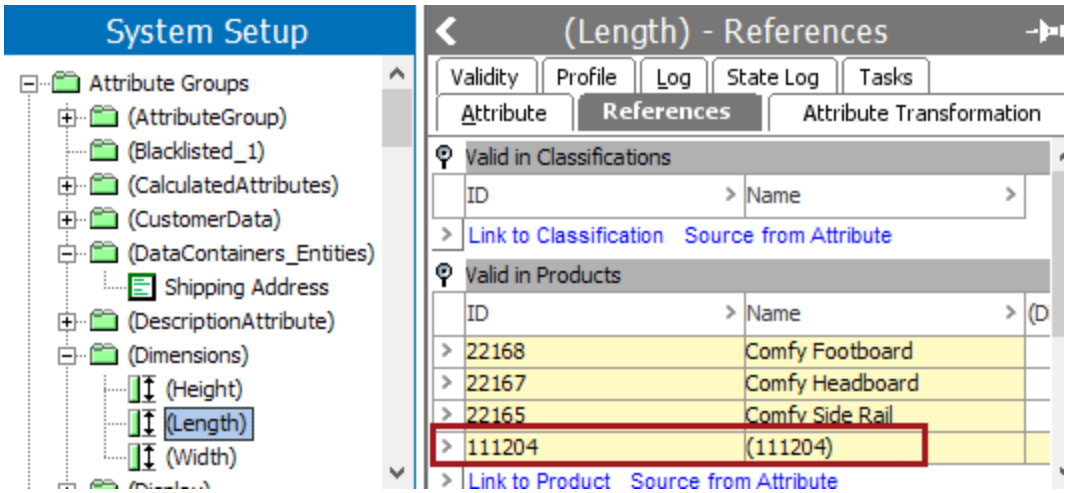
1. In System Setup, select the relevant attribute node, and click the **References** tab.
2. Under the 'Valid in Products' flipper, click **Link to Product** to link the object.



3. When the dialog box appears, search or browse for the product you want to link to. Select one or more products from the hierarchy, and then click **Select**.



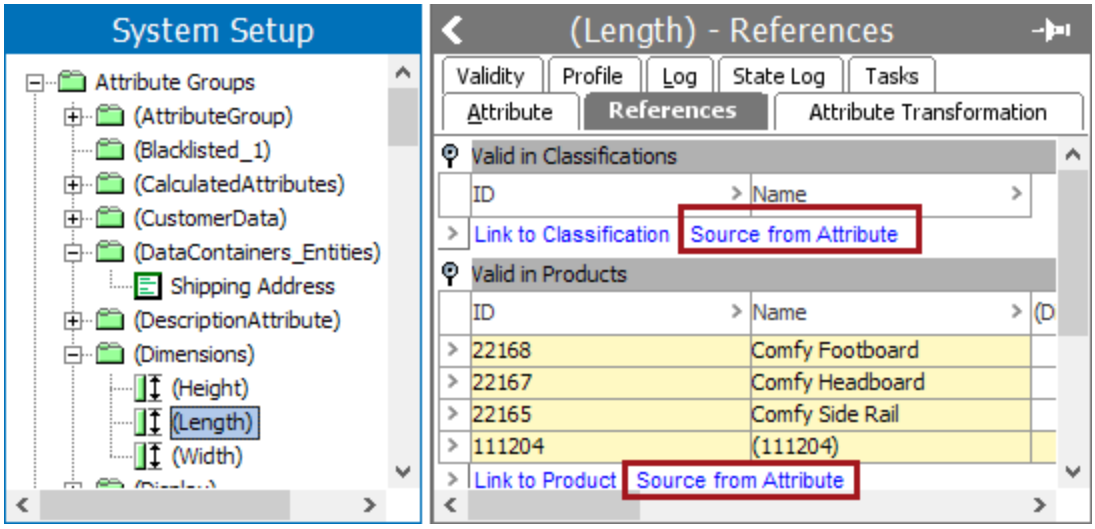
The selected product(s) will appear in the list of 'Valid in Products.'



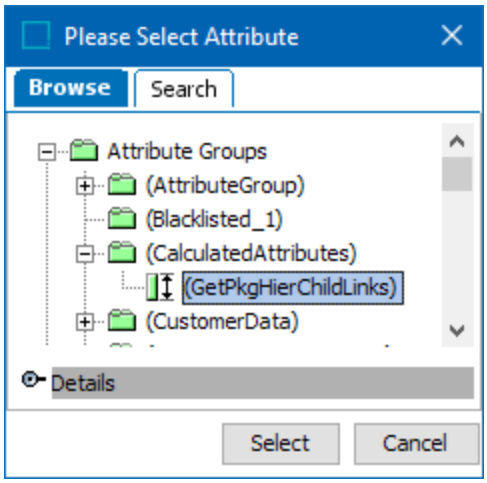
Note: While the maximum number of references to one object node is limited to 10,000 instances, this value can be changed; however, it is against Stibo Systems recommended practices to use this many references. Before changing this value, contact Stibo Systems for assistance.

Linking to a Source from Attribute

This option is used to copy the classification or product nodes from one attribute and link it to the current attribute. You can link to the 'Source from Attribute' under the 'Valid in Classifications' flipper or the 'Valid in Products' flipper. Because both are linked the same way, an example using a classification will be used.



1. To source from attribute, go to the desired attribute in System Setup and click on the **References** tab.
2. Open the 'Valid in classification' flipper or 'Valid in Products' flipper and click on **Source from Attribute**.
3. Select the source attribute you want to copy the classification node link from and link to the current (target) attribute, then click **Select**.



Now the classification node is linked to this attribute.

Sorting Linked Attributes

Sorting attributes linked to product, classification, or publication objects is done in the **Display Sequence** field of the attribute editor, if such a field is set up on your system. Both description (metadata) and specification attributes may be sequenced.

Attributes can be sorted for:

- Products

Sorting attributes is setting the sequence (1, 2, 3, or 10, 20, 30 etc.) in which the linked attributes will be shown in the product editor.

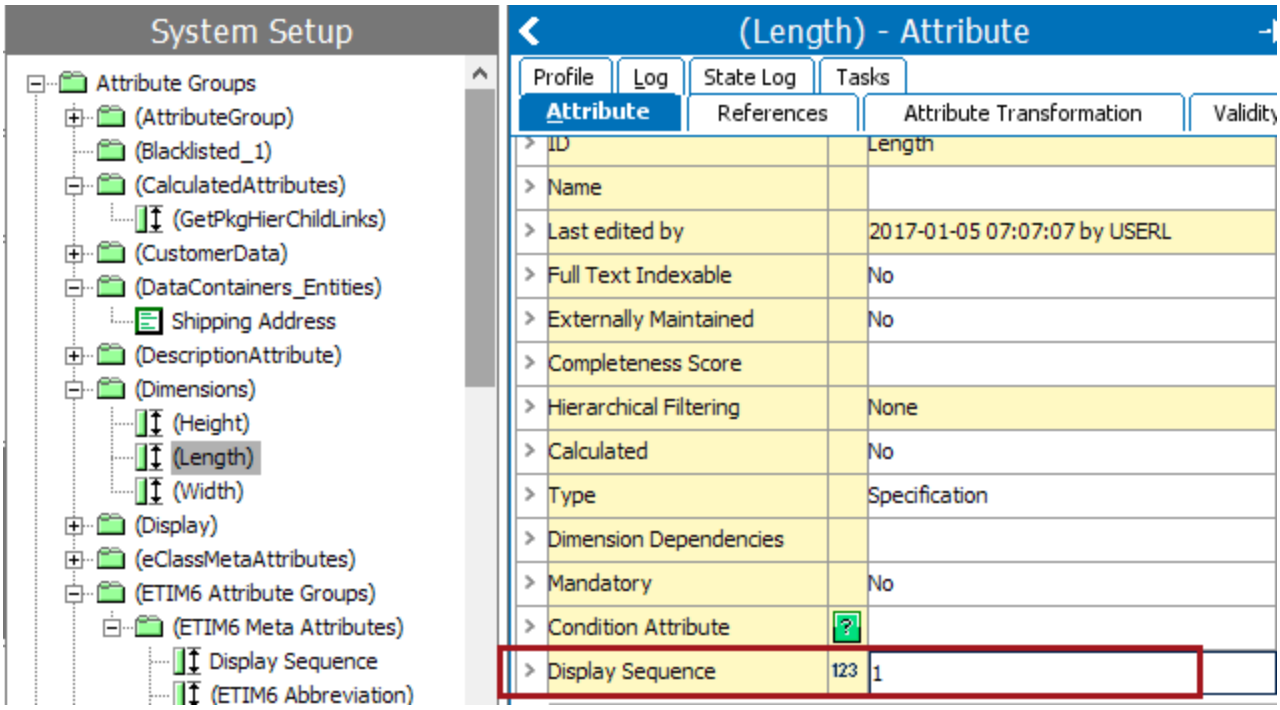
The attributes shown in the product editor can be sorted according to the order set in the 'Display Sequence' attribute. This can be done in two ways:

- By setting a number in the **Display Sequence** field of the attribute itself.
- By setting a number in the **Display Sequence** column under **Linked Attributes**.

Note: To determine which attribute on your system is set up as the 'Display Sequence' attribute, go to System Setup > Users & Groups > System Settings > Product Information Manager Default Settings flipper > verify the attribute under **Default Attribute to use as Attribute Display Sequence Attribute**. Alternatively, on a product editor > References tab > Linked Attributes from Product Hierarchy flipper > the first column shows the Display Sequence attribute on your system.

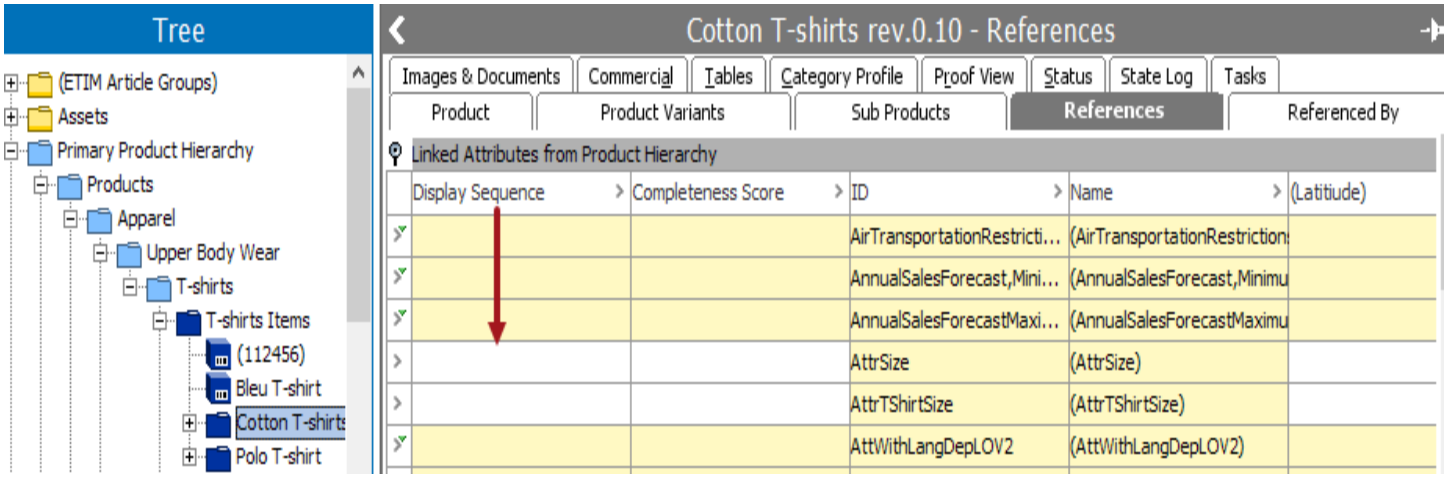
Setting a Display Sequence Number on the Attribute

1. In System Setup, open the Attribute Groups node, and then click the relevant attribute. The attribute editor appears.
2. In the display sequence field, type a number. You can choose to set a sequence by using e.g., 10, 20, 30, etc., or by using 1, 2, 3, etc. If you want to add attributes in between, you can then use for instance 15 in the first case, or 1.5 in the latter case.
3. Type the appropriate sequence number for each attribute in an attribute group.



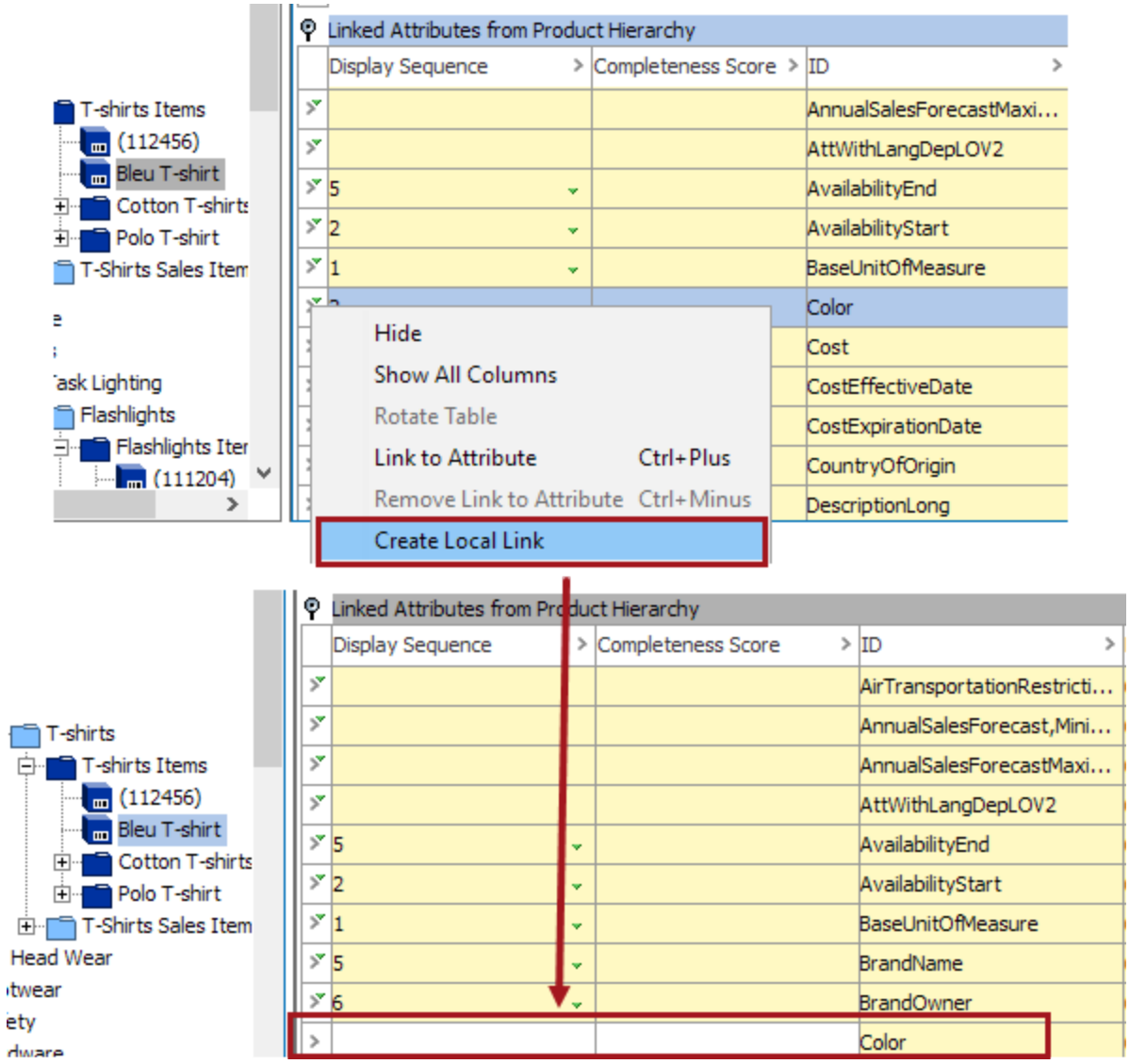
Setting a Display Sequence Number under Linked Attributes

1. In Tree, open the product hierarchy folder, click the relevant product folder or product.
2. Click the **References** tab.
3. Under Linked Attributes, type a number in the first column (the Display Sequence attribute column) in front of the relevant attribute. Note that you are only able to edit the display sequence attribute column (white background color), only if the attribute is linked in at the particular node. You cannot edit the display sequence attribute column (yellow background color) if it is linked to the parent node, The **Inherited from** column shows where the attribute is linked in



Note: An attribute can be linked in to one or more Attribute Groups. In the **Attribute Groups** column, you can verify which Attribute Group(s) the attribute belongs.

4. Optionally, if you want to create another display sequence at the level that you have selected, right-click the relevant row, and click **Create Local link**. The green arrow symbol will change in the inherited column, and the background color of the row will change from yellow to white. You are now able to type a local value in the display sequence column.



Note: Attributes that have no sequence number, and therefore are alphabetically sorted, will be placed last in the list.

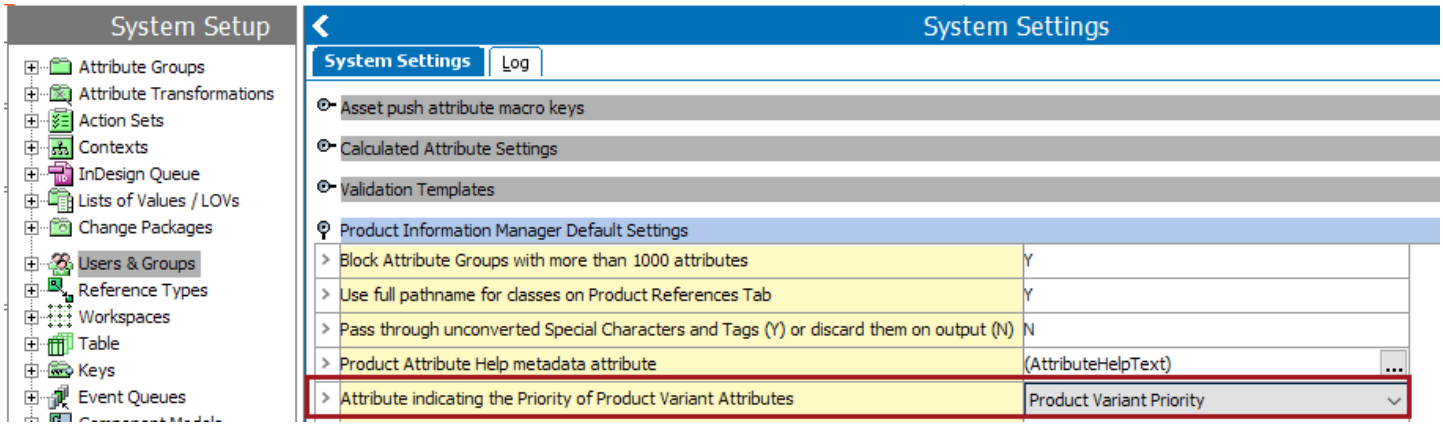
Important: Information about the Display Sequence of attributes is exported in an XML export. If the Display Sequence number is set on the attribute itself, the XML Export will contain the Attributes with Display Sequence attribute value. If the Display Sequence number is set on the Attribute Link, the XML Export will contain the Display Sequence information on the Attribute Links. A combination of the two is possible.

For more information, refer to the **Attribute Sequence** topic in the **System Setup** documentation.

Setting the Priority of a Product Variant Attribute

In order to set the priority of a product variant attribute, a user must first make sure that they have this feature selected.

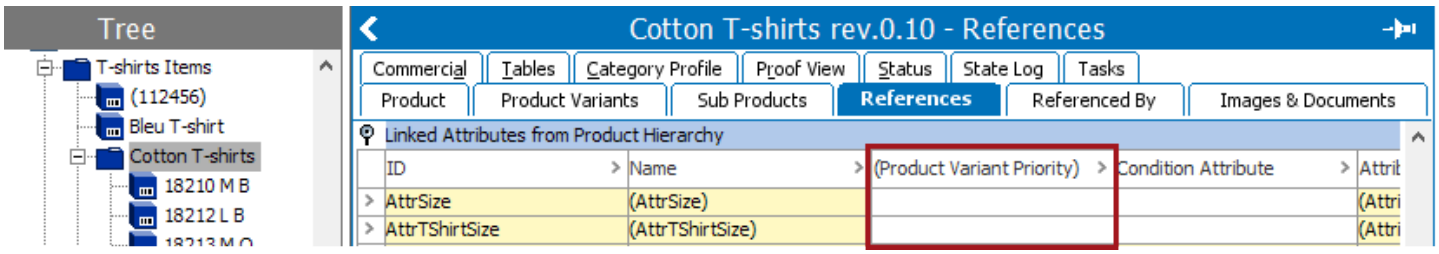
To check if it is selected go to System Setup > Users & Groups node > 'Product Information Manager Default Settings' flipper > **Attribute indication the Priority of Product Variant Attributes** field. In the field make sure that attribute set up to be the 'Product Variant Priority' is selected from the dropdown menu.



To set the priority of a product variant attribute, follow the steps below.

1. In Tree, select the 'super product' (the parent) containing the product variants.
2. Click the **References** tab.
3. Under Linked Attributes, type a number in the column for the 'Attribute indicating the Priority of Product Variant Attributes' attribute. This is again specified in User & Groups under the 'Product Information Manager Default Settings'.

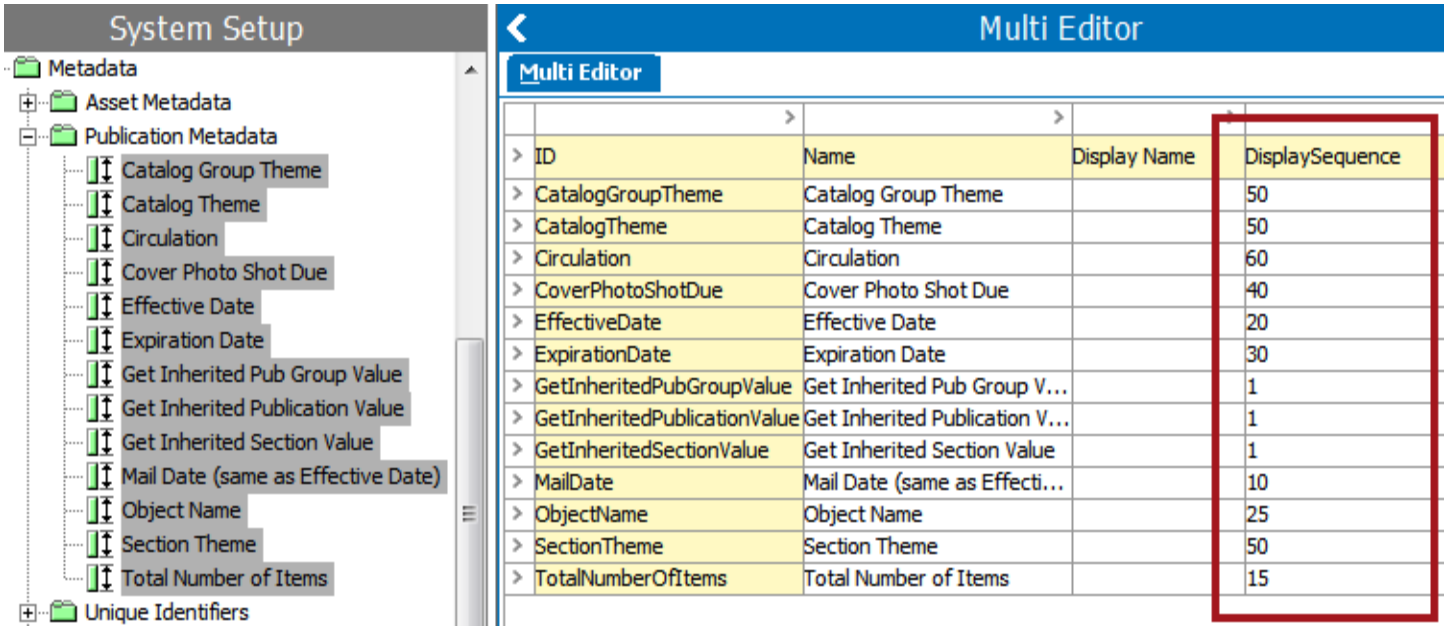
Display sequence values can be entered in the column related to the respective attributes.



Setting the Attribute Display Sequence on Publication (Green) Hierarchy Objects

Metadata (Description) attributes on publication hierarchy objects (publication groups, publications, sections, and planned pages) may also be sequenced using a display sequence attribute.

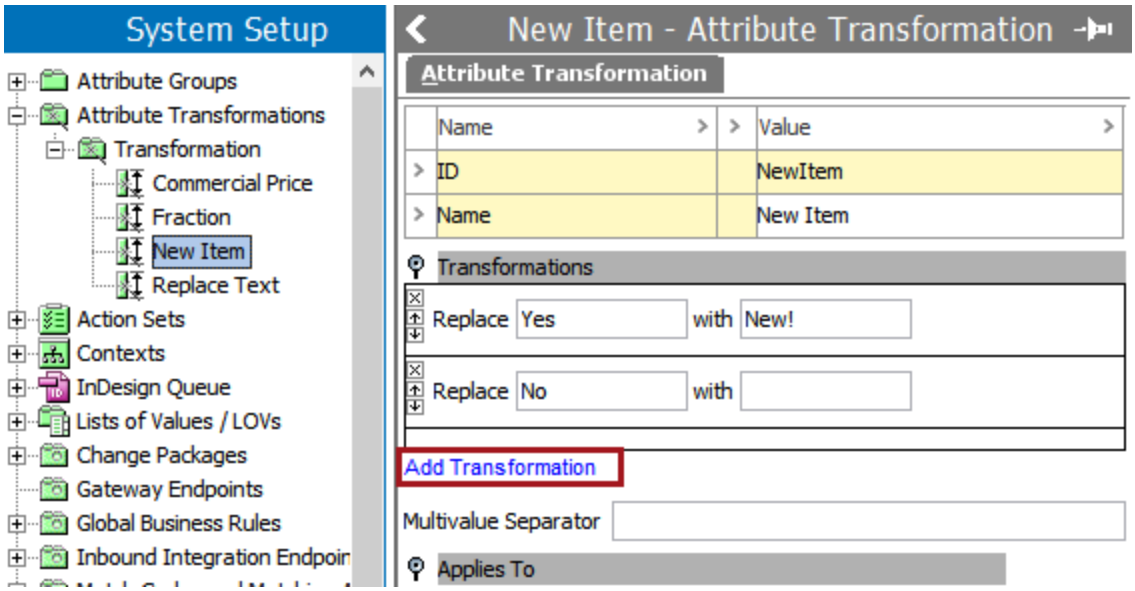
Because publication hierarchy objects do not use Reference Types, attribute sequencing cannot be set from a 'Linked Attributes' flipper on the References tab, as this is unavailable on publication hierarchy objects. Instead, metadata attribute sequencing must be set up at the attribute level. However, attributes may be multi-selected to allow sequencing from a single location.



Attribute Transformations

Attribute transformations are maintained in System Setup > Attribute Transformations can be used to transform attribute values, product names, and terms lists. Transformations are not intended to be a substitute for a programming language but can give a non-technical user the opportunity to modify data, using series of standard modification operations.

Transformation options are available after clicking the **Add Transformation** link on an Attribute Transformation:



As with all transformations, the original data is not modified, but the data delivered in an output, received during import, or displayed when mounted in Print Publisher, is altered by the transformations applied. Example attribute transformations could be:

- Convert numbers to only have two decimals.
- Replace comma with a dot.
- Insert a suffix on a product name. A suffix could be the text 'NEW' and used on new products.
- Transform dates by pattern or locale during import and export.

The examples illustrate that the attribute transformations can be used to perform very different and advanced tasks within the STEP system.

The following information is available for attribute transformations:

- **Creating an Attribute Transformation** includes steps for making a new transformation or applying multiple transformations in the **System Setup** documentation.
- **Maintaining an Attribute Transformation** includes information about configuration in the **System Setup** documentation.

For details on each of the available transformation options, refer to the **Transformations** topic in the **Resource Materials** online help.

Attribute transformations can also be used to make a set of transformations, and then applied in the following additional areas where transformations are available:

- Inbound and outbound data, when the selected format requires mapping, as discussed in the **Data Mapping** topic of the **Data Exchange** documentation.
- Tables for formatting, as discussed in the **Table Formatting Transformations** topic of the **Tables** documentation.

Creating an Attribute Transformation

Attribute Transformations are maintained in System Setup under the Attribute Transformations node using the following functionality:

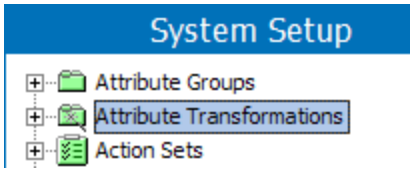
- **Create an Attribute Transformation Group** to organize the attribute transformations in your system.
- **Create an Attribute Transformation** to define one or more transformations to be used on your data.

These steps are defined below.

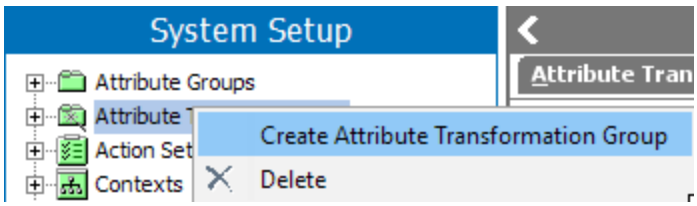
Create an Attribute Transformation Group

To create an attribute transformation group, follow the steps below:

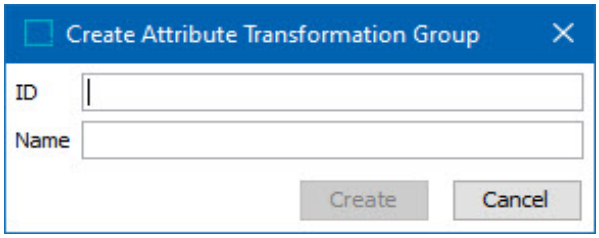
1. Go to System Setup, click on the **Attribute Transformation**, node.



2. Right-click on the top node, and then click **Create Attribute Transformation Group**.



A **Create Attribute Transformation Group** dialog box appears.

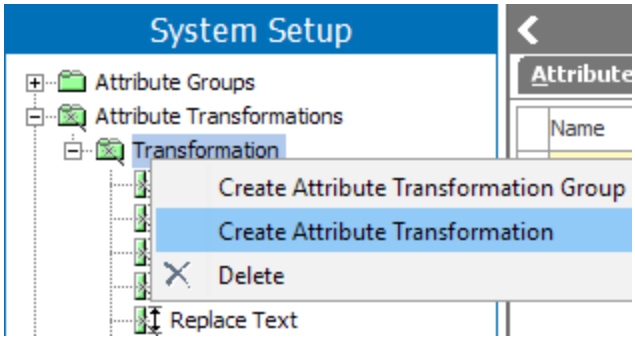


3. Type an ID and name for the attribute transformation group, and then click **Create**.
   The attribute transformation group is created, and you can now define an attribute transformation for it.

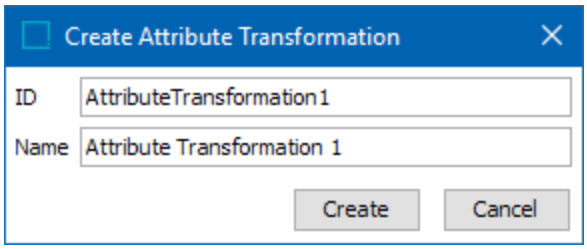
Create an Attribute Transformation

To create an attribute transformation, follow the steps below.

1. In System Setup, go to the **Attribute Transformation** node, and then select an Attribute Transformation group.
2. Right-click on the group and select **Create Attribute Transformation**.



3. A **Create Attribute Transformation Group** dialog box appears. Type an ID and name for the attribute transformation, and then click **Create**.

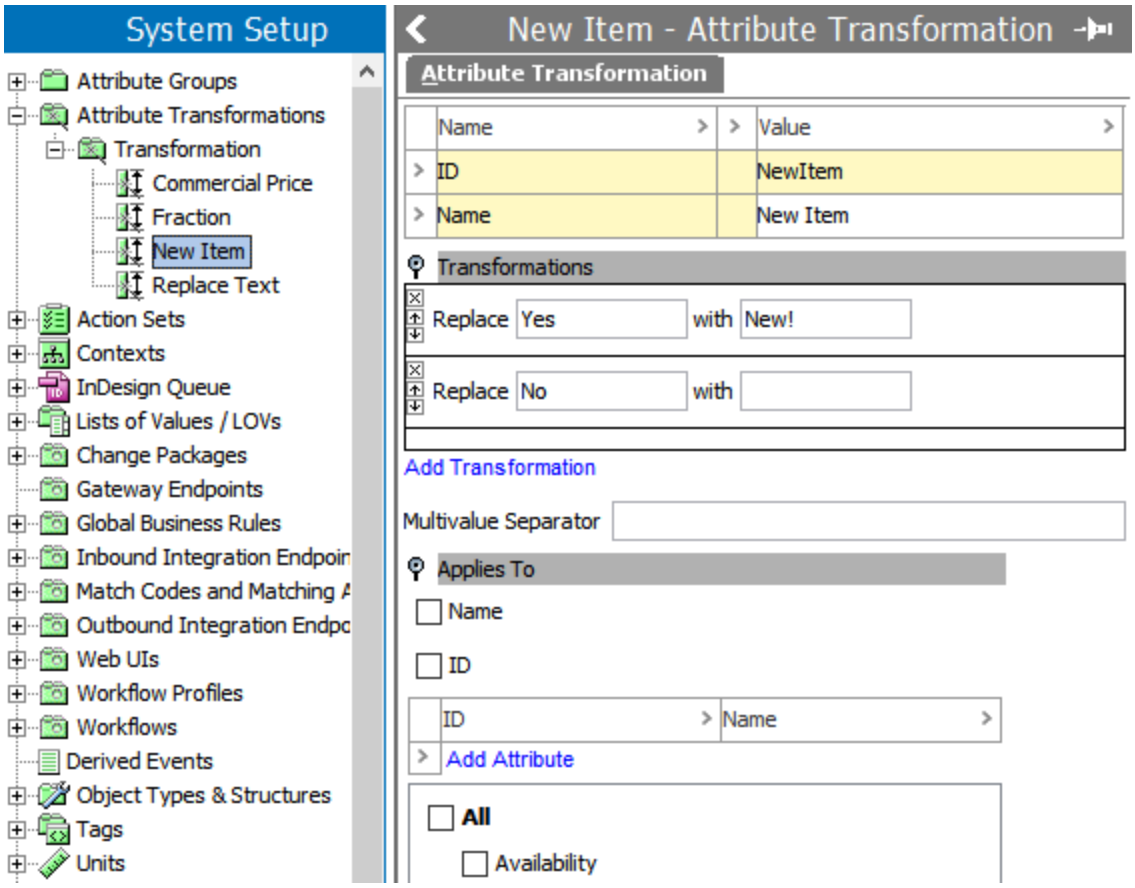


4. Once the attribute transformation is created, it will need to be set up with a transformation. Follow the steps in **Maintaining an Attribute Transformation** to complete the configuration.

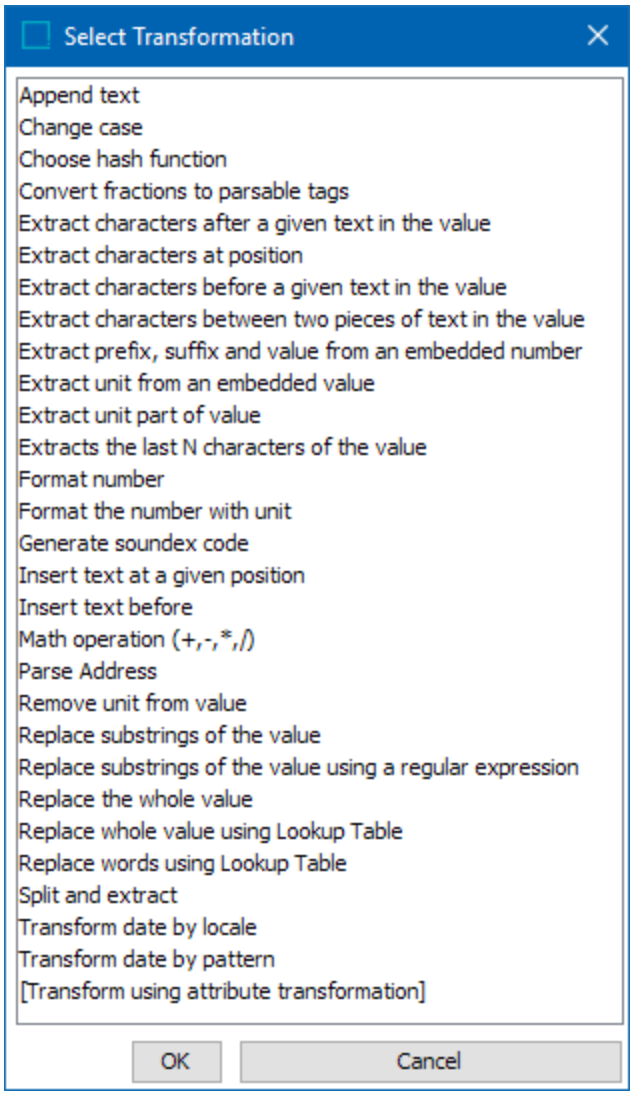
Configuring an Attribute Transformation

Once an attribute transformation is created, it can be configured by adding transformations.

1. In System Setup, open the Attribute Transformation node, and then select an Attribute Transformation to display the editor.



2. Under the Transformations flipper, click **Add Transformation** to display the Select Transformation dialog box appears with a list of rules to be used.



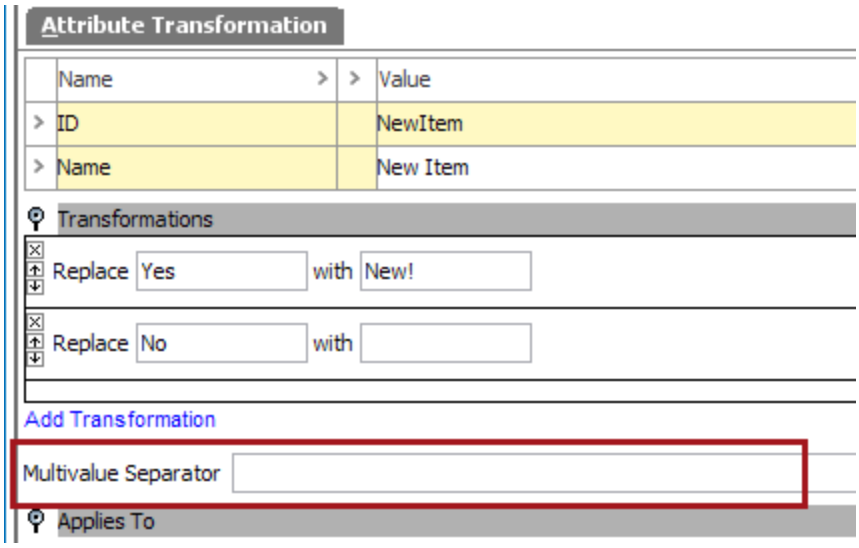
3. Select the relevant Transformations, and then click **OK**.

   For a description of the transformations, refer to the **Transformations** topic in the **Resource Materials** online help.

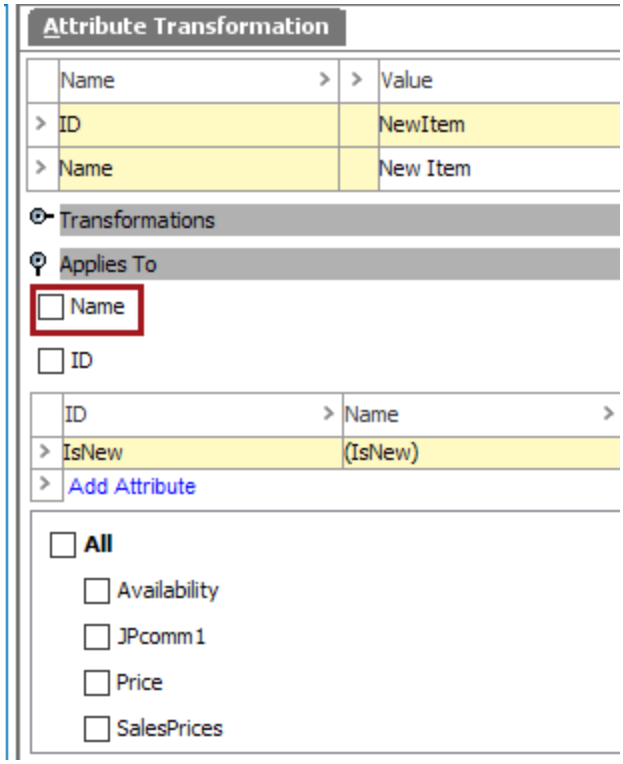
   Note: It is possible to create multiple sequential transformations as a rule, but you do have to be careful about the order in which the transformations are applied.

4. Under the Transformations flipper, in the **Multivalue Separator** field, type a character or character tag to be used to specify how values in a Multi-valued Attribute should be mounted / extracted. If a character is keyed in, then the character will be inserted between each value in the multi-valued Attribute.

   For example, if ',' is used as a separator, then a comma will be inserted between each value. Red, Green, Blue. If a character tag is keyed in, then the output formatting of the specific character tag is used to separate the values. So using </return> would result in a list with each value separated by a return.



5. Under the 'Applies To' flipper, check the **Name** checkbox if it should be legal to use the transformation on object names. An object name could be a product name.

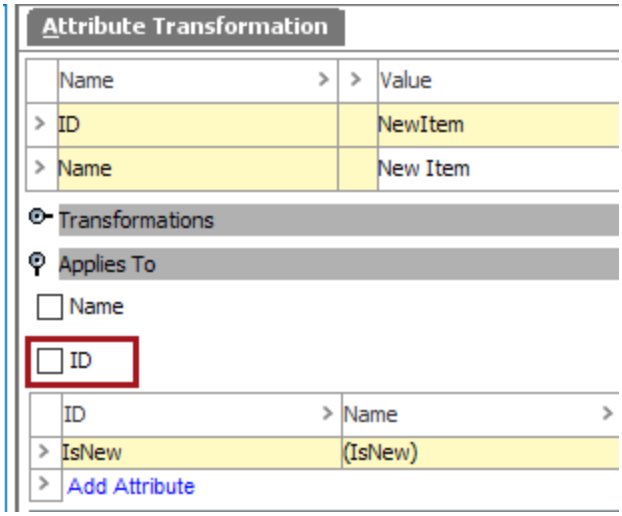


The transformation can be used in:

- Tables on columns or rows where an Object Name is extracted. Typically it would be used on a column or a row that lists product names. For more information about applying attribute transformations, refer to the **Applying Attribute Transformations to Tables** topic in the **Tables** documentation.

- InDesign on product templates. The product template can be set up to include the transformation, when an Object Name is mounted. Refer to the **Attribute Transformations in InDesign** topic in the **Print Publisher** documentation.

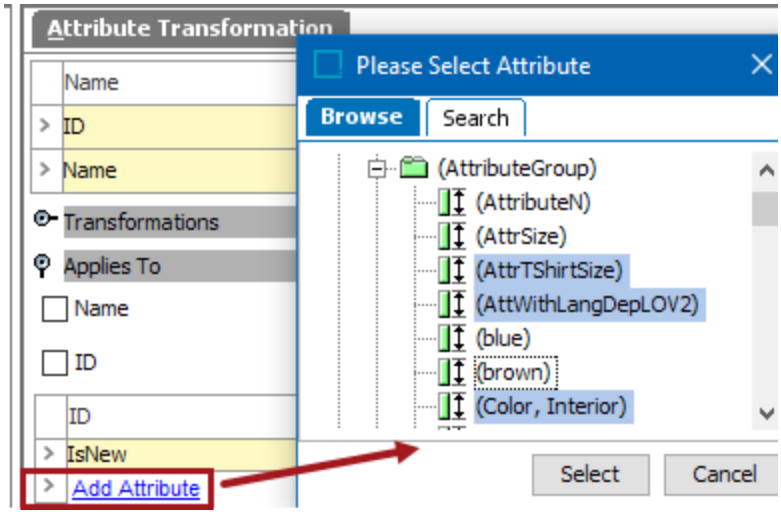
6. Under the 'Applies To' flipper, check the **ID** checkbox if it should be legal to use the Transformation on object IDs. For example, an object ID could be a product ID.



The transformation can be used in:

- Tables on columns or rows where an Object ID is extracted. Typically it would be used on a column or a row that lists product IDs. For more information about applying attribute transformations, refer to the **Applying Attribute Transformations to Table Content** topic in the **Tables** documentation.
- InDesign on product templates. The product template can be set up to include the transformation, when an Object ID is mounted. Refer to the **Attribute Transformations in Print Publisher** topic in the **Publisher (Adobe InDesign Integration)** documentation.

7. Under the Applies To flipper, click **Add Attribute**, and select an attribute to legalize the transformation on an attribute. A user can select multiple attributes at one time.



The transformation can be used in:

- Tables on columns or rows where attribute values are extracted. The transformation can be applied to columns or rows that list attribute values. For more information about applying attribute transformations, refer to the **Applying Attribute Transformations to Tables** topic in the **Tables** documentation.
- InDesign on product templates. The product template can be set up to include the transformation when an attribute is mounted. Refer to the **Attribute Transformations in InDesign** topic in the **Print Publisher** documentation.

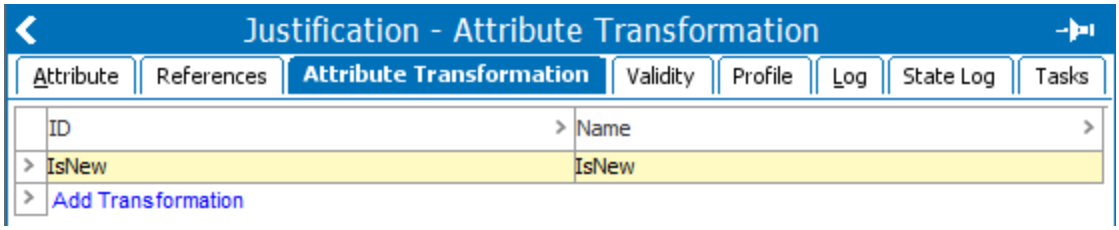
8. Under the 'Applies To' flipper, select a Terms List to legalize the transformation on a terms list.

   The transformation can be used in:

   - Tables on columns or rows where the contents of the specified terms list(s) are extracted. For more information about applying attribute transformations to tables, refer to the **Applying Attribute Transformations to Tables** topic in the **Tables** documentation.
   - InDesign on product templates. The product template can be set up to include the transformation when contents of the specific terms list(s) are mounted. Refer to the **Attribute Transformations in InDesign** topic in the **Print Publisher** documentation.

Important: If nothing is selected in the **Applies To** field, then the transformation will be considered as a Global Transformation. It means that it will be legalized on all types of Objects—Name, ID, Attributes and Terms Lists.

When an attribute is selected in the 'Applies To' flipper, the transformation is also displayed on the 'Attribute Transformation' tab when viewing the attribute editor.



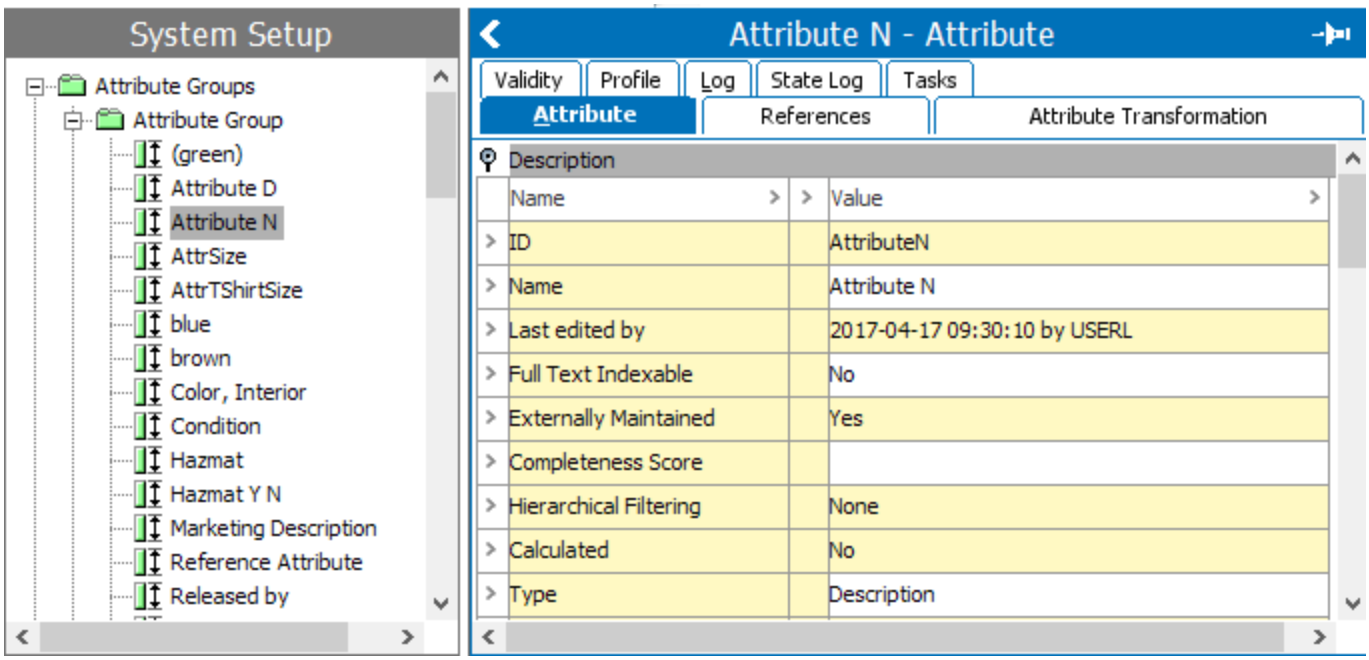
Attribute Types

When an attribute is created, it can be set to either a description attribute or a specification attribute based on the requirements. Similarly, changes can be done on existing attributes. For example, a certain description attribute is used to describe the product in detail. A user may now want to change the existing attribute from a description attribute, where the value entered is not for publishing, to a specification attribute, and publish the value entered for that attribute through different means.

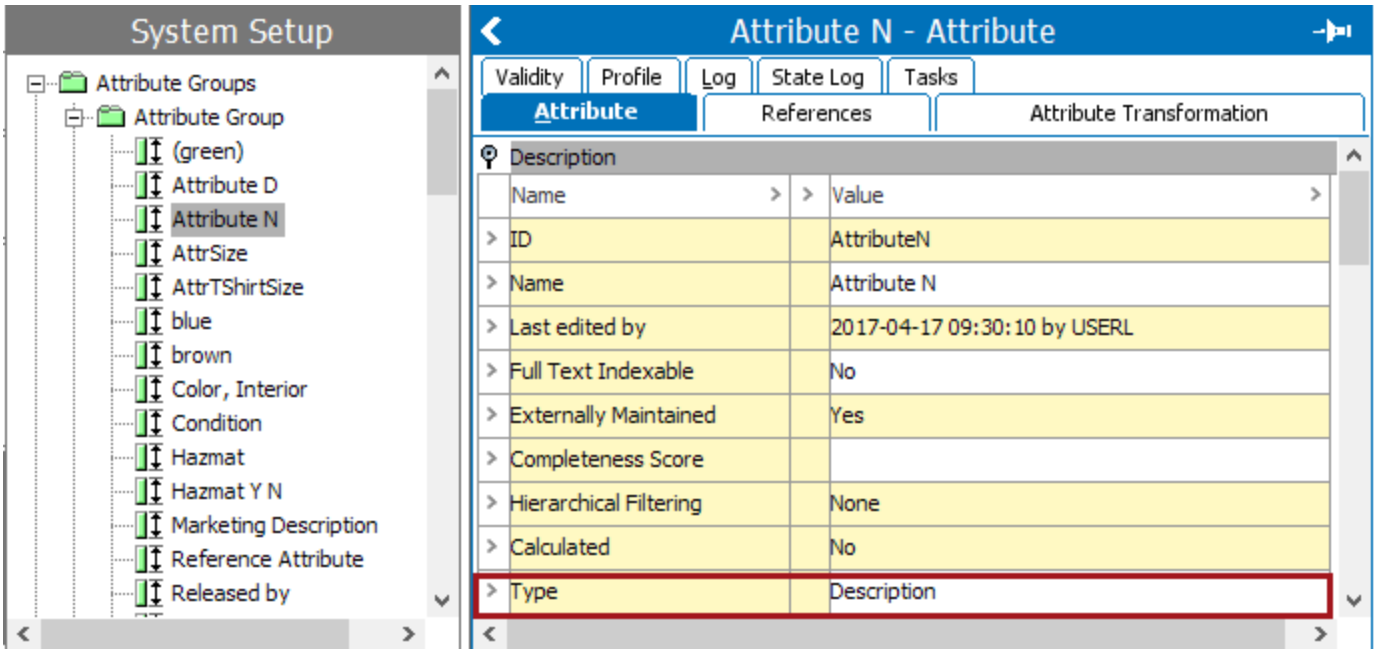
For more on attribute types, refer to the **Description Attributes** topic and the **Specification Attributes** topic in the **System Setup** documentation.

To set the attribute type, follow the directions below:

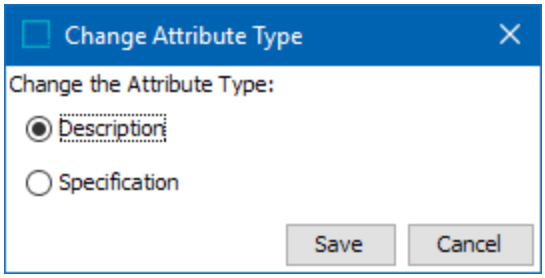
1. In System Setup, expand **Attribute Groups** node, expand the relevant attribute group, and then select the relevant attribute. The **Attribute** Editor appears.



2. Under the **Description** flipper, double-click the **Type** field.



The **Change Attribute Type** dialog box appears.



3. Select the relevant type, and click **Save**.

Note: When you are changing from a description type attribute to a specification type attribute, ensure that you link this attribute to the respective hierarchy. For more information, refer to the **Linking Specification Attributes** topic in the **System Setup** documentation.

Calculated Attributes

Calculated attributes are a special type of attributes whose values are not written in the database but are calculated on the fly. Calculated values are dynamic based on the context, version, product selected in the GUI or included in the export. Calculated values are generated when clicking on the object in GUI or when exported and are not stored in the database. The foundation for a calculated attribute is a functional programming language very similar to the language used for defining functions in Excel.

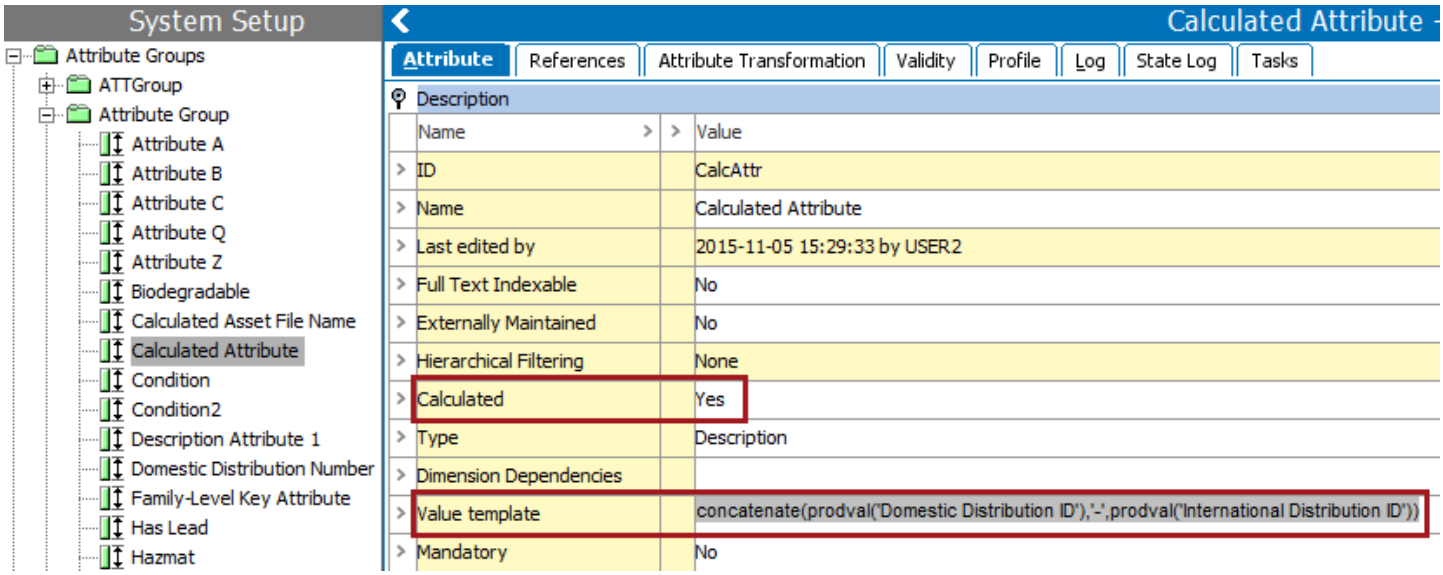
Note: Change Flags for events require that data is present in the database. Since calculated attribute values are not stored, no change flags are generated. For more information, refer to the **Limitations and Exceptions** section of the **Core Events** topic in the **System Setup** documentation.

For assistance in determining if a calculated attribute is the most efficient way to meet your requirements, refer to the **Calculated Attribute Considerations and Limitations** topic in the **Calculated Attributes** section of the **System Setup** documentation.

The value of a calculated attribute is determined by a value template which can be written in the Function Editor. Many functions can include an argument, which specifies the STEP data to be accessed. Functions can access information from references, compare data between objects, round numbers, modify text, and many other options. For a step-by-step guide to creating a calculated attribute, refer to the **Creating a Calculated Attribute** topic in the **Calculated Attributes** section of the **System Setup** documentation.

As an example, the following functions and arguments are included in the workbench image below:

- The 'concatenate' function takes a comma-delimited list of arguments. In this example, the three (3) arguments are: prodval('Domestic Distribution ID'), '-', and prodval('International Distribution ID').
- The 'prodval' function takes an argument of an attribute ID and retrieves the value of the attribute identified. In this example, the two (2) attribute IDs are: 'Domestic Distribution ID' and 'International Distribution ID'.
- Assuming that the 'Domestic Distribution ID' value is 1234 and the 'International Distribution ID' value is 5678, the result of this 'Value template' would be 1234-5678.



For additional use cases for calculated attributes, refer to the **Calculated Attribute Use Cases** topic.

In Web UI, calculated attributes can be identified, and their values can be overridden on the Attribute Management screen as described in the **Calculated Attributes in Web UI** section of the **Web User Interfaces** documentation.

Several parameters affect the export of calculated attributes and their values and/or empty values in both the Export Manager and in an OIEP. For more information, refer to the following topics in the Data Exchange documentation:

- STEP-ProductInformation Tag in STEPXML
- STEPXML Outbound Parameters
- CSV Format
- Excel Format
- Export Manager - Advanced
- Outbound Map Data - Transform
- OIEP - Event-Based - Output Templates Section

Calculated Attribute Considerations and Limitations

The decision to use a calculated attribute, and then the steps to create it to perform as expected, should include a consideration of the following topics:

- Deciding to Use a Calculated Attribute
- Setting up a Calculated Attribute
- Using Variables in a Calculated Attribute
- Optimizing Calculations using STEPXML
- Limit Performance Penalties for Calculations

Limitations

The following limitations exist because calculated attribute values are generated on-the-fly:

- Searching for the value of a calculated attribute is not possible since generating all possible calculations would cause substantial performance issues.
- Depending on the calculation formula, the revision history of an object does not necessarily display the calculated attribute value that was in effect at the time of the revision.

Deciding to Use a Calculated Attribute

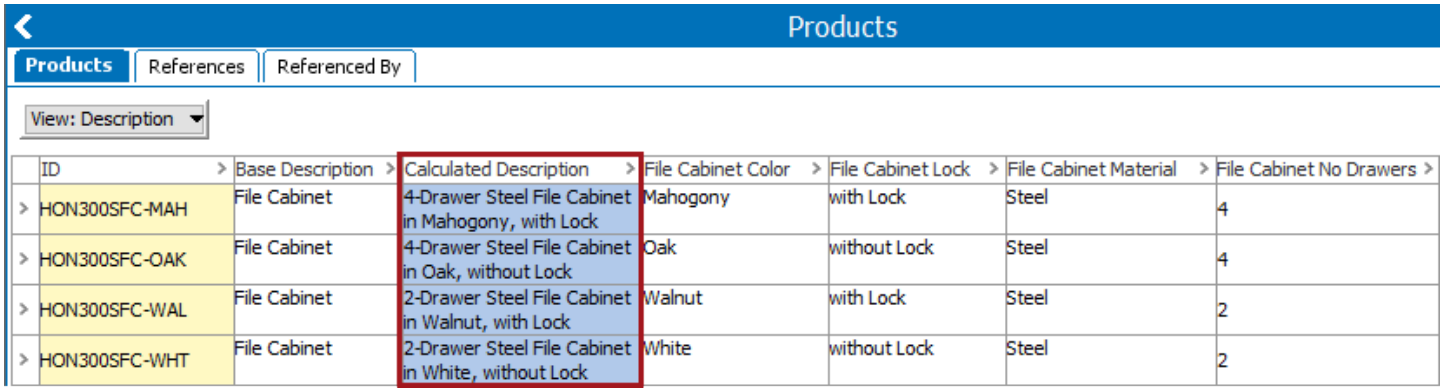
Although many functions can be accomplished using a calculated attribute, it is best to carefully consider when a calculated attribute is the most efficient way to address a requirement. Because a calculated attribute is recalculated each time it is viewed in an editor, and when it is exported (unless explicitly set to not calculate), overuse can lead to system inefficiency and user dissatisfaction The type of data involved helps determine if a calculated attribute would be considered recommended practice, as defined in the sections below.

When deciding to use a calculated attribute or not, start with the following general rules:

- Static data, such as attribute values that rarely change, seldom benefits from a calculated attribute since the result is also static.
- Fluid data, such as referenced data where the target of the reference does change, often benefits from calculated attribute since the result is rarely the same.

Static Data Example

Consider the following five (5) attributes that are used together to create a dynamic product description: Base Description, File Cabinet Color, File Cabinet Lock, File Cabinet Material, and File Cabinet No Drawers.



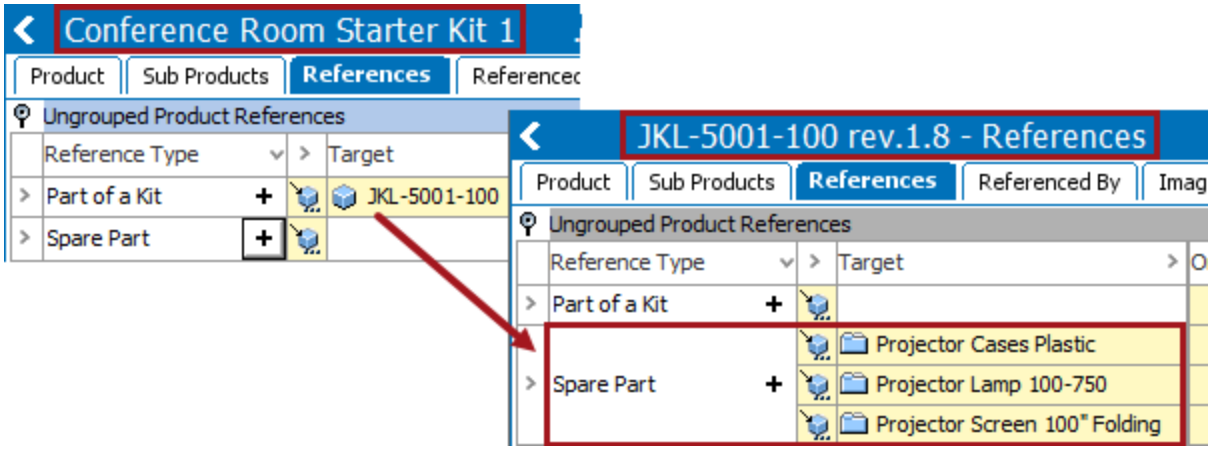
ID	Base Description	Calculated Description	File Cabinet Color	File Cabinet Lock	File Cabinet Material	File Cabinet No Drawers
HON300SFC-MAH	File Cabinet	4-Drawer Steel File Cabinet in Mahogony, with Lock	Mahogony	with Lock	Steel	4
HON300SFC-OAK	File Cabinet	4-Drawer Steel File Cabinet in Oak, without Lock	Oak	without Lock	Steel	4
HON300SFC-WAL	File Cabinet	2-Drawer Steel File Cabinet in Walnut, with Lock	Walnut	with Lock	Steel	2
HON300SFC-WHT	File Cabinet	2-Drawer Steel File Cabinet in White, without Lock	White	without Lock	Steel	2

In the image above, the calculated attribute (named Calculated Description) compiles each value into a single field. However, once an individual value is added for these attributes, they are not likely to change. If any one of the values did change, it would likely not be the same product. So using a calculated attribute in this case would mean that each time the data is displayed in an editor, or exported, the calculation runs but always returns the same result. Depending on the number of objects using this same calculation, the increased processing time could be significant. In this situation, it would be better to use a business rule to populate a standard specification attribute with the same information.

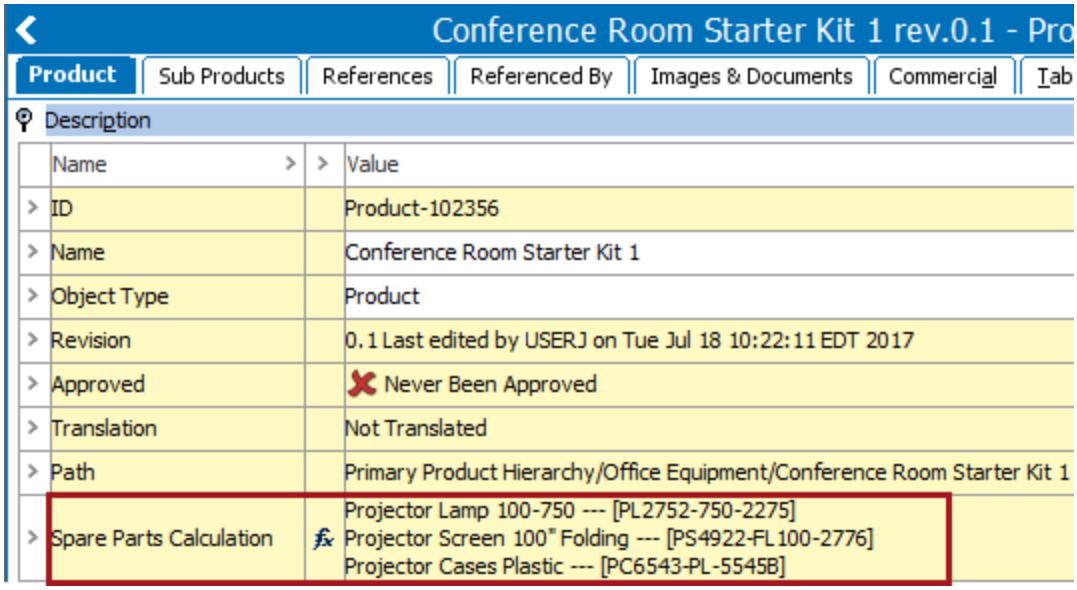
Fluid Data Example

Consider the following parts of a kit, where each includes product-to-product references. The requirement is to use the values on the target of the secondary reference.

In the example below, the 'Conference Room Starter Kit 1' References tab includes a reference to a single projector (with the ID JKL-5001-100) via the 'Part of a Kit' reference type. The projector, in turn, references three (3) other products via the 'Spare Part' reference type, as shown on the JKL-5001-100 References tab.



The screenshot below displays how these spare parts are displayed on the 'Conference Room Starter Kit 1' object Product tab using the calculated attribute named 'Spare Parts Calculation.'



In this scenario, the referenced objects are expected to be updated regularly as new products are added to the line. This fluid data would benefit from a calculated attribute to ensure the updates are displayed.

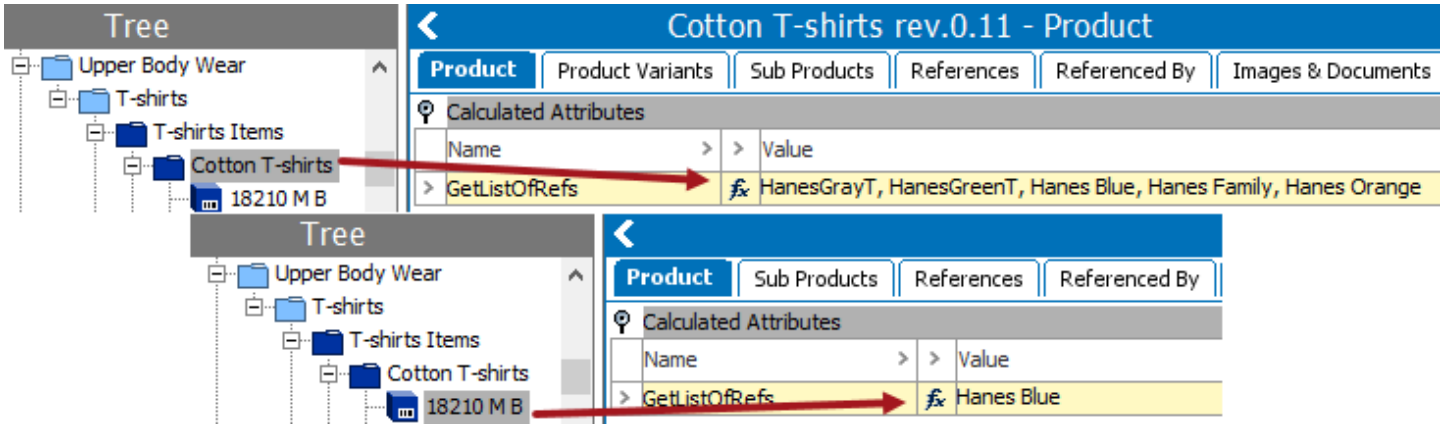
Setting up a Calculated Attribute

Once you have determined that a calculated attribute is the most efficient way to address your requirement, review the following points to determine the necessary settings within the calculated attribute editor.

Description or Specification

Calculated attributes, like standard attributes, can be set to description or specification.

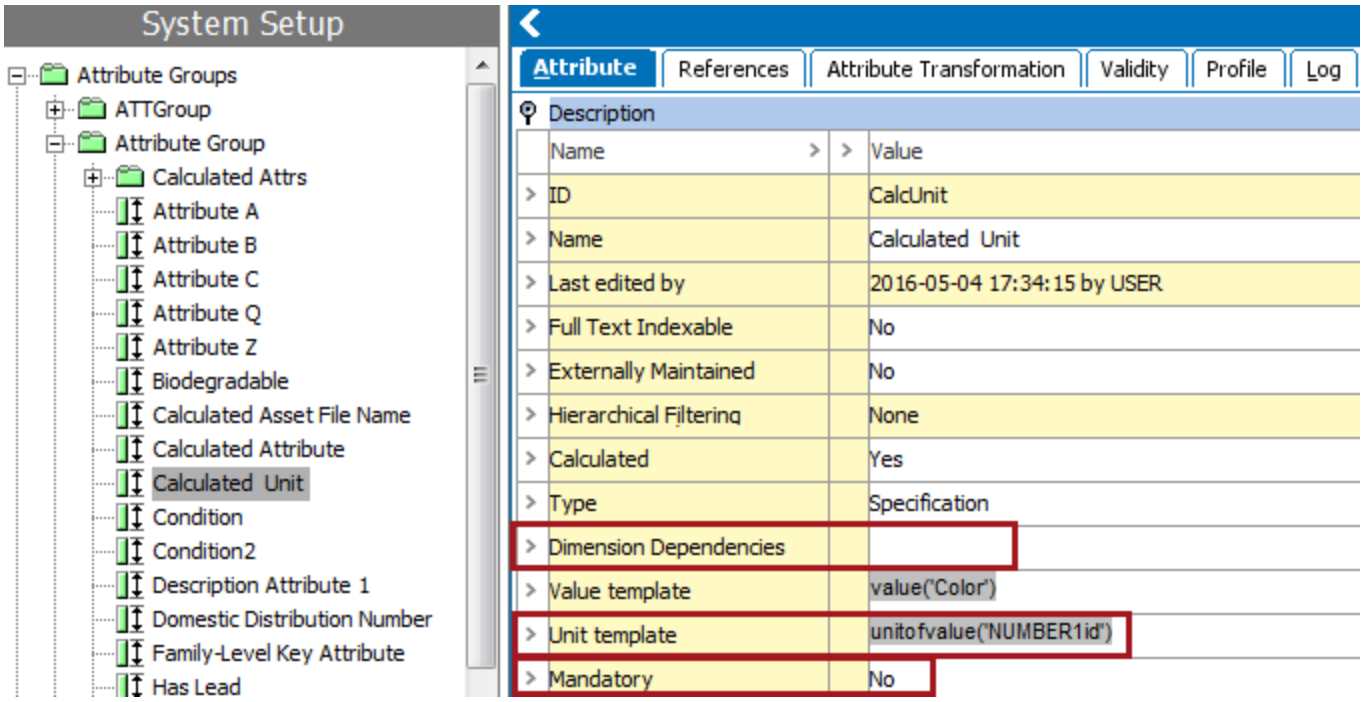
- **Calculated description attributes** can be made valid to objects based on the object type, just as any other description attribute. Thus a calculated description attribute can be made valid for an object, but as with all description attributes, the formula is not inherited. For more information, refer to the **Description Attributes** documentation.
- **Calculated specification attributes** allow the formula ('Function') to inherit down to subordinate products. The calculation will always be performed at each subordinate level. Thus, calculated attribute values are not inherited, only the formula is inherited. For more information, refer to the **Specification Attributes** documentation.



The following information identifies considerations when implementing a calculated attribute instead of a standard attribute.

Description Flipper

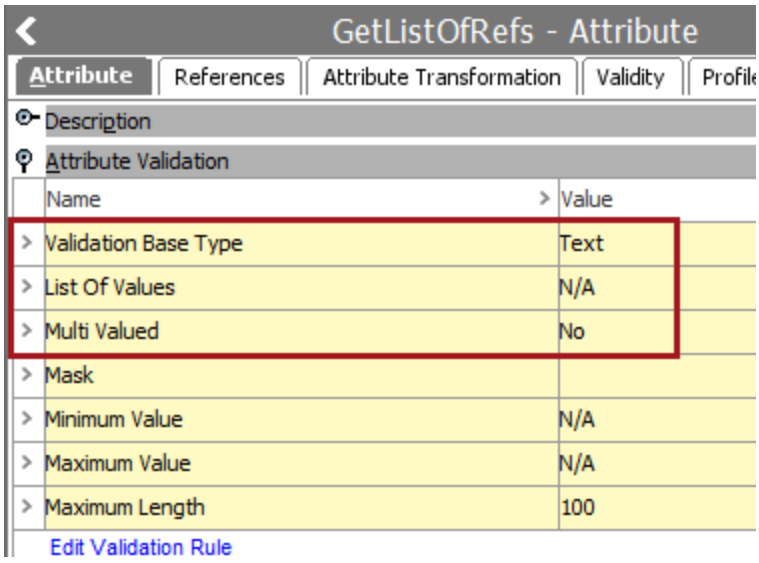
For all attributes, parameters describing the attribute are set in System Setup on the Attribute tab, under the Description flipper.



- **Mandatory** - Although an attribute with the parameter 'Calculated = Yes' can also have the parameter 'Mandatory = No', this is not advised. Since an actual value of a calculated attribute is not stored in the database (only the method to calculate the value), setting a calculated attribute to mandatory will prevent the attribute from being approved since it will never have a value.
- **Dimension Dependencies** - A calculated attribute only enforces the selected dimension dependencies when overriding the calculated value. A calculated attribute may reference attribute values, or reference objects that are dimension dependent, so the result of a calculated attribute is not constrained by the dimension dependency set on the attribute itself, but an override to the calculated value must respect the dimension dependency. For more information about setting calculated attributes to be dimension dependent, refer to the **Calculated Attribute Settings** within the **Users and Groups** section of the **System Setup** documentation.
- **Units** - When a calculated attribute uses the validation base type of Embedded Number, Fraction, Integer, Number, Numeric Text, or Numeric Text (exclude tags), the **Unit template** field displays. This field can hold a static Unit ID and/or an expression that evaluates to a Unit ID.

Attribute Validation Flipper

For all attributes, parameters for Attribute Validation are set in System Setup on the Attribute tab, under the Attribute Validation flipper.



- **Validation Base Type** -Validation base type only takes effect when the calculated value is manually overridden, even when it is selected for a calculated attribute. It is up to the formula in the calculation to control syntax of the resolved value, including any numeric min / max constraints, or the maximum length of text. A calculated value may in fact violate the validity settings, unless a calculated attribute is given the base validity of 'Integer' with minimum and maximum values, then any override to the calculated value must conform to that validity.
- **Validation Base Type of List of Values (LOV)** - Calculated attributes cannot have a validation base type of List of Values (LOV). Changing this parameter on a calculated attribute is not allowed. Attempting to update an attribute with an LOV validation base type to be calculated displays an error.
- **Multi Valued** - Calculated attributes cannot have the Multi Valued parameter set to Yes. Changing this parameter on a calculated attribute is not allowed. Attempting to update a multi-valued attribute to be calculated displays an error.

Using Variables in a Calculated Attribute

Once you have determined that a calculated attribute is a good choice, next consider if one or more variables would be useful. A variable is used to separate each element of the calculation into its own section. For more information on variables, refer to the **Variable Functions** documentation.

Note: When the calculation required involves many parts, it is a good idea to start with a small element, test and verify the results, before adding additional elements.

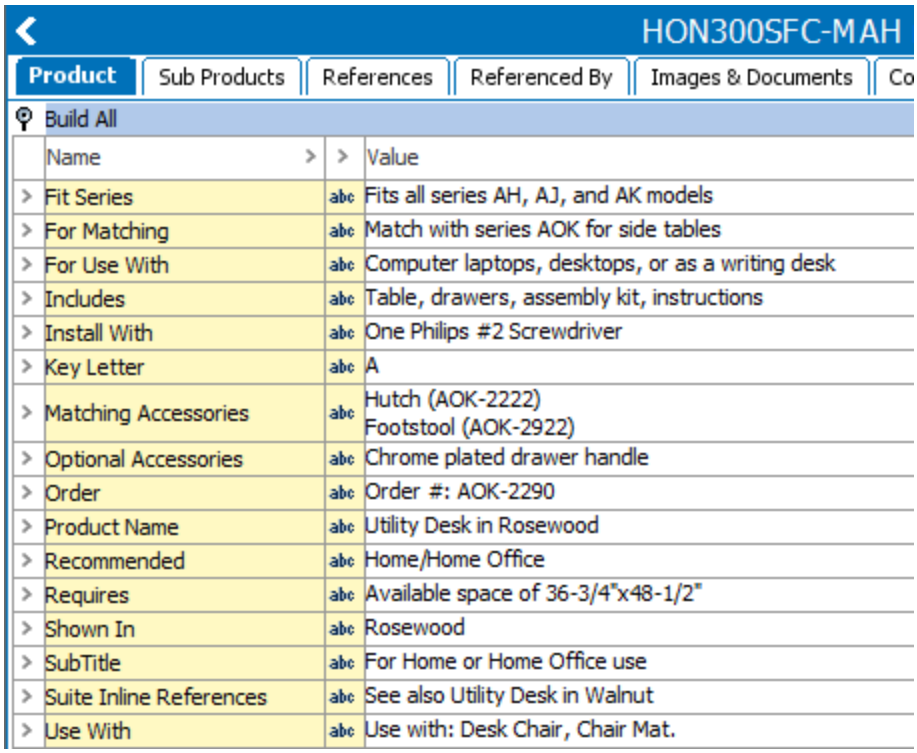
Functional and lengthy calculations without variables are harder to manage and troubleshoot later. To illustrate, the same calculation is written below; both without variables, and with variables.

The version that uses variables makes troubleshooting and maintenance easier for the following reasons:

- Identifying where a new attribute value should be inserted into the list is more obvious.
- Finding a missing parenthesis or comma is easier with fewer nested functions.
- Modifying a single element involves only the few defined lines in a variable, rather than having to first determine where the functions are in the larger calculation.

Example Input

The website requirement includes displaying the following 17 attribute values (when the exist) in a single block, including styling and introductory text to introduce the value.



Name	Value
Fit Series	Fits all series AH, AJ, and AK models
For Matching	Match with series AOK for side tables
For Use With	Computer laptops, desktops, or as a writing desk
Includes	Table, drawers, assembly kit, instructions
Install With	One Philips #2 Screwdriver
Key Letter	A
Matching Accessories	Hutch (AOK-2222) Footstool (AOK-2922)
Optional Accessories	Chrome plated drawer handle
Order	Order #: AOK-2290
Product Name	Utility Desk in Rosewood
Recommended	Home/Home Office
Requires	Available space of 36-3/4"x48-1/2"
Shown In	Rosewood
SubTitle	For Home or Home Office use
Suite Inline References	See also Utility Desk in Walnut
Use With	Use with: Desk Chair, Chair Mat.

Example Without Variables

Using the function editor, the following value template is created without variables. Notice that the first concatenate function wraps all of the attributes that should be included in the output. To make a change in one attribute, or the formatting applied, requires locating and changing only the functions for that attribute.

Note that many character tags ([PN], [ST], [FT], etc.) are being used to style the text for output. For more information on tags, refer to the **Tags** documentation.

```
concatenate(
if(exact(prodval("KeyLetter"),""),concatenate("[PN]",prodval("ProductName")),
concatenate("[PN]",prodval("KeyLetter"),". ",prodval("ProductName"))),
if(exact(prodval("SubTitle"),""),"",concatenate("
[ST]",prodval("SubTitle"))),
if(exact(prodval("Features"),""),"",concatenate("
[FT]",prodval("Features"))),
if(exact(prodval("MatchingAccessories"),""),"",concatenate("
[FT]Matching Accessories:
[FT]",prodval("MatchingAccessories"))),
if(exact(prodval("Requires"),""),"",concatenate("
[RQ]Requirements: ",prodval("Requires"))),
if(exact(prodval("ForUseWith"),""),"",concatenate("
[FT]Suitable for: ",prodval("ForUseWith"))),
if(exact(prodval("ForMatching"),""),"",concatenate("
[FT]For Matching: ",prodval("ForMatching"))),
if(exact(prodval("InstallWith"),""),"",concatenate("
[FT]Can be installed with: ",prodval("InstallWith"))),
if(exact(prodval("Order"),""),"",concatenate("
[FT]",prodval("Order"))),
if(exact(prodval("SuiteInlineReferences"),""),"",concatenate("
[FT]",prodval("SuiteInlineReferences"))),
if(exact(prodval("UseWith"),""),"",concatenate("
[FT]",prodval("UseWith"))),
if(exact(prodval("ShownIn"),""),"",concatenate("
[SI]Shown in: ",prodval("ShownIn"))),
if(exact(prodval("Recommended"),""),"",concatenate("
[FT]Recommended Usage: ",prodval("Recommended"))),
if(exact(prodval("FitSeries"),""),"",concatenate("
[FS]Fit Series:
[FT]",prodval("FitSeries"))),
if(exact(prodval("OptionalAccessories"),""),"",concatenate("
[FT]Optional: ",prodval("OptionalAccessories"))),
if(exact(prodval("Includes"),""),"",concatenate("
[FT]Includes: ",prodval("Includes")))
)
```

Example With Variables

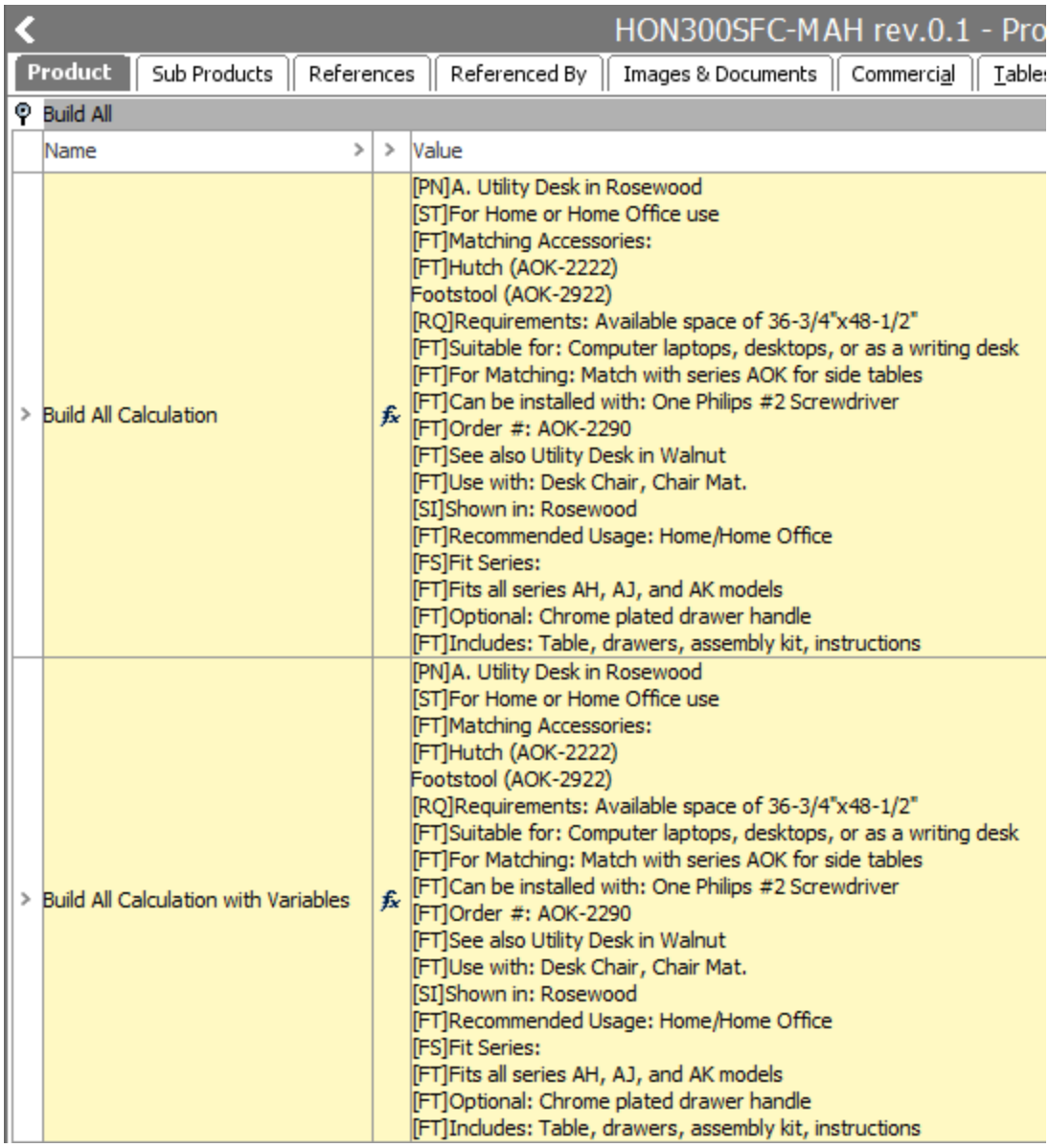
Using the function editor, the following value template is created and includes variables. Notice that each attribute that should be output is addressed in a single variable at the top. The final concatenate function then calls each of the variables and separates them with a hard return ("\n"). To make a change in one attribute, or to the formatting applied, locate the variable for that attribute.

```
{
pnnokey := concatenate("[PN]",prodval("ProductName")),
pnwkey := concatenate("[PN]",prodval("KeyLetter"),". ",prodval("ProductName")),
keyletter := if(exact(prodval("KeyLetter"),""),pnnokey,pnwkey),
subt := if(exact(prodval("SubTitle"),""),"",concatenate("[ST]",prodval("SubTitle"))),
feat := if(exact(prodval("Features"),""),"",concatenate("[FT]",prodval("Features"))),
match := if(exact(prodval("MatchingAccessories"),""),"",concatenate("[FT]Matching Accessories:","\n","[FT]",prodval("MatchingAccessories"))),
req := if(exact(prodval("Requires"),""),"",concatenate("[RQ]Requirements: ",prodval("Requires"))),
foruse := if(exact(prodval("ForUseWith"),""),"",concatenate("[FT]Suitable for: ",prodval("ForUseWith"))),
formatch := if(exact(prodval("ForMatching"),""),"",concatenate("[FT]For Matching: ",prodval("ForMatching"))),
install := if(exact(prodval("InstallWith"),""),"",concatenate("[FT]Can be installed with: ",prodval("InstallWith"))),
order := if(exact(prodval("Order"),""),"",concatenate("[FT]",prodval("Order"))),
suite := if(exact(prodval("SuiteInlineReferences"),""),"",concatenate("[FT]",prodval("SuiteInlineReferences"))),
usewith := if(exact(prodval("UseWith"),""),"",concatenate("[FT]",prodval("UseWith"))),
shown := if(exact(prodval("ShownIn"),""),"",concatenate("[SI]Shown in: ",prodval("ShownIn"))),
rec := if(exact(prodval("Recommended"),""),"",concatenate("[FT]Recommended Usage: ",prodval("Recommended"))),
fit := if(exact(prodval("FitSeries"),""),"",concatenate("[FS]Fit Series:","\n","[FT]",prodval("FitSeries"))),
option := if(exact(prodval("OptionalAccessories"),""),"",concatenate("[FT]Optional: ",prodval("OptionalAccessories"))),
includes := if(exact(prodval("Includes"),""),"",concatenate("[FT]Includes: ",prodval("Includes")))
}
concatenate(keyletter,"\n",subt,feat,"\n",match,"\n",req,"\n",foruse,"\n",formatch,"\n",install,"\n",order,"\n",suite,"\n",usewith,
"\n",shown,"\n",rec,"\n",fit,"\n",option,"\n",includes)
```

Example Output

Regardless of the method used to create the value template, the output contains the same static text and values as shown below in the following two resulting attributes.

- Build All Calculation - shows the result of the calculated attribute created without variables.
- Build All Calculation with Variables - shows the result of the calculated attribute created using variables.


HON300SFC-MAH rev.0.1 - Pro
Product
Sub Products
References
Referenced By
Images & Documents
Commercial
Tables
Build All
Name
Value
Build All Calculation
[PN]A. Utility Desk in Rosewood
[ST]For Home or Home Office use
[FT]Matching Accessories:
[FT]Hutch (AOK-2222)
Footstool (AOK-2922)
[RQ]Requirements: Available space of 36-3/4"x48-1/2"
[FT]Suitable for: Computer laptops, desktops, or as a writing desk
[FT]For Matching: Match with series AOK for side tables
[FT]Can be installed with: One Philips #2 Screwdriver
[FT]Order #: AOK-2290
[FT]See also Utility Desk in Walnut
[FT]Use with: Desk Chair, Chair Mat.
[SI]Shown in: Rosewood
[FT]Recommended Usage: Home/Home Office
[FS]Fit Series:
[FT]Fits all series AH, AJ, and AK models
[FT]Optional: Chrome plated drawer handle
[FT]Includes: Table, drawers, assembly kit, instructions
Build All Calculation with Variables
[PN]A. Utility Desk in Rosewood
[ST]For Home or Home Office use
[FT]Matching Accessories:
[FT]Hutch (AOK-2222)
Footstool (AOK-2922)
[RQ]Requirements: Available space of 36-3/4"x48-1/2"
[FT]Suitable for: Computer laptops, desktops, or as a writing desk
[FT]For Matching: Match with series AOK for side tables
[FT]Can be installed with: One Philips #2 Screwdriver
[FT]Order #: AOK-2290
[FT]See also Utility Desk in Walnut
[FT]Use with: Desk Chair, Chair Mat.
[SI]Shown in: Rosewood
[FT]Recommended Usage: Home/Home Office
[FS]Fit Series:
[FT]Fits all series AH, AJ, and AK models
[FT]Optional: Chrome plated drawer handle
[FT]Includes: Table, drawers, assembly kit, instructions

Optimizing Calculations Using STEPXML

When exporting calculated values in STEPXML files using cross-context mode, STEP will attempt to perform some optimization to avoid repetitive calculations per context. In this scenario, the following limitations exist:

1. None of the attributes used in the calculation can be dimension dependent.
2. There must be no iterations in the calculation that involve any kind of references or child products. Only attribute values that are directly on the selected object (or, if a product, an inherited value from a higher level) are allowed.
3. The calculated attribute cannot rely on the value from another calculated attribute, since the value does not actually exist in the database.

If these criteria are met, then the system will calculate the value once and will export that value for each of the selected contexts. This can result in a reduction of the time to create the exported STEPXML file.

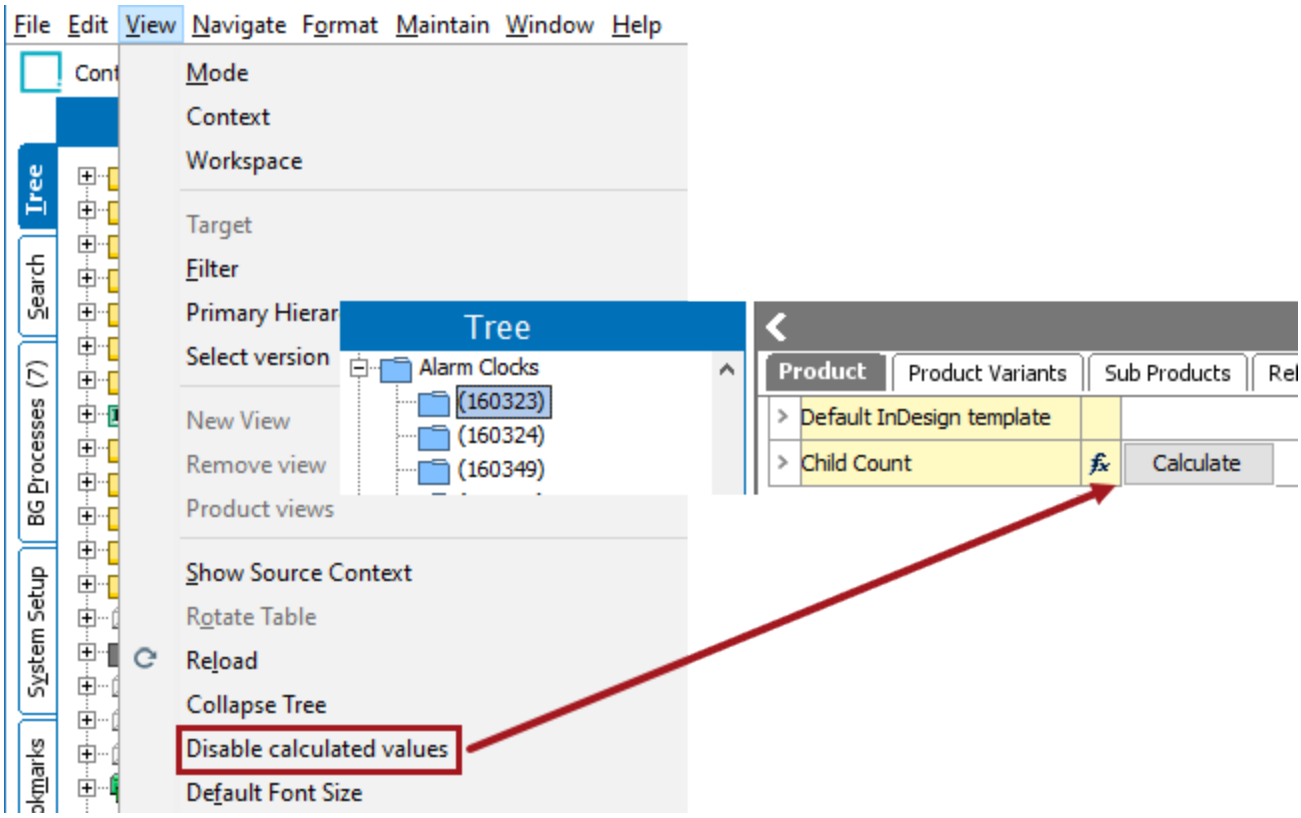
If these criteria are not met, then the calculation will be performed per context, which can increase the time to create the exported STEPXML file.

For more information on the STEPXML format, refer to the **STEPXML Format** topic in the **Data Exchange** documentation.

Limit Performance Penalties for Calculations

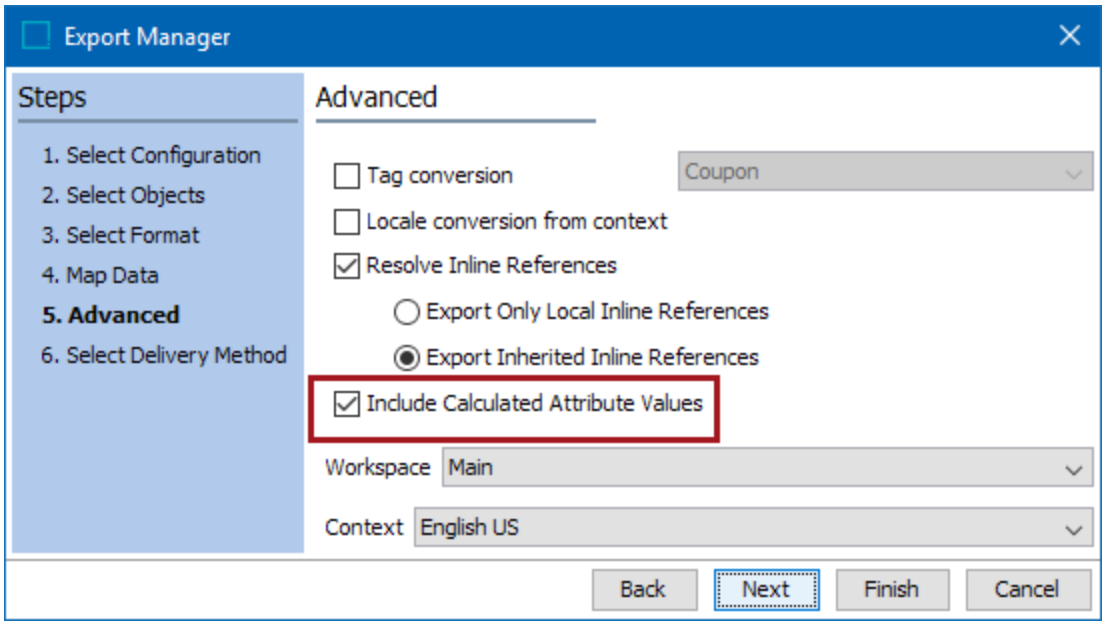
There is a performance penalty whenever the values are to be calculated. Complex calculations affect the time it takes to load editors and export objects.

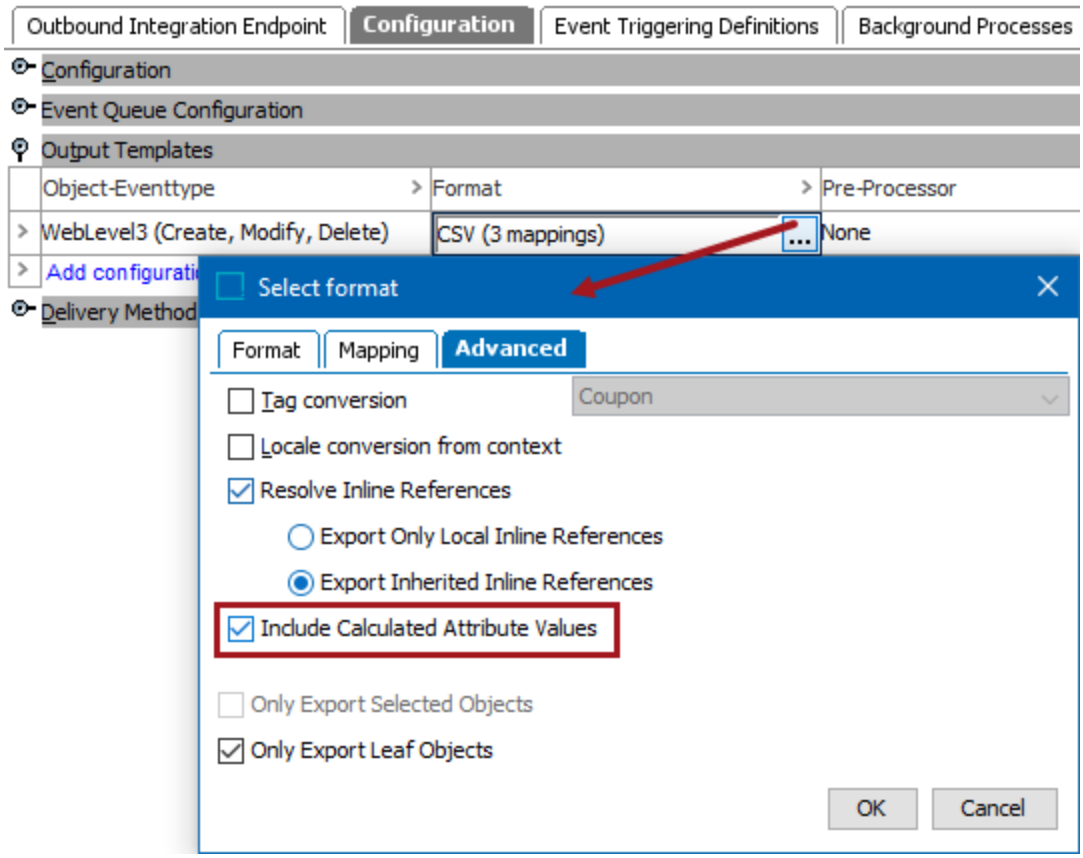
To limit potential performance penalties in editors, it is possible to disable the calculated attributes in workbench by setting View > **Disable calculated values**. Once disabled, calculated attributes are displayed with a calculate button. Clicking the button displays the calculated value for only that attribute.



To limit potential performance penalties in outbound data, the Export Manager and OIEP configuration include the option to resolve (or ignore) Calculated Attributes during export.

- When the option is checked, the output includes the calculated value.
- When not checked, even if the attribute is mapped, the value is blank. This provides for a quicker output time.


Export Manager
Steps
1. Select Configuration
2. Select Objects
3. Select Format
4. Map Data
5. Advanced
6. Select Delivery Method
Advanced
Tag conversion
Coupon
Locale conversion from context
Resolve Inline References
Export Only Local Inline References
Export Inherited Inline References
Include Calculated Attribute Values
Workspace
Main
Context
English US
Back
Next
Finish
Cancel


Outbound Integration Endpoint
Configuration
Event Triggering Definitions
Background Processes
Configuration
Event Queue Configuration
Output Templates
Object-Eventtype
Format
Pre-Processor
WebLevel3 (Create, Modify, Delete)
CSV (3 mappings)
None
Add configurati
Delivery Method
Select format
Format
Mapping
Advanced
Tag conversion
Coupon
Locale conversion from context
Resolve Inline References
Export Only Local Inline References
Export Inherited Inline References
Include Calculated Attribute Values
Only Export Selected Objects
Only Export Leaf Objects
OK
Cancel

Calculated Attribute Use Cases

Some of the countless ways to use a calculated attribute are defined in the following examples.

For a brief overview and introduction to some of the possibilities, refer to the **Introduction to Value Templates** topic.

Examples

For simple value templates that demonstrate the purpose and result of each function, refer to the following:

- Attribute
- Commercial
- Conditional
- Date
- List
- Number
- Other
- Text
- Variable

Scenarios

For more detailed scenarios, formula templates and results, refer to the following:

- Asset Push File Name
- Classification
- Commercial Data
- Comparing Localized Values
- Identifying Child Objects
- Including Parent Info on Child
- New Product Indicator
- Override
- Product Description
- Reference
- Total Cost of Materials
- Units

Introduction to Value Templates

This section provides a way to understand the relationship between the attribute values, a value template, and the calculated attribute result.

Unit Considerations

In order to convert units relevant units must have a Base Conversion defined in the units area of System Setup, and the unit template field must be available when calculated attributes have a numeric validation base type.

In some of the examples below, the prodval() function includes the 'unitid'. This 'unitid' is only needed if a user wants to convert the values to a specific unit. If the unit is already the correct type of unit, there is no need to use prodval("AttributeID", "Unitid"), the user can just use prodval("AttributeID").

Attribute Values

The functions ‘prodval’ and ‘value’ act the same in retrieving the attribute values in STEP.

The examples in this section use the following set of attribute values:

Attribute	Height	Width	Length	Color Front	Color Back
Value	22 cm	39 cm	54 cm	Black	White

Example Value Templates and Results

In the table below, the Description column describes some commonly used value template types, the Value Template column lists examples that can be copied and pasted into the Function Editor, and the Results column displays the resulting calculated attribute values when the example attribute values (listed above) are used with each value template.

Description	Value Template	Results
Box Shape: Displays if the bottom of the box is square or not.	if(value('Length') = value('Width'), 'Square', 'Not Square')	Not Square
Color: Compares the front and back colors of the current product and displays the result.	if(exact(value('Color Front'), value('Color Back')), 'Same color front and back', 'Different colors front and back')	Different colors front and back

Description	Value Template	Results
Dimensions: Displays the dimension of the current product in the form 'Height x Width x Length'	CONCATENATE(simplevalue('Height'), ' x ',simplevalue ('Width'), ' x ', simplevalue('Length'))	22 cm x 39 cm x 54 cm
Size for cabin baggage: An air carrier has a limit on the size of the cabin baggage, namely: 1) max dimension allowed is 23 x 40 x 55 cm, and 2) the sum of these must be max 115 cm. This calculated attribute delivers the result of the calculation of size with respect to both rules.	IF (AND (OR (AND (PRODVAL ("Height", "unece.unit.CMT") <= 23, PRODVAL ("Length", "unece.unit.CMT") <= 40, PRODVAL ("Width", "unece.unit.CMT") <= 55), AND (PRODVAL ("Height", "unece.unit.CMT") <= 23, PRODVAL ("Length", "unece.unit.CMT") <= 55, PRODVAL ("Width", "unece.unit.CMT") <= 40), AND (PRODVAL ("Height", "unece.unit.CMT") <= 40, PRODVAL ("Length", "unece.unit.CMT") <= 55, PRODVAL ("Width", "unece.unit.CMT") <= 23), AND (PRODVAL ("Height", "unece.unit.CMT") <= 40, PRODVAL ("Length", "unece.unit.CMT") <= 23, PRODVAL ("Width", "unece.unit.CMT") <= 55), AND (PRODVAL ("Height", "unece.unit.CMT") <= 55, PRODVAL ("Length", "unece.unit.CMT") <= 23, PRODVAL ("Width", "unece.unit.CMT") <= 40), AND (PRODVAL ("Height", "unece.unit.CMT") <= 55, PRODVAL ("Length", "unece.unit.CMT") <= 40, PRODVAL ("Width", "unece.unit.CMT") <= 23)), PRODVAL ("Height", "unece.unit.CMT") + PRODVAL ("Length", "unece.unit.CMT") + PRODVAL ("Width", "unece.unit.CMT") <= 115),"Size OK for cabin baggage", "Too Big for cabin baggage")	Size OK for cabin baggage
Size for special storage: The product must have either width or length greater than 40 cm, but not both.	IF (AND (OR (PRODVAL ("Length") >40, PRODVAL ("Width") > 40), NOT (AND (PRODVAL ("Length") > 40, PRODVAL ("Width") >40))),	OK - One and only one dimension > 40

Description	Value Template	Results
	"OK - One and only one dimension > 40","Not OK - none or two dimensions > 40")	
Size for standard package: Since a delivery service charges extra for oversized packages, this could be used to determine if a dimension exceeds 40 cm.	IF (AND (PRODVAL ("Height", "unece.unit.CMT") <= 40, PRODVAL ("Width","unece.unit.CMT") <= 40, PRODVAL ("Length","unece.unit.CMT") <= 40),"Size OK for standard package", "Too big for standard package")	Too big for standard package
Volume: Calculates and displays the volume of the current product.	prodval("Height","unece.unit.CMT") *prodval("Width", "unece.unit.CMT") *prodval ("Length","unece.unit.CMT") **Unit Template:** iterate(stepurl2objid(stepurl ("Unit","unece.unit.CMQ")),'stepid()')	46332 cm^3
Volume (Liter): Calculates the volume in Liter and displays with one decimal.	text(prodval("Height","unece.unit.CMT") *prodval("Width","unece.unit.CMT") *prodval ("Length","unece.unit.CMT")/1000,"0.0")	46.3

Attribute Examples

These example calculated attributes are written to use the data defined in the following tables.

For function syntax information and more detailed use cases, refer to the **Attribute Functions** documentation.

Note: Text used for 'attribute-id' and 'unit-id' is case-sensitive.

The example value templates require the **attributes** and values defined in the following table:

ATTRIBUTE Type	ID	Name	AttrDesc
Embedded number-validated product attribute with length units	EMBEDDEDNUMBER1id	EMBEDDEDNUMBER1	EMBEDDEDNUMBER1 description
LOV-validated product attribute	LOVAttr1id	LOVAttr1	LOV description
LOV with 'Use IDs on Values' = Yes; and Values =Yes and No	LOV1id	LOV1	
Number-validated product attribute with length units	NUMBER1id	NUMBER1	NUMBER1 description
Text-validated attribute property	AttrDescid	AttrDesc1	AttrDesc description
Text-validated product attribute	TEXT1id	TEXT1	TEXT1 description

The example value templates require the **products** and values defined in the following table:

PRODUCTS ID	Name	Parent	TEXT1id	NUMBER1id
P-family-id	P-family	Product hierarchy root	family value	2 m
P1id	P1	P-family-id	p1 value	4 m
P2id	P2	P-family-id	p2 value	5 m
P3id	P3	P-family-id	p3 value	6 m

After creating the data above, copy and paste any of the **Value Template** text below into the Function Editor. Select the **Object** identified and click the Evaluate button to display the defined **Result**.

Value Template	Object	Result
`attrname('NUMBER1id')`	P-family-id	NUMBER1
`prodval('TEXT1id')`	P-family-id	family value
`prodval('NUMBER1id')`	P-family-id	2
`produnit('NUMBER1id')`	P-family-id	m
`prodval('NUMBER1id', 'unece.unit.MMT')`	P-family-id	2000
`prodvalsimple('NUMBER1id')`	P-family-id	2 m
`prodvalsimple('NUMBER1id', 'unece.unit.MMT')`	P-family-id	2000 mm
`getembeddedprefix(prodval('EMBEDDEDNUMBER1id'))`	P3id	prefix
`getembeddedvalue(prodval('EMBEDDEDNUMBER1id'))`	P3id	3
`getembeddedsuffix(prodval('EMBEDDEDNUMBER1id'))`	P3id	suffix
`prodvalsimple('EMBEDDEDNUMBER1id')`	P3id	prefix 3 m suffix
`prodvalsimple('EMBEDDEDNUMBER1id', 'unece.unit.MMT')`	P3id	prefix 3000 mm suffix

Value Template	Object	Result
`produnit('EMBEDDEDNUMBER1id')`	P3id	m
`unitconv('2','unece.unit.MTR','unece.unit.MMT')`	P3id	2000
`valuelovid('LOV1Attrid')`	P3id	LOV1id

Commercial Examples

These example calculated attributes are written to use the data defined in the following tables.

For function syntax information and more detailed use cases, refer to the **Commercial Functions** documentation.

Note: Text used for 'attribute-id' and 'unit-id' is case-sensitive.

The example value templates require the **Terms List Type** and **Terms List** defined in the following table:

Term List Type ID = PriceID			Terms List ID = TermsListID			
Product Name	**Value**	**Unit - name(id)**	**Min Qty**	**Max Qty**	**Start**	**End**
Pink Party Hat	$7.79	$ (iso4217.unit.USD)	1	11	Jan-1-25	Dec-31-25
Pink Party Hat	$2.79	$ (iso4217.unit.USD)	12	24	Jan-1-25	Dec-31-26
Blue Party Hat	£6.79	£ (iso4217.unit.GBP)	1	11	Jan-1-25	Dec-31-27
Blue Party Hat	£3.79	£ (iso4217.unit.GBP)	12	24	Jan-1-25	Dec-31-28

After creating the data above, open the Function Editor. Copy and paste any of the **Value Template** text below into the Function Editor, select the **Object** identified, and click the Evaluate button to display the defined **Result**.

Value Template	Object	Result
`termqtymax('PriceID', '1')`	Blue Party Hat	11
`termqtymin('PriceID', '2')`	Blue Party Hat	12
`termunit('PriceID', '1')`	Pink Party Hat Blue Party Hat	$ £
`termunitid('PriceID', '1')`	Pink Party Hat Blue Party Hat	iso4217.unit.USD iso4217.unit.GBP

Value Template	Object	Result
`termval('PriceID', '1', '2015-12-31 01:01:01')`	Pink Party Hat	$7.79
`termval('PriceID', '2', '2015-12-31 01:01:01')`	Pink Party Hat	$2.79
`termvalid('TermsListID', '2')`	Pink Party Hat	$7.79

Conditional Examples

These examples do not require specific object data to produce the defined result.

For function syntax information and more detailed use cases, refer to the **Conditional Functions** documentation.

Copy and paste any of the **Value Template** text below into the Function Editor, select any object, and click the Evaluate button to display the defined **Result**.

Value Template	Result	Notes
`if (1=1, 'true', 'false')`	true	1 does equal 1 so the first result is returned
`if (not(1=1), 'true', 'false')`	false	NOT changes 'False to True' or 'True to False,' so the second result is returned
`if (exact('hello','you'), 'true', 'false')`	false	EXACT requires that the two values match, so the second result is returned
`if (or(1=1,exact('hello','you')), 'true', 'false')`	true	OR allows either 1=1 or an exact match, so the first result is returned
`if (and(1=1,exact('hello','you')), 'true', 'false')`	false	AND requires both functions to be true, so the second result is returned

Testing Using And, Or, and Not Functions

The example value templates require the **attributes** and values defined in the following table:

ATTRIBUTE Type	ID	Name	AttrDesc
Number-validated product attribute with length units	NUMBER1id	NUMBER1	NUMBER1 description
Text-validated product attribute	TEXT1id	TEXT1	TEXT1 description

The example value templates require the **products** and values defined in the following table:

PRODUCTS ID	Name	Parent	TEXT1id	NUMBER1id
P1id	P1	P-family-id	p1 value	4 m

After creating the data above, copy and paste any of the **Value Template** text below into the Function Editor. Select the **Object** identified and click the Evaluate button to display the defined **Result**.

Value Template	Object	Result	Notes
`and((value('TEXT1id')= 'p1 value'), (value('NUMBER1id')= '4'))`	P1id	1	Both conditions are true
`and((value('TEXT1id')= 'p0 value'), (value('NUMBER1id')= '3'))`	P1id	0	Both conditions are false
`or((value('TEXT1id')= 'p1 value'), (value('NUMBER1id')= '4'))`	P1id	1	One condition is true
`or((value('TEXT1id')= 'p0 value'), (value('NUMBER1id')= '3'))`	P1id	0	Both conditions are false
`not(value('TEXT1id')= 'p1 value')) // = 0 (FALSE) evaluated P1id`	P1id	0	Condition is true, NOT results in a return of 'false '
`not(value('TEXT1id')= 'p0 value')) // = 1 (TRUE) evaluated P1id`	P1id	1	Condition is false, NOT results in a return of 'true'

Testing Using If Function

These example calculated attributes are written to use a product with the attribute data defined in the following table.

Attribute	Length	Width	PowerCordLength
Value	75 cm	75 cm	2 m

Copy and paste any of the **Value Template** text below into the Function Editor, select the **Object** with the defined data, and click the Evaluate button to display the **Result**.

Value Template	Result	Notes
`if(prodval('Length') = prodval('Width'), 'Product is Square.','Product is Oblong.')`	Product is Square.	Length does equal Width, so the first result is returned
`if(prodval("PowerCordLength") > 0,concatenate ('A ', prodvalsimple("PowerCordLength"), ' power cord is included.'), 'Power cord not included.')`	A 2 m power cord is included.	2 is greater than 0, so the first result is returned The value of '2 m' is extracted via the function PRODVALSIMPLE (“PowerCordLength”), and the surrounding text to that value was accomplished using the CONCATENATE function. If it is desired that the unit for meters (m) is not situated immediately after the value '2', then the function of PRODVALSIMPLE is not appropriate, but the following formula could be used instead.
`if(prodval("PowerCordLength") > 0,concatenate ('A ', prodval("PowerCordLength"), produnit("PowerCordLength"), ' power cord is included.'), 'Power cord not included.')`	A 2 m power cord is included.	The value of '2' is extracted via the function PRODVAL (“PowerCordLength”), and the unit of 'm' was extracted separately via the function PRODUNIT (“PowerCordLength”).

Displaying a Value Using If Function

This example calculated attribute is written to use products with the attribute data defined in the following table.

	Weight
P2(P2id)	75
P3(P3id)	23
P4(P4id)	101

Copy and paste the **Value Template** text below into the Function Editor, select the **Object** identified, and click the Evaluate button to display the **Result**.

Value Template	Object	Result
`If (value('Weight') > 100, 'A', if (value('Weight') < 50, 'B', 'C'))`	P2id	C
`If (value('Weight') > 100, 'A', if (value('Weight') < 50, 'B', 'C'))`	P3id	B
`If (value('Weight') > 100, 'A', if (value('Weight') < 50, 'B', 'C'))`	P4id	A

Date Examples

These example calculated attributes are written to use the data defined in the following tables.

For function syntax information and more detailed use cases, refer to the **Date Functions** documentation.

These example calculated attributes are written to use a **product** with the attribute data defined in the following table.

Product ID	AttrDateID	StartDate (ISO Date)
P1id	2016-10-15	
P2id	1997-12-25	
P3id	2016-05-15	
P4id		2017-03-13

After creating the data above, open the Function Editor. Copy and paste any of the **Value Template** text below into the Function Editor, select the **Object** identified, and click the Evaluate button to display the defined **Result**.

Value Template	Object	Result
`formatdatetime(prodval('AttrDateid'), "EEE, MMM d, ''yy")`	P1id	Fri, Oct 15, '16
`formatdatetime(prodval('AttrDateid'), "yyyyy.MMMMM.dd" )`	P2id	01997.December.25
`formatdatetime(prodval('AttrDateid'), "MMM d, yy" )`	P3id	May 15, 16
`localizedate(prodval('AttrDateid'))`	P3id when in Danish context	15-05-2016
`now()`	any when executed	2016-05-04 12:06:25

Value Template	Object	Result
	on 4 MAY 2016 just after midday	

`{d := value('StartDate'),`
`x := localizedate(d, "en_GB"),`
`y := localizedate(d, "en_US"),`
`z := localizedate(d, "de_DE")`
`}`
`concatenate(d, "; ", x, "; ", y, "; ", z)`
	P4id	2017-03-13; 13-Mar-2017; Mar 13, 2017; 13.03.2017

List Examples

These example calculated attributes are written to use the data defined in the following tables.

For function syntax information and more detailed use cases, refer to the **List Functions** documentation.

Note: Text used for 'attribute-id' and 'unit-id' is case-sensitive.

The example value templates require the **attributes** and values defined in the following table:

ATTRIBUTE Type	ID	Name	AttrDesc
Embedded number-validated product attribute with length units	EMBEDDEDNUMBER1id	EMBEDDEDNUMBER1	EMBEDDEDNUMBER1 description
LOV-validated product attribute	LOVAttr1id	LOVAttr1	LOV description
LOV with 'Use IDs on Values' = Yes; and Values =Yes and No	LOV1id	LOV1	
Number-validated product attribute with length units	NUMBER1id	NUMBER1	NUMBER1 description
Text-validated attribute property	AttrDescid	AttrDesc1	AttrDesc description
Text-validated product attribute	TEXT1id	TEXT1	TEXT1 description

The example value templates require the **products** and values defined in the following table:

PRODUCTS ID	Name	Parent	TEXT1id	NUMBER1id
P-family-id	P-family	Product hierarchy root	family value	2 m
P1id	P1	P-family-id	p1 value	4 m
P2id	P2	P-family-id	p2 value	5 m
P3id	P3	P-family-id	p3 value	6 m

After creating the data above, copy and paste any of the **Value Template** text below into the Function Editor. Select the **Object** identified and click the Evaluate button to display the defined **Result**.

Value Template	Object	Result
`list(iterate(subproducts(), 'prodval("TEXT1id")'), ', ')`	P-family-id	p1 value, p2 value, p3 value
`list(iterate(subproducts(), 'prodval("TEXT1id")'), ', ', ' & ')`	P-family-id	p1 value, p2 value & p3 value
`list(reverse(iterate(subproducts(), 'prodval("TEXT1id")')),', ')`	P-family-id	p3 value, p2 value, p1 value
`list(iterate(subproducts(), 'concatenate(index,": ",item)'), '\n')`	P-family-id	1. com.stibo.core.persistence.NodePO-343239, 2. com.stibo.core.persistence.NodePO-3432395, 3. com.stibo.core.persistence.NodePO-3432395 **Note:** 'com.stibo.core.persistence.NodePO-3432391,…' are internal

Value Template	Object	Result
		representation of the nodes (sub products). This happens when iterating subproducts and displaying them using the default variable 'item.'
`list(iterate(subproducts(), 'concatenate(index,": ",stepid())'), '\n')`	P-family-id	P1id, P2id, P3id **Note:** Attribute values from the iterated nodes are displayed when called from inside the iterate function.
`list(list2multivalue(value('AttributeA')))`		value a<multisep/>value b<multisep/>value c **Note:** multivalue attribute with the values: "value a", "value b", and "value c"
`list(multivalue2list(value('AttributeA')),', ')`		value a, value b, value c **Note:** multivalue attribute with the values: "value a", "value b", and "value c"
`list(sortnumeric(listconcatenate('2', '56', '11', '0', '21', '13')), ',')`	{any}	0,2,11,13,21,56
`list(unique(listconcatenate('a','b','a','c','b ')),', ')`	{any}	a, b, c

Value Template	Object	Result
`listconcatenate(iterate(subproducts(), 'prodval ("TEXT1id")'), iterate(subproducts(), 'prodval("NUMBER1id")'))`	P-family-id	p1 valuep2 valuep3 value456
`valuelovid('LOV1Attrid')`	P3id	LOV1id
`if(listcontains(iterate(subproducts(), 'prodval("TEXT1id")'),"p1 value"), "p1 is present","p1 is NOT present")`	any family *other than* P-family-id	p1 is NOT present This is the same formula as shown previously except the list formula is written in full within the LISTCONTAINS function
`listlen(iterate(subproducts(), 'prodval("TEXT1id")'))`	P-family-id	3
`listitem(iterate(subproducts(), 'prodval ("TEXT1id")'),2)`	P-family-id	p2 value
`iterate(filter(subproducts(),'prodval ("number1id")>3'), 'concatenate("Name = ",stepname(),"; ID = ", stepid(), ". ")')`	P-family-id	Name = P1; ID = P1id. Name = P2; ID = P2id. Name = P3; ID = P3id. extracts id of all child products where number1id is greater than 3
`{x := iterate(subproducts(), 'prodval("TEXT1id")') } if(listcontains(x,"p1 value"), "p1 is present","p1 is NOT present")`	P-family-id	p1 is present this is the same formula as shown following except the variable x is used to separate the list formula
`range(listconcatenate('1','5','8','6','7'), '-')`	{an	1-8

Value Template	Object	Result
	y}	
`range(listconcatenate('1','5','8','6','7'), '-', ', ')`	{any}	1, 5-8
`sort(iterate(subproducts(), 'prodval("NUMBER1id")'))`	P-family-id	456

Number Examples

These examples do not require specific object data to produce the defined result.

For function syntax information and more detailed use cases, refer to the **Number Functions** documentation.

Copy and paste any of the **Value Template** text below into the Function Editor, select any object, and click the Evaluate button to display the defined **Result**.

Value Template	Result
`1.25*11`	13.75
`int(5.64)`	5
`int(-5.64)`	-6
`text(2.45, '000.0')`	002.5
`text(2.45, '.0')`	2.5
`text(2000.45, ',.0')`	2,000.5
`trunc(5.64)`	5
`trunc(-5.64)`	-5
`round(5.64, 0)`	6
`round(5.64, 1)`	5.6
`round(5.64, -1)`	10

Controlling Decimal Places

These example calculated attributes are written to use a product with the attribute data defined in the following table.

Attribute	height	width	length
Value	50.3 cm	135.26 cm	75.1 cm

After creating the data above, copy and paste any of the **Value Template** text below into the Function Editor, select the object with the defined data, and click the Evaluate button to display the **Result**.

Value Template	Result	Notes
`(value('length'))*(value('width'))`	10158.026	No formatting is applied to the resulting number.

`prodval('height', 'unece.unit.CMT') *`
`prodval('width', 'unece.unit.CMT') *`
`prodval('length', 'unece.unit.CMT')`
	510948.7078	No formatting is applied to the resulting number.

`text(prodval('height', 'unece.unit.CMT') *`
`prodval('width', 'unece.unit.CMT') *`
`prodval('length', 'unece.unit.CMT'), "000,000.0")`
	510,948.7	The TEXT function adds a thousands delimiter and reduces the decimal places to 1

`concatenate(prodvalsimple('height','unece.unit.CMT'), ' H x ',`
`prodvalsimple('width','unece.unit.CMT'),' W x ',`
`prodvalsimple('length','unece.unit.CMT'),' L')`
	50.3 cm H x 135.26 cm W x 75.1 cm L	Static text strings provide a typical display for dimension information.

Value Template	Result	Notes
`concatenate(trunc(prodval('height')), " x ", trunc(prodval('width')), " x ", trunc(prodval('length')))`	50 x 135 x 75	The TRUNC function eliminates the decimal point and places.
`concatenate(int(prodval('height')), " x ", int(prodval('width')), " x ", int(prodval('length')))`	50 x 135 x 75	The INT function returns the integer part of the number.
`concatenate(round(prodval('height'),1), " x ", round(prodval('width'),0), " x ", round(prodval('length'),-1))`	50.3 x 136 x 80	The ROUND function, using each of the available precision values (1, 0, -1), controls the decimal places for each value being used.

Localized Number

These example calculated attributes are written to use a product with the attribute data defined in the following table.

Attribute	Diameter

Value	12,7
Locale Setting	'comma-is-decimal' method

Copy and paste any of the **Value Template** text below into the Function Editor, select the object with the defined data, and click the Evaluate button to display the **Result**.

Value Template	Result	Notes

`{x := value('Diameter'),`
`y := 3.414,`
`num_us := localizenumber(x, "en_US"),`
`num_de := localizenumber(x, "de_DE"),`
`p := num_us*y, q := num_de*y,`
`num := localizenumber(p)`
`}`
`concatenate(x, "; ", p, "; ", q, "; ", num)`
	12,7; 43.3578; NaN; 43,3578	If you attempt to make a math calculation on a number using the comma-is-decimal method, the calculation does not work, as indicated by the NaN ('not a number') result. Instead, perform calculations in a 'dot-is-decimal' locale (en_US or en_GB, for example) and then convert back to the preferred locale after the calculation has been done. In this example, this is done by the statement 'num := localizenumber (p),' which reverts the calculated number to the format according to the locale that is specified in the currently selected context.

Other Examples

In the sections below, many other calculated attribute functions are grouped by purpose and are demonstrated in simple terms using a variety of value templates:

- **Classification Functions** can be used to access classification objects.
- **Completeness Functions** can be used to access the completeness score of an object.
- **Data Container Functions** can be used to access data container objects.
- **Hierarchy Functions** can be used to access STEP hierarchy objects.
- **Lookup Table Functions** can be used to access lookup table data.
- **Object Functions** can be used to access object information.
- **Override Functions** can be used to access product override data.
- **Reference Functions** can be used to access object reference data.
- **Revision Functions** can be used to access revision information.
- **Workflow Functions** can be used to access workflow information.

For function syntax information and links to more detailed use cases, refer to the **Other Functions** topic in the **STEP Functions** section of the **Resource Materials** online help.

Classification Functions

These functions can be used to access classification objects.

The example calculated attribute is written to use a **product** with the classification data defined in the following table.

	References
Product1(P1)	ClassificationA ClassificationB

After creating the data above, copy and paste any of the **Value Template** text below into the Function Editor, select the object with the defined data, and click the Evaluate button to display the **Result**.

Value Template	Object	Result
`list(iterate(classifications(), "stepid()"), "/ ")`	P1	ClassificationA/ ClassificationB

Use Cases

For a scenario using the CLASSIFICATIONS function, refer to **Classification Scenario**.

Completeness Functions

These functions can be used to access the completeness score of an object.

For more information, refer to **Initial Setup for Metrics** in the **System Setup** documentation.

Copy and paste the **Value Template** text below into the Function Editor, select an object set up for completeness metric, and click the Evaluate button to display the defined **Result**.

Value Template	Result
`completeness()`	51.28205128205128460194828221574 4
`round(completeness(),0)`	51

Data Container Functions

These functions can be used to access data container objects on products or entities.

The example value templates require the **products** and values defined in the following table:

Data Container Types (ID):	Non-Typed Data (244320)	Technical Specifications (244321)
Product: ALRM-01 (157618)	Non-Typed Data ID / Field Name / Supplier Cost / Value NonTypedData_286148 / Bells / 0.45 / 2 NonTypedData_286149 / Handles / 0.28 / 1 Add Data Container	Technical Specifications ID / Attribute Name / Value 286155 / Inrush VA / 12 286155 / Sealed VA / 2.8 286155 / Sealed Watts / 4w 286155 / Supplier Cost / 0.19
Product: ALRM-02 (157619)	{no Non-Typed Data (244320) data container exists}	Technical Specifications ID / Attribute Name / Value 286156 / Inrush VA / 10 286156 / Sealed VA / 1.9 286156 / Sealed Watts / 9w 286156 / Supplier Cost / 0.36

Value Template	ALRM-01 Result	ALRM-02 Result

`{`
`dclist := datacontainers(),`
`dc_typeids := iterate(dclist, 'datacontainertypeid()')`
`}`
`list(sort(unique(dc_typeids)), "\n")`
	244320
	
	244321
		244321

`{`
`dc := datacontainers(),`
`dcid := list(iterate(dc, 'value("Supplier_Cost")'), "/"),`
`dcc := list(iterate(dc, 'datacontainertypeid()'), ", "),`
`dc1 := listitem(dc, 1),`
`dc2 := iterate(datacontainercomposite(), 'stepname()'),`
`msg := ""`
`}`
`concatenate(dcid, " --- ", dcc, " --- ", dc2)`
	0.19/0.28/0.45 --- 244321, 244320, 244320 --- ALRM-01	0.36---244321---ALRM-02

`{`
`dc := datacontainers(),`
`dcid := sort(unique(iterate(dc, 'value("Supplier_Cost")'))),`
`introtext := if(listlen(dcid) <gt/> 1, "Supplier Cost ranges from ", "Supplier Cost is "),`
`septext := if(listlen(dcid) <gt/> 1, " to ", ""),`
 	
`firstval := listitem(dcid,1),`
`lastval := if(listlen(dcid) <gt/> 1, listitem(dcid, listlen(dcid)), ""),`
 	
`dctypes := sort(unique(iterate(dc, 'datacontainertypeid()'))),`
`dclist := if(listlen(dctypes) <gt/> 1, list(dctypes, ", ", " and "), listitem(dctypes,1)),`
`dctext := if(listlen(dctypes) <gt/> 1, " in Data Container types ", " in Data Container type "),`
`msg := "Data Container examples"`
`}`
`concatenate(introtext, firstval, septext, lastval, dctext, dclist)`
	Supplier Cost ranges from 0.19 to 0.45 in data container types 244320 and 244321.	Supplier Cost is 0.36 in Data Container type 244321

Hierarchy Functions

These functions can be used to access STEP hierarchy objects.

The example value templates require the **objects** and values defined in the following table:

Object	Parent	TEXT1id
P-family(P-family-id)	Product hierarchy root(PRoot)	product value
P1(P1id)	PFam(P-family-id)	p1 value
P2(P2id)	PFam(P-family-id)	p2 value
P3(P3id)	PFam(P-family-id)	p3 value
E-family(E-family-id)	Entity root(ERoot)	entity value
E1(E1id)	EFam(E-family-id)	e1 value
E2(E2id)	EFam(E-family-id)	e2 value

After creating the data above, copy and paste any of the **Value Template** text below into the Function Editor, select the object with the defined data, and click the Evaluate button to display the **Result**.

Value Template	Object	Result	Notes
`list(iterate(children(), 'concatenate(stepname())'),', ')`	P-family-id	P1, P2, P3	These are products
`list(iterate(subproducts(), 'concatenate(stepname())'),', ')`	P-family-id	P1, P2, P3	These are products
`list(iterate(children(), 'concatenate(stepname())'),', ')`	E-family-id	E1, E2	These are entities
`list(iterate(subproducts(), 'concatenate(stepname())'),', ')`	E-family-id		These are entities, not products
`parentid()`	P1id	P-family	

Value Template	Object	Result	Notes
`list(iterate(path(), 'concatenate(stepname())'),', ')`	P-family-id	Primary Product Hierarchy, Products, P-family	
`isbelow('step://product?id=P1id')`	P-family-id	0	FALSE
`isbelow('step://product?id=P-Family')`	P1id	1	TRUE
`{i:=path(), parent:=listitem(i,listlen(i)-1) } iterate(parent, 'concatenate("name=",stepname(),"; id=", stepid())')`	P1id	name=P-family; id=P-family-id	Use -2 (instead of -1) to get name / ID of grandparent, etc.

Evaluating Data on Child Objects

The example value templates require the **products** and values defined in the following table:

Parent	Products	BrandNameID	RemovalDate
Product hierarchy root(PRoot)	J-family(J-family-id)		
J-family-id	J1(J1id)	Alpha	2013-05-01
J-family-id	J2(J2id)	Alpha	2014-05-01
J-family-id	J3(J3id)	Alpha	2012-05-01
J-family-id	J4(J4id)	Zeta	
J-family-id	J5(J5id)	Zeta	2016-05-01

After creating the data above, copy and paste any of the **Value Template** text below into the Function Editor, select the object with the defined data, and click the Evaluate button to display the **Result**.

Value Template	Object	Result	Notes
`{all:=iterate(subproducts(), "prodval ('BrandNameID')"), unique:=unique(all), oftenIndex:=1, oftenCount:=0, dummy:=iterate(unique, ' {curval:=item, count:=listlen(filter(all,"exact(curval,item)")) } if (count>oftenCount, concatenate(oftenCount:=count, oftenIndex:=index), 0)') } if (oftenCount>0, listitem(unique,oftenIndex), "")`	J-family-id	Alpha	Value for attribute ID 'BrandName' that occurs the most times in its children.
`{attrid:='grandchildattrid' } listconcatenate(iterate(subproducts(), 'iterate(subproducts(),"prodval(attrid)")'))`	J-family-id	AlphaAlphaAlphaZetaZeta	Use cautiously. This operation can drain system CPU since all grandchildren are read for each product.
`{msg := "Closest date that is less than the current date is: ", datenow := left(substitute(now(), "-", ""), 8), datelist := filter(iterate(children(), 'value ("RemovalDate")'), 'substitute(item, "-", "") < datenow'), neardate := listitem(reverse(sortnumeric (datelist)), 1) }`	J-family-id	Closest date that is less than the current date is: 2016-05-01	Returns the value of 'Removal Date' attribute on the child

Value Template	Object	Result	Notes
`if(exact(neardate, "N/A"), "None Newer", concatenate(msg, neardate))`			objects that is closest to the current date while still less than the current date. Returns 'None Newer' if no such child exists.

Lookup Table Functions

These functions can be used to access lookup table data.

For more information, refer to the **Transformation Lookup Tables** topic in the **Resource Materials** online help.

The following templates use this lookup table data.

Asset: UOMLookupTable			
From	EACH	DOZEN	CASE
To	Ea.	Dz.	Case

The examples in the following table do not require specific object data to produce the defined result. Copy and paste any of the **Value Template** text below into the Function Editor, select any object, and click the Evaluate button to display the defined **Result**.

Value Template	Result
`REPLACEVALUEBYLOOKUP('UOMLookupTable','EACH')`	Ea.
`REPLACEWORDBYLOOKUP('UOMLookupTable','EACH, DOZEN, CASE')`	Ea., Dz., Case

Object Functions

These functions can be used to access object information.

The example value templates require the **products** and values defined in the following table:

Product	Object Type	TEXT1id	TEXT1id Metadata
P-family(P-family-id)	Folder	Family value	Family meta value
P1(P1id)	Item	P1 value	P1 meta value

After creating the data above, copy and paste any of the **Value Template** text below into the Function Editor, select the object with the defined data, and click the Evaluate button to display the **Result**.

Value Template	Object	Result
`stepid()`	P1id	P1id
`stepname()`	P1id	P1
`stepname('step://product?id=P1id')`	P1id	P1
`stepurl()`	P1id	step://product?id=P1id
`stepurl('Product','P1id')`	P1id	step://product?id=P1id
`stepobjecttype()`	P1id	Item

Value Template	Object	Result
`stepobjecttype('step://product?id=P1id')`	P1id	Item
`iterate(stepurl2objid(stepurl('Product','Level1-109267')),'stepname()')`	{any}	P1id
`{meta := iterate(stepurl2objid(stepurl('attribute','TEXT1id')), 'value("Attribute Description")'), val := value('TEXT1id') } concatenate("\'", meta,"\'", " is the metadata on the \'TEXT1id\' attribute which contains the value: ", val)`	P-family-id	'Family meta value' is the metadata on the 'TEXT1id' attribute which contains the value: Family value

Override Functions

These functions can be used to access product override data.

The example calculated attributes below are written to use the hierarchy objects defined in the following table.

Family	Folder	Overrides
Batteries(BatteriesID)	Battery Items(BatteryItemsID)	Override 1(Override1ID) Override 2(Override2ID) Override 3(Override3ID)

After creating the data above, copy and paste any of the **Value Template** text below into the Function Editor, select the object with the defined data, and click the Evaluate button to display the **Result**.

Template	Object	Results
`overriddenproduct('Override1ID')`	Override1ID	Batteries
`overriddenproduct('Batteries')`	Override1ID	N/A

Template	Object	Results

`{x := listlen(overriddenby()),`
`z := iterate(overriddenby(), 'stepname()'),`
`z := list2multivalue(z),`
`z := substitute(z, "<multisep/>", "")`
`}`
`concatenate("This product is overridden by ", x, "`
`product override(s):`
`", z)`
	BatteriesID	This product is overridden by 3 product override(s):
		Override 2
		Override 1
		Override 3

`{x := iterate(overriddenproductobject(), 'stepname()'),`
`z := listitem(x,1)`
`}`
`concatenate('This PO overrides the product "', z, '"')`
	Override1ID	This PO overrides the product "Batteries"

`list(iterate(productoverrideparents(), "stepid()"), "/ ")`	BatteryItemsID	Override2ID/Override1ID/Override3ID

Reference Functions

These functions can be used to access object reference data.

The example calculated attributes below are written to use the referenced object defined in the following table.

Product	Reference Type	Reference Target
P1(P1id)	BillOfMaterials	P3(P3id)

After creating the data above, copy and paste any of the **Value Template** text below into the Function Editor, select the object with the defined data, and click the Evaluate button to display the **Result**.

Value Template	Object	Result
`list(iterate(iterate(references('product', 'BillOfMaterials'),'referencetarget()'),'stepname()'),', ')`	P1id	P3

Use Cases

For a scenario using the REFERENCES function, refer to **Reference Scenario**.

For a scenario using the REFERENCES and REFERENCETARGET functions, refer to **Total Cost of Materials Scenario**.

Revision Functions

These functions can be used to access revision information.

The example calculated attributes below are written to use the revisions defined in the following table.

Product	Revision #	Create Date	Edit Date	Major	User	Comment
P-family(P-family-id)	1.1	Wed Jul 12 12:06:16 EDT 2017	Wed Jul 12 12:26:55 EDT 2017		USERZ	Complete Approval
P-family(P-family-id)	1.0	Mon May 08 11:34:51 EDT 2016	Tue May 09 15:09:14 EDT 2016	X	USERY	Comment added by user
P-family(P-family-id)	0.1	Mon Jun 15 16:27:04 EDT 2015	Mon Jun 15 16:27:04 EDT 2015		USERW	Auto Generated

After creating the data above, copy and paste any of the **Value Template** text below into the Function Editor, select the object with the defined data, and click the Evaluate button to display the **Result**.

Value Template	Object	Result
`list(iterate(revisions(), 'revisioncreatedate()'), ', ')`	P-family-id	2015-06-15 16:27:04, 2016-05-08 11:34:51, 2017-07-12 12:06:16
`revisionname()`	P-family-id	1.1
`revisioneditedby()`	P-family-id	USERZ
`revisioncomment()`	P-family-id	Complete approval

Value Template	Object	Result
`revisionismajor()`	P-family-id	0
`revisioncreatedate()`	P-family-id	2017-07-12 12:06:16
`revisioneditdate()`	P-family-id	2017-07-12 12:26:55
`firstrevisioncreatedate()`	P-family-id	2015-02-13 11:36:39

Workflow Functions

These functions can be used to access workflow information.

The example calculated attributes below are written to use the referenced object defined in the following table.

Product	Current Workflow	Current State
P1(P1id)	Workflow5	State-C
P1(P1id)	Workflow6	State-A

After creating the data above, copy and paste any of the **Value Template** text below into the Function Editor, select the object with the defined data, and click the Evaluate button to display the **Result**.

Value Template	Object	Result
`workflowids()`	P1id	Workflow5Workflow6
`currentworkflowstates('Workflow6')`	P1id	State-A

Publishing Examples

Publishing functions can be used to pull information from objects within the publication hierarchy, such as:

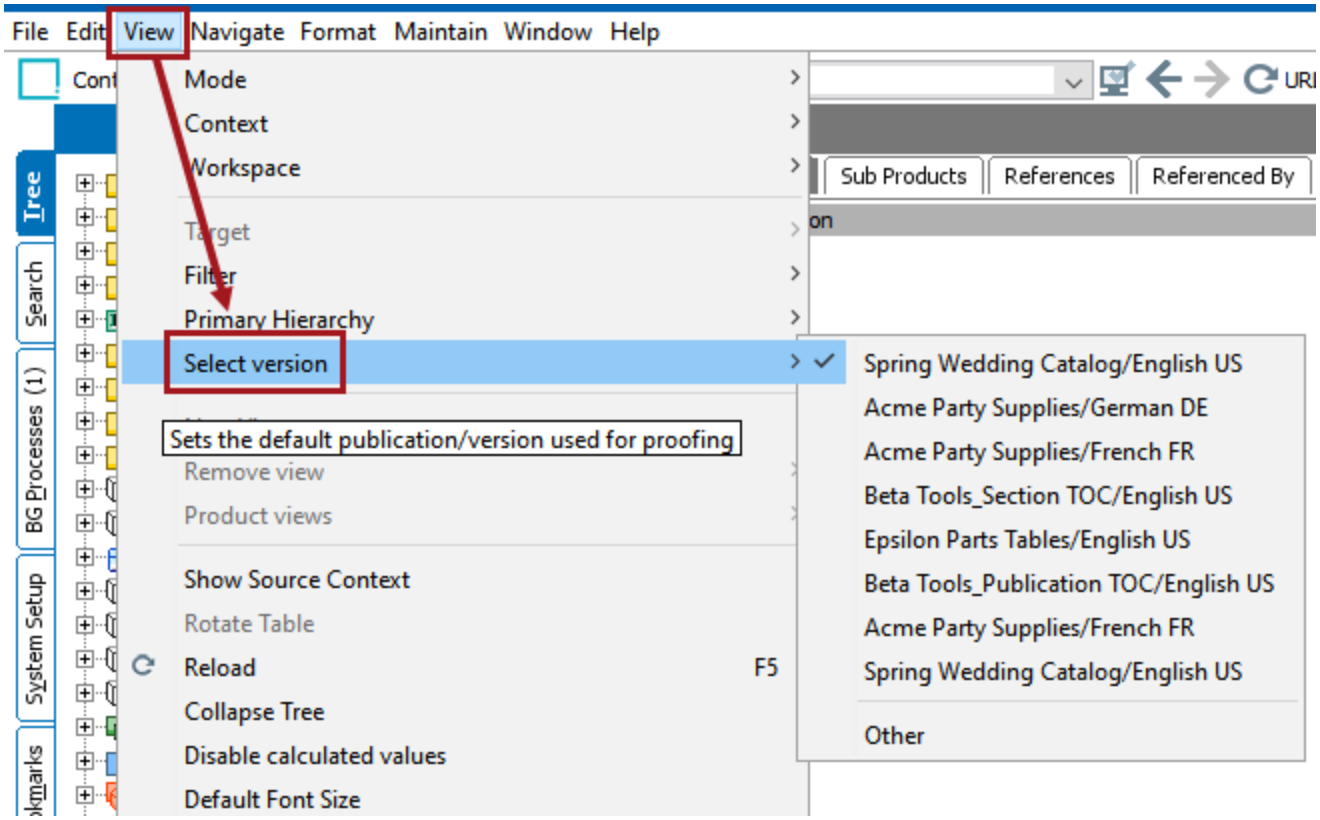
- The values of metadata attributes on publication group, publication, and section objects
- The name of a publication
- The name and/or ID of a currently selected publication version
- The first and last page numbers of the DTP pages saved to a section
- The page number(s) on which a product appears in a publication

These functions are most commonly used within calculated attributes whose values display on InDesign pages created with Print Publisher. They can also be used in formulas that display in publication-related locations in the workbench, such as the Tables preview and in Flatplanner Sticker Book views, baskets, and financial reports.

Prerequisites

A publishing function will not return a value unless a publication **version** is selected. Additionally, the selected version must typically be relevant to the object on which the calculated attribute appears. One example would be for a product that appears on a DTP page that is saved in a particular publication. If a version from a *different* publication is chosen, then values such as page numbers will not display on the product, since it does not appear on any pages within that publication.

The examples in this topic show how calculated values from publishing functions display on **product** objects in the STEP Workbench Tree. To choose a version for testing purposes, go to View > **Select version** in the menu bar, then choose the relevant publication version.



Sample Formulas and Values

This section provides basic examples of calculated attribute formulas that use publishing functions, along with illustrations of the values they return. Where applicable, links are provided to more detailed topics that appear in other sections of the STEP Online Help. Though the examples provided are basic, they can be embedded within more complex calculations.

For the full list of publishing functions and brief descriptions of their intended purpose, refer to the **Publishing Functions** section of the **STEP Functions** documentation.

getInheritedPublicationValue and getInheritedPublicationHierarchyValue

The getInheritedPublicationValue and getInheritedPublicationHierarchyValue functions are very similar. When used for product objects, both return metadata values from attributes on publication groups and publications, whereas the getInheritedPublicationHierarchyValue also returns values from sections.

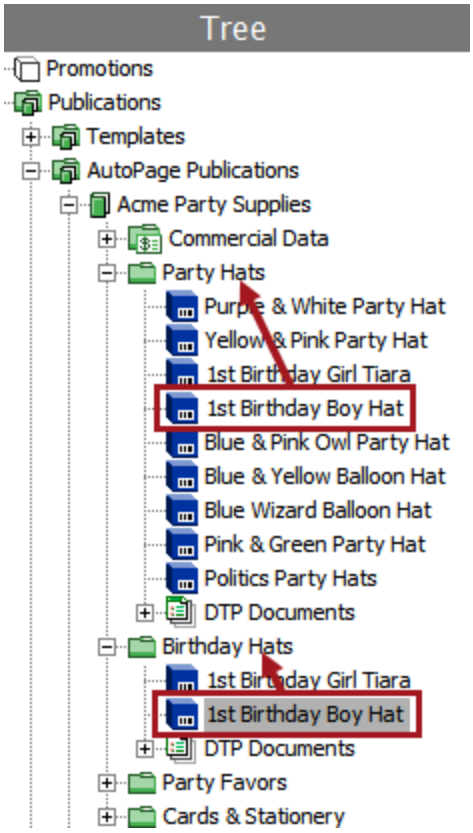
Since the getInheritedPublicationValue function returns values from publication groups, publications, and sections when used to mount metadata using **publication templates**, it is more commonly used for mounted pages, whereas getInheritedPublicationHierarchyValue is more commonly used for products. The publication template scenario is only relevant to the Print Flatplanner and Print AutoPage components. For more information, refer to:

- **Using the getInheritedPublicationValue Function in Flatplanner** in the **Print Flatplanner** documentation

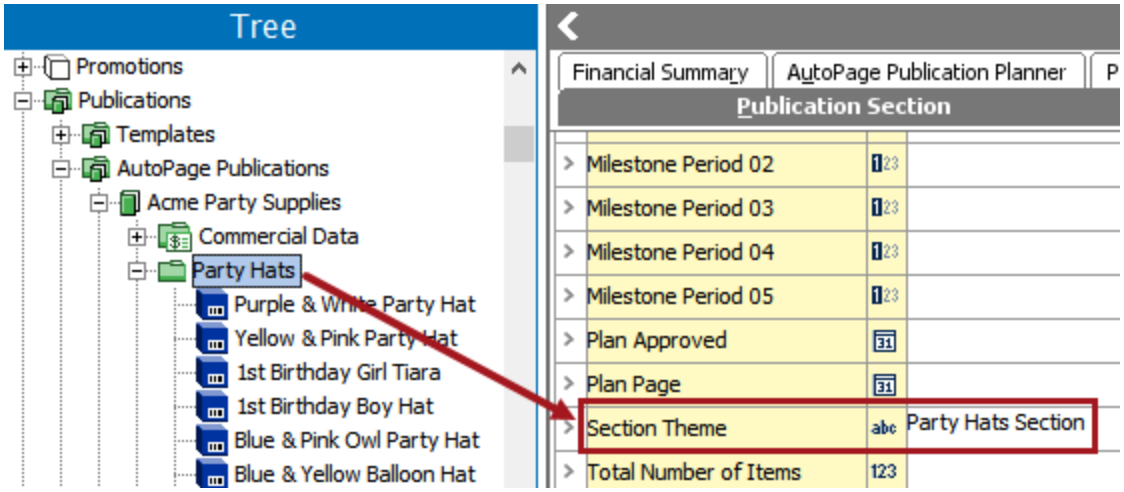
- **Using the getInheritedPublicationValue Function in AutoPage** in the **Print AutoPage** documentation

The following example uses the getInheritedPublicationHierarchyValue function to pull metadata from a section onto a product, using the formula `getInheritedPublicationHierarchyValue('SectionTheme')`. 'SectionTheme' is the ID of the source attribute on the section.

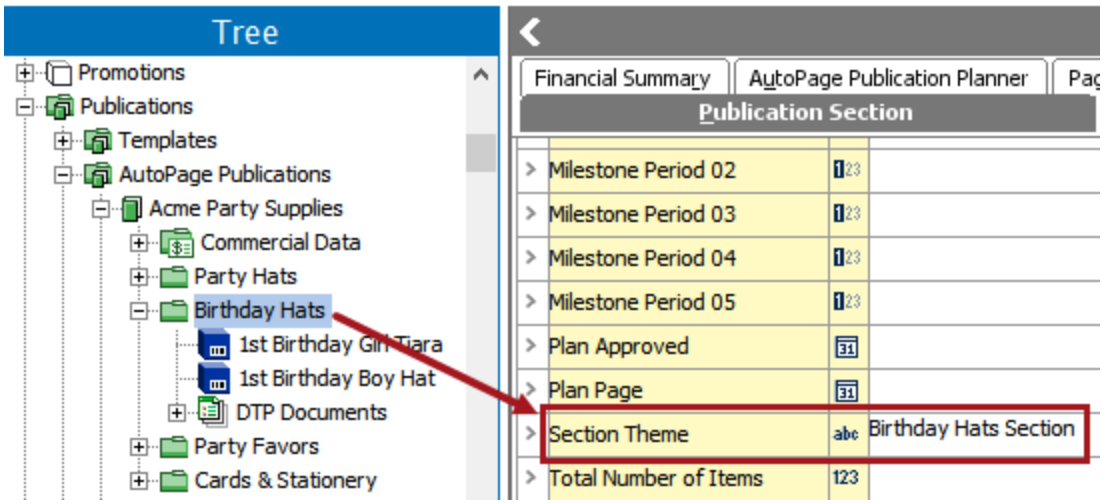
The selected product is linked into two sections of the publication—'Party Hats' and 'Birthday Hats.'



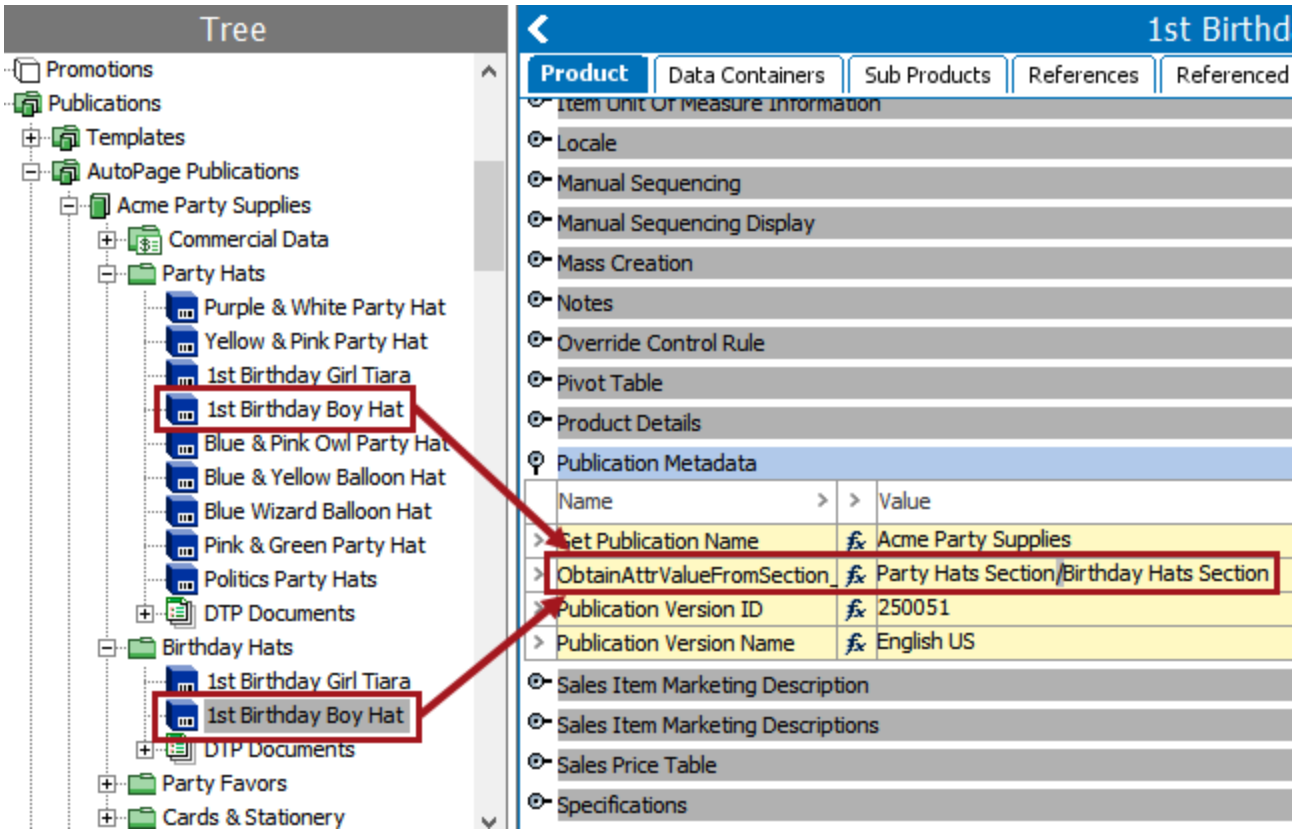
On 'Party Hats,' the value of Section Theme (SectionTheme) is 'Party Hats Section.'



On 'Birthday Hats,' the value of Section Theme (SectionTheme) is 'Birthday Hats Section.'



With the product selected in the Tree, the value of Section Theme (SectionTheme) from both sections displays in the ObtainAttrValueFromSection calculated attribute field. Values are sorted as they appear from top to bottom in the publication hierarchy, and are separated with a slash (/).

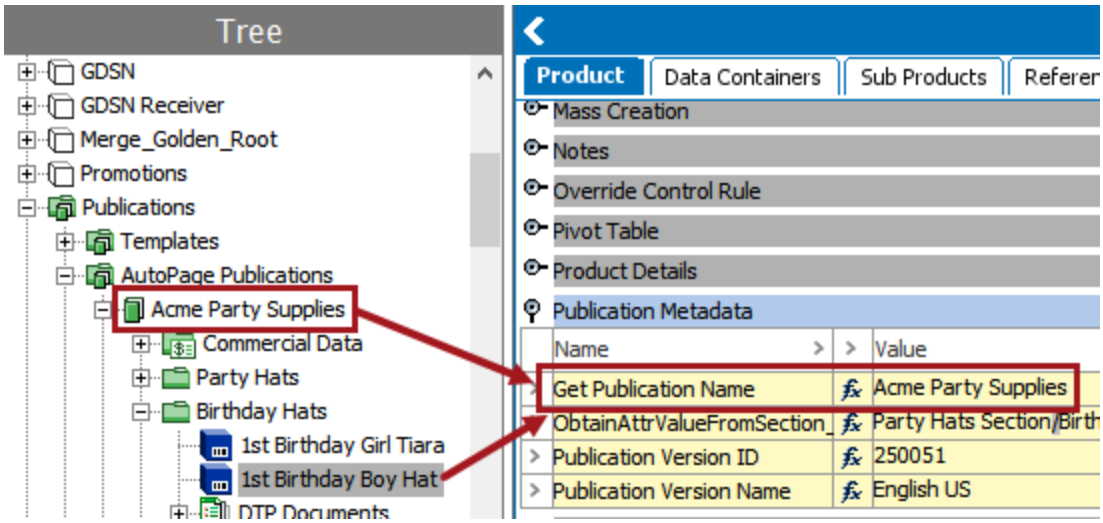


Similar values will be returned if the calculated attribute formula includes the ID of a metadata attribute that appears on a publication group or publication.

getPublication

Use this formula to return the name of a parent publication using the getPublication function:

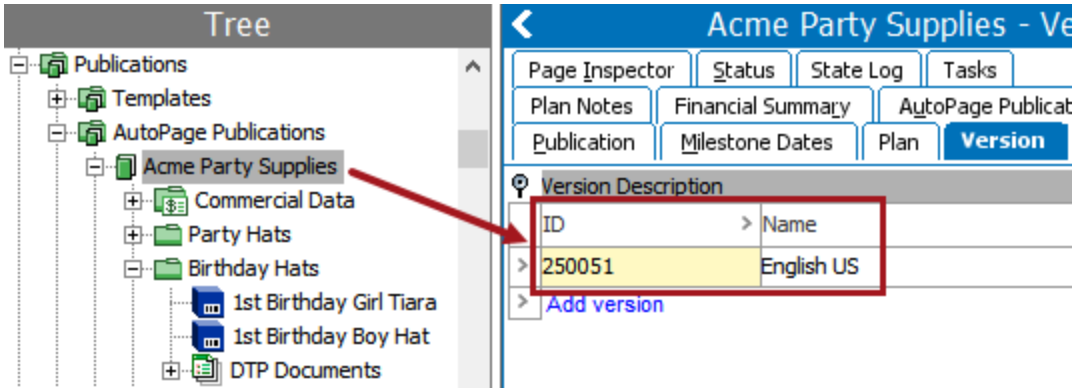
```
iterate(getPublication(),"stepname()")
```



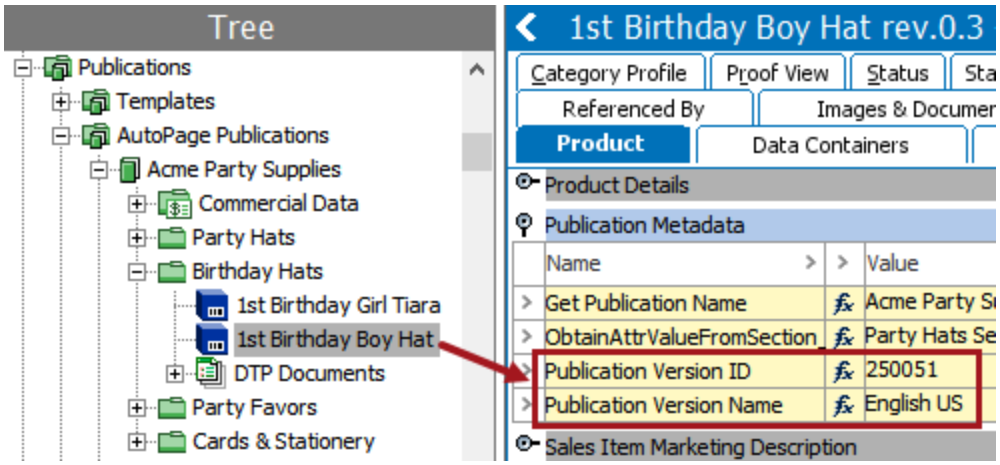
getPublicationVersionID and getPublicationVersionName

The below example uses the simple formulas of `getPublicationVersionID()` and `getPublicationVersionName()` to return the ID and Name of the current publication version.

The following image shows the ID (250051) and Name (English US) of the selected publication on the **Version** tab.



Below, the product is selected and the values of the publication ID and Name display in the calculated attribute fields.

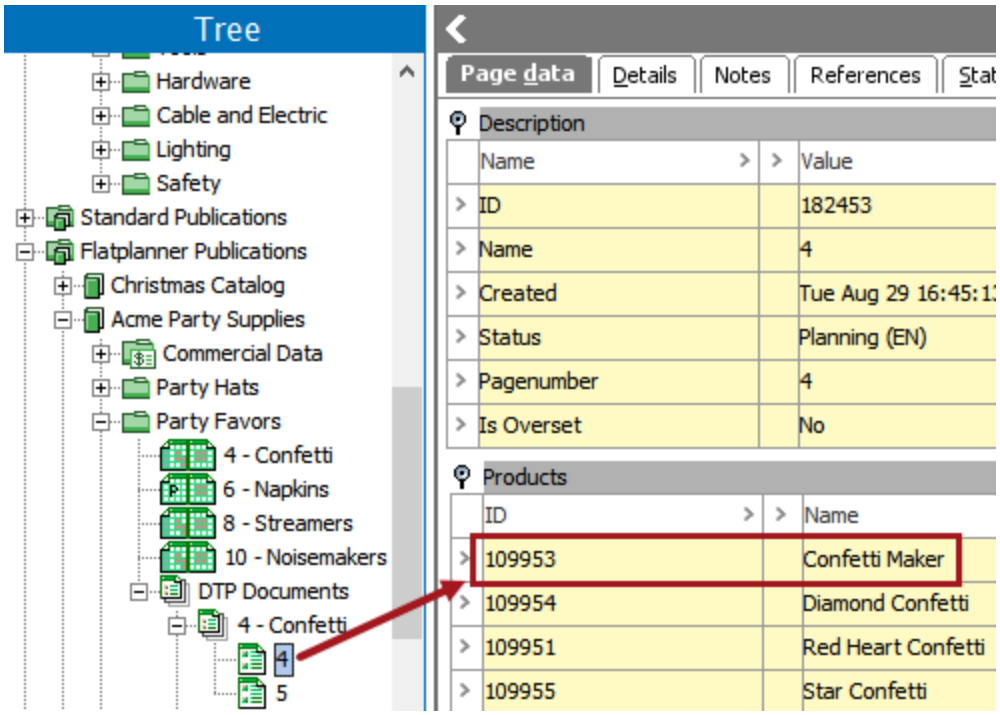


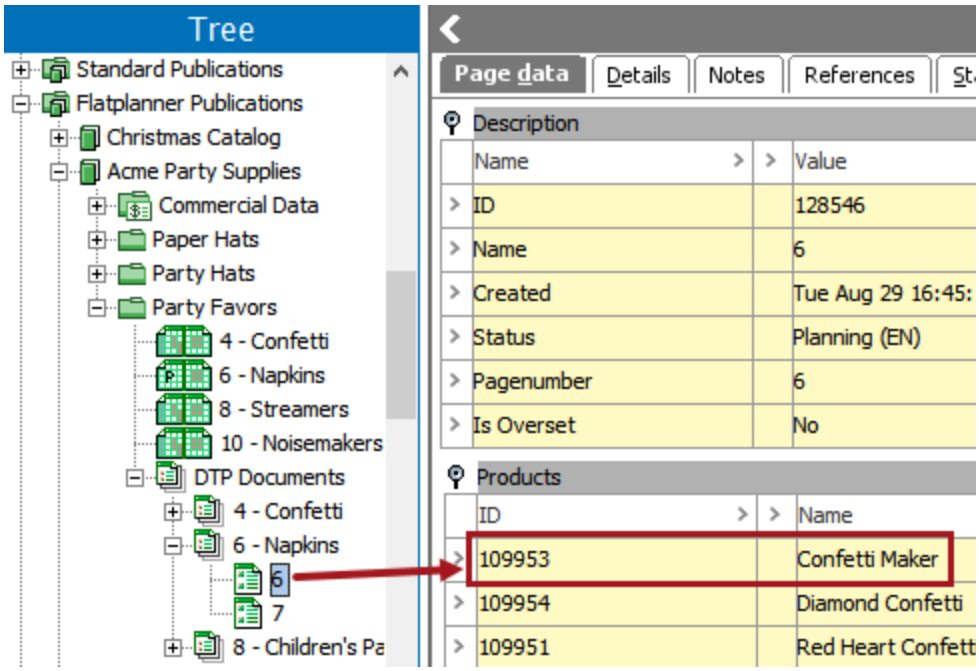
pagenumbers

This formula uses the pagenumbers function to return a list of page numbers (separating each with a comma and a space) on which a product appears in a publication:

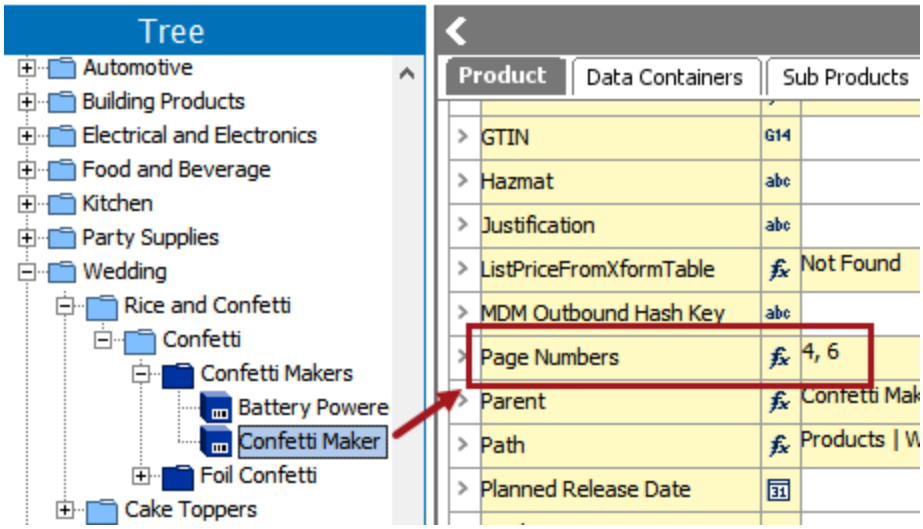
```
list(sortnumeric(pagenumbers()), ", ")
```

The below screenshot shows the **Page data** tab of two selected DTP pages. The products that appear on the pages are listed under the **Products** flipper. This example uses a product named 'Confetti Maker,' which appears on both page 4 and 6 of the publication.



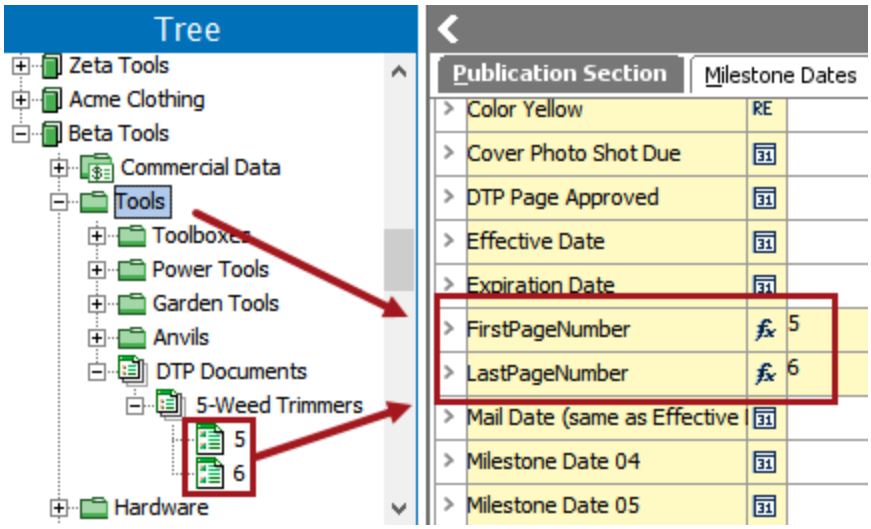


When the Confetti Maker product is selected in the Tree, the page numbers on which it appears display in the calculated attribute field, e.g., pages 4 and 6.



sectionFirstPageNumber and sectionLastPageNumber

Use the formulas `sectionFirstPageNumber()` and `sectionLastPageNumber()` to return the values of the first and last page numbers of the DTP pages saved within a section. Typically there will be more than two pages, but for this basic example, only two DTP pages have been saved into the Tools section.



For a scenario using the SectionFirstPageNumber and SectionLastPageNumber functions to create a table of contents, refer to **Creating a Table of Contents Product Template** in the **Print Publisher**documentation.

Text Examples

In the sections below, the calculated attribute text functions are grouped by purpose and are demonstrated in simple terms using a variety of value templates:

- **Escape Functions** can be used to allow for special characters during text manipulation.
- **Identify Functions** can be used to display the defined data.
- **Modify Functions** can be used to modify defined data.
- **Regular Expression Functions** can be used to search and modify text based on a defined template.
- **Representative Text Functions** can be used to produce an alternative value for the defined text.
- **Test Functions** can be used to perform a test and return a result.

For function syntax information and more detailed use cases, refer to the **Text Functions** documentation.

Escape Functions

These functions can be used to allow for special characters during text manipulation.

The examples in the following table do not require specific object data to produce the defined result. Copy and paste any of the **Value Template** text below into the Function Editor, select any object, and click the Evaluate button to display the defined **Result**.

Value Template	Result	Notes
`escapemerge(';', '/', "Red", "Orange; Blue", "Violet")`	Red;Orange/; Blue;Violet	Write semicolon (;) (split character) after each element and include slash (/) (escape character) when split character is found in text.
`escapesplit(';', '/', 'Red;Orange/; Blue;Violet')`	RedOrange; BlueViolet	Write elements without semicolon (;) (split character) unless it is escaped with a slash (/) (escape character).

Identify Functions

These functions can be used to display the defined data.

The examples in the following table do not require specific object data to produce the defined result. Copy and paste any of the **Value Template** text below into the Function Editor, select any object, and click the Evaluate button to display the defined **Result**.

Value Template	Result	Notes
`left('hello')`	h	1 character from left
`left('hello',3)`	hel	3 characters from left
`right('hello')`	o	1 character from right
`right('hello', 3)`	llo	3 characters from right
`mid('hello',2,3)`	ell	3 characters starting at character 2
`len('hello')`	5	number of characters in string

Modify Functions

These functions can be used to modify defined data.

The examples in the following table do not require specific object data to produce the defined result. Copy and paste any of the **Value Template** text below into the Function Editor, select any object, and click the Evaluate button to display the defined **Result**.

Value Template	Result	Notes
`concatenate("hello", "hallo")`	hellohallo	join multiple text strings into a single text string
`trim('   hello   ')`	hello	remove spaces before and after text
`upper('hello')`	HELLO	convert to uppercase letters
`lower('HELLO')`	hello	convert to lowercase letters
`proper("hello, are you john's son?")`	Hello, Are You John'S Son?	capitalize the first letter of each word, including capitalization after

Value Template	Result	Notes
		punctuation
`firstnamefirst("Johnson, John S.")`	John S. Johnson	transpose words using comma as separator
`firstnamefirst("Joe Dalton")`	Joe Dalton	transpose words using comma as separator
`replace('hello',2,3,'el')`	helo	insert 'el' in place of 3 characters, starting at character 2
`substitute('hellohellohello', 'ell', 'al')`	halohalohalo	update all instances of 'ell' with 'al'
`substitute('hellohellohello', 'ell', 'al', 2)`	hellohalohello	update only instance 2 of 'ell' with 'al'

Formatting Text

The example calculated attributes below use an object with the attribute values defined in the following table.

Attribute>	height	width	length
Product1	50 cm	135 cm	75 cm
Product2	50 cm		75 cm

Note: Text used for 'attribute-id' and 'unit-id' is case-sensitive.

After creating the data above, copy and paste any of the **Value Template** text below into the Function Editor, select the object with the defined data, and click the Evaluate button to display the **Result**.

Value Template	Object	Result	Notes
`concatenate( prodval('height'), prodval('width'), prodval('length'))`	Product 1	5013575	Concatenating only the values excludes the unit information and results in an unformatted number.
`concatenate( prodvalsimple('height','unece.unit.CMT'),' H x ', prodvalsimple('width','unece.unit.CMT'),' W x ', prodvalsimple('length','unece.unit.CMT'),' L')`	Product 1	50 cm H x 135 cm W x 75 cm L	Static text strings provide a typical display for dimension information.
`list(listconcatenate( prodval("height"), prodval("width"), prodval("length")),'*')`	Product 2	50*75	Since the width value is empty, this needs to be concatenated without an extra separator '*' so the LISTCONCATENATE and LIST functions are used. Alternatively, the IF function can be used to check whether a value is empty or not before concatenating, but would require additional code to check for each concatenating value.

The example calculated attributes below use an object with the attribute values defined in the following table.

Attribute>	prodname
Product3	ACME-BP-1001 Super XBP

Note: Text used for 'attribute-id' is case-sensitive.

After creating the data above, copy and paste any of the **Value Template** text below into the Function Editor, select the object with the defined data, and click the Evaluate button to display the **Result**.

Value Template	Object	Result	Notes
`replace(prodval('prodname'), 6,2,'Boardroom Projector Series')`	Product3	ACME-Boardroom Projector Series-1001 Super XBP	Update the first occurrence of BP while leaving the second instance untouched. **Note:** If the position (6) or length (2) to be replaced was miscounted, whatever text is found at the location will be replaced.
`substitute(prodval('prodname'), '-BP-',' Boardroom Projector Series ')`	Product3	ACME Boardroom Projector Series 1001 Super XBP	Update all occurrences of -BP-, so that the second instance of BP is not changed.
`substitute(prodval('prodname'), 'BP','Boardroom Projector Series')`	Product3	ACME-Boardroom Projector Series-1001 Super XBoardroom Projector Series	Update all occurrences of BP.

Value Template	Object	Result	Notes
`substitute(prodval('prodname'), 'BP','Boardroom Projector Series',1)`	Product3	ACME-Boardroom Projector Series-1001 Super XBP	Update only the first occurrence of BP.

Regular Expression Functions

These functions can be used to search and modify text based on a defined template.

For more information on creating regular expressions, refer to the **Regular Expression** documentation.

The examples in the following table do not require specific object data to produce the defined result. Copy and paste any of the **Value Template** text below into the Function Editor, select any object, and click the Evaluate button to display the defined **Result**.

Value Template	Result	Notes
`regexpsearch('e.*he', 'hellohello')`	2	2 is the start point for 'ellohe' as a case sensitive match for the regexp
`regexpsearch('[ABC]\\d', 'HELLOHA2MSTER')`	7	7 is the start point for 'A' + any digit as a case sensitive match for the regexp. [ ] indicates only one of the enclosed letters is required. \\d indicates a digit.
`regexpsearchi('[efg]|[ojk]', 'HELLOHELLO')`	2	2 is the start point for 'E' as a case insensitive match for the regexp looking for either 'e, f, g' or 'o, j, k'. [ ] indicates only one of the enclosed letters is required. | indicates 'or.'

Value Template	Result	Notes
`regexpsearchi('[abc]|[ojk]', 'HELLOHELLO', 3)`	5	Searching starting at position 3, 5 is the start point for 'O' as a case insensitive match for the regexp looking for either 'a, b, c' or 'o, j, k'. [ ] indicates only one of the enclosed letters is required. | indicates 'or.'
`regexpsubstitute("kat;abe", "(.*);(.*)", "$2$1")`	abekat	Save all characters before the semicolon in Group 1, save all characters after the semicolon in Group 2; display Group 2 then Group 1, without any space or the semicolon
`regexpsubstitute("kat  abe", "(\\w*)\\s*(\\w*)", "$2$1")`	abekat	Find first word (and save it in Group 1) followed by a space, then find another word (and save it in Group 2), display Group 2 then Group 1 without the space. \\w indicates a word and \\s indicates a space.

Representative Text Functions

These functions can be used to produce an alternative value for the defined text.

The examples in the following table do not require specific object data to produce the defined result. Copy and paste any of the **Value Template** text below into the Function Editor, select any object, and click the Evaluate button to display the defined **Result**.

Value Template	Result
`soundex("hello")`	H400
`metaphone3("Joel Dalton")`	JLTLTN
`metaphone3alternate("Joel Dalton")`	ALTLTN

Test Functions

The functions can be used to perform a test and return a result.

The examples in the following table do not require specific object data to produce the defined result. Copy and paste any of the **Value Template** text below into the Function Editor, select any object, and click the Evaluate button to display the defined **Result**.

Value Template	Result	Notes
`exact("hello", "hallo")`	0	Exact match not found
`exact("hello", "hello")`	1	Exact match is found
`if (exact('hello','you'), 'true', 'false')`	false	Exact match is not found so the second result is returned
`find('llo','hellohello')`	3	The position of the first occurrence
`find('llo','hellohello', 4)`	8	The position of the first occurrence found after character 4
`find('lllo','hellohello')`	N/A	Match is not found

Testing Text

The example calculated attributes below use an object with the attribute values defined in the following table.

Attribute>	PowerCordIncluded

Product4	Yes
Product5	yes

After creating the data above, copy and paste any of the **Value Template** text below into the Function Editor, select the object with the defined data, and click the Evaluate button to display the **Result**.

Value Template	Object	Result
`if(exact(prodval('PowerCordIncluded'),'Yes'), 'A 2 meter power cord is included.', 'Power cord is not included.')`	Product4 Product5	A 2 meter power cord is included. Power cord is not included.

Variable Examples

These example calculated attributes are written to use the data defined in the following tables.

For function syntax information on and more detailed use cases, refer to the **Variable Functions** documentation.

The examples below assume a setup including these **attributes** and **products**:

ATTRIBUTE Type	ID	Name
Text-validated product attribute	TEXT1id	TEXT1

PRODUCTS ID	Name	Parent	TEXT1id
P-family-id	P-family	Product hierarchy root	family value
P1id	P1	P-family-id	p1 value
P2id	P2	P-family-id	p2 value
P3id	P3	P-family-id	p3 value

After creating the data above, copy and paste any of the **Value Template** text below into the Function Editor, select the object with the defined data, and click the Evaluate button to display the **Result**.

Value Template	Object	Result

`{txt:=prodval('TEXT1id'), pos:=find('p3', txt)`
`}`
`if(pos='N/A', 'no P3', replace(txt, pos, 2, '??'))`
	P3
	P2
		?? value
		no P3

`{total:=0,`
`loop:=iterate(listconcatenate(1,4,8,13),`
`'total:=total+item')`
`}`
`concatenate(total)`
	{any}	26

Concatenate Function with Variables

Consider a calculated attribute that will concatenate two different attribute values, where they style of each should be different. Use character tags in STEP to format (or style) text attributes. Then convert those tags to either paragraph or character tags for the output media. For information on character tags, refer to **Tags**.

The example calculated attribute is written to use an object with the **attributes** defined in the following table.

Attribute>	ProductName	KeyLetter
Mandatory	Yes	No
Character Tag	[PN]	[KL]

The example calculated attributes below use an object with the attribute values defined in the following table.

	ProductName	**KeyLetter**	**Required Result**
Product1(P1)	Acme Widget	A	[KL]A. [PN]Acme Widget
Product2(P2)	Acme Widget		[PN]Acme Widget

A calculated attribute can produce the same result with or without variables as demonstrated in the table below.

Value Template With Variables	**Value Template Without Variables**
`{pnnokey := concatenate('[PN]',prodval ("ProductName")), pnwkey := concatenate('[KL]',prodval ("KeyLetter"), '. [PN]',prodval("ProductName")) } if(exact(prodval ("KeyLetter"),''),pnnokey,pnwkey)`	`if(exact(prodval("KeyLetter"),''), concatenate('[PN]',prodval ("ProductName")), concatenate('[KL]',prodval ("KeyLetter"), '. [PN]',prodval("ProductName")))`

Variables

In this example, two variables allow the actual value template (the last line) to be shorter and more legible to the reader:

- Variable 'pnnokey' calculates the result when no KeyLetter value exists.
- Variable 'pnwkey' calculates when there is a KeyLetter value.

In both examples, testing for a blank value is achieved by using the EXACT function to compare against two (2) single quote marks (') with no spaces between them.

Find Function with Variables

The example calculated attributes below use an object with the attribute values defined in the following table.

	ProductName(prodname)
Product1(P1)	ACME-BP-1001 Super XBP

A calculated attribute can produce the same result with or without variables as demonstrated in the table below.

Value Template	Result	Notes

`{x := find('-BP-', prodval("prodname")),`
`y := 'Boardroom Projector Series'`
`}`
`if(exact(x,'N/A'),'',replace(prodval("prodname"),x+1,2,y))`
	ACME-Boardroom Projector Series-1001 Super XBP	The IF function checks if the value of x is 'N/A'
		○ If the value is 'N/A' the result is no output, as indicated by the blank value of two single quote marks.
		○ If the value is not 'N/A', then the two (2) characters starting at position x+1 (6, in this example), are replaced by the value of y.

Variables

- Variable 'x' finds the position of the text string that will be replaced using the FIND function. In this example, the position of the text '-BP-' within the 'prodname' attribute value is needed. The function returns the numeric value of the position, in this example, 5 is returned since the first dash is at position 5.

- Variable 'y' supplies the replacement text string.

Asset Push File Name Scenario

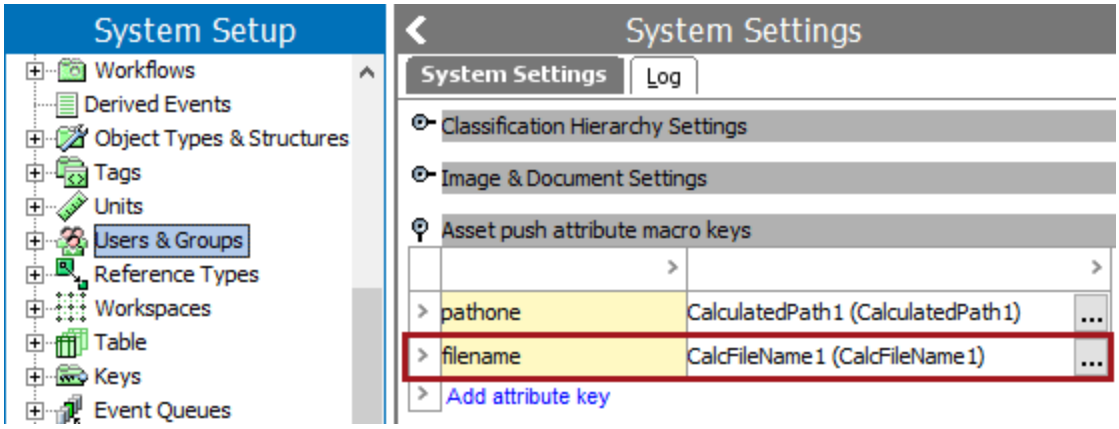
A calculated attribute can be used to create a custom file name for use with assets exported from STEP using the Asset Push functionality.

In this scenario, the file name of assets will be generated to contain the ID of the asset, appended with the date and timestamp of the upload. Of course, other attribute values may be included in the file name generation, including (but not limited to) Description Attributes values on the asset and any other attribute value from the asset's System Attribute flipper.

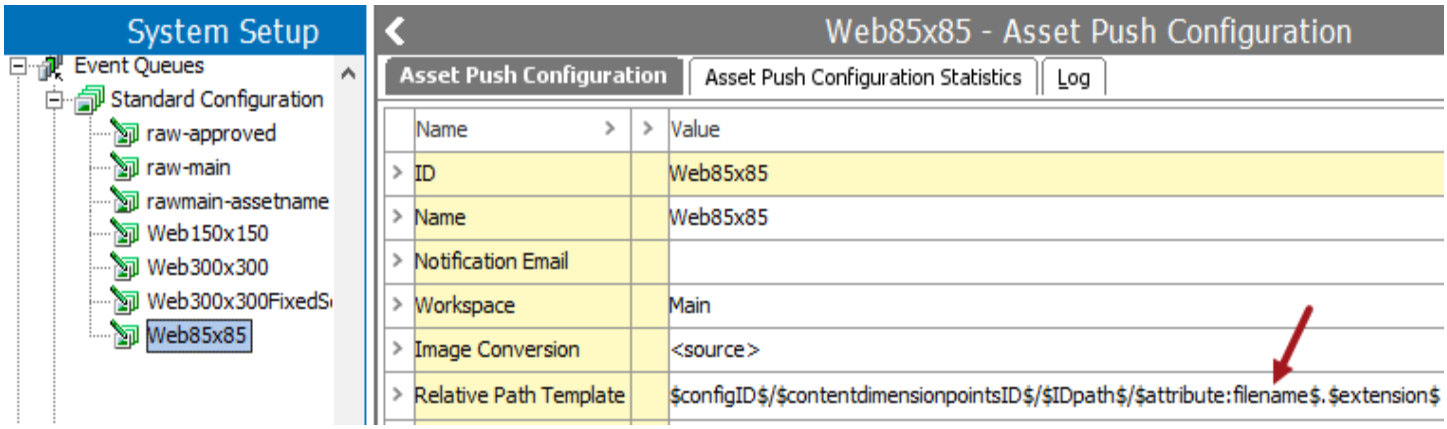
For information on Asset Push, refer to the **Asset Push** topic in the **Digital Assets** documentation.

Assumptions

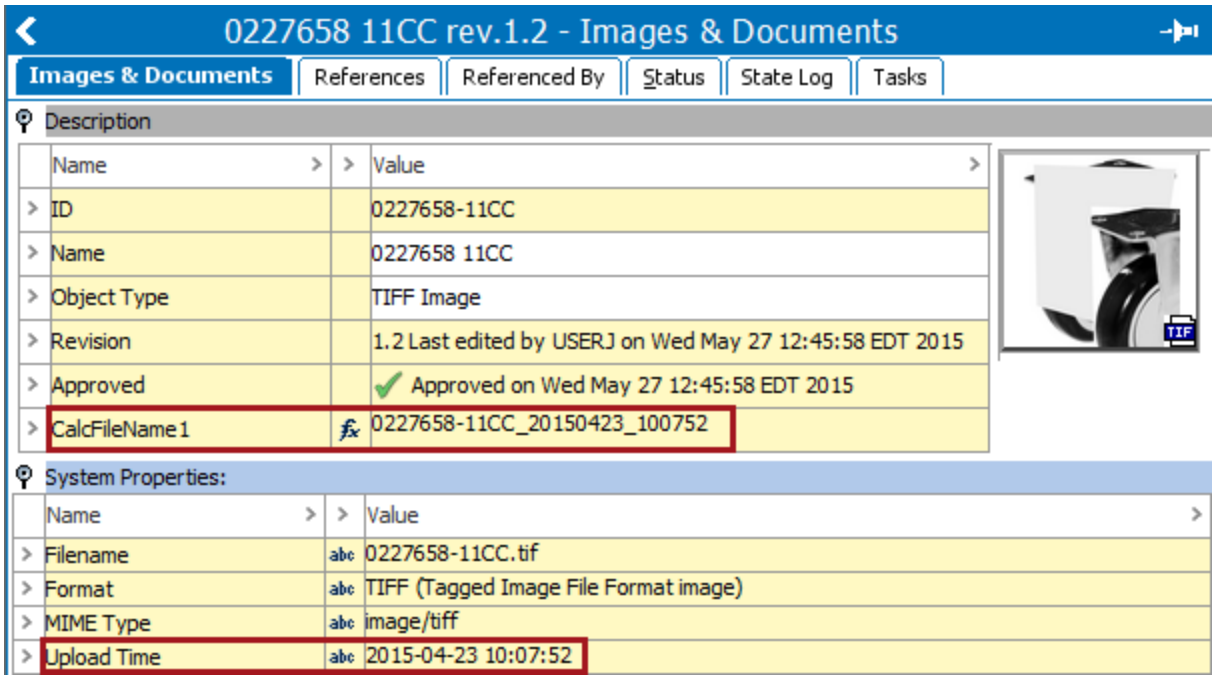
1. An asset push attribute macro key with the Attribute Key value 'filename' is created to hold the calculated attribute 'CalcFileName1(CalcFileName1)'. A macro key attribute must be a description attribute. For more information on this macro, refer to **Asset Push Attribute Macro Keys** topic within the **Users and Groups** section of the **System Setup** documentation.



2. The Asset Push Configuration 'Web85x85' will use the 'filename' macro key within its Relative Path Template, in order to construct the full path and file name of the assets pushed with this configuration. For details on creating a Relative Path Template, refer to the **Relative Path Template** documentation.



3. In this scenario, the asset being pushed is '0227658 11CC(0227658-11CC)' and the following screenshot includes some of the available description attribute values. In the Asset editor, the metadata system default attribute 'Upload Time(asset.uploaded)' is found under the System Properties flipper. The value of this asset is used to produce the date and time of the upload. The CalcFileName1 attribute displays the concatenation of the ID, upload date, and upload time, as described in the solution below.



Solution

Approach

A description calculated attribute 'CalcFileName1(CalcFileName1)' is made valid for all relevant assets, and includes two (2) variables:

- The **uploaddate** variable extracts the date of the upload, for example 2017-06-06, removing the dash or hyphen (-) character. For purposes of this example, assume that the requirement is not to have any separators in the date value.
- The **uploadtime** variable extracts the time of the upload, for example 14:53:28, removing the colon (:) character. Apart from the fact that this is an illegal character in a file name, again assume that the preference is not to use any separator in the time value.

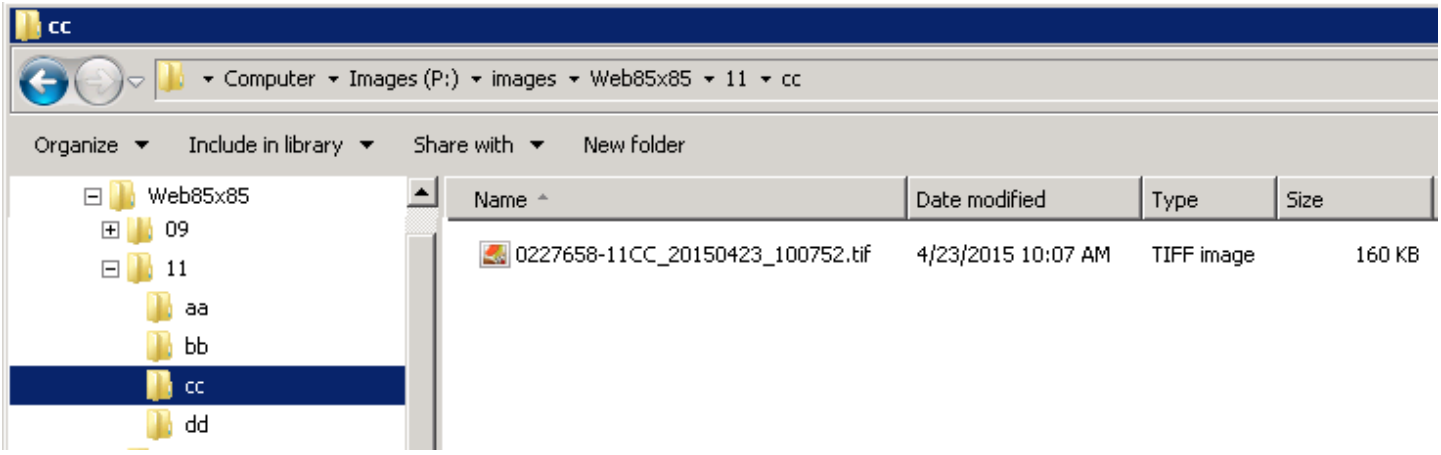
Value Template

```
{uploaddate := substitute(left(value('asset.uploaded'), 10), "-", ""),
uploadtime := substitute(left(value('asset.uploaded'), 8), ":", "")
}
concatenate(stepid(), "_", uploaddate, "_", uploadtime)
```

Results

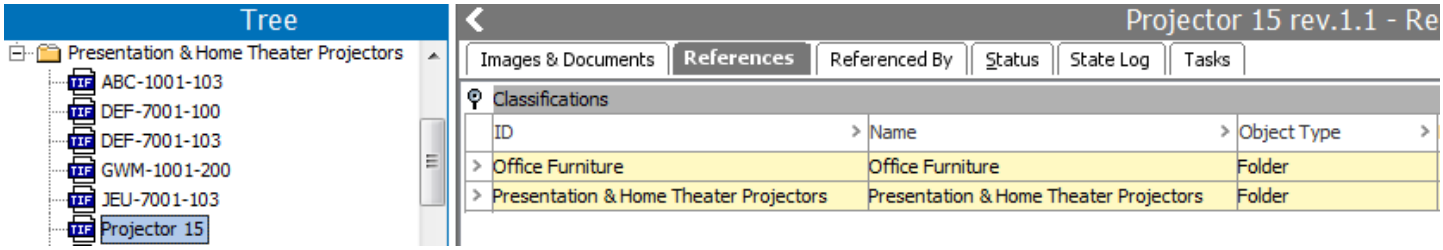
The pushed asset file is saved to the path generated by the Relative Path Template within the Asset Push Configuration, and includes the file name generated by the calculated attribute. The calculate attribute separates each of the elements of the file name listed below with an underscore (_):

- STEP ID = 0227658-11CC
- Upload date = 20150423
- Upload time = 100752



Classification Scenario

An asset is linked to two classifications.

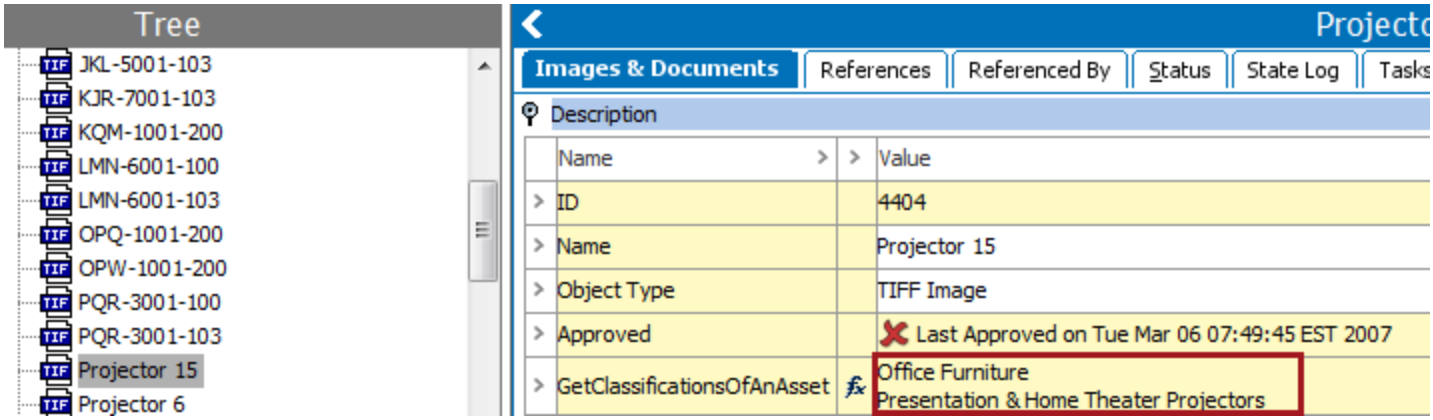


Get All Classifications

A metadata calculated attribute on the asset will display the name and/or ID for all classifications. The calculated attribute formula could be written as:

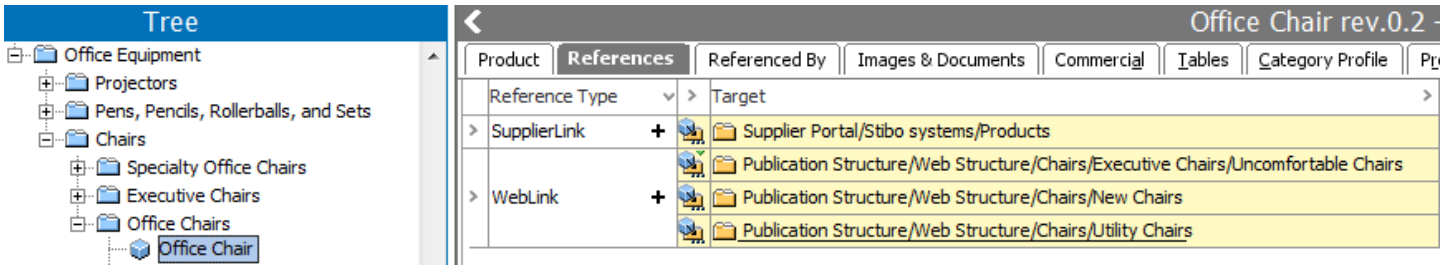
```
list(iterate(classifications(), 'stepname()'), "\n")
```

The new line (added by pressing Enter or using "\n") within the formula allows the attribute value to display on multiple lines, as shown in the following image.



Get Classifications Based on Type

Multiple types of classifications exist.

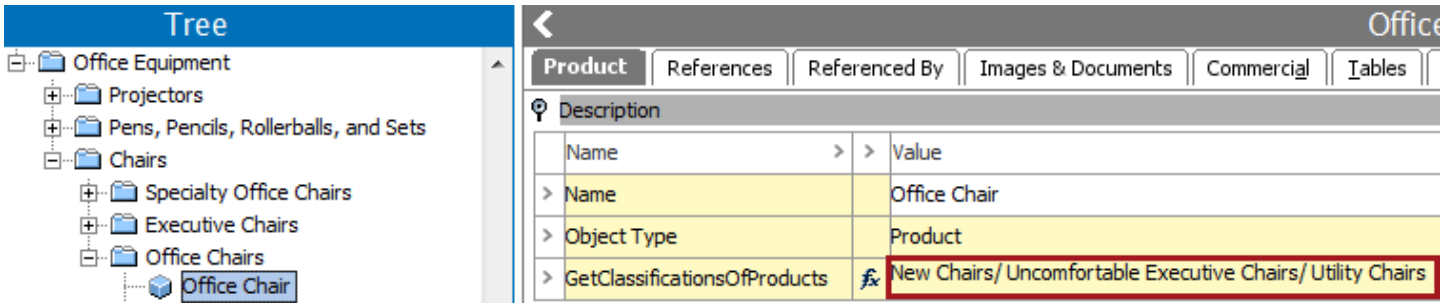


A calculated attribute on the product could display a limited number of classifications. For example, only include the 'WebLink' references type, which have an ID of 'WebInclude'.

The calculated attribute formula could be written as:

```
list(iterate(classifications("WebInclude"), "stepid()"), "/ ")
```

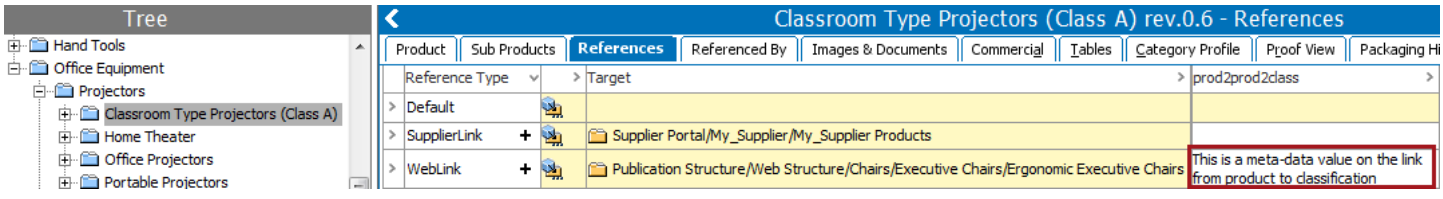
The result displays the references separated by the text string "/ ".



Get Metadata Value Located on the Link From Classification-to-Product

The product is linked to a classification folder with a product to classification reference type, and includes metadata on that particular product to classification reference type link.

For example, Classroom Type Projectors has a product to classification reference type called WebLink reference (ID = 'WebInclude'), that has the metadata attribute prod2prod2class on it.

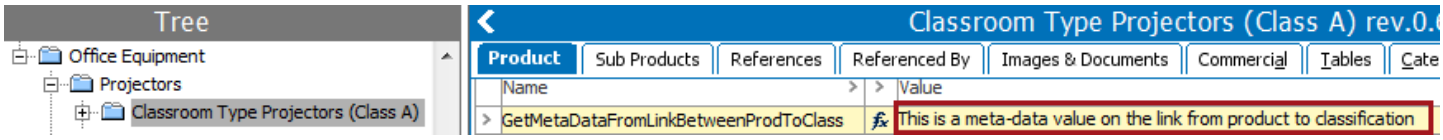


The calculated attribute formula could be written as:

```
list (iterate(classificationproductlinks("WebInclude"),'value("prod2prod2class")'),
'\n')
```

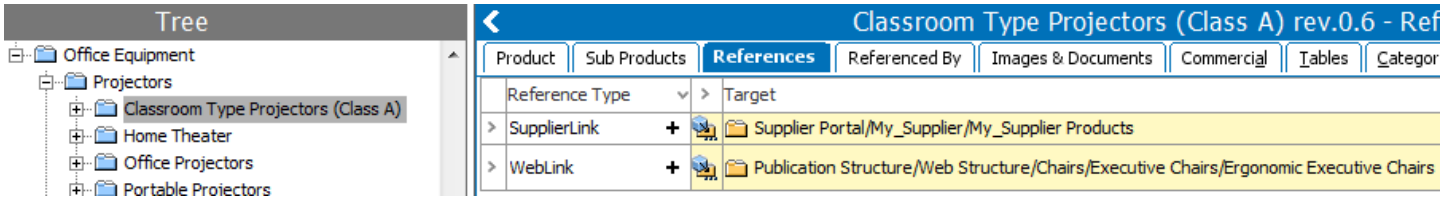
This will display the meta attribute value from all classification links with type WebInclude and the separator between the multiple links values is “\n” (new line).

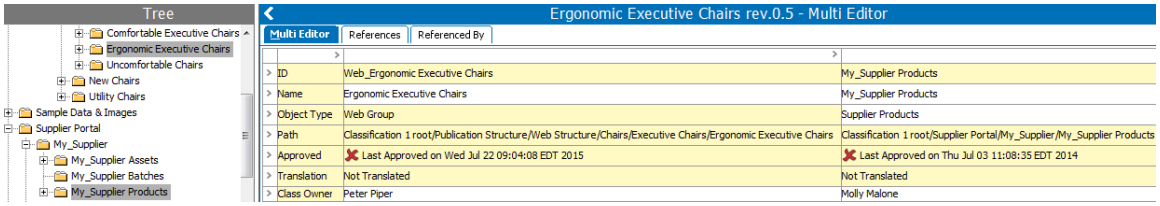
The result displays the value of the linked metadata on the original product.



Get CPL Classifications Using Classification Product Links

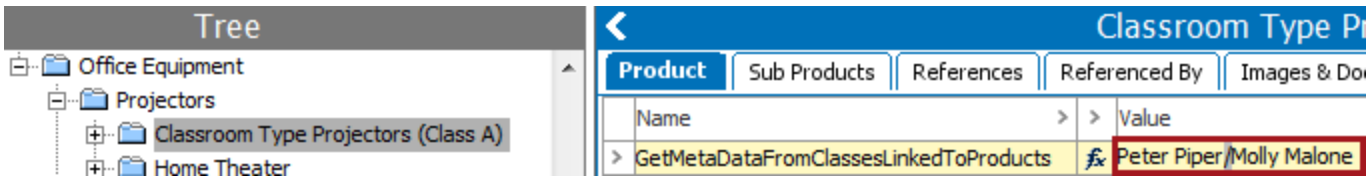
A product is linked into one or more classifications and metadata from each classification is needed. For example, for the Classroom Type Projectors product, linked using SupplierLink and WebLink, the calculated attribute will display the Class Owner attribute (ID = 'ClassOwner') from the classification.





The ITERATE function shown in bold above returns a list of the internal 'labels' for the classifications. The surrounding ITERATE function scans through the list and gets the ClassOwner attribute value from the classifications.

The result is a list of the owners, separated by a multisep character tag as the list was converted to a multivalue list before being displayed.



Commercial Data Scenario

This use case describes two ways to display commercial data (price list information) as an attribute value using a calculated attribute. These options allows you to use price lists and display a single price value per object in the object attributes.

Price List in a Publication Structure

The formula for this calculated attribute is:

```
(TermVal('SalesPrices', '0'))
```

In this example, object type of the commercial price list is 'SalesPrices'.

Place the commercial price list within the publication structure and select the appropriate Workbench menu, view, and version.

For more information on commercial data, refer to the **Commercial Data** section of the **Publisher (Adobe InDesign Integration)** guide.

Price List in an eCatalog Structure

The formula for this calculated attribute is:

```
TermValid('PriceListID', '1')
```

In this example, the ID of the commercial price list is 'PriceListID'.

For more information on commercial data, refer to **eCatalogs** in the **eCatalogs** guide.

Comparing Localized Values Scenario

Calculated attributes can be used to identify and then compare an inherited value with a localized value. For example, an attribute named 'Warranty' is valid both at the product family level and at the item level (child of the product family). An export include objects with a value entered at the item level that is different from the value entered at the product family level. In other words, only when the value is localized.

Assumptions

1. Report only when the local value is different from the inherited value.
2. Do not report if a value has been entered on the item that is the same as the inherited value.

Solution

Approach

The approach follows the steps below:

1. A list of the product path is generated.
2. The value for the Warranty attribute is calculated from the parent of the child product (item).
3. The Warranty value for the child product is obtained.
4. The Warranty value for the child product is compared to the Warranty value for the parent of the child product.
5. If different, then both the inherited and local values are displayed.
6. If same, then the results value is blank.

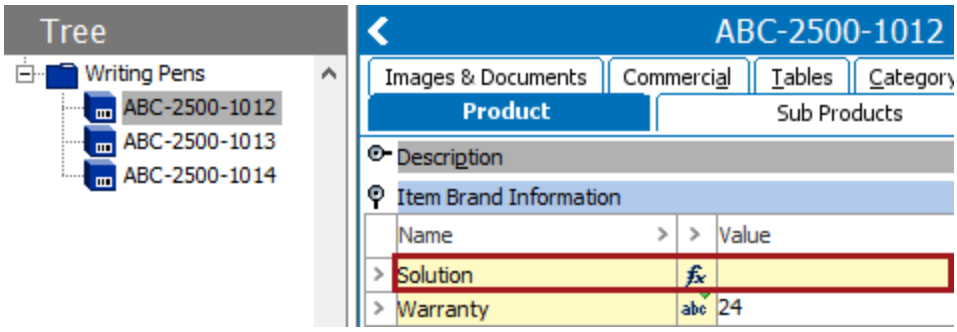
Value Template

```
{i:=path(),
parent:=listitem(i,listlen(i)-1),
parentvalue := iterate(parent, 'value("Warranty")'),
localvalue := value("Warranty")

}
if(exact(parentvalue,localvalue), "", concatenate("Parent Value = ", parentvalue, ",
Local Value = ",localvalue))
```

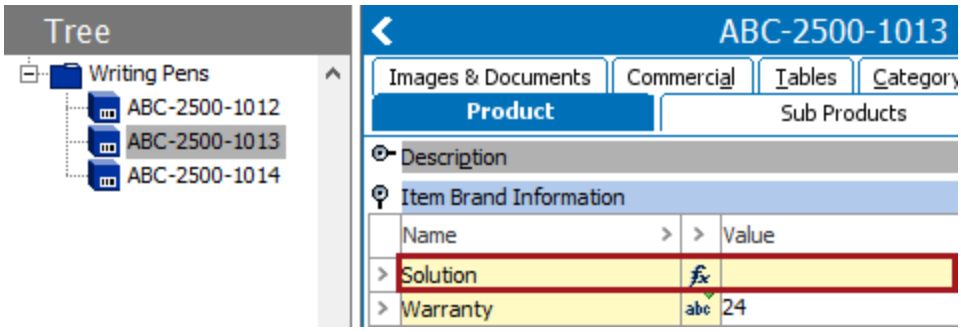
Results

The value for the Warranty attribute on the parent node (Writing Pens) is 24.

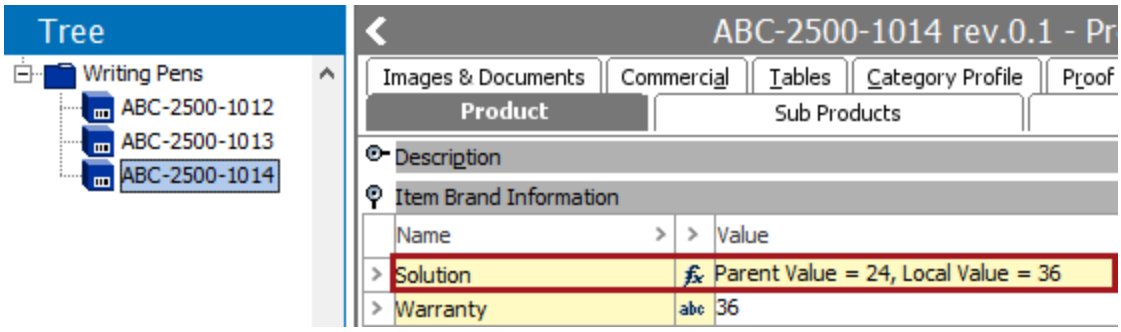
The first child product has inherited the value for Warranty from the parent (indicated by the green triangle), so the calculated attribute result is blank.



The second child product has a localized value, but it is the same as the value on the parent (indicated by the green triangle), so the calculated attribute result is blank.



The third child product has a localized value that is different from the value on the parent, so the calculated attribute result shows both the parent and the local values.



Identifying Child Objects Scenario

It can be beneficial to use a calculated attribute to easily identify if a product family has any children. For example, it can be beneficial to run an export of product families, and have a clear indication of whether the family has no child products, one single child product, or more than one child product.

Assumptions

1. The calculated attribute is valid for specific 'parental' product object types.
2. The subsequent export specifies the appropriate object type(s) to be exported.
3. This simple calculation will check all child products below the selected product family object type, which includes all subordinate levels.
4. If a calculation is required to restrict the levels to a specific number of children, a more sophisticated calculation will be required.

Solution

Approach

A simple list of child products will be obtained. The list will then be checked if it has 0 length (no children) or if it has a length of 1 (a single child product), and if neither of those two criteria are met then the family is assumed to have more than one child product.

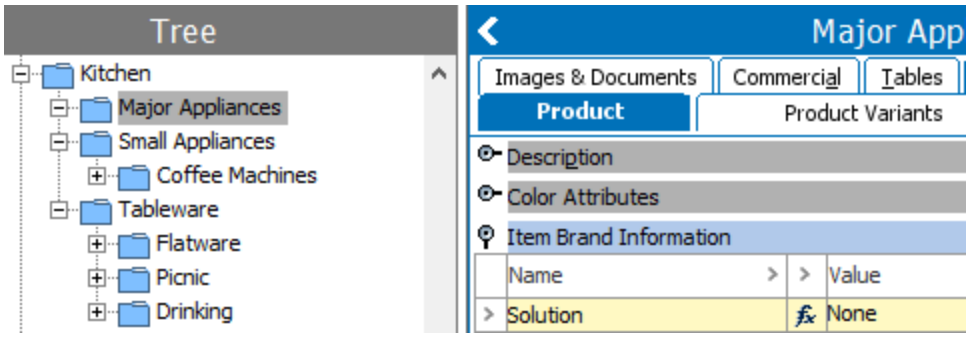
Value Template

```
{childlist := subproducts()}
if(listlen(childlist)=0, "None", if(listlen(childlist)=1, "Single Child", "Multiple Children"))
```

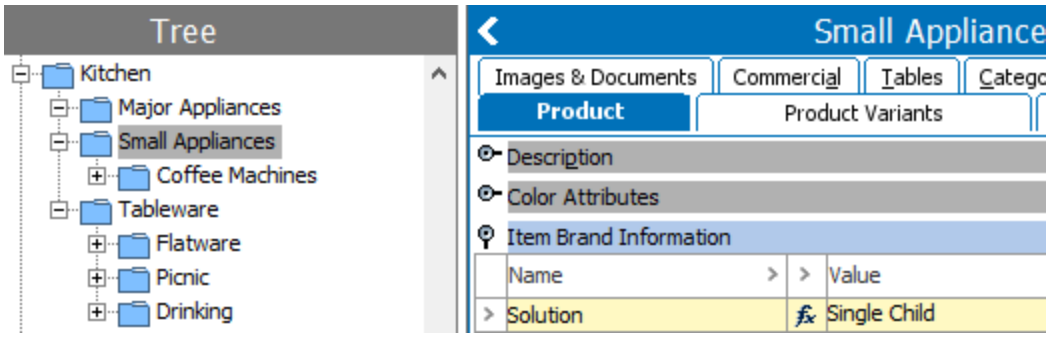
For information on adding a value template, refer to the **Attribute Editor** section of the **Function Editor** documentation.

Results

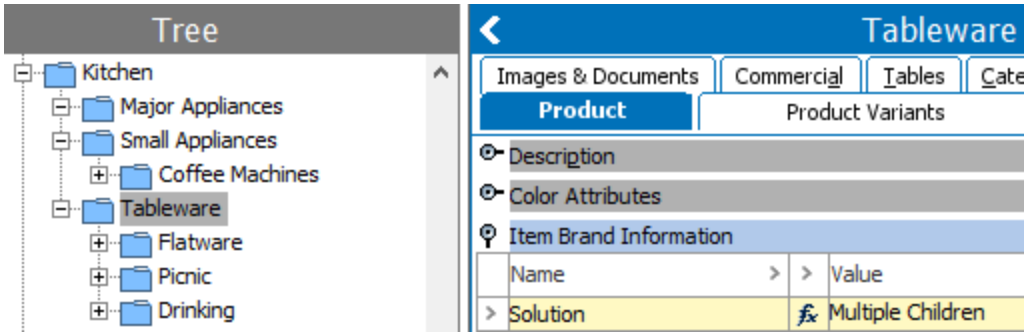
The first node selected has no children, so 'None' is displayed.



The second node selected has one child, so 'Single Child' is displayed.

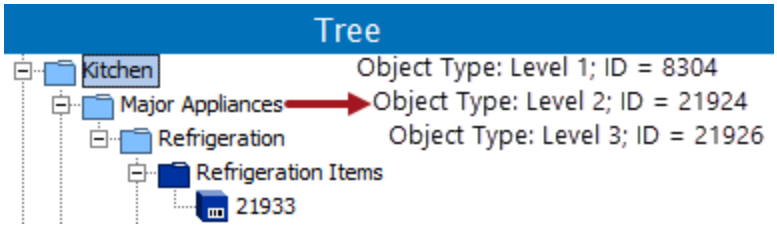


The third node selected has more than one child, so 'Multiple Children' is displayed.



Including Parent Info on Child Scenario

Calculated attributes can be used to automate the task of including parent information on a child. This topic addresses two options: when each individual child item should display the ID of the specified parent, and when the ID and name of each of the specified parent object types should display using multiple calculated attributes.



Assumptions

1. The Object Types in the path are all unique.
2. The Object Type requested in the calculation exists, otherwise the calculation results in the text 'N/A'.

Solution Option 1

Display only one parent using one calculated attribute.

Approach

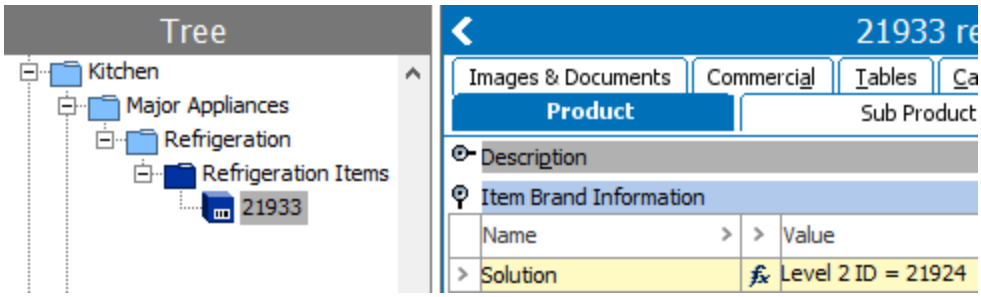
The first three variables of the calculation will specify the object type name that is required, and will generate two lists, one for the IDs of the product nodes in the path, and the other for the object type names in the path. These two lists will have identical lengths. The 'getid' variable then locates the index number of the required object type name in the one list and returns the corresponding value of the product ID in the other list.

Value Template

```
{objtype := "Level 2", //This is the object type NAME
plist := iterate(path(), 'stepid()'),
idlist := iterate(path(), 'stepobjecttype()'),
getid := listitem(filter(plist, 'exact(objtype, listitem(idlist,index))'),1)
}
concatenate("Level 2 ID = ",getid)
```

Results

The ID of the Level 2 object type that is parent to the item (ID = 21933) is reported by the calculated attribute.



Solution Option 2

Display information for multiple parents using the same calculated attribute copied on each level to display each object type.

Assumptions

1. A total of three calculated attributes are required (for Level 1, Level 2, and Level 3).
2. The value template for each would be nearly identical, but the first variable of each formula would identify the unique object type.

Approach

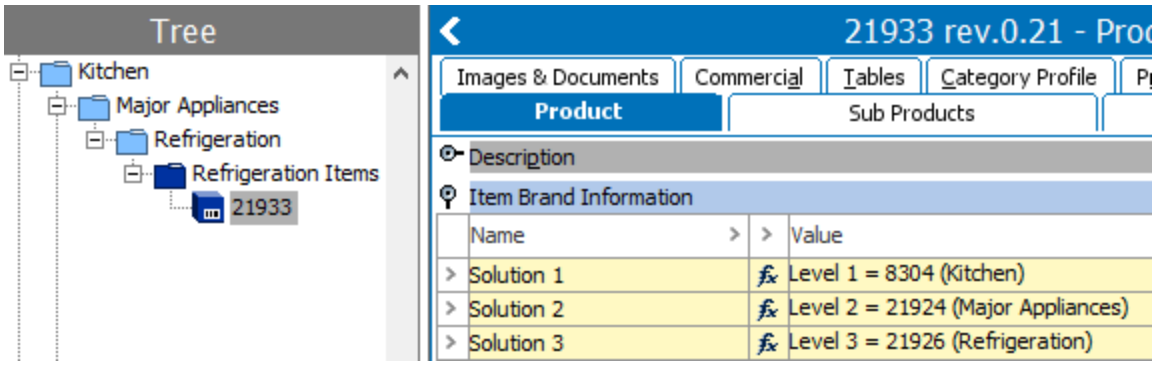
The following two additional variables are added to the previous value template: nlist and getname; and the concatenate formula has been modified accordingly.

Value Template

```
{objtype := "Level 1", //This is the object type NAME
plist := iterate(path(), 'stepid()'),
nlist := iterate(path(), 'stepname()'),
idlist := iterate(path(), 'stepobjecttype()'),
getid := listitem(filter(plist, 'exact(objtype, listitem(idlist,index))'),1),
getname := listitem(filter(nlist, 'exact(objtype, listitem(idlist,index))'),1)
}
concatenate("Level = ", getid, " (", getname,")")
```

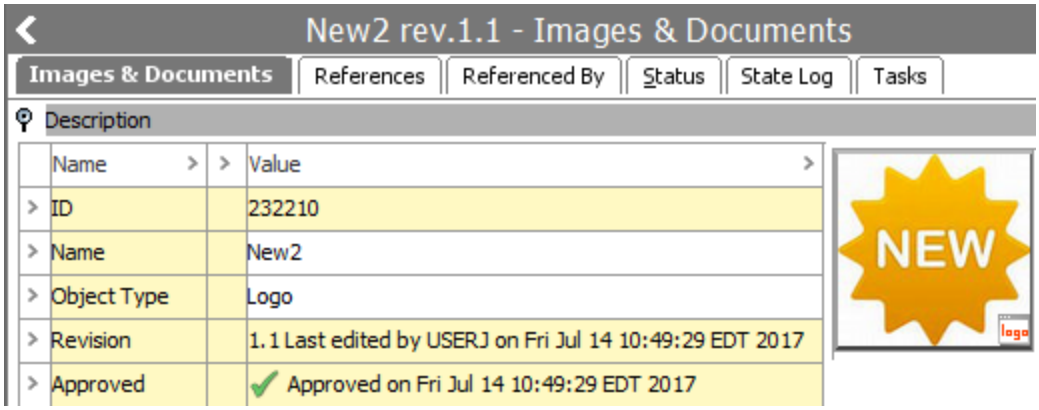
Results

Each of the identified parent object types to the item (ID = 21933) are reported by separate calculated attributes.


Tree
Kitchen
Major Appliances
Refrigeration
Refrigeration Items
21933
21933 rev.0.21 - Proc
Images & Documents
Commercial
Tables
Category Profile
Product
Sub Products
Description
Item Brand Information
Name
Value
Solution 1
Level 1 = 8304 (Kitchen)
Solution 2
Level 2 = 21924 (Major Appliances)
Solution 3
Level 3 = 21926 (Refrigeration)

New Product Indicator Scenario

A calculated attribute can be used to automate the task of marking a product as new, or manually updating a field to indicate an item is new. For example, in a print application, a 'new' indicator needs to be generated if any of the products in a product family are designated as new. This could result in the display of a logo asset (such as the one in the image below) on a catalog section.



Assumptions

1. This calculated attribute will be used in a Print Publisher product template.
2. The resulting value from this calculated attribute will either be changed via a transformation action into a call out for a logo, or a Stibo Systems tag will be established that calls out the logo.
3. The calculated attribute will be made valid at the product family level (or product override if that is appropriate).

Approach

All the children in the family (or override if used) will be inspected for the value of a particular attribute (in this case the attribute is 'New Flag').

If any product has a value of 'Yes' as the New Flag value, the calculated attribute will return a value of 'Some New'. If none of the products has a 'Yes' as its New Flag value, the calculation will result in a value of 'None New'.

Solution Options

The following solutions are all valid for this approach.

Value Template 1

```
if(listlen(filter(subproducts(), 'exact("Yes",value("New Flag"))')) >0, "Some
New","None New")
```

Value Template 2

```
{x := iterate(subproducts(), 'value("New Flag")="Yes"')}
if(listcontains(x,"1"), "Some New","None New")
```

Value Template 3

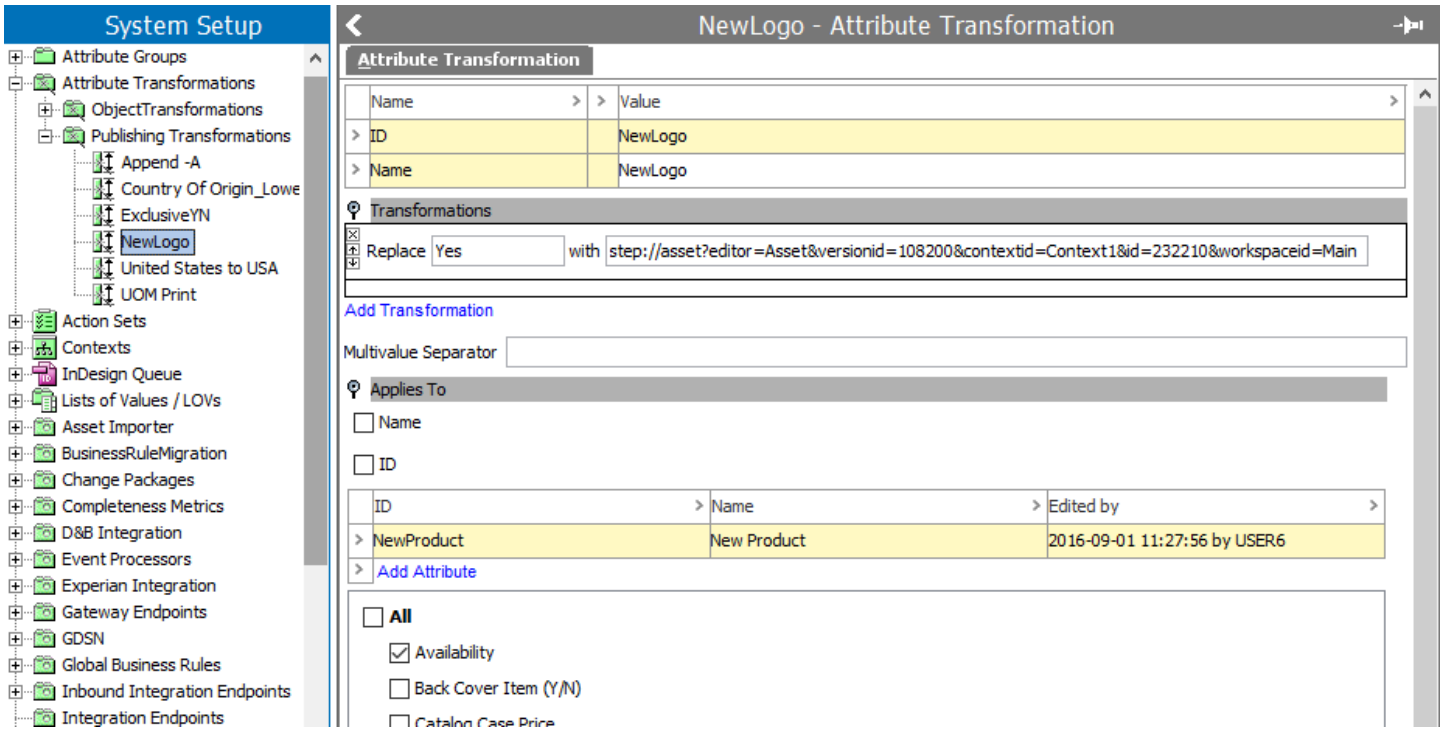
```
{x := iterate(subproducts(), 'value("New Flag")')}
if(listcontains(x,"Yes"), "Some New","None New")
```

Value Template 4

```
{x := iterate(subproducts(), 'value("New Flag")="Yes"')
}
if(listcontains(x,"1"), "<NewLogo/>","")
```

Considerations

- Value Templates 1, 2, and 3 require some subsequent action, such as a transformation on the attribute value. For example, a transformation of Replace Whole Value could be established so that 'Some New' is transformed to an asset, as shown below; and the value of 'None New' would be transformed to nothing.

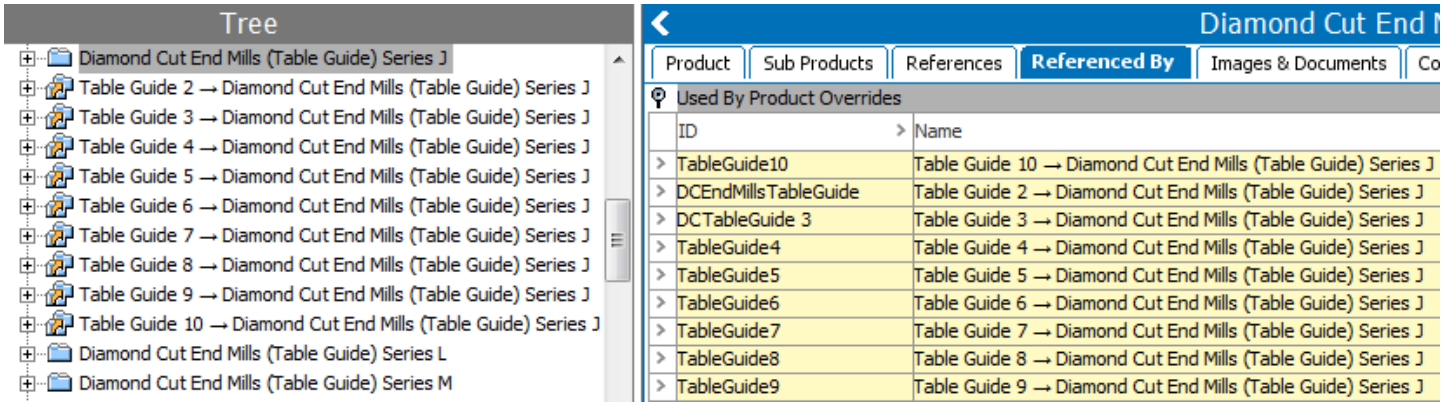


- Value Templates 1, 2, and 3 could have taken advantage of using a Stibo Systems tag instead of creating a value of 'Some New' or 'None New'. This eliminates the need of a transformation, but does still require a setup for the Stibo Systems tag. In this example, the tag <NewLogo/> would be converted to the appropriate image call out, the same way as the transformation.
- Value Template 3 is very similar to Value Template 2.
- Value Template 4 is the same as Value Template 2, but uses a tag.

Note: Alternatively, attribute transformations can be applied to text within Print Publisher product templates to transform text into an image, such as changing the word 'New' to a logo. This method does not require calculated attributes. Refer to the **Attribute Transformations in Print Publisher** topic in the **Publisher (Adobe InDesign Integration)** documentation for more information.

Override Scenario

A calculated attribute can be used to display information about a product override on the originating product. In the screenshot below, the product 'Diamond Cut End Mills (Table Guide) Series J' has been overridden several times. The sections below describe how to use calculated attributes to display on the originating product the name of the overriding products, display on the overriding product the name of the overridden product, and display on the overriding product the IDs of parent products.



Prerequisites

For more information on product overrides, refer to the **Product Overrides** topic in the **Getting Started** documentation.

Get Overridden By Products

A calculated attribute on the originating product can list the names of the products that are overriding it. In this example, 'Diamond Cut End Mills (Table Guide) Series J' has multiple overrides.

Value Template

The formula for this calculated attribute could be written:

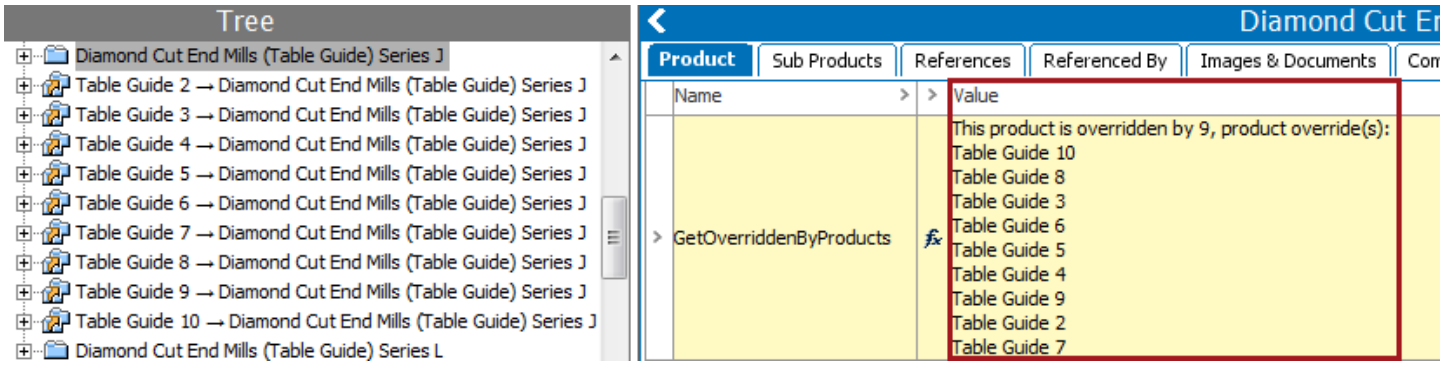
```
{x := listlen(overriddenby()),
z := list(iterate(overriddenby(), 'stepname()'), '\n')
}
concatenate("This product is overridden by ", x, " product override(s): \n", z)
```

This formula uses the following elements:

- Adding a new line using the Enter key or adding \n" allows the results to be displayed on individual lines.
- The LISTLEN() function gets the number of override items.

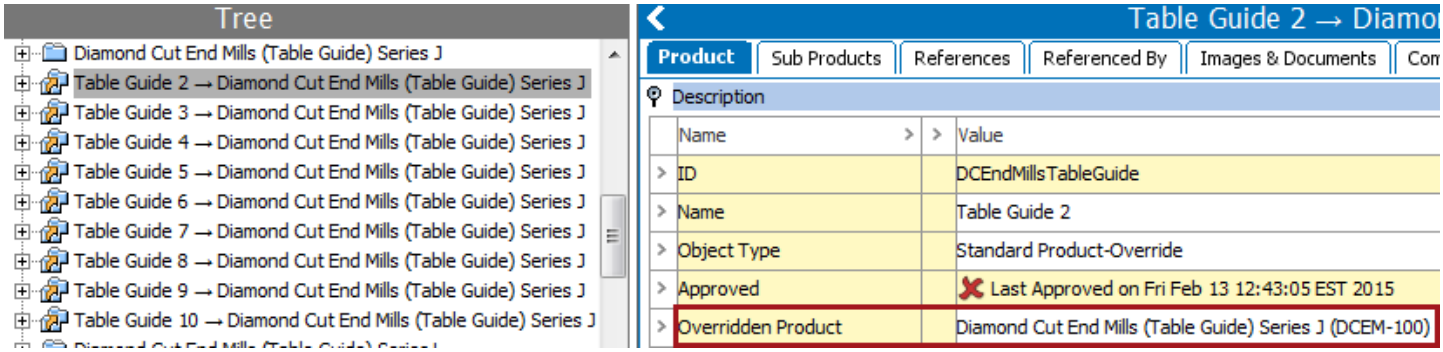
- The LISTLEN() function, used with STEPNAME(), gets the names of the override items.
- The final output is assembled using a text string, the list count, and the STEPNAME of the overrides with new lines for each name.

Results



Get Overridden Product Objects

Select a product override object to display the Overridden Product attribute where the value is the name and ID of the product being overridden. In this example, 'Table Guide 2' has overridden the product 'Diamond Cut End Mills (Table Guide) Series J' with ID 'DCEM-100.'



Value Template

A calculated attribute on the product override could be written with the following formula:

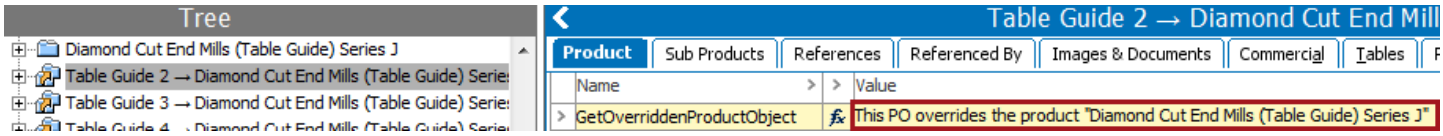
```
{x := iterate(overriddenproductobject(), 'stepname()')
}
concatenate('This PO overrides the product "', x, '"')
```

This formula uses the following elements:

- The ITERATE() function gets information from an object other than the currently selected object.
- Since the maximum list length is 1, the list is displayed directly.

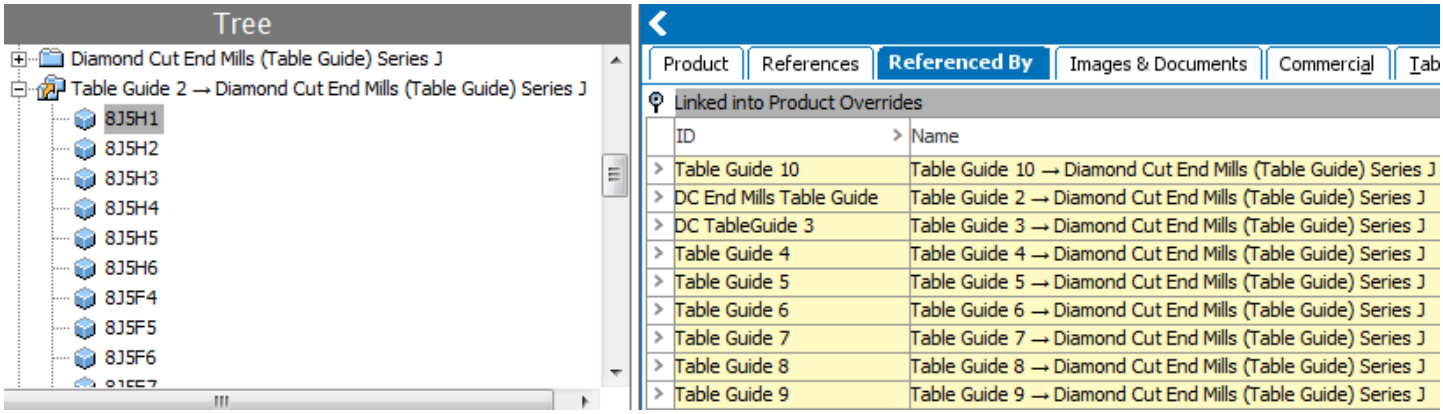
- The final output is assembled using a text string and the name of the product that is overridden.

Results



Get Product Override Parents

A product that is used in one or more product overrides can have multiple parents.

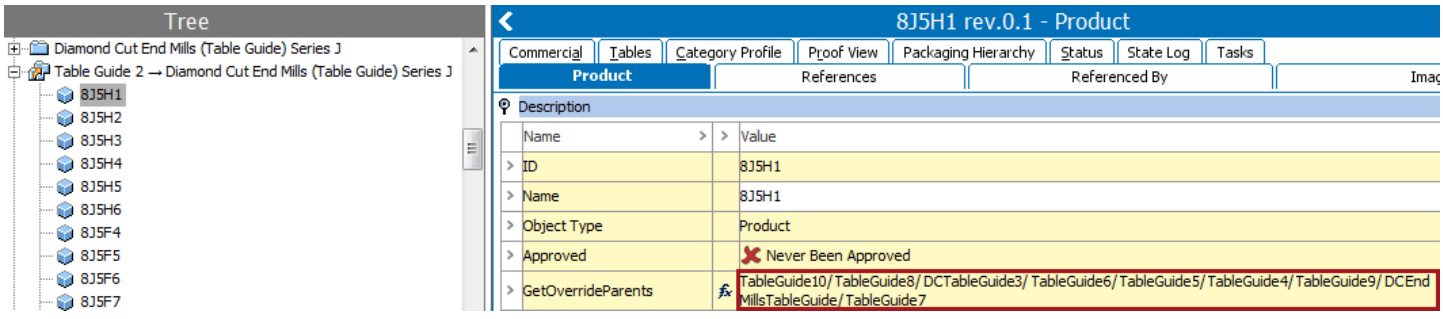


Value Template

A simple metadata calculated attribute on the main product can display the IDs of the parents for all product override objects. This could be written with the following formula:

```
list(iterate(productoverrideparents(), "stepid()"), "/ ")
```

Results



Product Description Scenario

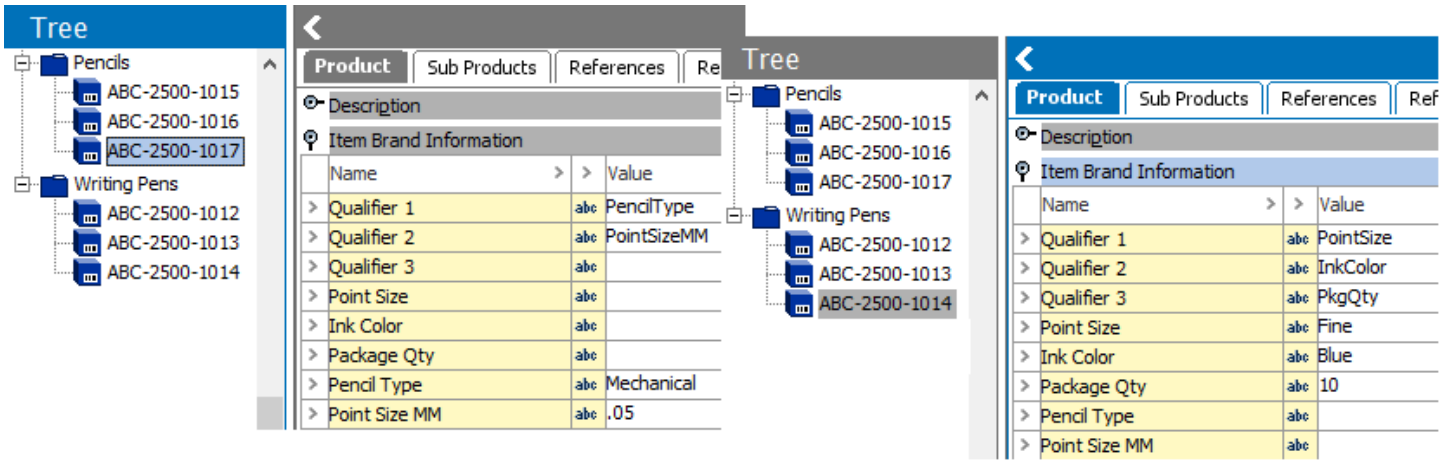
A calculated attribute can be used to automate the process of building dynamic product descriptions. Using existing attributes, and based on different product lines, in the example below we will generate a product description that is comprised of a basic 'stem' attribute, and concatenated with additional attributes.

Assumptions

1. The Primary Product Hierarchy is organized so that product attributes may be placed on different product nodes in that hierarchy that correlate to a 'product line.'
2. Up to three 'building' attributes are appended to a constant base (or 'stem') attribute to compose the complete product description.
3. The following attribute values exist for the product lines.

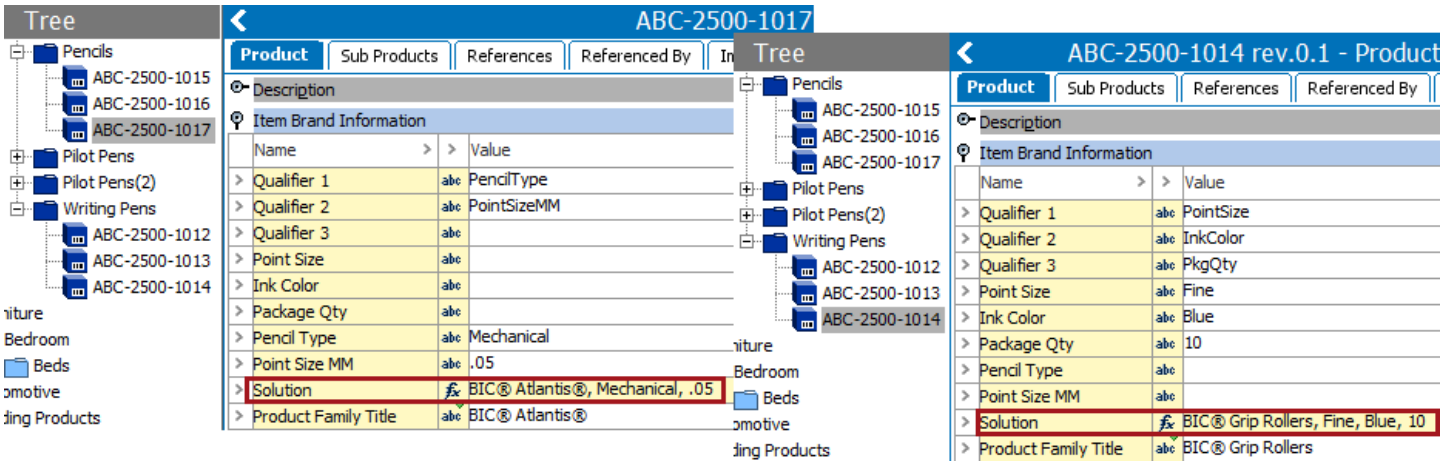
Product Line	Pencils	Writing Pens
Product Family Title ('stem')	BIC® Atlantis®	BIC® Grip Rollers
Point Size (PointSize)		Fine
Point Size MM (PointSizeMM)	0.5	
Ink Color (InkColor)		Blue
Package Qty (PkgQty)		10
Pencil Type (PencilType)	Mechanical	

The screenshot below displays the attribute values used to compose the calculated product description for the product lines in workbench:



Results

The result of either solution 1 or solution 2 defined below are the same:



Solution Option 1

Approach

1. Create three 'Qualifier' attributes that will reference and be made valid on the product nodes in the Primary Product Hierarchy. These attributes will hold the IDs of the attributes to be used to compose the final Product Description. In this case those attributes will have the ID of Q1, Q2, and Q3 (with names of Qualifier 1, 2, and 3).
2. Place the qualifier attributes on the appropriate product line object type(s) and populate the values with the IDs of the attributes to use for the composed product description. For example, the pencils product line will have Q1 = PencilType, Q2 = PointSizeMM, Q3 = {empty}; and the writing pens product line will have Q1 = PointSize, Q2 = InkColor, Q3 = PkgQty

Value Template

The calculated attribute template includes a concatenation / if structure like this:

```
concatenate(value('ProductFamilyTitle')
,if(exact(value('Q1'),''),'',concatenate(', ',value(value('Q1'))))
,if(exact(value('Q2'),''),'',concatenate(', ',value(value('Q2'))))
,if(exact(value('Q3'),''),'',concatenate(', ',value(value('Q3')))))
```

Notes

- The syntax **value(value('Q1'))** is used to get the value of the attribute ID pointed to by the attribute Q1 if that value is not blank. The same is repeated for Q2 and Q3.
- The concatenate function takes into account skipping over empty Qualifier attribute values as well as empty values in the attributes to be used to build the product description.
- This approach is not limited to only three attributes. As many Qualifier attributes can be used as are required by inserting an copy of the 'Q2' line before the 'Q3' line. Note that the 'Q3' row in the value template includes the final closing parenthesis and should not be duplicated.
- This approach requires only one calculated attribute to satisfy the needs of every product line. A more labor intensive (not recommended) approach would be to create a calculated attribute using fixed attributes for each product line.
- For the same result while simplifying the calculation and making it more readable, use variables to hold the values of each attribute, as shown below:

```
{GetQ1 := if(exact(value('Q1'),''),'',concatenate(', ',value(value('Q1')))),
GetQ2 := if(exact(value('Q2'),''),'',concatenate(', ',value(value('Q2')))),
GetQ3 := if(exact(value('Q3'),''),'',concatenate(', ',value(value('Q3')))),
stem := value('ProductFamilyTitle')
}
concatenate(stem,GetQ1,GetQ2,GetQ3)
```

- When using auto-generated attribute IDs, if you prefer to display the name of the attribute in the Qualifiers attribute (for readability purposes), allow the qualifier values to include either name or id first, separating them with a delimiter character such as a colon (:). For example, if the Point Size attribute had an ID of 12734, and Ink Color an ID of 28276, and Package Quantity an ID of 47338, the qualifier values could allow for entries of 'Point Size:112734', 'Ink Color:28276', and 'Package Quantity:47338'. Then need to modify the value template to parse out the attribute ID from each qualifier entry, as demonstrated for Q1 below:

```
{GetID1 := trim(mid(value('Q1'),find(":",value('Q1'))+1,100)),
GetQ1 := if(exact(GetID1,''),'',concatenate(', ',value(GetID1))),
....
}
concatenate(stem,GetQ1,GetQ2,GetQ3)
```

Solution Option 2

Approach

Instead of having separate qualifier attributes for each element in the product description, a single attribute could be used with all the required Qualifier IDs separated by a pre-designated delimiter character such as a comma.

1. Create one qualifier attribute with the ID of Qualifiers (name is also Qualifiers).
2. Reference the Qualifiers attribute on the appropriate product line object type(s), make it valid, and populate the values with the IDs of the attributes to use for the composed product description, separated by a comma delimiter. For example, PointSize,InkColor,PkgQty and PointSizemm,PkgQty

Value Template

This formula requires that the spaces before and after the delimiter must be accommodated.

```
{qattrs := iterate(ESCAPESPLIT(',', '/', value('Qualifiers')), 'trim(item)'),
  vals := filter(iterate(qattrs, 'value(item)'), 'not(exact(item, ""))')
}
concatenate(value('ProductFamilyTitle')', ',  list(vals, ', '))
```

Considerations

- This approach first builds a list (label is 'qattrs') from the entries found in the attribute 'Qualifiers', separated by a comma.
- Then another list (label is 'vals') is formed by iterating through the qattrs list.
- Finally the list 'vals' is converted to a text string (with a comma / space as the separator between values) and is prepended to the ProductFamilyTitle attribute value.

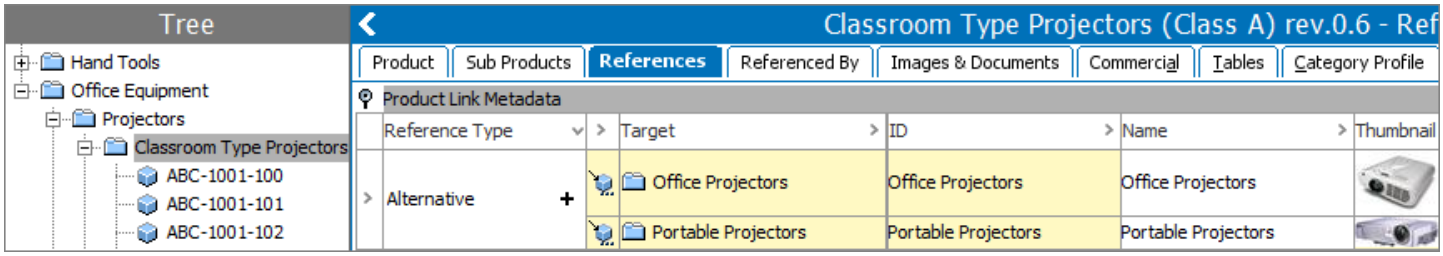
Reference Scenario

A calculated attribute can be helpful when an object has references to multiple products. The scenarios described below are examples of how calculated attributes could be used.

- Get List of References
- Get Value from Referenced Product
- Get Metadata Value Located on the Link from Product-to-Product
- Get Referenced By Using Reference Owner
- Get Reference Type ID
- Get Reference Source or Target Product Information on the Link

Get List of References

Calculated attributes could be used to get a list of references, and display them on the Product tab. For example, the Classroom Type Projectors product is linked to two other products: Office Projectors and Portable Projectors. A calculated attribute on Classroom Type Projectors will list the names of the referenced products.



Value Template

The formula for this calculated attribute could look like the formula below:

```
{i := iterate(iterate(references("product", "Alternative"), 'referencetarget()'),
'stepname()'),
x := list(i, ", ")
}
concatenate(x)
```

Notes

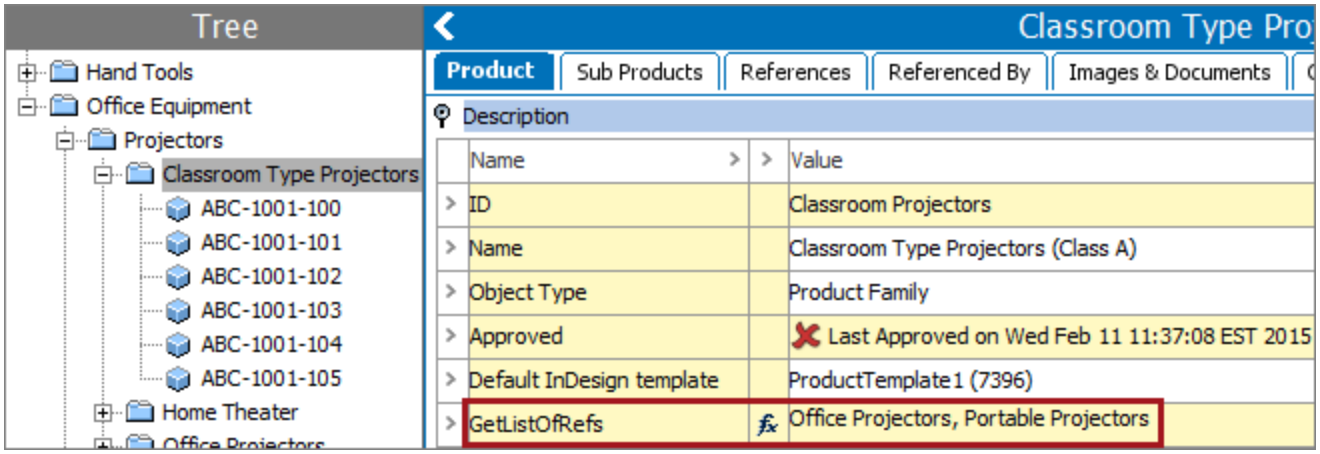
To break this formula down, the first ITERATE() function is used to pull information that is not on the current product. The second ITERATE() function (shown as bold above) returns a list of 'labels' for all of the references that Classroom Type Projectors has made to other products (i.e., reference targets) with the reference Type ID of 'Alternative'.

Because this list of labels is not needed, having the first ITERATE() function surround the second ITERATE() function, makes it so that the names of the referenced products are retrieved from the labels:

```
iterate(iterate(references("product", "Alternative"), 'referencetarget()'),
'stepname()')
```

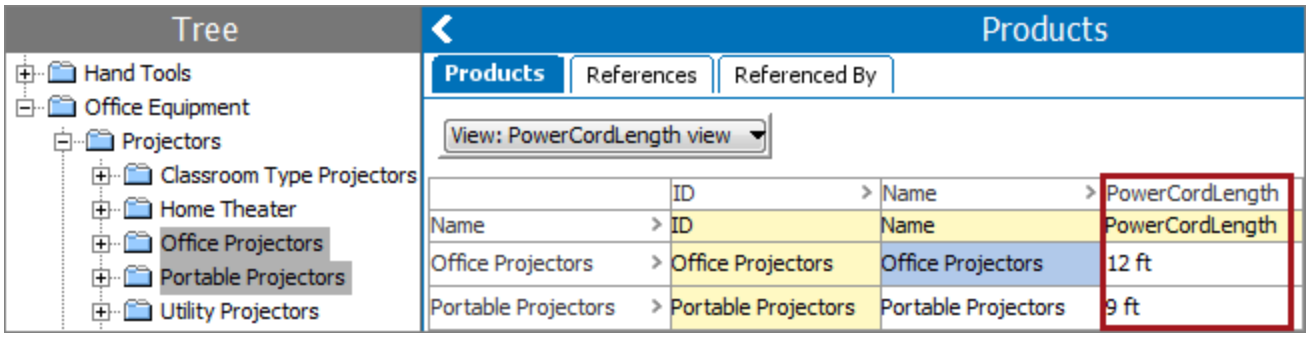
Results

The result of the calculated attribute displays the name of the references on the object.



Get Value From a Referenced Product

Using this formula for a calculated attribute allows a user to look to a reference on an object, get a value that is on the reference, and display it on the object. To expand on this, get an attribute *value from* the target products, instead of the *name of* the target product. For example, the target products have a 'PowerCordLength' attribute:



Value Template

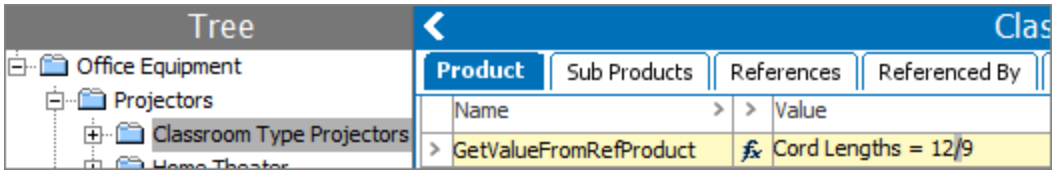
A calculated attribute with the following formula would allow the product Classroom Type Projectors to display the lengths of the power cords of the referenced products.

```
{i := iterate(iterate(references("product", "Alternative"), 'referencetarget()'),
'value("PowerCordLength")')
```

```
}
concatenate("Cord Lengths = ",list2multivalue(i))
```

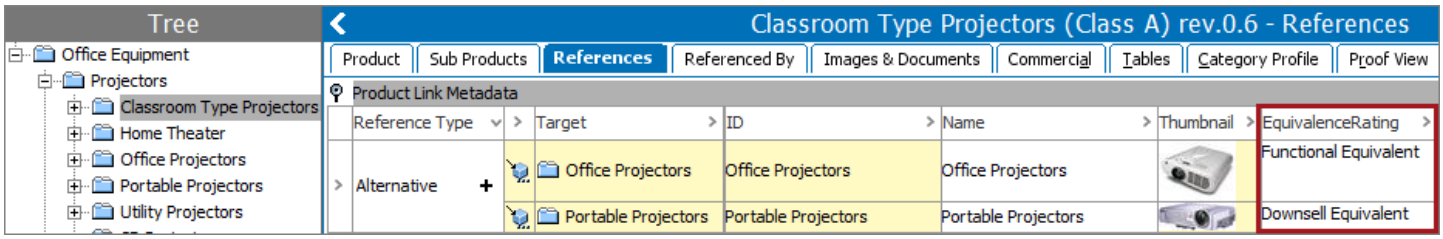
Results

This is much like the prior example, but the LIST2MULTIVALUE() function is used since it automatically places a STEP tag <multisep/> between values. Based on the configuration of the tag, it is rendered as a slash in the value.



Get Metadata Value Located on the Link From Product-to-Product

Additionally, metadata values on references can also be returned. For example, the product-to-product 'Alternative' reference has an 'EquivalenceRating' attribute:



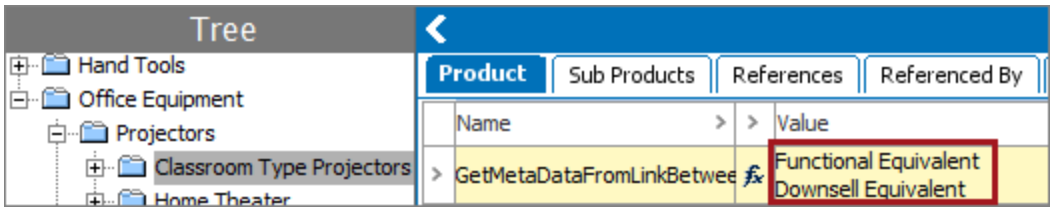
Value Template

A calculated attribute with the following formula will display the metadata on the original product.

```
{j := iterate(references("product", "Alternative"),'value("EquivalenceRating")'),
z := list2multivalue(j),
z := substitute(z, "<multisep/>", "\n ")
}
concatenate(z)
```

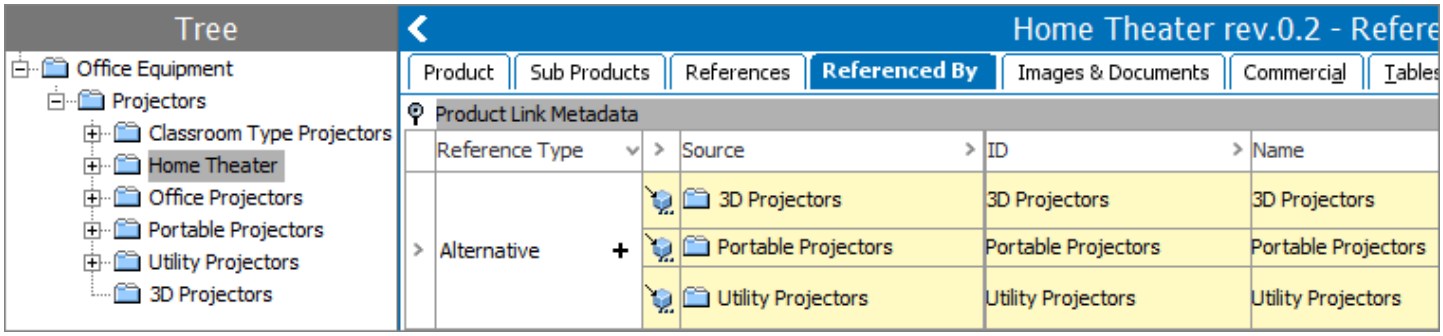
Results

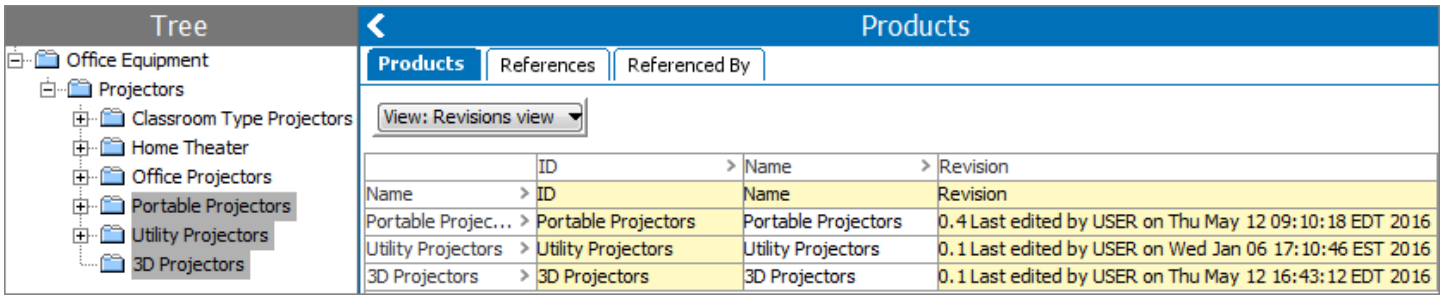
The default separator used by the LIST2MULTIVALUE() function is converted to a carriage return, so that the workbench displays a new line for each entry within the same value field.



Get Referenced By Using Reference Owner

A product is being referenced by two other products. In addition to the name of the products being referenced, data from those products is also needed. For example, the last time the 'Alternative' referenced products were edited.





Value Template

The following calculated attribute formula could be written:

```
{refnames := iterate(iterate(referencesto("product", "Alternative"), 'referenceowner
()'), 'stepname()'),
editdates := iterate(iterate(referencesto("product", "Alternative"), 'referenceowner
()'), 'revisioneditdate()'),
combo := iterate(refnames, 'concatenate(item, " Last edited on ", listitem
(editdates,index))'),
fin := substitute(list2multivalue(combo), "<lt/>multisep/<gt/>", "")
}
concatenate(fin)
```

Notes

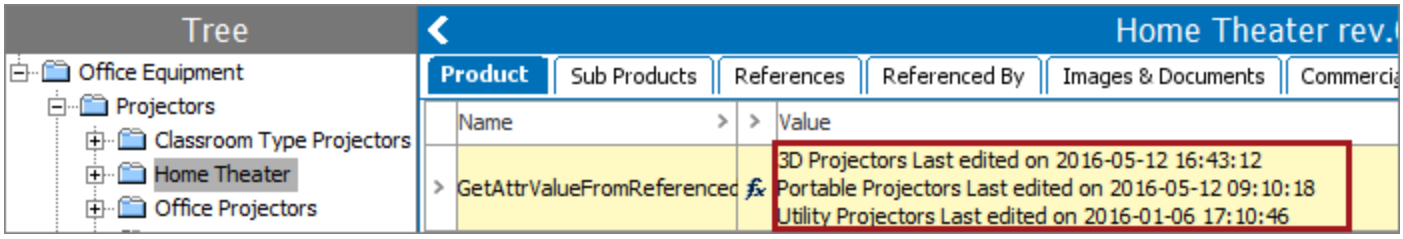
This formula uses the following elements:

- List 1 'refnames' uses the REFERENCESTO() function in conjunction with the REFERENCEOWNER() function to get data from the referencing product, in this example it gets the STEPNAME().
- List 2 'editdates' gets a list of the last edited metadata on the referencing products.
- List 3 'combo' iterates through List 1 'refnames' and then concatenates the 'current' value indicated by the field 'item' (i.e., the referencing product's name), with the corresponding list item number in the List 2 'editdates'.
- The function LISTITEM(editdates,index) uses List 2 'editdates' and gets the entry indicated by the number in the index field. So if you are on item 1 in List 1 'refnames', it gets item 1 value in List 2 'editdates'. If you are on item 2, it gets item 2 value in List 2 'editdates', and so on.

Important: When using a calculated attribute to 'marry' information from one list to the corresponding information in another list, the number of entries in each list MUST be identical.

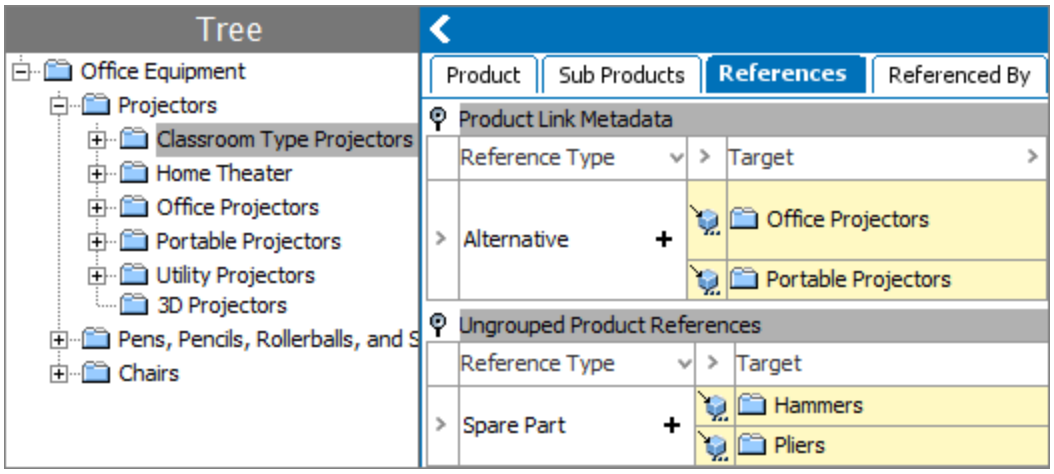
Results

The results display the referenced product and the corresponding last edit date.



Get Reference Type ID

In this example, a product is being referenced by other products. A calculated attribute can display the reference types being used. For example, the product Classroom Type Projectors has four references to other products: two with the reference type of Alternative and two with the reference type of Spare Part.



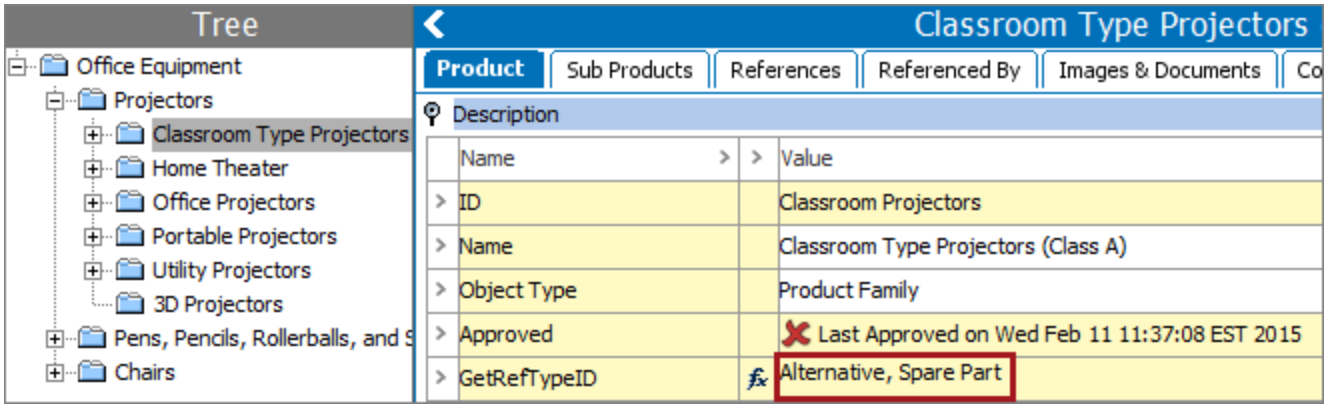
Value Template

The following calculated attribute formula could be written:

```
{refids := iterate(references("product"), 'referencetypeid()'),
refids := list(unique(refids), ", ")
}
concatenate(refids)
```

Results

The results display each of the reference type IDs.



Although accurate, the display could be more informative with some modifications. You could filter the list so that each of the names and/or IDs of the referenced products together with the reference type displays.

Value Template

Similar to the above example of referencing product names and their edit dates, the formula could be written:

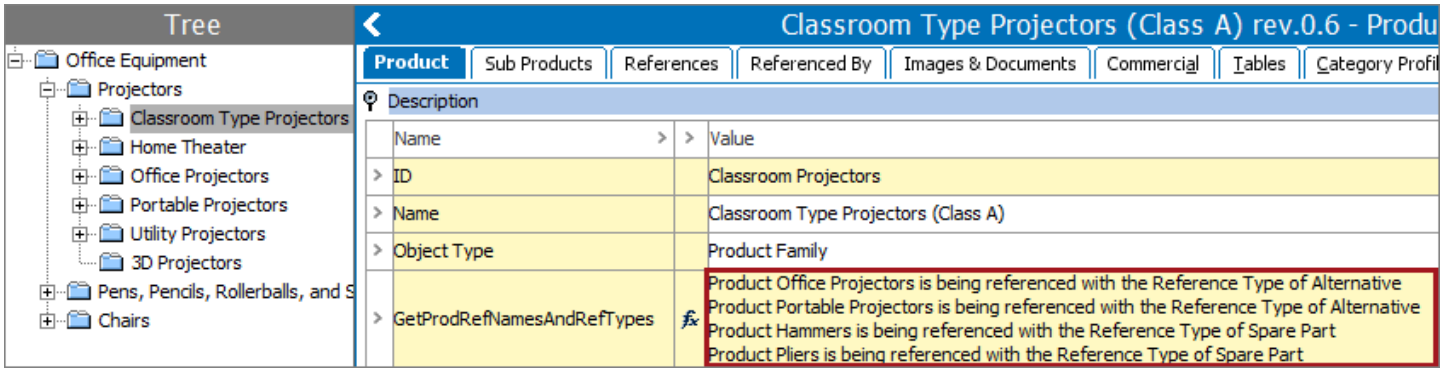
```
{refnames := iterate(iterate(references("product"), 'referencetarget()'), 'stepname
()'),
reftypes := iterate(references("product", ""), 'referencetypeid()'),
combo := iterate(refnames, 'concatenate("Product ", item, " is being referenced with
the Reference Type of ", listitem(reftypes,index))'),
fin := substitute(list2multivalue(combo), "<multisep/>", "")
}
concatenate(fin)
```

Notes

Again, three lists are made: a list of the names of the referenced products, a corresponding list of reference types, and a list that combines the corresponding values in list one and two. Finally, added text strings clarify the results.

Results

The results display each product being referenced, as well as the reference type ID.

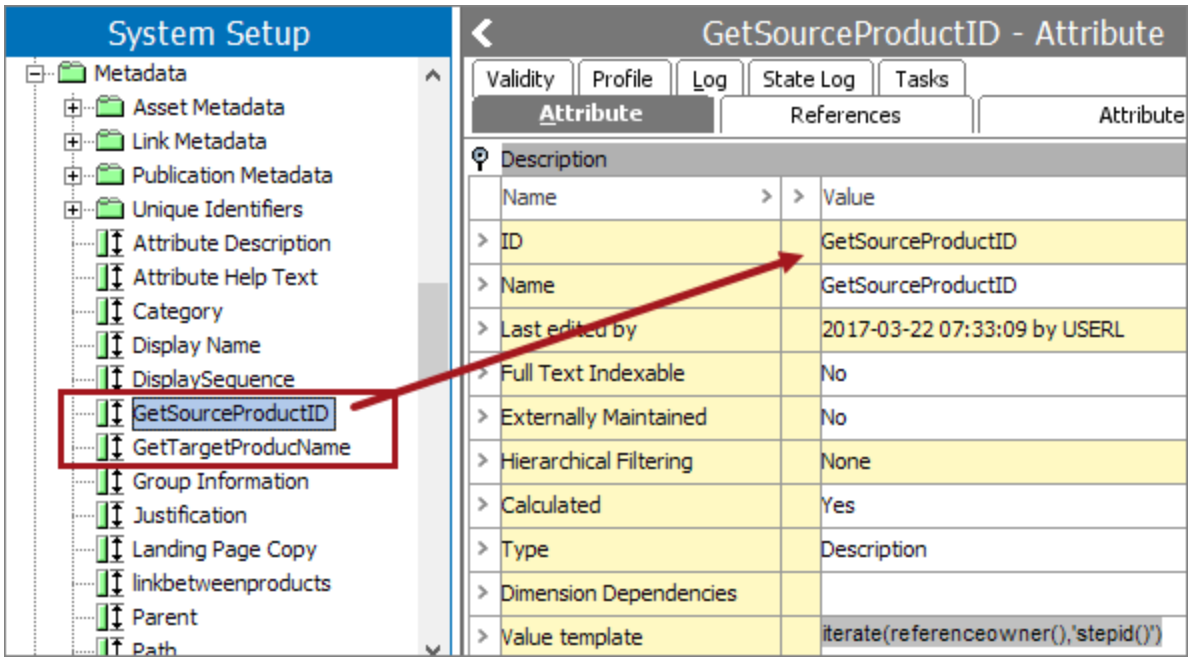


Get Reference Source or Target Product Information on the Link

The calculated attribute can also be used to show metadata on the References link. A user could use it to show the Source product and the Target product for the link.

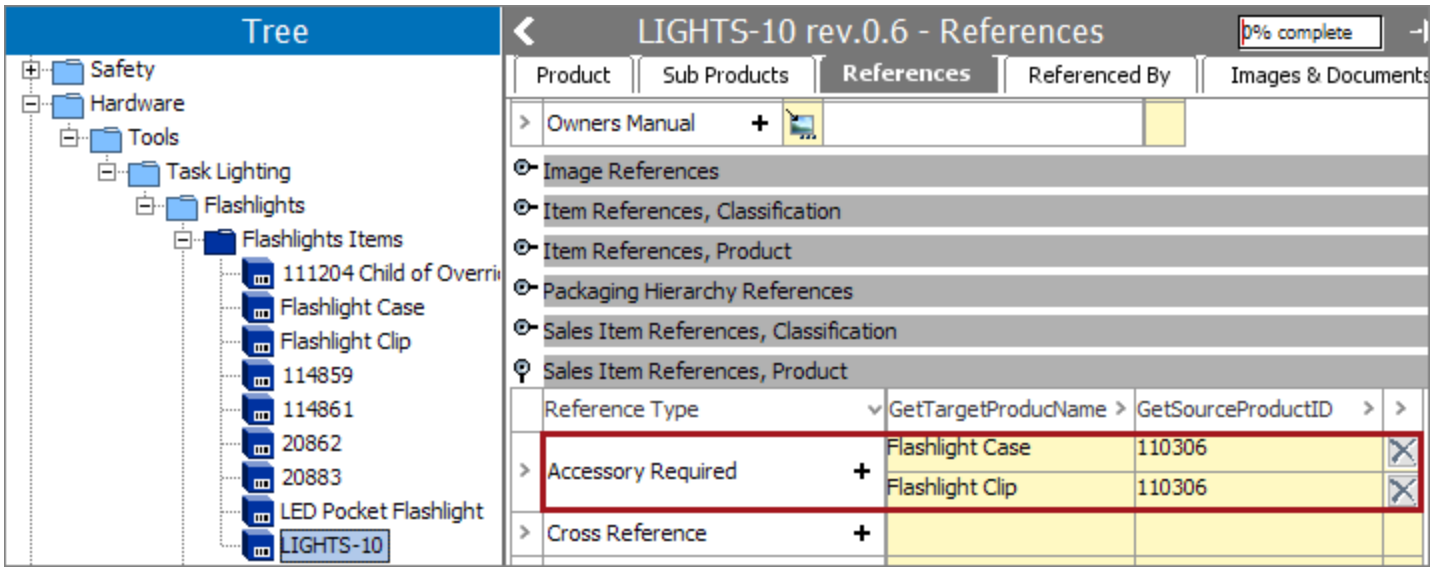
Value Template

```
iterate(referenceowner(),'stepid()') // to get the Source product ID
iterate(referencetarget(),'stepname()') // to get the Target product name
```



Results

When configured properly, the metadata calculated attributes appear like below.



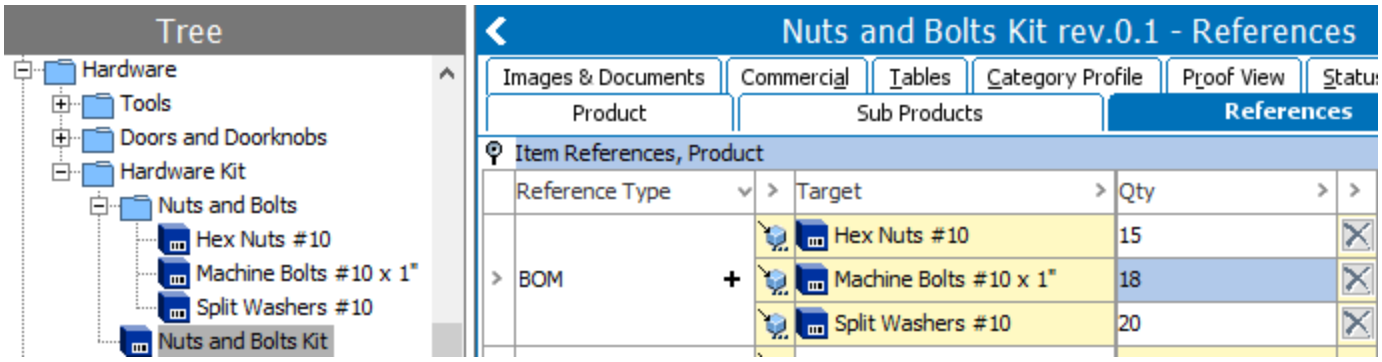
Total Cost of Materials Scenario

A calculated attribute can be used to find the total cost of a Bill of Materials (BOM), which is an 'assembled' product, that is itself a collection of individual products or 'part products.'

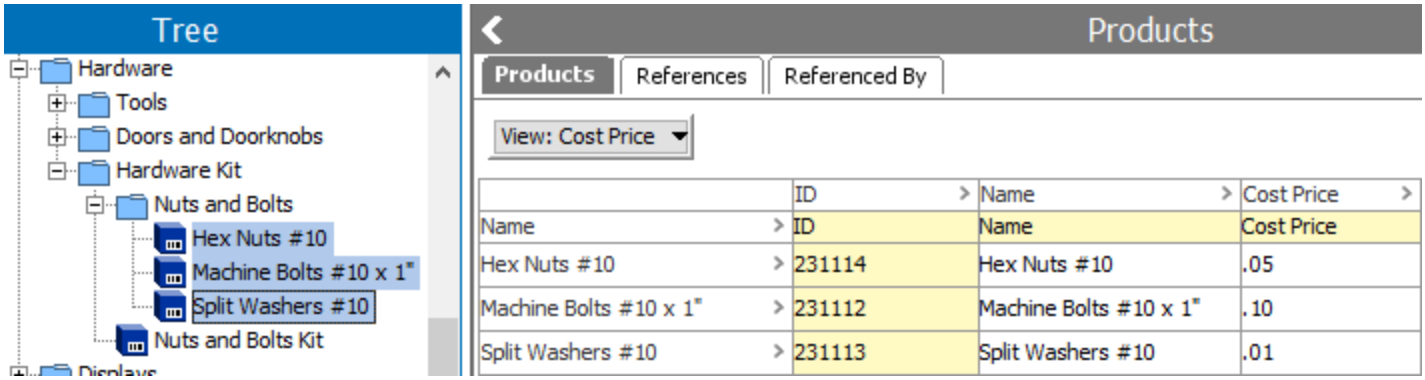
The most popular approach is to link the source product (i.e., the assembled product) to the various part products that go to make up that assembly (target product), using a specific reference type, for example, 'BOM.' Then, the cost of each of the part products is usually a standard product attribute, for example, 'Cost Price.' Finally, the quantity required for each of the part products in the assembly is a description attribute (metadata) on the link between the source product (the assembly) and each target product (the part products).

Assumptions

1. The reference type with ID = BOM exists and the assembled product is linked to the individual part products using this reference type.
2. A description attribute (metadata) with ID = Qty exists on the BOM reference type and the values are populated for how many of those part products are required in the assembled product.



3. An attribute with ID = CostPrice exists on the part products and the values are entered for the cost of each part product.



Solution

Approach

In the calculation, three (3) lists are generated.

- The **CostPriceVal** list will hold the CostPrice of each of the part products referenced by the assembled products. By definition, these two lists will have the same number of entries and have values that are in the same order. That is, entry #1 in List #1 will have the corresponding cost in entry #1 of List #2.
- The **QtyVal** list will hold the Qty attribute values for each of the references from the assembled part to the part products.
- The **TotalCost** list will hold the list of total cost for each reference by multiplying entry #1 in List #1 with the value in entry #1 of List #2, and so on. The last part of the calculation will then summarize the entries of this third list, and thus calculate the total cost for the assembled product.

Value Template

```
{CostPriceVal := iterate(iterate(references("product", "BOM"), 'referencetarget()'),
'value("CostPrice")'),
QtyVal := iterate(references ("product",""),'value("Qty")'),
TotalCost := iterate(CostPriceVal, 'item*listitem(QtyVal,index)'),
total := '0',
dummy := iterate(TotalCost,'total:=item + total')
}
concatenate('Sum of BOM = ',total)
```

Notes

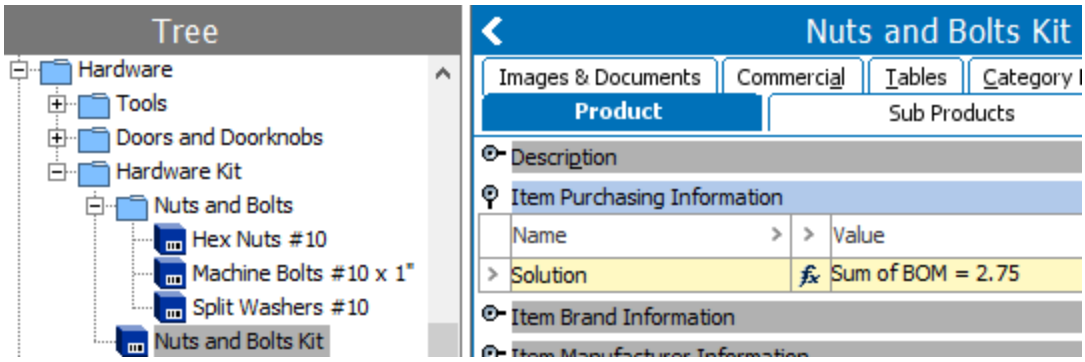
The summation of the entries in TotalCost is a little unusual in that the variable 'dummy' is not required at all, but the variable 'total' is what is needed. Although the contents of the variable 'dummy' are never used, in calculating that value, it is used to calculate the variable 'total' which is the required piece.

Results

The value template multiplies the CostPrice value with the Qty value for each item in the kit as follows:

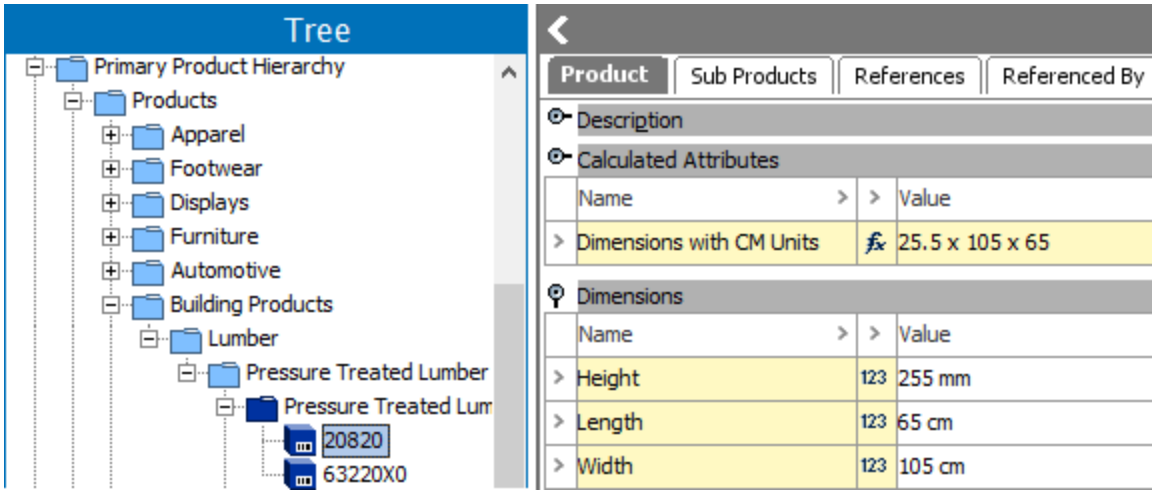
- Hex Nuts: .05 x 15 = .75
- Machine Bolts: .10 x 18 = 1.80
- Split Washers: .01 x 20 = .20

Then sums the total for each part of the kit: .75 + 1.80 + .20 = 2.75


Tree
Hardware
Tools
Doors and Doorknobs
Hardware Kit
Nuts and Bolts
Hex Nuts #10
Machine Bolts #10 x 1"
Split Washers #10
Nuts and Bolts Kit
Nuts and Bolts Kit
Images & Documents
Commercial
Tables
Product
Sub Products
Description
Item Purchasing Information
Name
Value
Solution
Sum of BOM = 2.75
Item Brand Information

Units Scenario

A calculated attribute can show multiple unit values using a single unit of measure. In this example, a product has several attributes with units, but the values entered are not using the same unit, the values of attributes height, length, and width have valid unit types of MM and CM.



Prerequisites

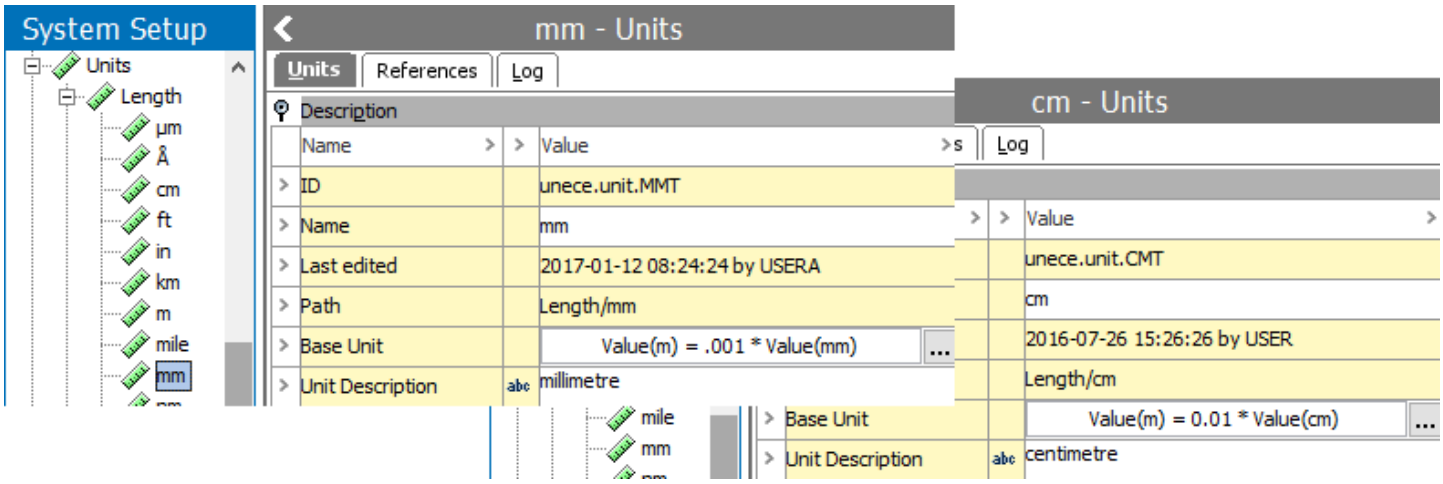
For more information on units, refer to the **Units** topic in the **Getting Started** documentation.

Approach

The units will need to be configured for conversion, and then the required display unit will need to be specified for the results.

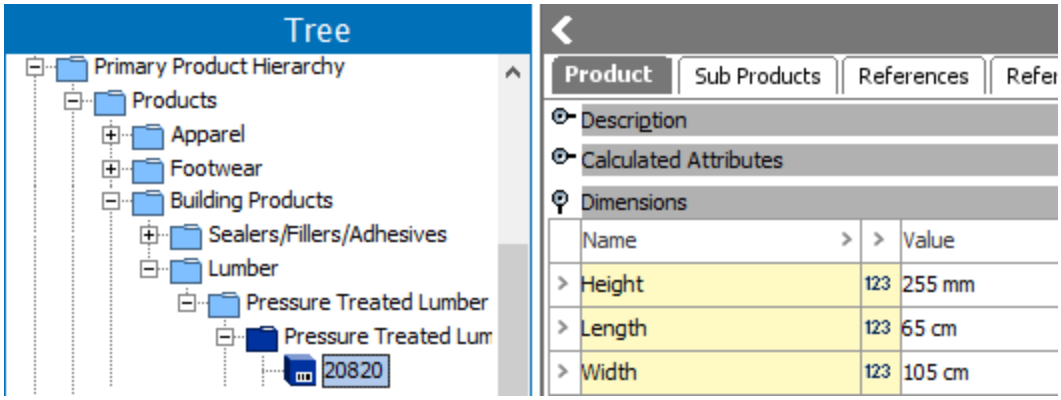
Configure Units for Conversion

Using an appropriate conversion formula to associate multiple units allows the calculated attribute to make the conversions as needed. For example, meters can be converted to millimeters and centimeter as shown below.



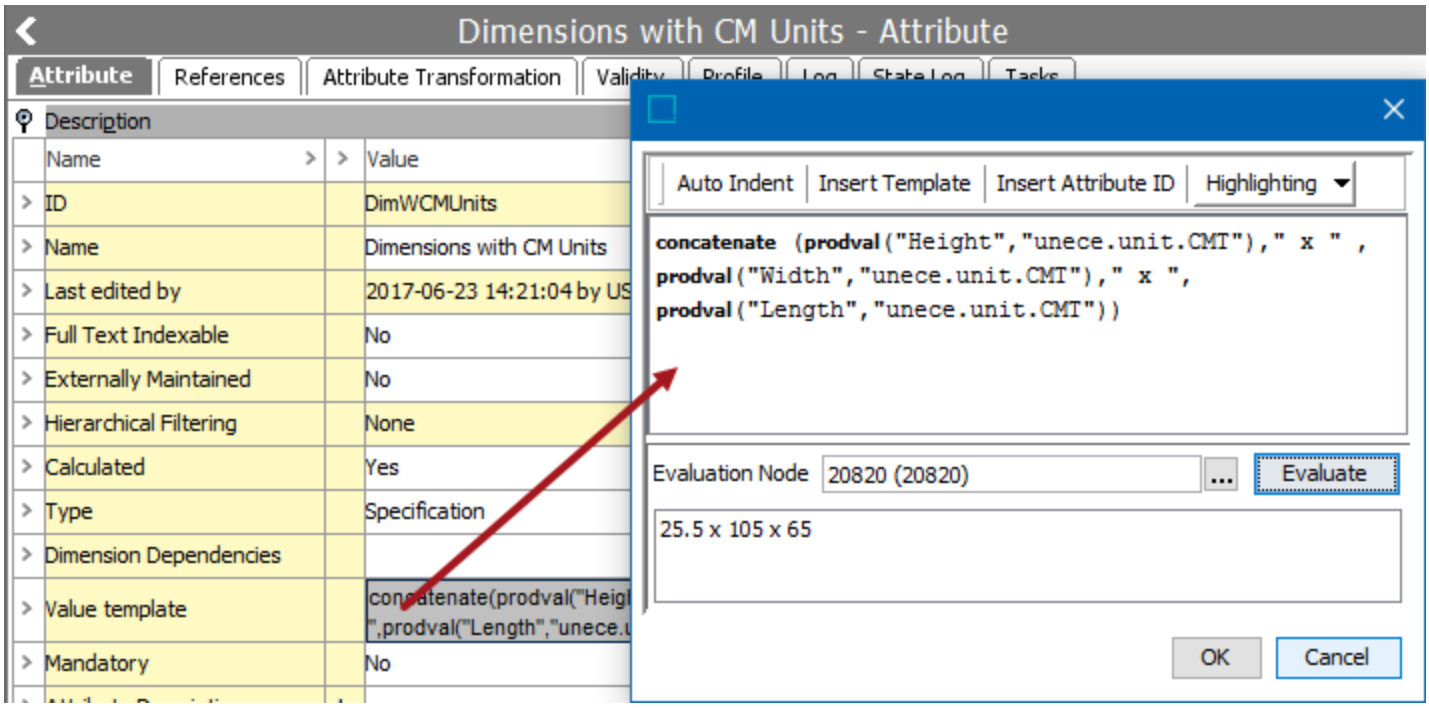
Concatenate and Specify Required Unit

Different units were selected while adding values for the height, length, and width attributes.



The calculated attribute value template can specify the required display unit for the result. In the following value template, notice that the centimeter unit is applied to each attribute value. It also concatenates each of the values and separates them with 'x' (static text).

Note: To verify the value template formula is correct, use Evaluation Node to select an object with values in the attributes and click the Evaluate button. The result is displayed in the bottom text box.



Value Template

The following text was added to the value template:

```
concatenate (prodval("Height","unece.unit.CMT")," x ",
prodval("Width","unece.unit.CMT")," x ",
prodval("Length","unece.unit.CMT"))
```

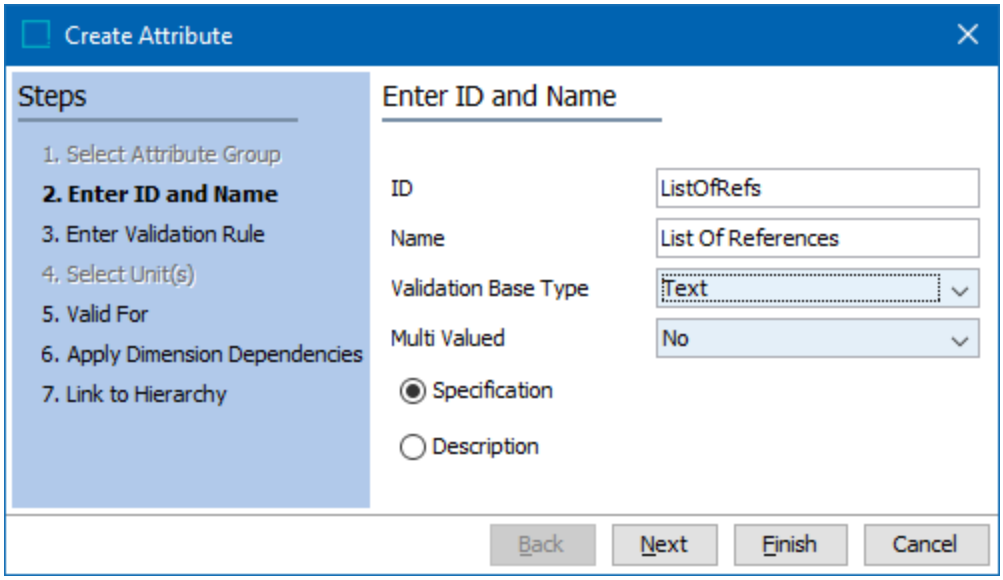
Note that the value entered as 255 mm was converted to 25.5 cm, using the Base Unit conversion formula.

Creating a Calculated Attribute

Although a calculated attribute must be created in workbench, it is available for use in both workbench and Web UI.

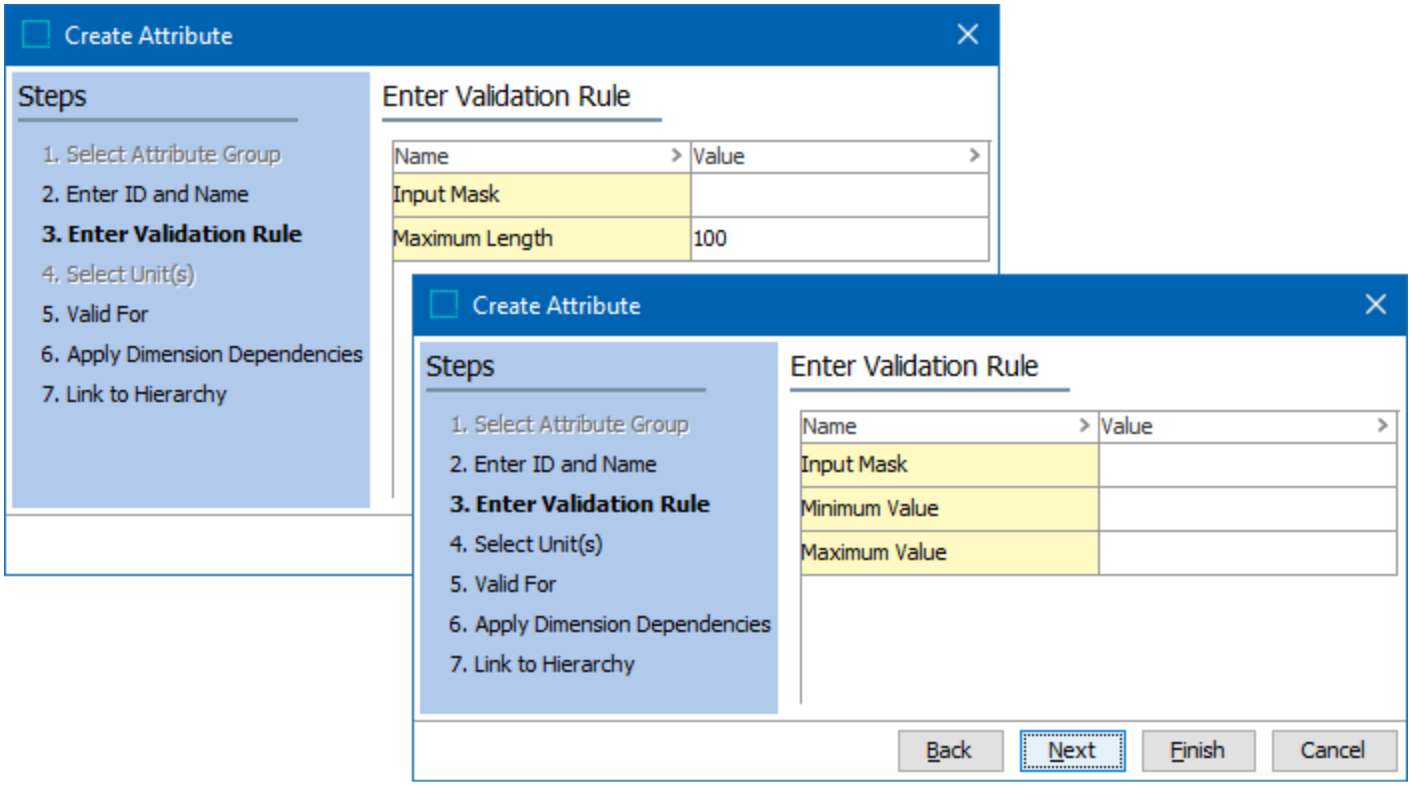
Important: A calculated attribute is not always the best tool. Before creating a calculated attribute, it is important to be certain a different (i.e., more efficient) STEP method should not be used instead. For more information, refer to the **Calculated Attribute Considerations** topic within this guide.

1. In workbench > System Setup > select the attribute group that will hold your calculated attribute or create a new group.
2. Right-click the attribute group, and select the **New Attribute** option. The Create Attribute wizard displays and the selected group is provided for the Select Attribute Group step of the wizard.
3. On the **Enter ID and Name** step of the wizard, provide the following information:
   - Type an **ID** and **Name** for your new attribute.
   - Set **Validation Base Type**, keeping in mind that the assigned type only takes effect when the calculated value is manually overridden. For more information, refer to the **Attribute Validation Flipper** section of the **Setting up a Calculated Attribute** topic.
   - Set **Multi Valued** to **No**. This is required for a calculated attribute.
   - Select **Specification** or **Description** based on your requirements. For more information, refer to the **Description or Specification** section of the **Deciding Settings for a Calculated Attribute** topic.



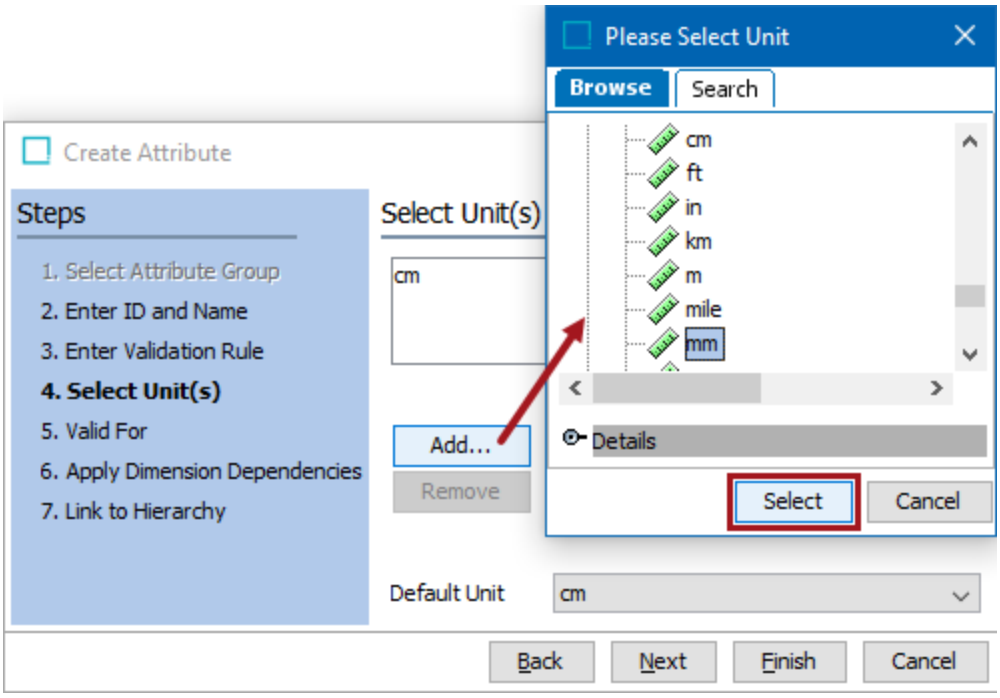
   - Click the **Next** button.

4. On the **Enter Validation Rule** step of the wizard, provide the required information, based on the validation base type selected (as shown in the image below):
   - Type an **Input Mask** if required. For more information, refer to the **Input Masks** section of the **Validation Rules** documentation and the **Restrict Override on a Calculated Value** section of **Overriding and Restoring Calculated Attribute Values**.
   - For Validation Base Types of Embedded Number, Fraction, Integer, Number, Numeric Text, or Numeric Text (exclude tags), set a **Minimum Value** and/or **Maximum Value** if required. For more information, refer to the **Validation Rules** documentation.
   - For other Validation Base Types, set a **Maximum Length** if required. For more information, refer to the **Validation Rules** documentation.



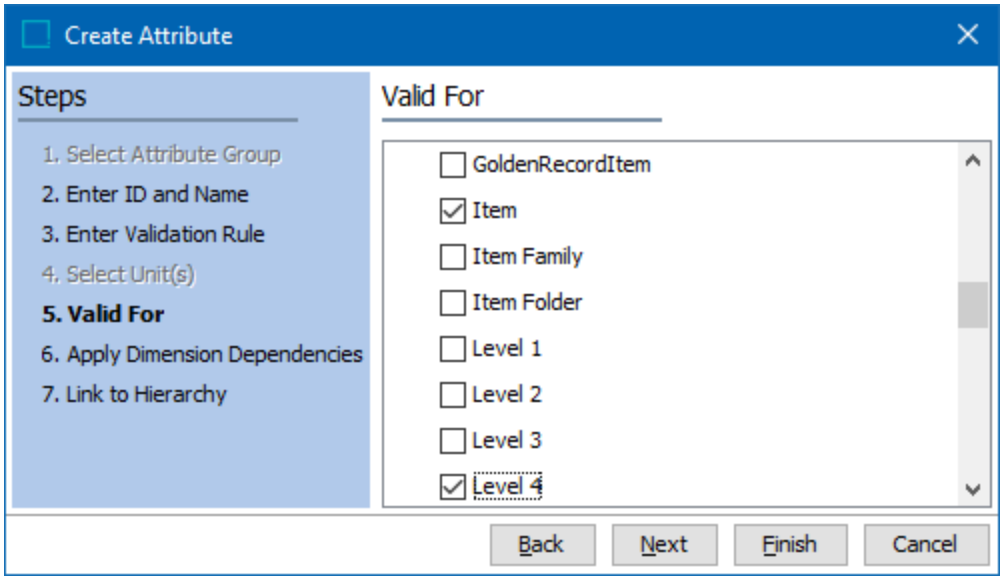
   - Click the **Next** button.

5. The **Select Unit(s)** step of the wizard is only enabled when the Validation Base Types is Embedded Number, Fraction, Integer, Number, Numeric Text, or Numeric Text (exclude tags). Add the following data if required:
   - Click the **Add** button to display a dialog. Choose a unit and click the **Select** button. The selected unit is displayed in the text box. Add as many units as are required.



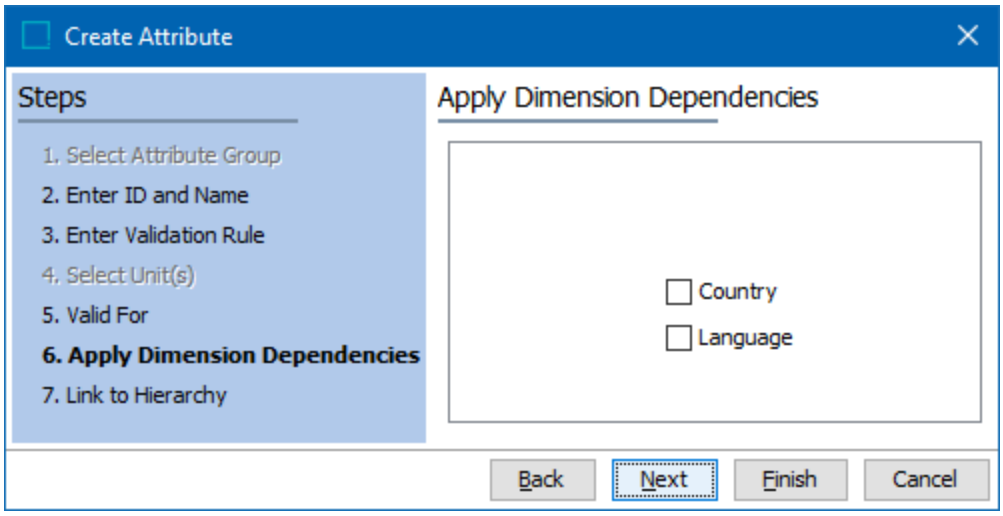
- When a unit exists in the text box, the **Remove** button is enabled. Click it to remove the selected unit from the text box.
- Use the **Default Unit** dropdown to set the unit that will be automatically applied to the calculated attribute value.
- Click the **Next** button.

6. On the **Valid For** step of the wizard, select the object types where the calculated attribute can be edited. This sets the attribute editor Validity tab selections.



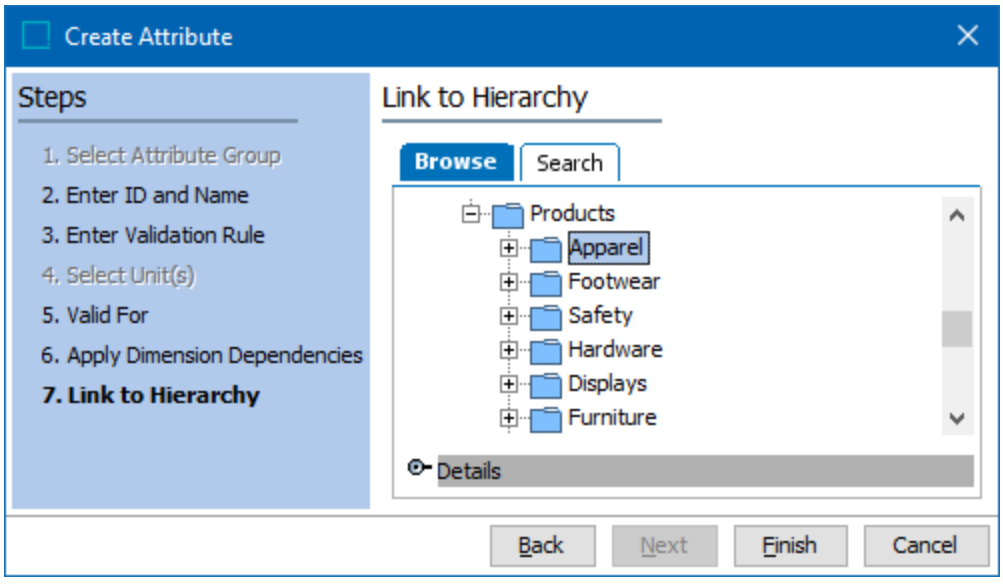
- Click the **Next** button.

7. On the **Apply Dimension Dependencies** step of the wizard, leave all checkboxes unchecked unless you have a reason to set a dimension. Dimension dependencies are only relevant when overriding the calculated value. For more information, refer to the **Deciding Settings for a Calculated Attribute** topic.

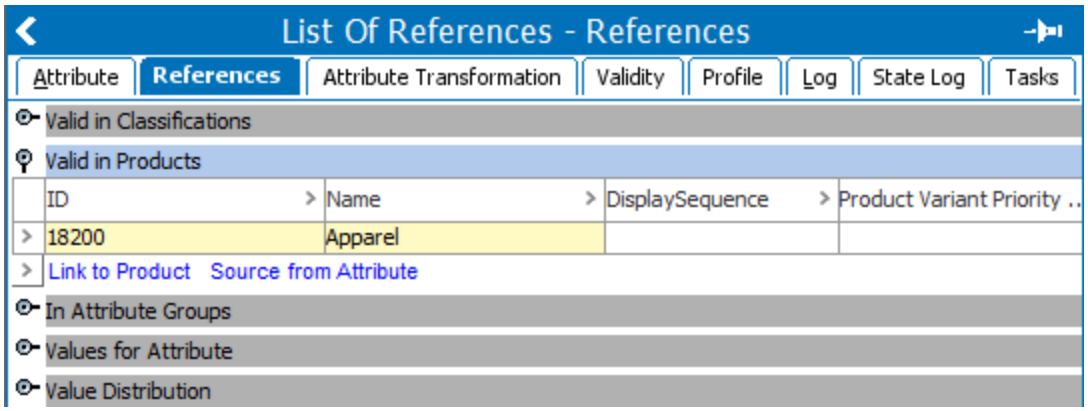


- Click the **Next** button.

8. On the **Link to Hierarchy** step of the wizard, use the Browse and/or Search tab to find and select the hierarchy nodes where the new attribute can be viewed.

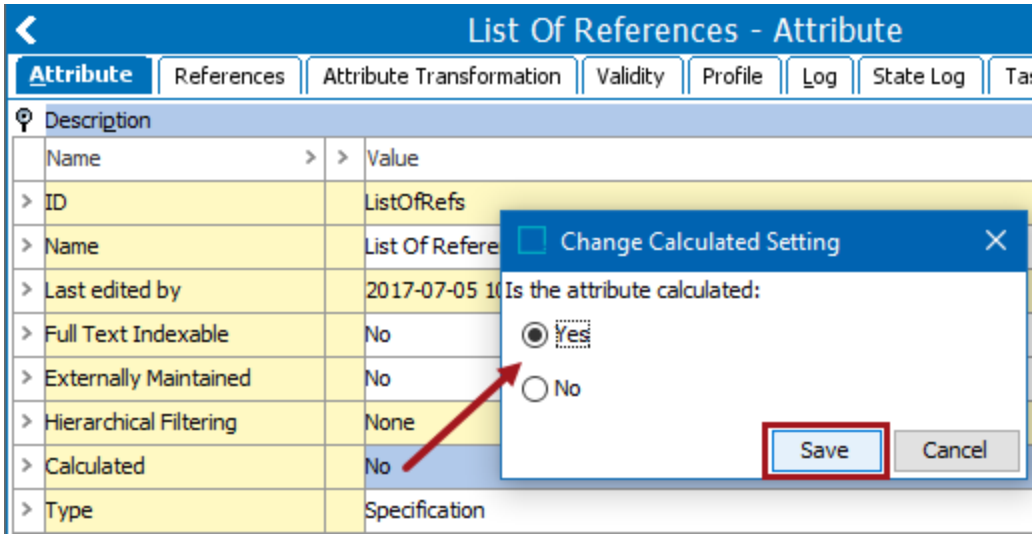


This creates an entry on the attribute editor References tab, under the Valid in Products flipper as shown below.

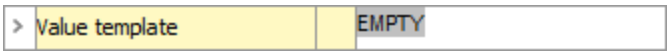


- Click the **Finish** button on the wizard. The attribute editor is displayed for the new attribute in the attribute group. Continue with the manual configuration steps below to make the attribute calculated.

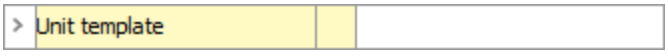
9. In the attribute editor, on the Attribute tab, within the Description flipper, double click the **Calculated** field to display the Change Calculated Setting dialog. Click the **Yes** radio button, and click the **Save** button.



- The 'Value template' parameter displays in the editor with the text 'EMPTY' and a gray background.



- Based on the validation base type selected in the previous wizard step, the 'Unit template' parameter displays in the editor with no text.



10. Open the Function Editor for the 'Value template' and 'Unit template' parameters to supply the calculation. For detailed steps, refer to the **Attribute Editor** section of the **Function Editor** documentation.

11. Use the Function Editor to update the 'Value template' and 'Unit template' parameters to construct the required functions. For details on available functions, refer to the **STEP Functions** section or the **Calculated Attribute Use Cases** section.

Overriding and Restoring Calculated Attribute Values

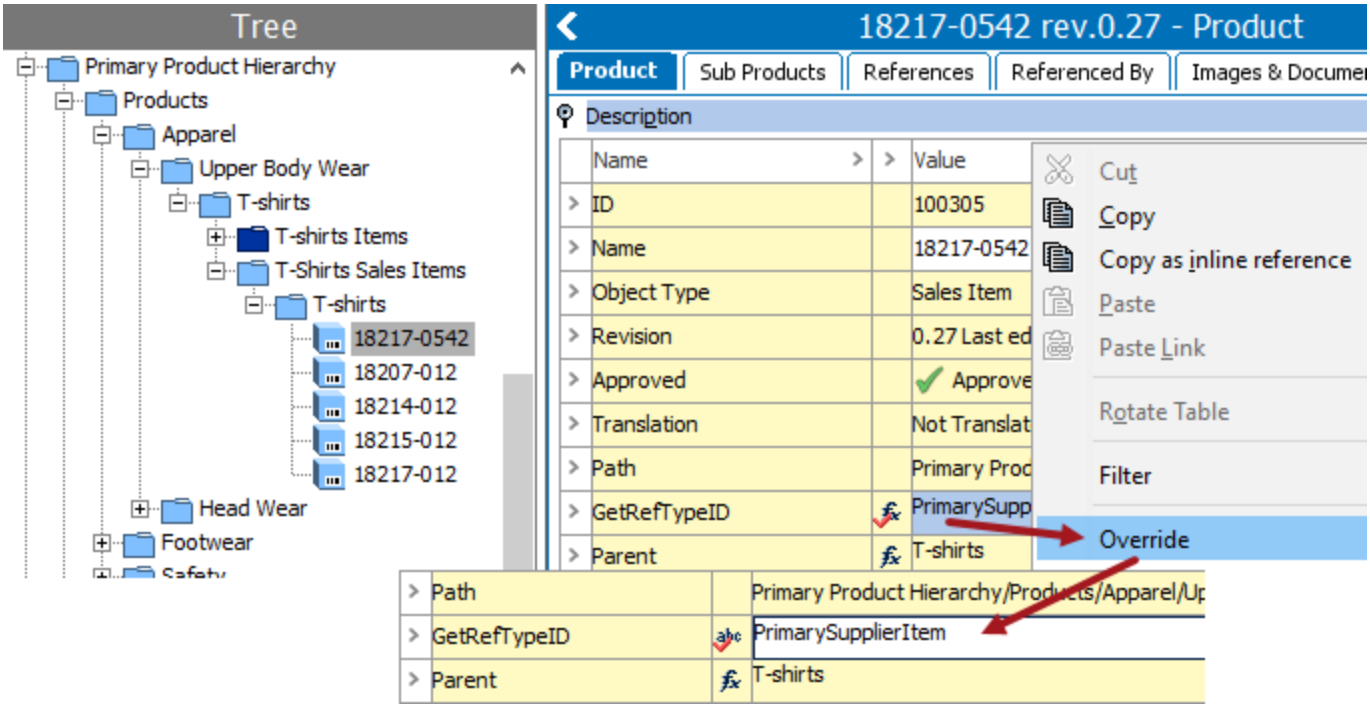
When a calculated attribute displays on an object, the value is read only. Occasionally, the calculated value for a specific product, even though correct, may not be what is desired. Below are options for overriding calculated attributes, restricting override, removing override values, and restoring a calculated value.

Note: For calculated attributes, the value is expected to be controlled by the resulting value within the actual calculation, so the settings for the attribute's validation base type, assigned unit, and dimension dependencies etc. are all ignored. It is only when a manual override is applied to the attribute value that those limits and setups are active.

Override a Calculated Attribute

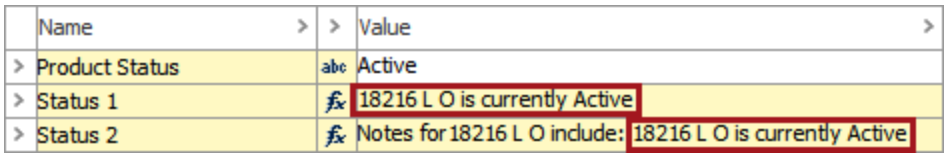
Although a calculated attribute value is displayed as read-only in the workbench or Web UI Tree object editor, it can be overridden.

To manually override the value on specific product (and child products for specification attributes, if the value is inherited), right-click **the calculated value** and click **Override**.

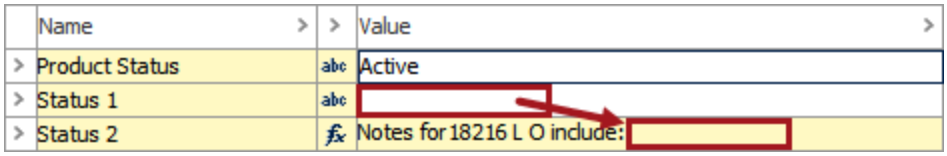


The parameter can then be edited, allowing you to enter the value to replace the calculated value. If values existed prior to clicking Override, then those values become static text. When static text has been defined, it is displayed with a white background. No calculations are performed on static text. The text entered is displayed in the object editor for the objects where the attribute is valid. Static text can also be used in combination with functions.

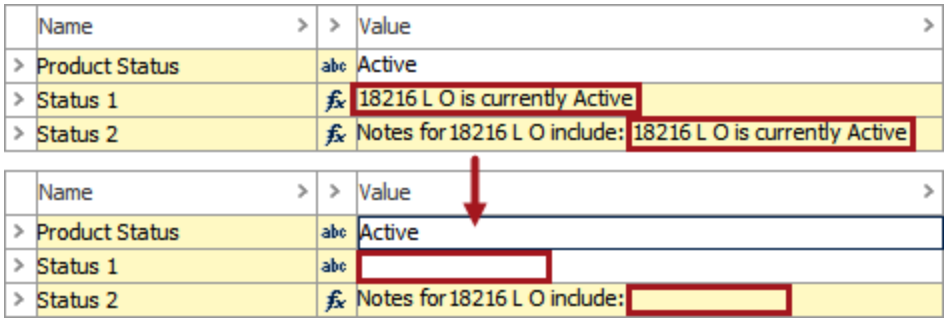
Another option is when a space added as a value is used to override a calculated attribute value. In the following image, Status 1 is a calculated value that uses data from Product Status, in this case the value of 'Active.' Status 2 adds the value of Status 1 to some text.



When Status 1 gets a space value for an override, that space is passed onto Status 2.



This method can be used to overwrite calculated values per object.



Restrict Overrides of a Calculated Attribute Value

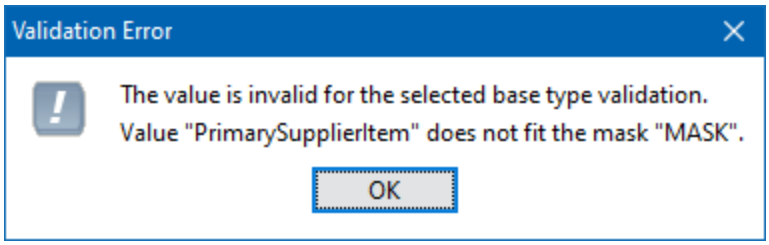
Calculated attribute values can be overridden as described above, and can also be overwritten via import.

For example, consider an export that includes the calculated attribute values (among other values). After making a change to non-calculated attributes, you then re-import the file. Since the file contains the value of the calculation, the calculation is overridden with an actual value, making it a local value. In this case, it might be beneficial to apply a mask to prevent the calculated value from ever being overridden unintentionally.

Important: Using an input mask places a restriction on the attribute override value. The only override allowed via keyboard entry or import is one that matches the mask. For more information, refer to the **Input Masks** section of the **Validation Rules** documentation.

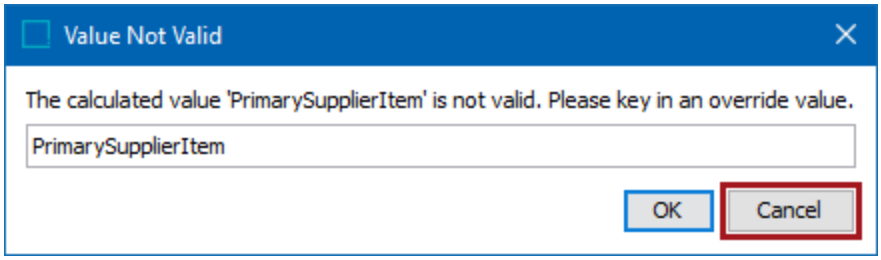
Continuing with the override example above, a mask of 'MASK' has been added to the calculated attribute named 'GetRefTypeID'.

1. Click the **Override** option for a calculated attribute value that includes a mask. The following validation error displays and compares the calculated value to the mask.



> **Note:** This error is also displayed if override values already exist for a calculated attribute that is being modified to include a mask. In this case, follow the steps in the **Remove Override Values** section below, and then add the mask.

2. The Value Not Valid dialog only allows adding the mask text as an override. The user can either:
   - add the required mask text, or
   - click Cancel to resume using the calculated attribute value.



Remove Override Values

To delete existing override values:

1. Use Export Manager to create an export of the attribute (and any other attributes needed for identification) for all objects. For more information, refer to the **Creating a Data Export** topic in the **Data Exchange** documentation.
2. On the Export Manager wizard Advanced step, uncheck the 'Include Calculated Attribute Values' Advanced option. This outputs only local values. For more information, the **Export Manager - Advanced** documentation.
3. In the output export file, replace the attribute's local values with '[delete]' and save the file. For more information, refer to the **Delete Values - Map Inbound** documentation.
4. Use Import Manager to import the modified file. For more information, refer to the **Creating a Data Import** documentation.

Restore a Calculated Value

To restore the calculated value in workbench or Web UI, delete the manually entered value to have the calculated value display again.

Conditional Attribute Display

As is often the case, an attribute may not be relevant unless another attribute holds a certain value. For example, attributes specific to hazardous materials may become valid if the attribute 'Has Lead' has a value of 'Yes'. To facilitate this, attributes can be conditionally displayed in Web UI and Smartsheets.

A condition can be configured in two ways: as metadata on a description attribute or as a specification attribute link. When configured, it indicates the circumstances under which the relevant attribute is valid.

This enables business users to steer the Web UI and Smartsheets behavior for end users without requiring use of the Web UI designer.

Note: Conditional attribute support does not apply to STEP Workbench as all attribute visibility in the workbench is determined solely by user privileges.

Terminology

For additional context, refer to relevant definitions below:

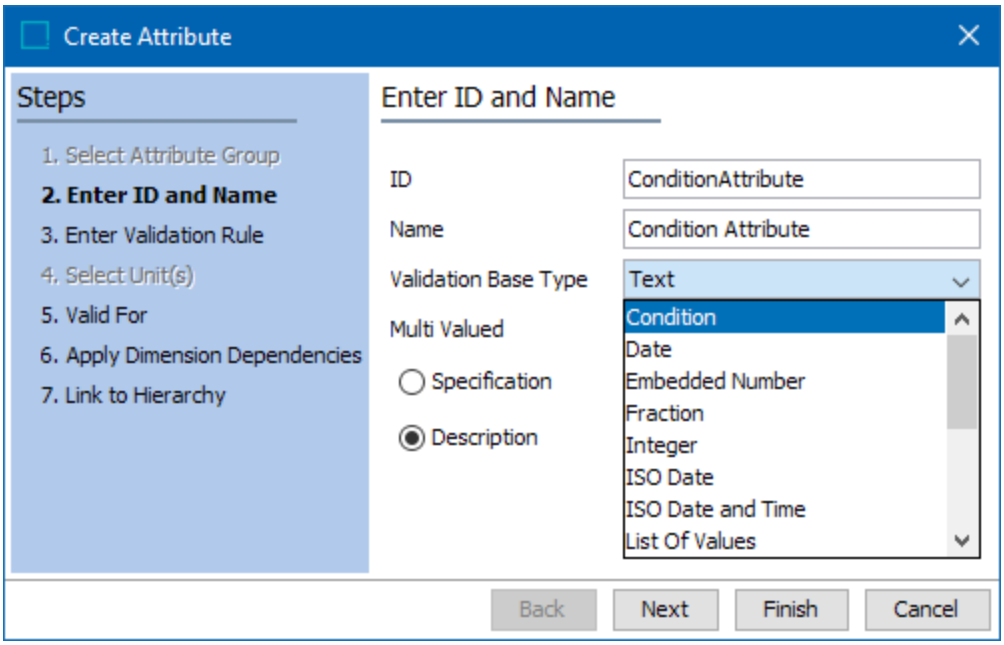
- **Conditional Attribute** - This attribute appears as a metadata field on Description attributes and on Specification attribute links in the Product Hierarchy. Conditional expressions are stored in this attribute.
- **Conditional Expression** - Validity rules for the Conditionally Valid Attribute. Expressions are stored in the Conditional Attribute field for the relevant attribute or attribute link.
- **Conditionally Valid Attribute** - These attributes are only valid under the conditions specified by a conditional expression. In Web UI, Conditionally Valid Attributes are only displayed to the user when the Conditionally Driving Attribute is populated according to the Conditional Expression.
- **Conditionally Driving Attributes** - Attributes that are specified in a conditional expression. Conditionally Valid Attributes rely on populating this attribute with the correct value. In Web UI, Conditionally Driving Attributes are always displayed.

Creating the Conditional Attribute

Before conditions can be set on attributes, the Conditional Attribute must be created.

Note: Only one Conditional Attribute can be active on the system at any given time. To be clear, the Conditional Attribute is the attribute that holds the logic for the Conditionally Valid Attributes. Therefore, any number of Conditionally Valid Attributes and their associated expressions can be configured using a single Conditional Attribute.

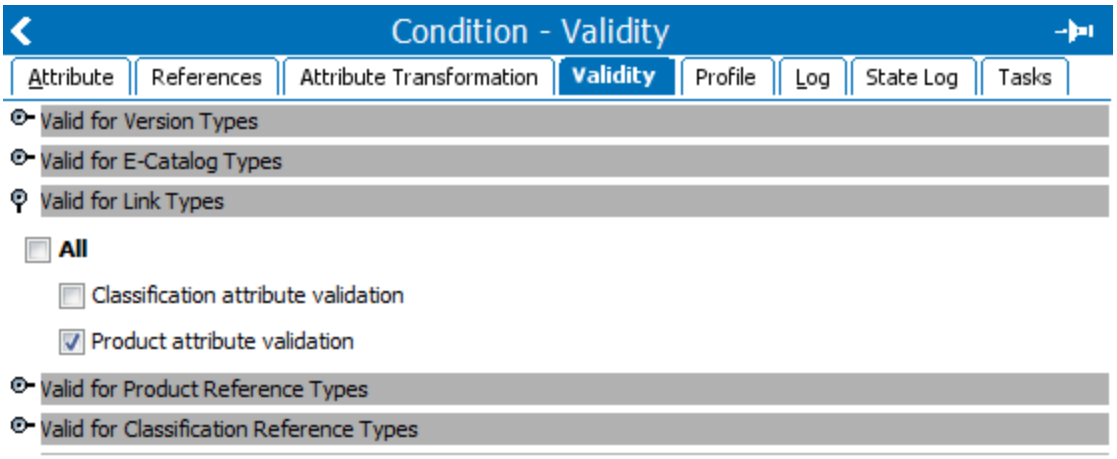
1. In System Setup, navigate to a relevant attribute group and create a Description Attribute with the Base Validation Type of Condition.



2. Complete any other relevant information and click **Finish** to create the attribute.

Important: It is recommended that attributes used for conditional validity (as the Conditional Attribute or as a Conditionally Driving Attribute) do not have dimension dependencies.

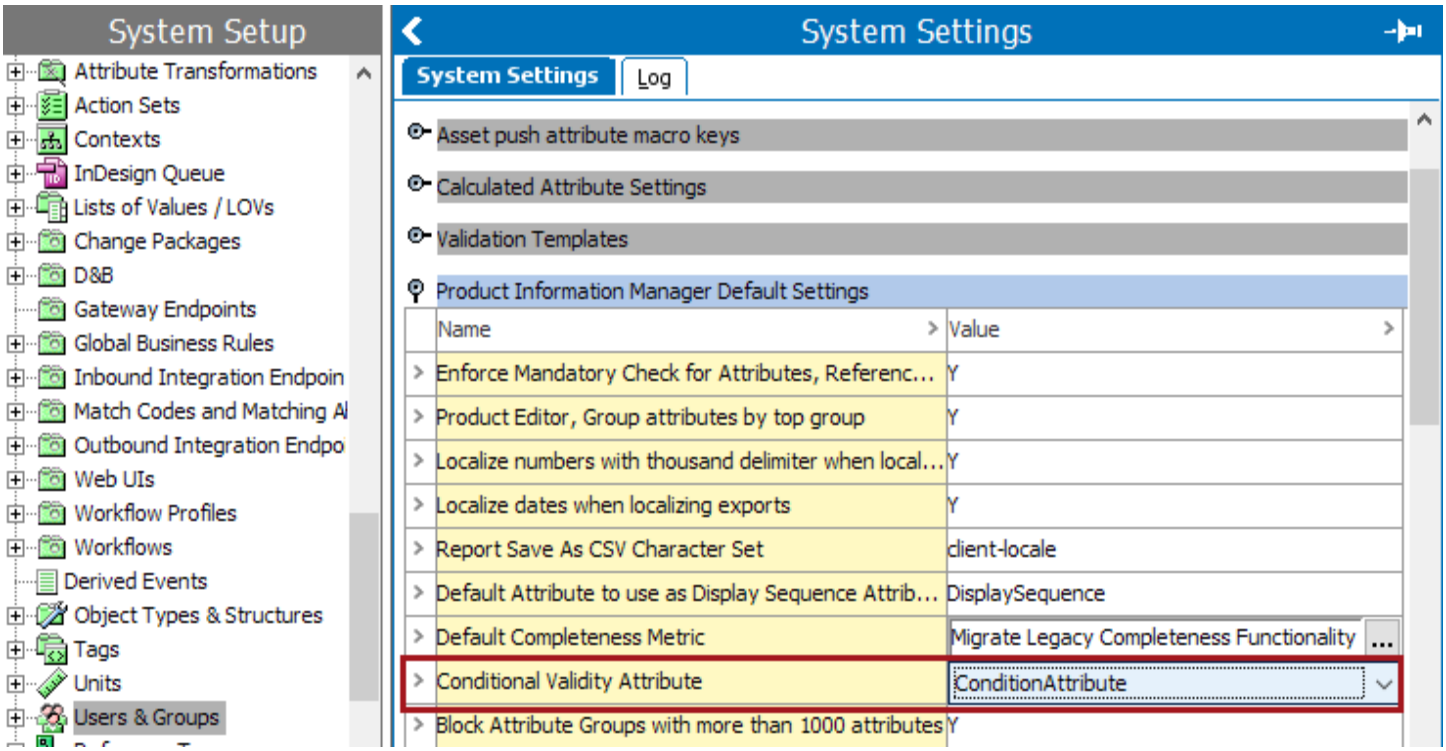
3. Under 'Valid for Link Types', set the validity of the attribute for the **Product attribute validation** option.



Activating a Conditional Attribute

Once created, the Conditional Attribute must be activated.

1. Navigate to System Settings and select **Users & Groups**.
2. Locate the 'Product Information Manager Default Settings' section.
3. In the 'Conditional Validity Attribute' field, select the conditional attribute configured in the previous section.



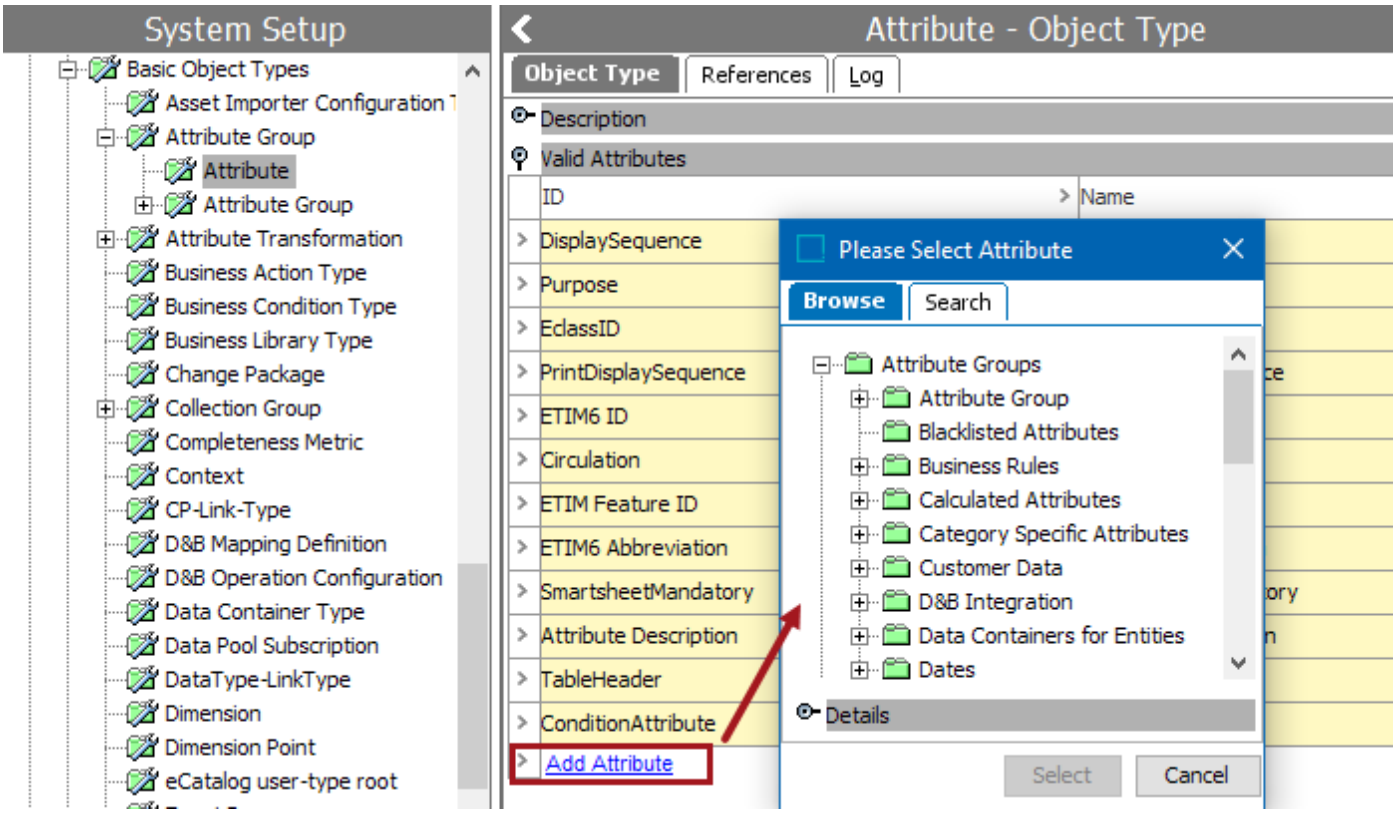
Configuring Conditionally Valid Attributes

Where and how you configure a condition for an attribute depends on whether it is a description or specification attribute.

Description Attributes

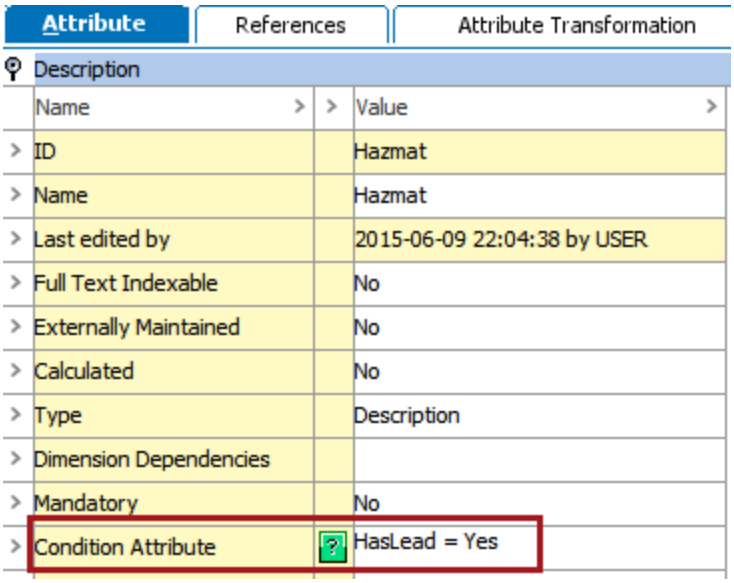
The condition for a description attribute is configured as metadata on the attribute itself. Before you can add it to an attribute, however, make the conditional attribute valid for the attribute object type.

1. In System Setup, navigate to Objects & Structures and expand Basic Object Types, expand Attribute Groups, and then click on **Attribute**.
2. In the Valid Attributes section of the Object Type tab, click **Add Attribute** and browse or select the conditional attribute from the list.



For more information, refer to the **Description Attribute** section of the **System Setup** documentation.

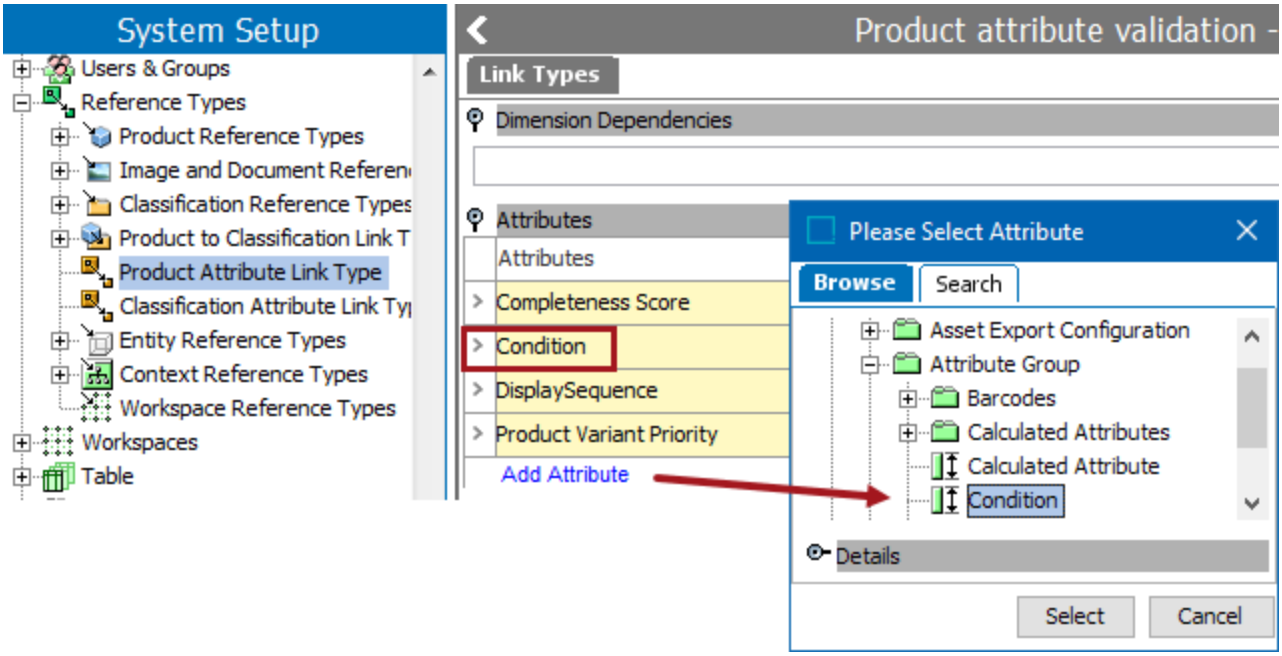
3. Navigate to System Setup and select the desired description attribute.
4. In the Conditional Attribute field, enter the desired condition rules for the conditionally valid attribute.



Specification Attributes

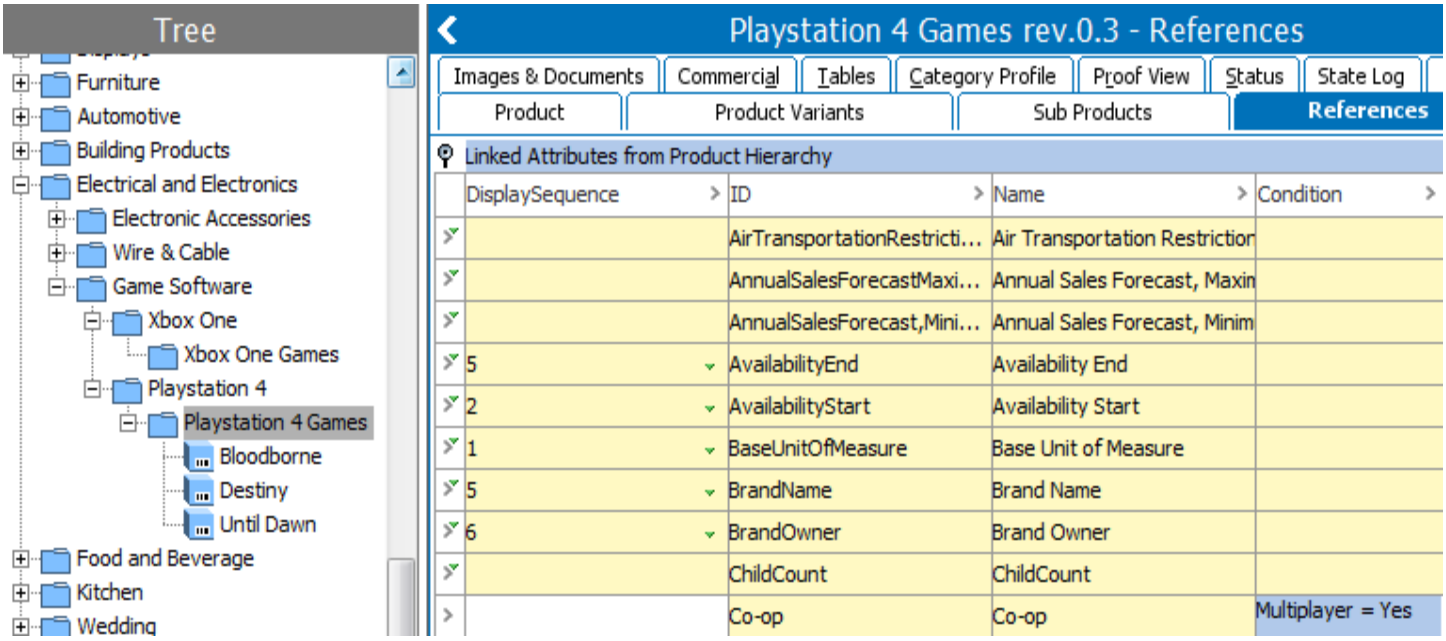
The condition for the Specification Attribute is configured by linking it to the relevant products on the References tab. Before you can add it to a product, however, the Conditional Attribute must be made valid for the Product Attribute Link Type object type.

1. In System Setup, expand Reference Types and open the Product Attribute Link Type node.
2. Click **Add Attribute** and browse or select the Conditional Attribute.



3. Navigate to the Tree and open the relevant node in the product hierarchy.
4. On the list of linked attributes, locate the desired Specification Attribute. In Conditional Attribute column, enter

the conditional expression.



Writing Conditional Expressions

Conditional expressions are written directly in the STEP Workbench text editor.

The expressions are written in a simple syntax in the format [AttributeID] = [Value1];[Value2], where multiple values act as an 'OR' operator. For example, a Condition Attribute called 'Condition Attribute' specifies that the 'Hazmat' attribute will only appear if the 'HasLead' attribute has a value of true, using the syntax [AttributeID] = [Value1]:

Syntax forms:

- Any value: *
- Value list :<value>; <value>
- Value with a wildcard: val*

Note: A wildcard in the middle of a value is treated as a part of the value, and the leading wildcard is ignored.

Rules that must be observed for the conditions:

- The used attribute must not have spaces in its ID.
- The used attribute must not have ':' in its ID.
- If a value contains ';' it must be escaped with \'
- If a value contains '\' it must be escaped with \'

Note: Conditional expressions using attributes with LOVs that utilize value IDs will evaluate the value ID. For example, assume a Yes / No LOV exists that uses value IDs, where 1=Yes and 2=No. The conditional expression for this must use the value ID, e.g., 'AttributeA = 1' if the attribute should only be available when the value of AttributeA is 'Yes'.

For more information refer to the **Business Rules with Conditional Attributes** section of the **Business Rules** documentation.

Note: Conditional attributes can also be exported using Smartsheets. When exporting products with conditional attributes any cells containing invalid conditionally displayed values will be automatically locked for editing. In order to unlock the cell and make changes, the user must first fulfill the proper conditions for the attribute and then validate the sheet. For more information on creating Smartsheets exports, refer to the **Smartsheet Data and Template Configurations** section of the **Data Exchange** documentation.

Conditional Attribute Example

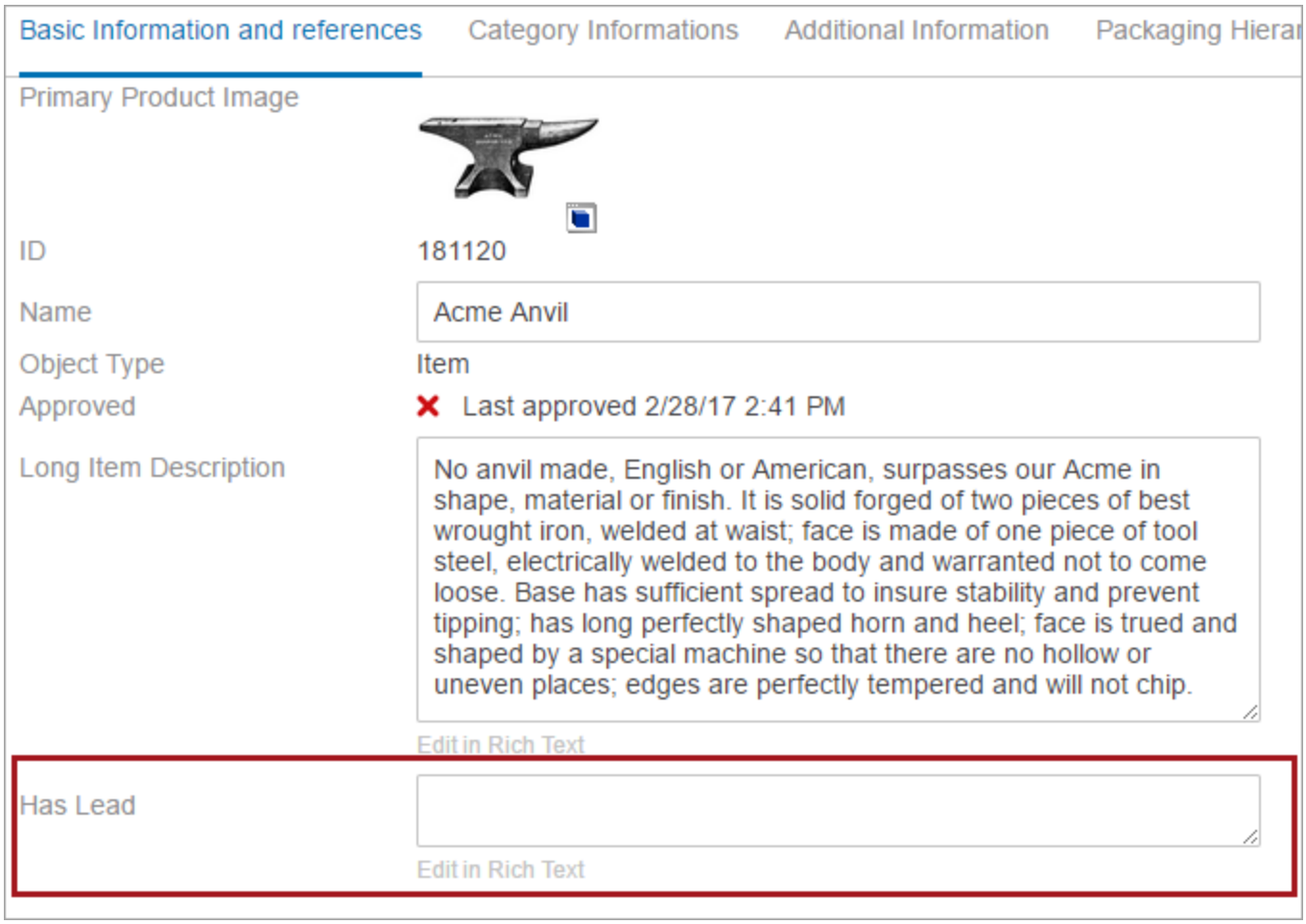
A number of Web UI components centered around the Task List and Node Editor components are enabled to deal with the conditional validity of attributes. These components honor the conditional validity settings and only allow for display and/or editing of attribute values if they are valid based on the driving conditions.

For example, the 'Hazmat' attribute is available when 'Has Lead' is set to 'Yes', but is unavailable when 'Has Lead' is left unpopulated or set to 'No'.

Basic Information and references | Category Informations | Additional Information | Packaging Hier

Primary Product Image

ID	181120
Name	Acme Anvil
Object Type	Item
Approved	✖ Last approved 2/28/17 2:41 PM
Long Item Description	No anvil made, English or American, surpasses our Acme in shape, material or finish. It is solid forged of two pieces of best wrought iron, welded at waist; face is made of one piece of tool steel, electrically welded to the body and warranted not to come loose. Base has sufficient spread to insure stability and prevent tipping; has long perfectly shaped horn and heel; face is trued and shaped by a special machine so that there are no hollow or uneven places; edges are perfectly tempered and will not chip.
	Edit in Rich Text
Has Lead	Yes
	Edit in Rich Text
Hazmat	
	Edit in Rich Text



Note: The 'Hazmat' attribute is not available if the ‘Has Lead’ attribute is set to ‘No’ or left blank.

Conditional attribute functionality can be used with Web UI elements:

- ParentValue
- TargetAttributeColumn
- TargetAttributeLinkColumn
- TargetValueHeader
- Value
- ValueHeader
- ValueGroup
- ValueLinkHeader

- ValueGroupHeader
- Attribute Value Component
- Attribute Value Group Component

Note: Before working on Conditional Attributes, it is important to ensure that attributes have validity and are linked on the object where conditions should match. In our example, 'Has Lead' and 'Hazmat' attributes are linked and have validity on the Item object. If the attribute is linked on the parent level, specify the condition on the parent level. Validity must be available on object.

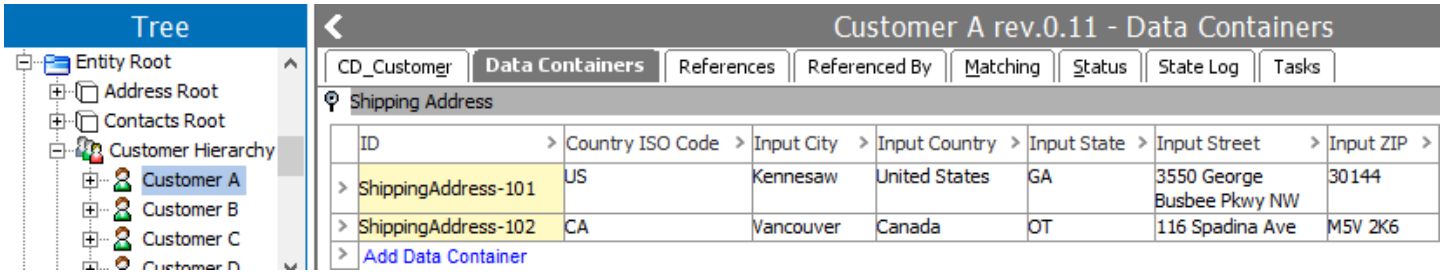
Data Containers

A data container allows you to represent and structure complex entity or product data through the use of composite attribute objects. This topic is an overview of complex data modeling as well as basic information regarding data container functionality available within workbench and Web UI.

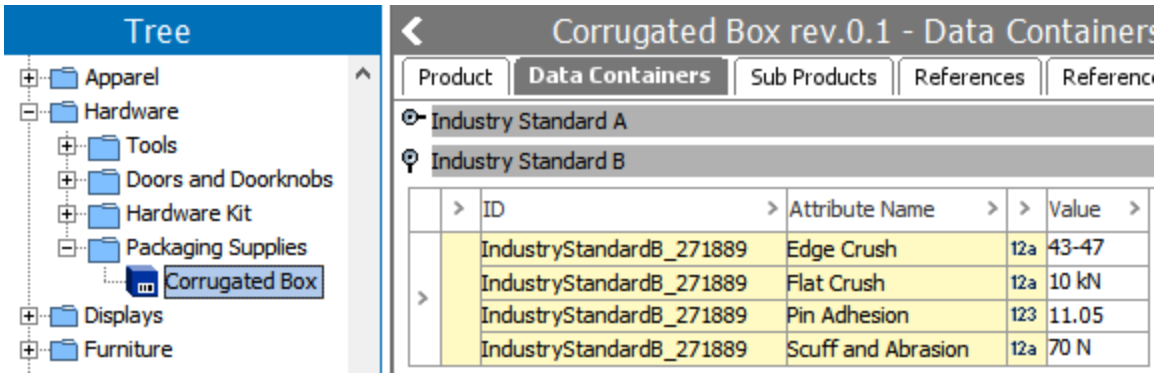
Composite Attribute Concept

A data container type allows modeling complex data with a single record that comprises many different pieces of information. Composite attribute objects have many benefits, including simplified revision handling, a collective process to save and approve data, and easier management of composite attribute data in workflows.

For example, a composite attribute object for a customer record could use entity data containers for addresses (e.g., main / physical, shipping), contact names, contact information, email addresses, phone numbers, etc., with relevant attributes and references. The customer record acts as a 'composite attribute,' which is a data structure that is composed of other data structures that need to be viewed and treated as a whole. While this type of complex data can be modeled using references, it provides challenges with various actions and processes. The following image shows an entity data container that allows multiple instances (the 'Allow multiple data containers' parameter is set to 'Yes'), so the individual data container attributes / references are displayed as columns.



Another example is a composite attribute object that captures data for multiple tests on a single product. Each data container holds values for a single industry standard test (e.g., tensile strength, specific gravity, water absorption). All tests must pass before the product can be approved. Data containers allow a value to indicate pass / fail for each test to be recorded, and workflows / business rules can be used to verify that the product is not approved until all tests pass. The following image shows a product data container that does not allow multiple instances (The 'Allow multiple data containers' parameter is set to No.), so the individual data container attributes are displayed as rows.



Using Data Containers

Once basic setup is complete, users can begin working with data containers and their associated attributes and references. Data container modeling is intended to ensure that all create, read, update, and delete operations can succeed or fail as a whole since the operations are being performed on an object holding the data container.

The following rules apply to data containers:

- Data Container Type is a Basic Object Type found on the System Setup tab under the Object Types & Structures node.
- New Data Container Type instances are created in workbench on the System Setup tab, under the Attribute Groups node and are distinguished via the icon. One data container can reside in multiple attribute groups.
- Data container types can only contain description attributes and references, and these attributes / references can be used in multiple data container types.
- Data container types have these tabs when viewed in workbench: Data Container Type, References, Validity, and Log.
- Once the data container type validity is set in System Setup, selecting a valid object from the Tree displays a Data Containers tab in the editor. Data containers configured in workbench are available for configuration in the Web UI designer, allowing users to add, edit, delete, or view data container values in Web UI.

Support for Data Containers

- Data container setups are transferable through change packages.
- Attribute values in data containers are searchable, and the entities or products are returned as results. The workbench Advanced Search tab, the Web UI Advanced Search functionality, and the Query API include a Data Containers search criteria. The workbench Search and Web UI simple search allows for searching via attribute values in Data Containers.
- Matching can be done for objects that use data containers via the survivorship rules for data containers ('Data Container: Trusted Source' and 'Data Container: Most Recent').
- Data containers are supported in calculated functions.

- Event handling is supported for data containers.
- The API supports access to data containers in JavaScript business rules.
- Data Containers are supported in the Address Component Model, as well the Loqate, CASS, and Trillium integrations used for address standardization.
- Completeness statistics take into account the attributes in the data containers.
- Revisions made to data containers are created on the applicable entity or product object, including creating, deleting, and editing attributes / references.
- Data containers can be maintained in Web UI by using one of the Data Container components.

Considerations and Limitations

Review the following items while working with data containers:

- Data containers can be made valid for either entities or products, and can only include description attributes and references.
- Product and entity data containers can be imported and exported using STEPXML, Advanced STEPXML, CSV, Generic JSON, and Excel.
- Only product data containers allow inheritance, restriction to specified hierarchy structures, and the ability to make the data container mandatory.
- An entity or product can only contain 1,000 data container records.
- Data containers cannot be externally maintained.
- Data containers cannot be exported via Generic XML.
- Data containers are not dimension dependent; however, the individual attributes in data containers do support dimension dependencies.
- Data container attributes cannot be exported with the Export Current View action.
- Data containers cannot be translated via the standard translation tools.
- Data containers cannot be initiated into workflows; they follow the workflow of their owning objects.
- Data containers are not supported in REST v1 and SOAP calls (web services).
- In REST v2, data containers are part of GET calls, while PATCH calls can create new data container instances. UPDATE is supported in GraphQL API.
- Importing a product data container completely replaces the data container records, instead of making updates.
- Data containers are not supported for print output.

- Some business actions cannot run on data inside a data container. In general, when mapping to an attribute, it must be read directly from the node it runs on, not from the data container on the node.
- Data container sort order cannot be changed for viewing in workbench. It is, however, possible to change the sorting order that is displayed in Web UI by changing the data container to manually sort the attributes in workbench. For more information, refer to the **Additional Web UI Functionality** section of **Data Containers in Web UI** topic in this documentation.
- Searching for inherited data containers and attributes is not supported.

For information on using data containers in workbench, refer to the **Adding and Maintaining Data Container Instances** topic in this guide.

For information on configuring data containers and using data containers in Web UI, refer to the following topics:

- **Setting Up Data Container Types in Workbench**
- **Data Containers in Web UI** in the **Web User Interfaces** documentation

Additional information can be found in the relevant documentation for a particular functionality (i.e., Data Exchange, Navigation and Searches / Advanced Search (Web UI), Data Profiling, and more). In online help, search for "Data Container" (including the double quote marks) to review the available topics.

Setting Up Data Container Types in Workbench

This topic provides basic information on how to set up data containers in STEP Workbench. Once setup is complete, users can begin working with data containers in workbench and start configuring Web UI screens and components.

This topic includes the following information:

- Prerequisites
- Adding Data Container Types
- Configuring Data Container Types
- Deleting Data Container Types

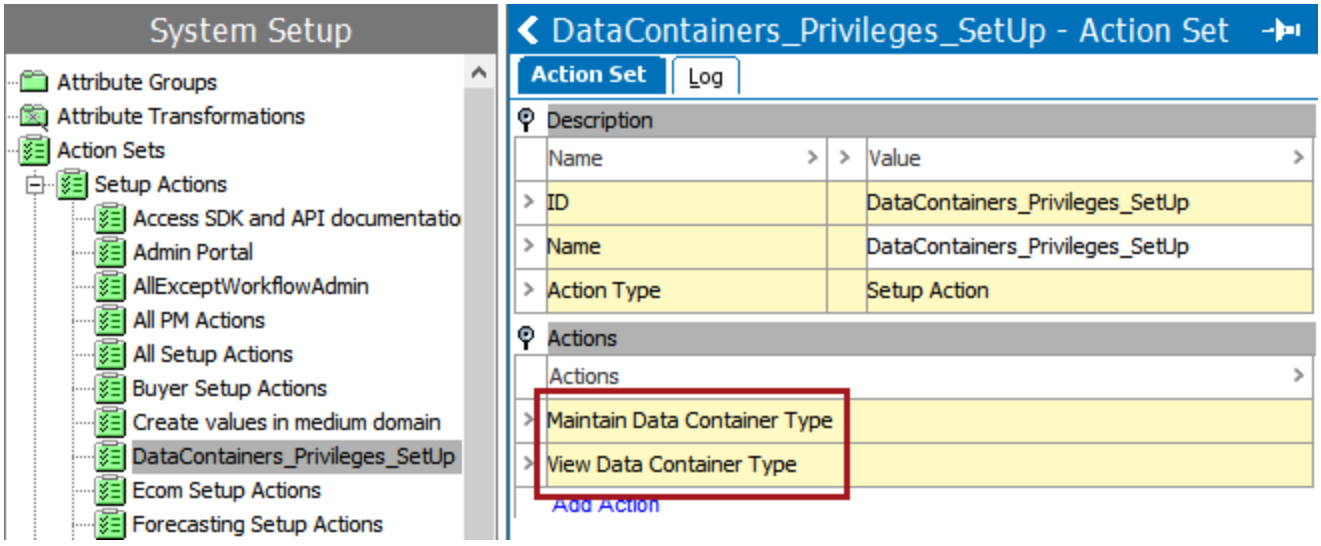
Prerequisites

Before setup begins, users should be familiar with basic information regarding using data containers and associated limitations. This information is available in the **Data Containers** topic in **System Setup** documentation.

To create a new data container object type and work with related attributes, you must have all the proper privileges.

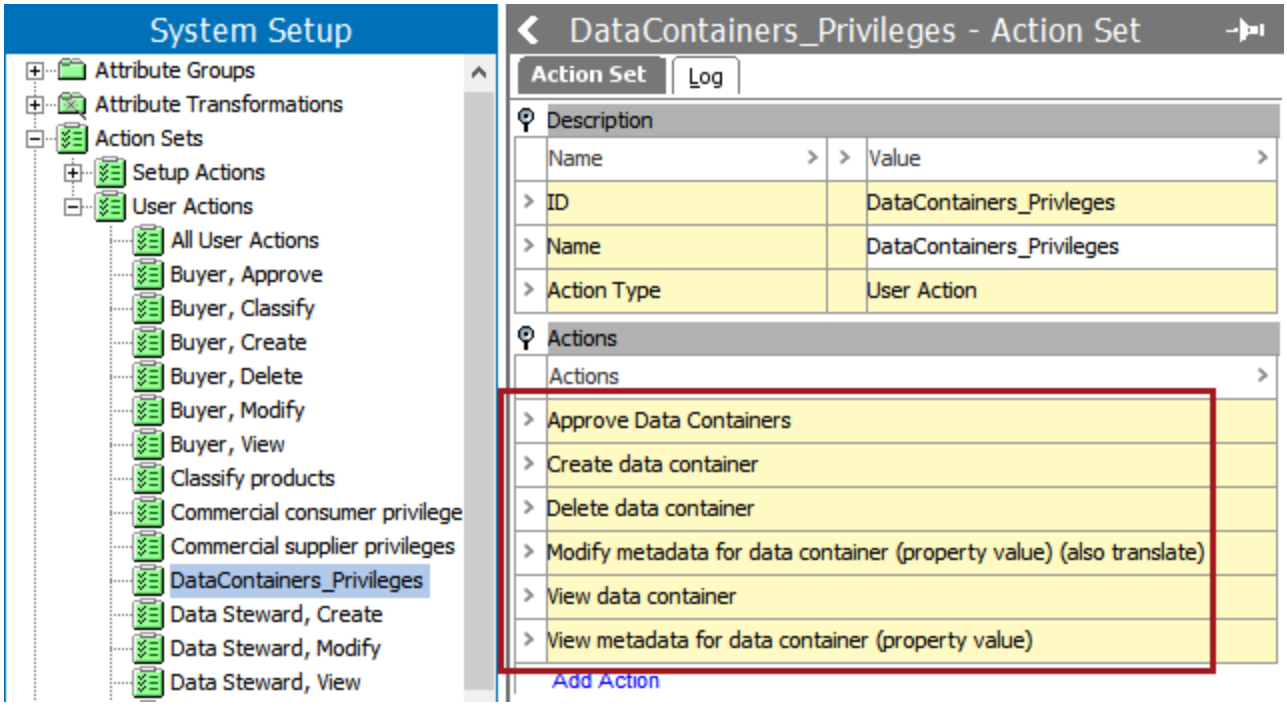
The following setup actions are related to data containers:

1. Maintain Data Container Type
2. View Data Container Type



The following user actions are related to data containers:

1. Approve data containers
2. Create data containers
3. Delete data containers
4. Modify metadata for data container
5. View data containers
6. View metadata for data containers

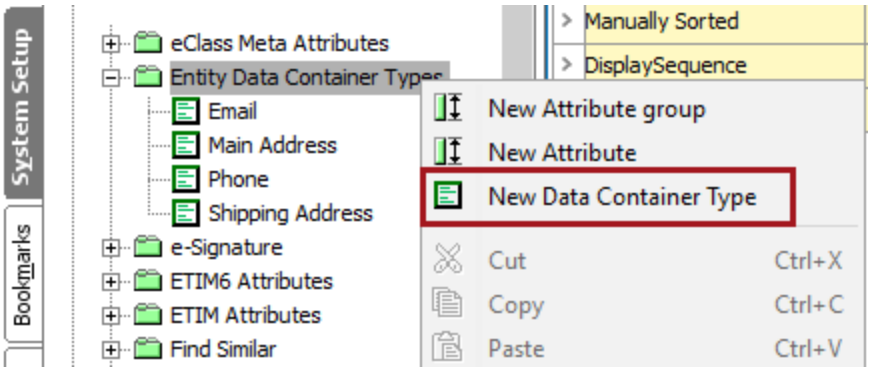


For more information, refer to the **Action Sets** section of the **System Setup** documentation.

Adding Data Container Types

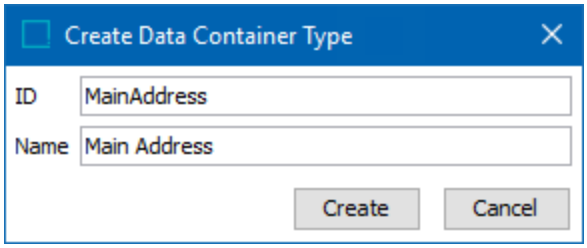
New data container types, distinguished via the icon, are created in workbench within System Setup > Attribute Groups. Insert data containers into new or existing attribute groups using the same functionality used to create new attribute groups and new attributes. For more information, refer to the **Attributes** and **Attribute Groups** topics.

1. In System Setup, right-click the attribute group that will hold the data container type, and select **New Data Container Type**, as shown below.



2. Enter the data container type ID and Name, and click **Create**.

Note: Data Containers IDs are global and unique across objects.



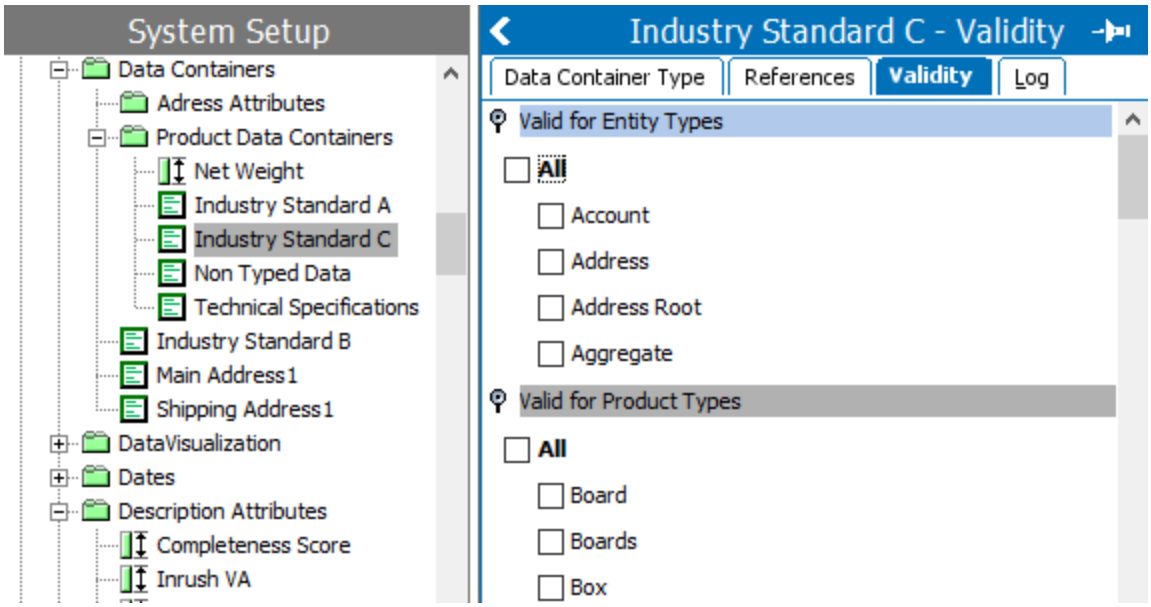
The new data container type editor displays four tabs: Data Container Type, References, Validity, and Log. Each one is described in the **Data Container Tabs** section later in this topic.

Configuring Data Container Types

Data container types can contain description attributes and references, and these attributes / references can be used in multiple data container types. Also, a data container can reside in multiple attribute groups.

1. In System Setup, select the Data Container Type and click the **Validity** tab to set valid object types. A data container can only be valid for entity or product object types, not both.

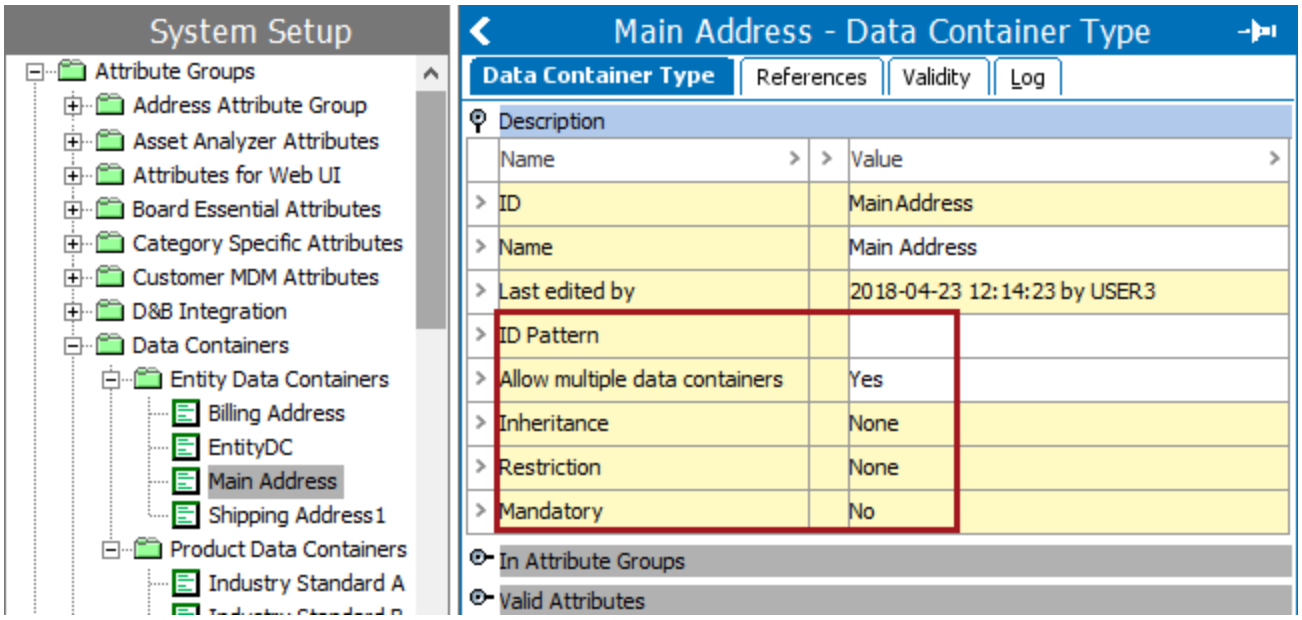
Note: To change the object type validity of a data container, you must first clear all current settings before choosing the other object type. If existing values are found on a data container type when attempting to remove the validity of an attribute, the user is asked to confirm or reject the deletion of existing values.



- Open the **Valid for Entity Types** flipper and select the valid types of entities. Selecting an entity object type makes the Inheritance, Restriction, and Mandatory product-related parameters on the Data Container Type editor tab read only. If those parameters have already been modified, they must be restored to the default settings before the validity can be modified.
- Open the **Valid for Product Types** flipper and select the valid types of products. The Inheritance, Restriction, and Mandatory product-related parameters on the Data Container Type editor tab can now be edited.

Note: If a data container is made invalid for an object type, and it had data container instances of that type, those instances are orphaned by a background process. The values are still displayed in the Tree, but only the delete functionality is available while the object type is not valid.

2. Select the **Data Container Type** tab, and on the **Description** flipper, set the following parameters:



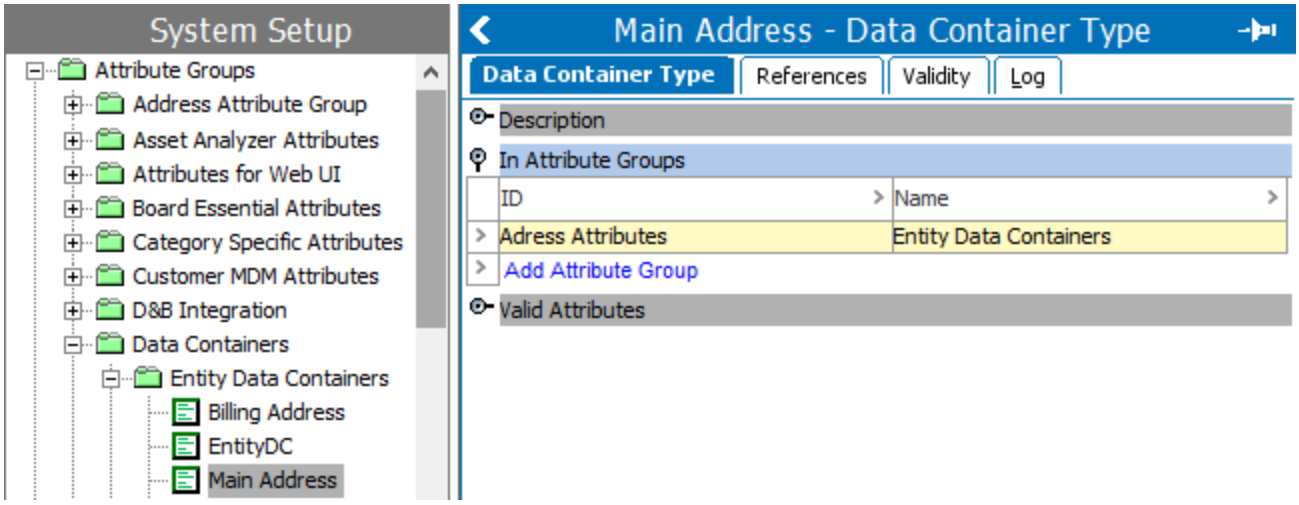
- For **ID Pattern**, which is required to add, edit, and delete the data container in Web UI, enter a pattern. If nothing is entered, users are able to determine their own data container ID when adding them to an object.
- For **Allow multiple data containers**, the default setting of 'No' means only one of this data container type can exist on the same object in the tree and the individual data container attributes are displayed as rows. Change this parameter to 'Yes' if two or more container instances should be allowed on the same object in the tree and to display individual data container attributes as columns

  When set to 'Yes', if multiple instances of the data container type exists on a single object, reverting to 'No' requires some data clean up, as defined in the **Changing 'Allow multiple data containers' back to 'No'** section below.

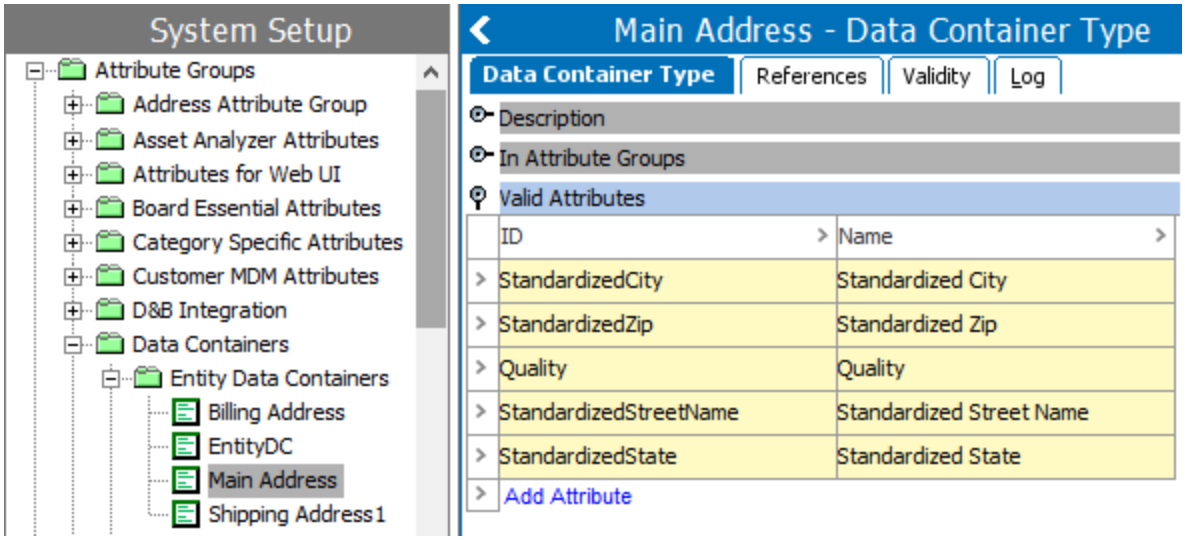
  Once set, although this parameter can be modified, doing so requires special handling. For Oracle databases, this action requires single-update mode (SUM), as defined in the Single-Update Mode topic. For Cassandra databases, this action uses Lock-free Schema Change (LFSC) functionality, as defined in the Lock-free Schema Change topic.

- For **Inheritance**, on product data containers only, the default setting of 'None' means values of the valid attributes are not inherited. Change this parameter to 'Inherited' if values should be inherited as they would be on a standard specification attribute. For entity data containers, this parameter is read only.
- For **Restriction**, for product data containers only, the default setting of 'None' means the data container can be used at all levels of the hierarchy. Change this parameter to 'Validity restricted to hierarchies' if the data container usage should be limited to specified nodes in the hierarchy, as determined by the References tab. For entity data containers, this parameter is read only.
- For **Mandatory**, for product data containers only, the default setting of 'No' means the data container attribute values can be left blank. Change this parameter to 'Yes' if the data container attribute values are required. For entity data containers, this parameter is read only.

3. On the **In Attribute Groups** flipper, click the **Add Attribute Group** link to display the data container type in one or more attribute groups.



4. On the **Valid Attributes** flipper, click the **Add Attribute** link to add attributes to the data container type. Individual attributes must be selected (no attribute groups); however, multiple attributes can be selected and added at the same time.

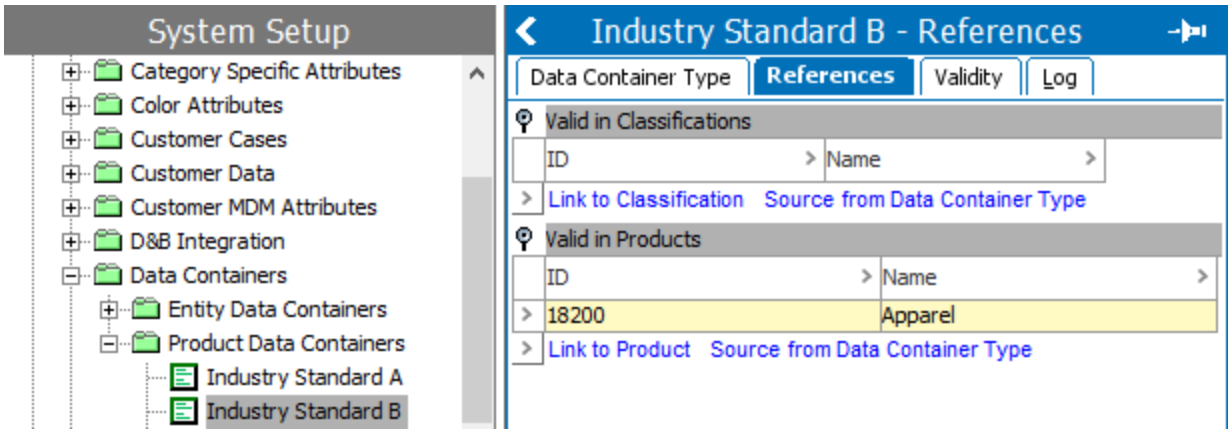


Note: Formatting of attributes is not supported. If formatting is used, the attributes are displayed as read only in the Web UI and, in the case of multi-valued data containers, locked for editing. Calculated attributes can be used. And, if using inline references in attribute values, the received value is displayed as read only.

Alternatively, attributes can be added to a data container from the attribute's 'Validity' tab, under the 'Valid for Data Container Types' flipper.

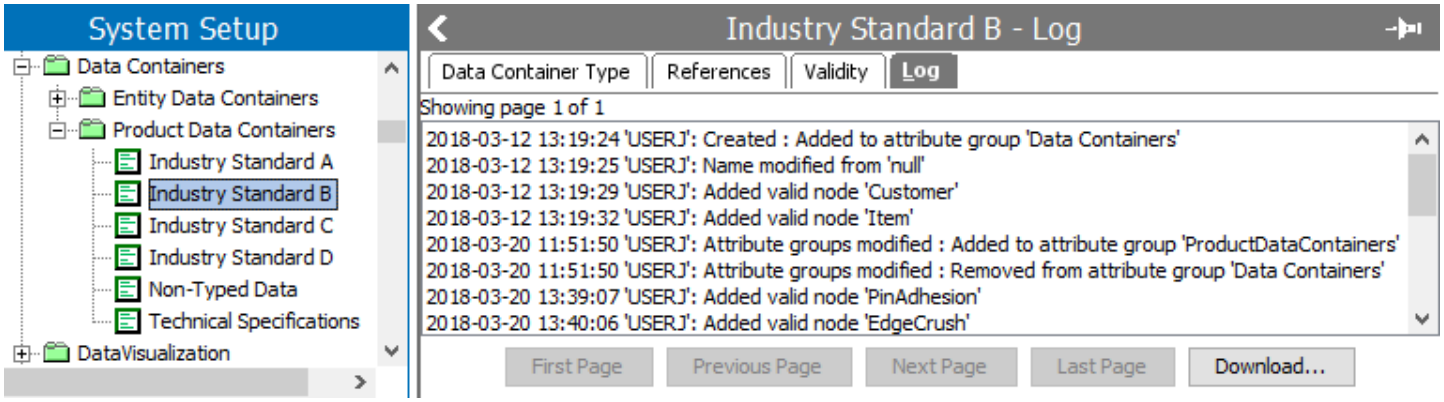
Once validity is set for an entity object type, although this parameter can be modified, doing so requires special handling. For Oracle databases, this action requires single-update mode (SUM), as defined in the Single-Update Mode topic. For Cassandra databases, this action uses Lock-free Schema Change (LFSC) functionality, as defined in the Lock-free Schema Change topic.

5. If product object types are valid, and the Restrictions parameter on the Data Container Type editor tab is set to 'Validity restricted to hierarchies', then click the **References** tab, and set the node in the hierarchy where the data container can be used.



   - Click the 'Link to Classifications' or 'Link to Product' links to define classification or product nodes for the data container.

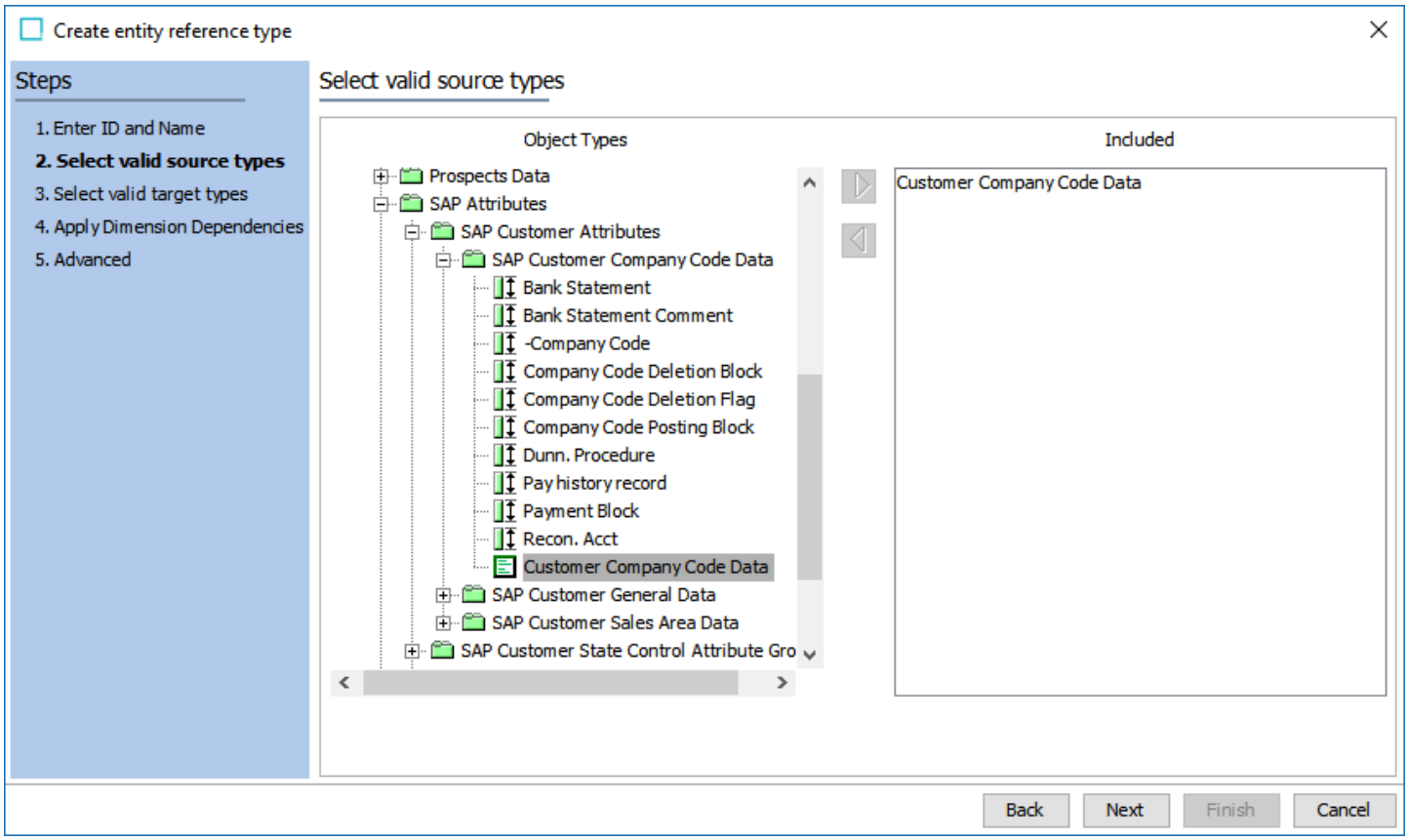
6. Select the **Log** tab to display the history of changes made to the data container. Users may download this record via the 'Download...' button.



Refer to the **Adding and Maintaining Data Container Instances** topic to work with data containers in the Tree.

Adding references to a data container type

To add a reference to another object on a data container, a new reference type must be created in System Setup. Specifically, when configuring the new reference type, select the relevant data container as a valid source type.



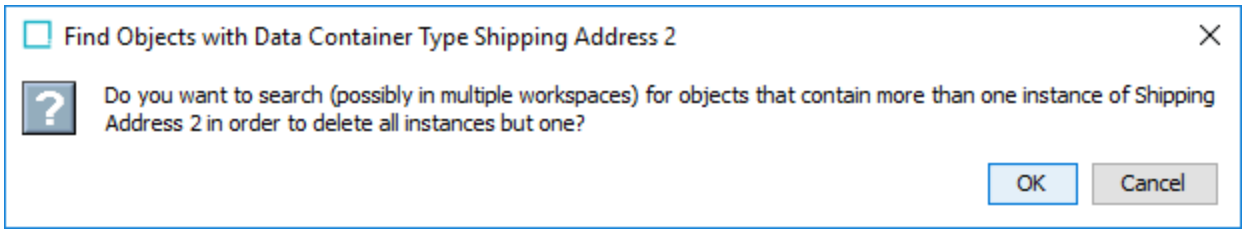
For more information on creating reference types, refer to the **Creating a Reference Type** section of the **System Setup** documentation. For more detailed information on configuring references on data containers, refer to the **References on Data Containers** section of the **System Setup** documentation.

Changing 'Allow multiple data containers' back to 'No'

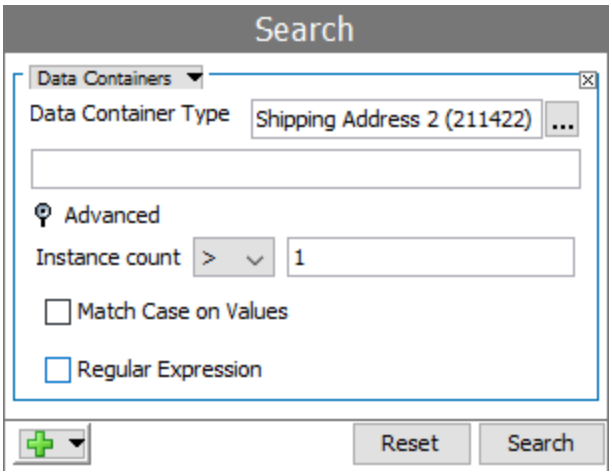
If the 'Allow multiple data containers' parameter is set to 'Yes,' and two or more container instances exist for any object, it is no longer possible to set it to 'No' until all the objects include a maximum of one instance.

To identify objects that have more than one instance of a data container type:

1. In System Setup, select the data container type, change the 'Allow multiple data containers' parameter from 'Yes' to 'No'.
2. If multiple instances exist on any single object, a dialog similar to the following is displayed for an optional auto search.



3. Choose an option:
   - Click **Cancel** to close the dialog and leave the data container set to allow multiple instances.
   - Click **OK** to display a Search tab with the relevant criteria is already supplied.

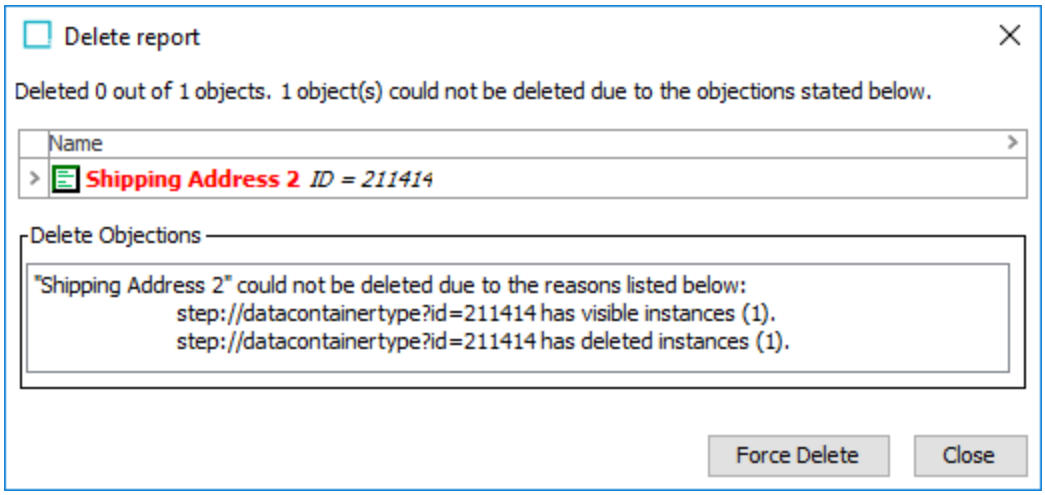


   For more information on executing searches, refer to the **Advanced Search** section of the **Getting Started** documentation.

4. To search for multiple instances, click the **Search** button to display the results.
5. Review the objects with multiple instances of the same data container type and delete as necessary to leave a maximum of one for all reported objects.
6. Back in System Setup, select the data container type again, change the 'Allow multiple data containers' parameter from 'Yes' to 'No'. This indicates it is a single-valued object type.

Deleting Data Container Types

Data container types can be force deleted, even if they have visible or deleted instances. Deleting a data container type starts a background process that also purges any associated data container instances.



Data Container Keys

Data containers can be identified and modified by using key definitions, which can be created using a combination of attributes and/or references. For more information, refer to the **Data Container Keys** topic in the **Data** Containers documentation.

Data Container Keys

Data container objects can be uniquely identified via a key. This allows users to create and update data containers via imports. The data container key serves as a unique identifier and can be based on the values of selected attributes and/or the target object IDs of selected reference types. These unique identifiers are necessary in order to identify data containers when that data is imported (e.g., from an external system that cannot identify an internal STEP ID) and to ensure that duplicate data container objects are not created.

In order to ensure uniqueness, keys are defined by and cover the scope of their node, workspace, and data container type.

In addition to creating data container keys within the workbench, there are pertinent aspects of data container keys that are addressed in other topics:

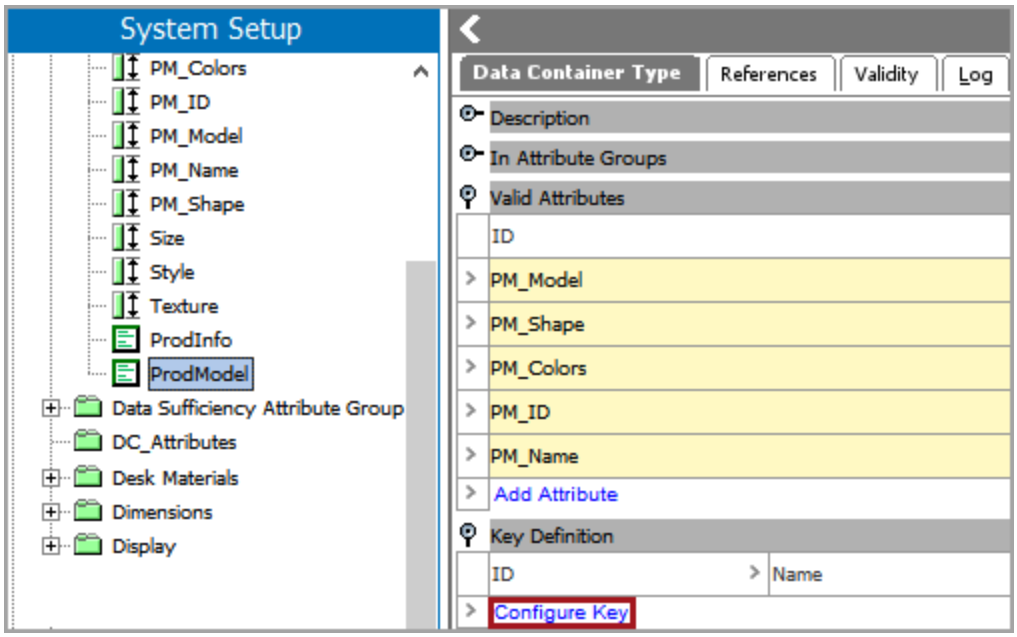
- **Data Container Keys in STEPXML** - Users can modify data container keys using the <KeyDefinition> tag. For more information regarding data container keys in STEPXML, refer to the **Data Containers in STEPXML** topic in the **STEPXML Format** documentation.
- **Mapping Data Containers** - Users can specify the mapping of attributes and reference types for data container keys. For more information, refer to the **Data Container - Map Inbound** topic or the **Data Container Type ID - Map Inbound** topic, both in the **Data Exchange** documentation.
- **Data Containers in Web UI** - Users working with data containers in Web UI are able to add values to attributes and/or reference types that make up data container keys. For more information, refer to the **Data Containers in Web UI** topic in the **Using Web UI** documentation.

Creating a Data Container Key in the Workbench

Users can create data container keys within the workbench using the Configure Key feature, located within the Key Definition flipper parameter.

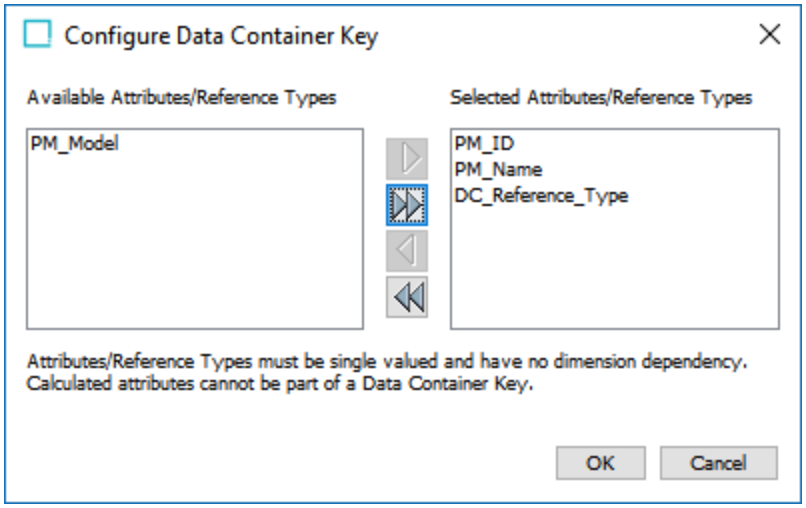
Note: Within the Data Container Type editor, the Inheritance parameter (located under the Description flipper) must be set to 'None' in order to create data container keys. If the parameter is set to 'Inherited,' the key definition cannot be configured. Additionally, if a user attempts to set the Inheritance parameter to 'Inherited' after a key definition has been configured, they will receive an error.

1. Select the data container to which you want to apply a unique key, then open the Key Definition flipper within the Data Container Type editor.
2. Click **Configure Key**.



3. In the Configure Data Container Key dialog, select the attributes and reference types that the key will consist of from the Available Attributes/Reference Types column and click the right single arrow to place those options into the Selected Attributes/Reference Types column. Only attributes and reference types that fit the specific criteria to be part of a key definition will be available for selection. The specific criteria is detailed later in this topic.

   In this example, the user has selected the attributes PM_ID and PM_Name, and the reference type DC_Reference_Type. These attributes and the reference type will be used to create the data container key.



Note: By clicking the right double arrow, all options in the Available Attributes/Reference Types column will be moved to the Selected Attributes/Reference Types column. By clicking the left double arrow, all options in the Selected Attributes/Reference Types column will be moved back to the Available Attributes/Reference Types column.

Attributes and reference types must meet specific criteria to be used as data container keys.

Attributes **cannot** be:

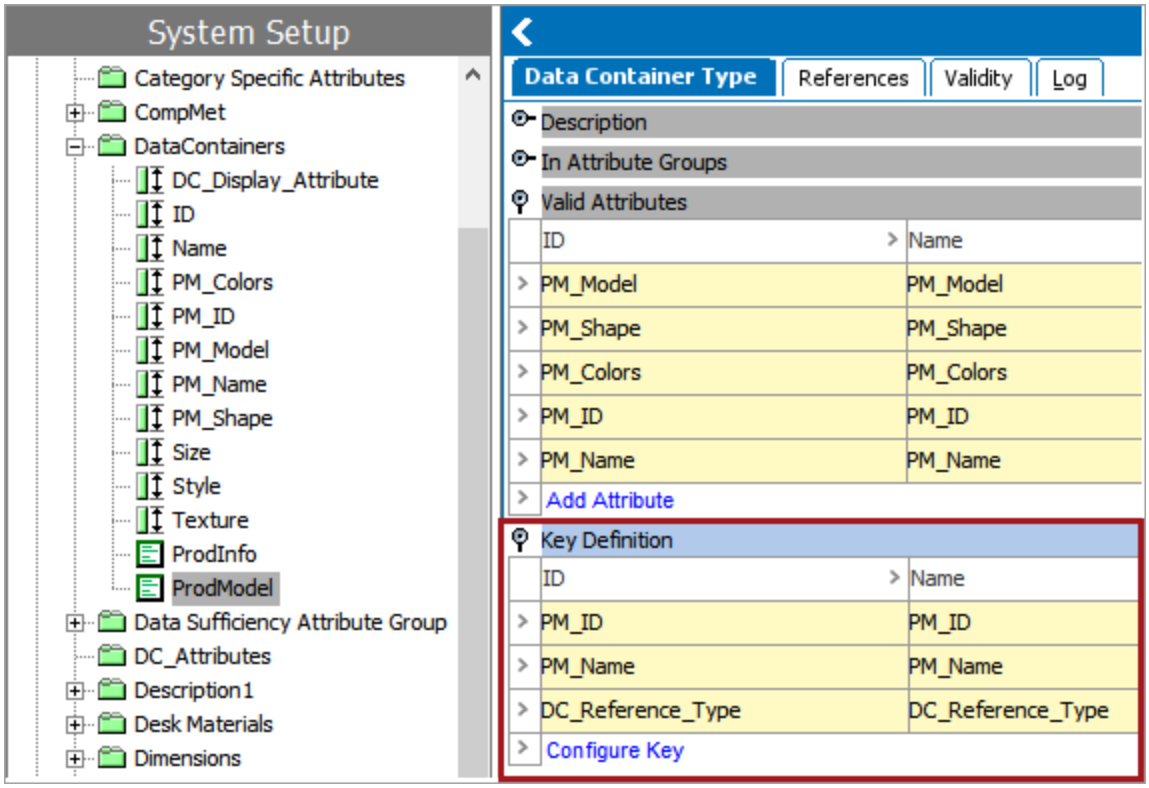
- inherited
- dimension-dependent
- calculated
- multi-valued

Reference types **cannot** be:

- inherited
- dimension-dependent
- multi-valued

Additionally, attributes and reference types must be valid for the selected data container.

4. Once the desired attributes and/or reference types are selected, click OK to close the dialog.
   The selected data container keys are now visible in the Key Definition parameter within the workbench.

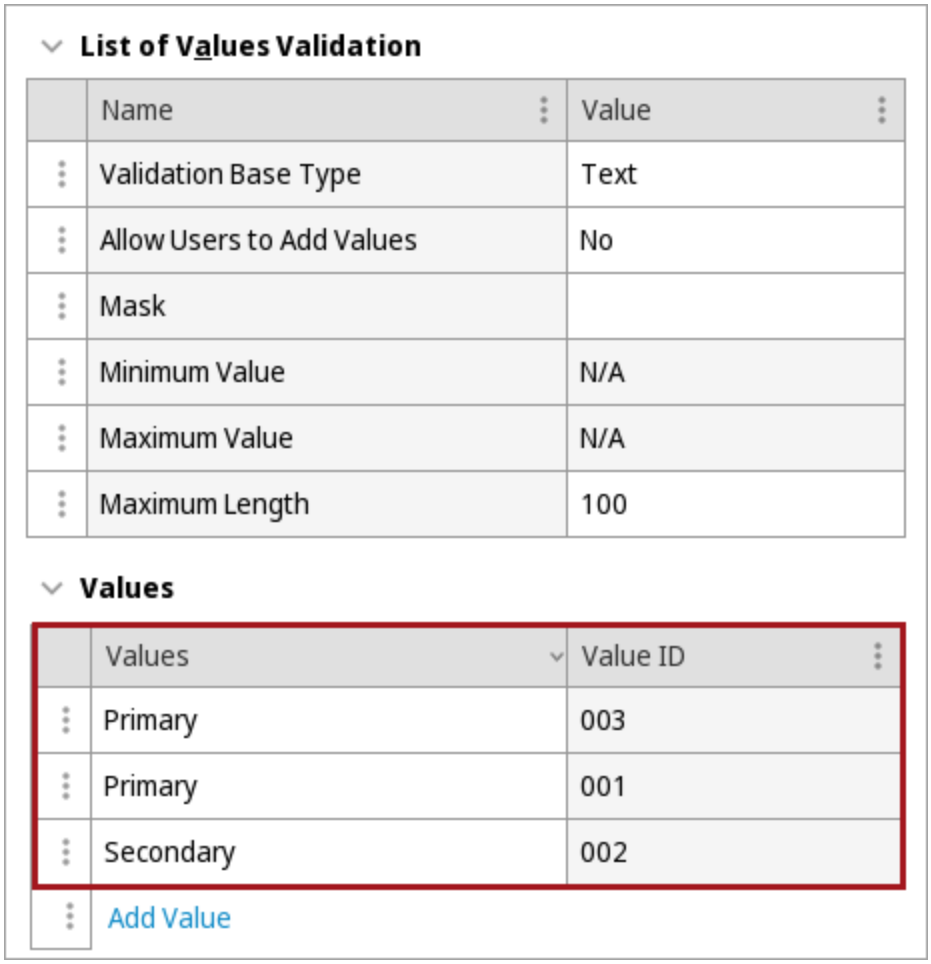


Note: Only users with the 'Edit Data Containers' privilege can make edits to the attributes /reference types after they have been assigned to data containers. It is recommended that only select admin users have this privilege added to their user profile and that this privilege be used sparingly to avoid creating duplicate keys. For more information regarding privileges, refer to the **User Actions and Error Descriptions** topic in the **System Setup** documentation.

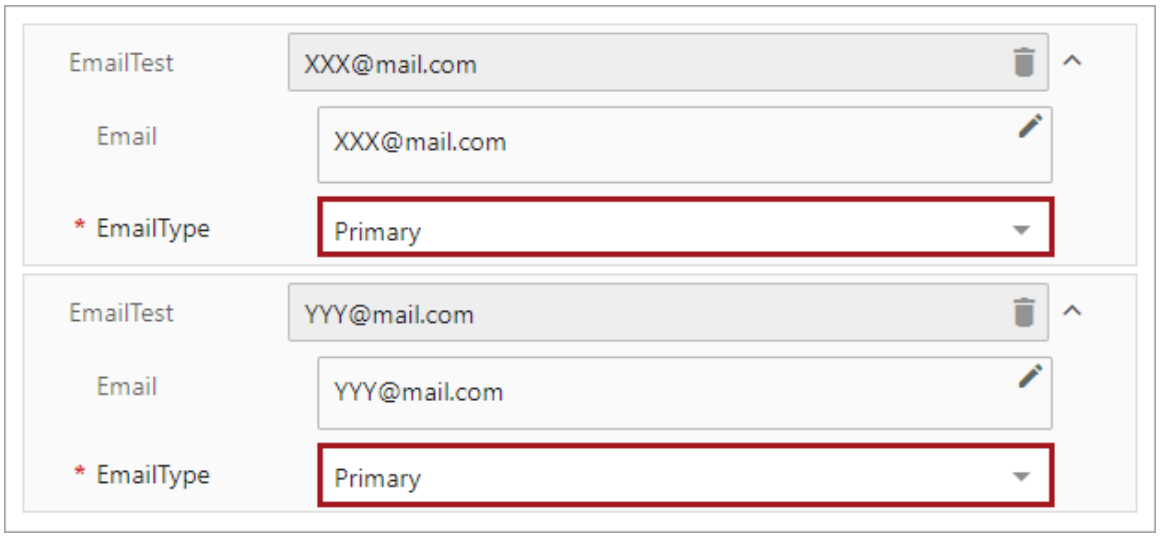
Note: Users can edit the target of a reference type that has been used as part of the data container key by right-clicking within the data container cell that holds the reference type and selecting 'Edit.' This will open up the node picker where another target for the reference type can be selected.

Using Lists of Values (LOV) in Data Container Keys

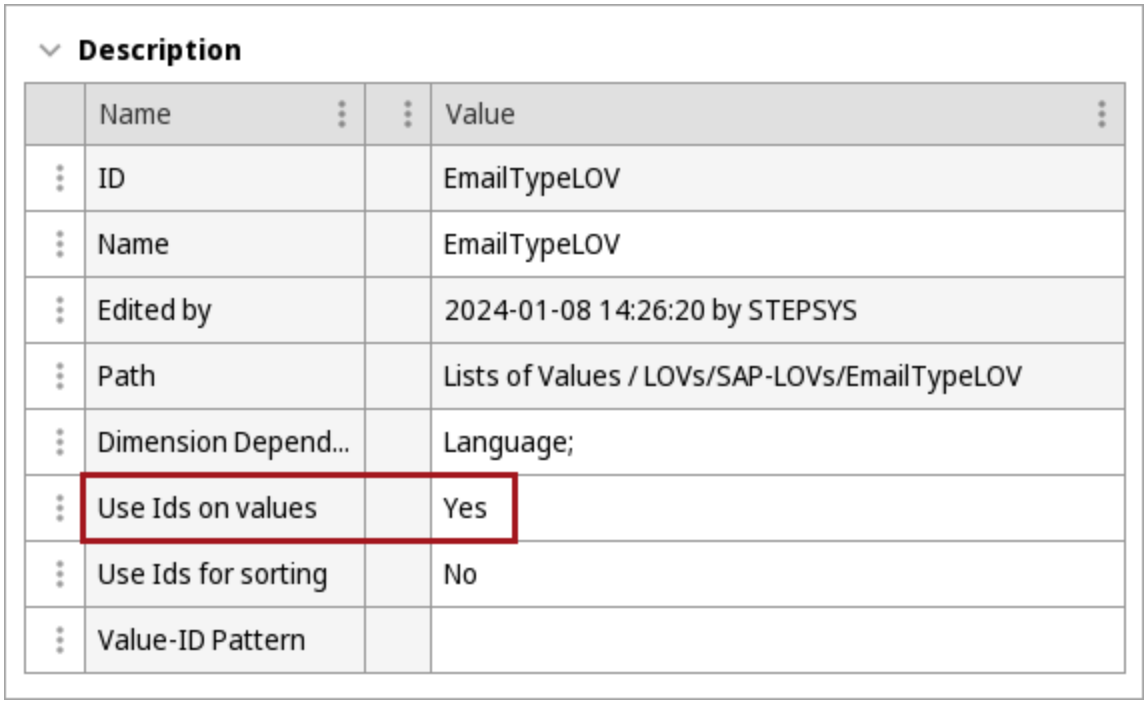
Lists of Values (LOV) can be used as part of a data container key. When the user creates a data container key using the LOV as part of the key, the STEP system uses the Value ID of the LOV's values rather than the values themselves to identify the key.



This means that the data container can contain, for example, two instances of a valid attribute ('EmailType') using the same LOV value ('Primary') because they have different value IDs ('001' and '003').



If an attribute with a 'List of Values' validation base type is used as a data container key definition, the LOV must have 'Yes' selected as the 'Use Ids on values' setting if the LOV is language-dependent.



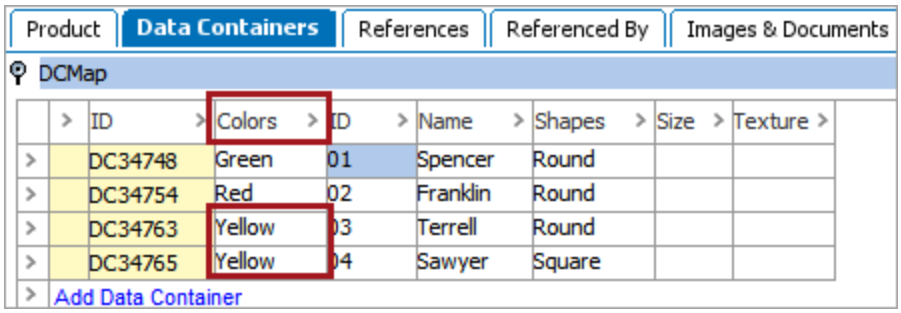
Description

Name	Value
ID	EmailTypeLOV
Name	EmailTypeLOV
Edited by	2024-01-08 14:26:20 by STEPSYS
Path	Lists of Values / LOVs/SAP-LOVs/EmailTypeLOV
Dimension Depend...	Language;
Use Ids on values	Yes
Use Ids for sorting	No
Value-ID Pattern	

Check Duplicate Keys

Users are able to check duplicate keys on the same data container type using the Check Duplicate Keys feature. Duplicate keys, which can occur when a user selects an attribute or reference type to be used as a key definition that already has duplicate values, undermine the overall value of applying uniquely identifiable keys for data containers.

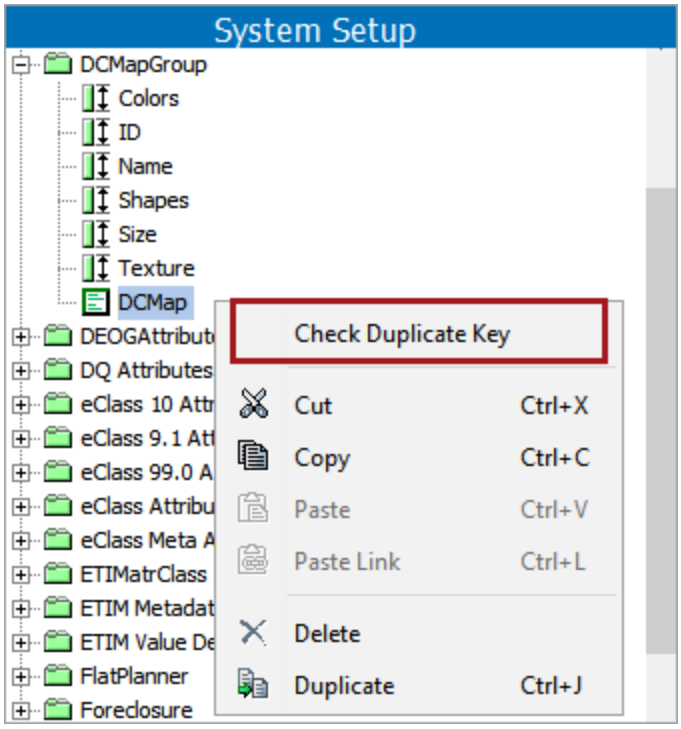
For example, in the image below, there are two data containers within the DCMap data container type that include the value 'Yellow' for the attribute 'Colors.'



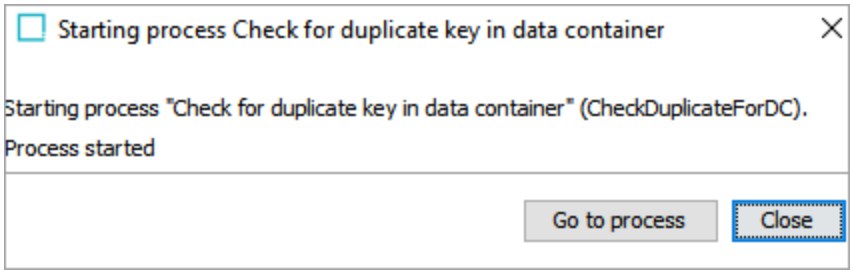
If the user creates a data container key using the attribute 'Colors' as the key definition to be part of the data container key after these data containers have already been created, this will result in duplicate keys.

To check for duplicate keys on a data container type:

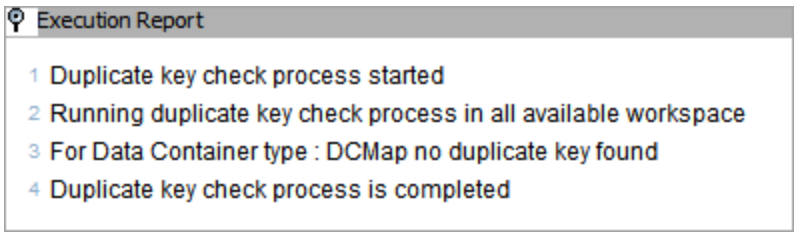
1. Right-click the data container type and select Check Duplicate Key.



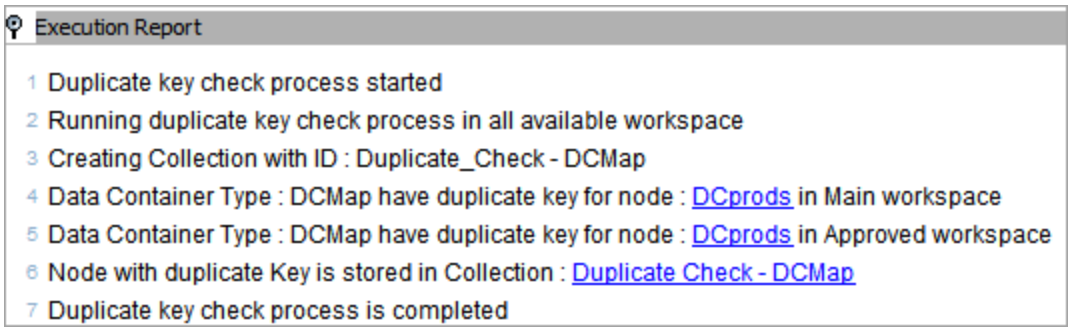
2. Click 'Go to process' to identify any duplicate keys (and if necessary, which data containers they are in), or click 'Close' to shut dialog.



If there are no duplicate keys, the execution report message will state that no duplicate keys are found.



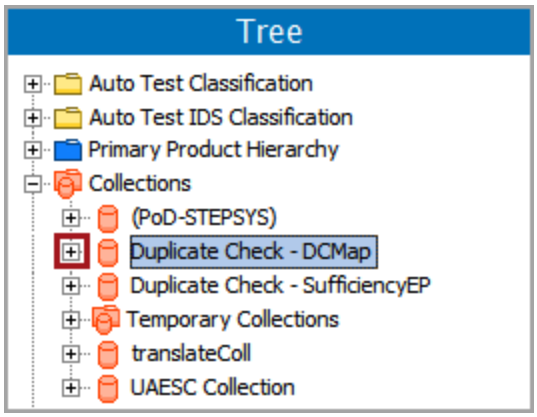
If there are duplicate keys, the execution report message will include the name and link of the collection that is created to store the objects that contain the data containers with duplicate keys. In this example, the name of the relevant collection is Duplicate Check - DCMap.



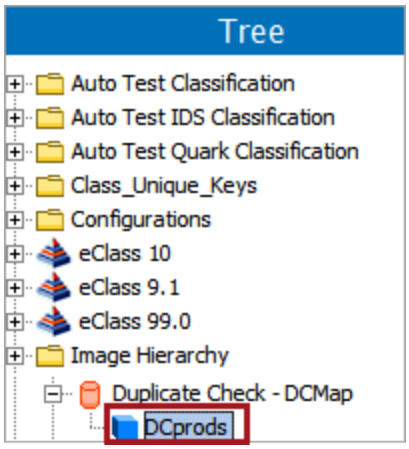
Removing Duplicate Keys in Collections

Once objects that contain data containers with duplicate keys are placed into a collection, the data containers that are attached to those objects can be modified to remove the duplicate key values.

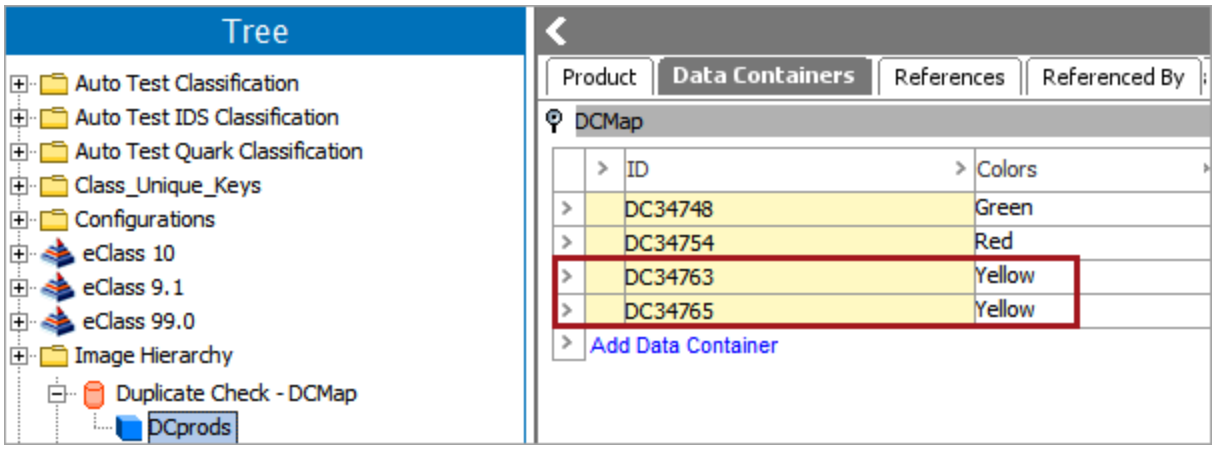
1. In Tree, expand the Collections node, locate the collection which houses the objects holding the data containers with duplicate key values, and click on the plus sign next to the selected collection.



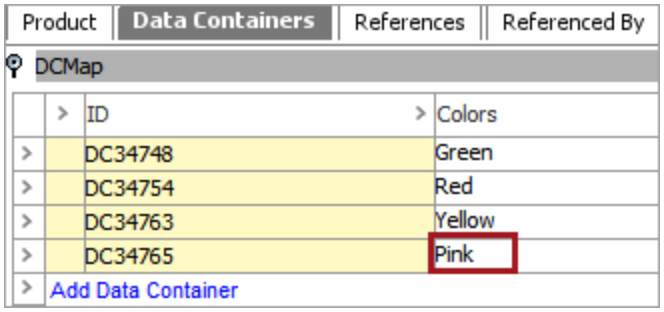
2. Select the product that contains the data container with duplicate keys.



3. With the product selected, click the Data Containers tab. In this example are two duplicate values for the attribute 'Colors.'



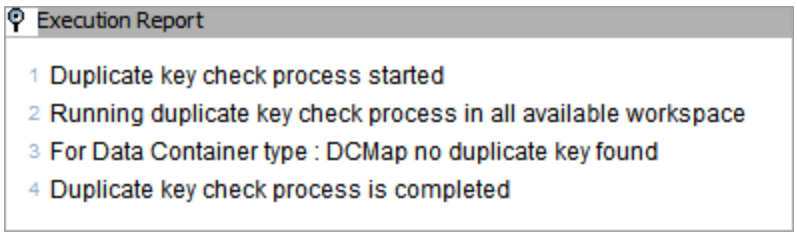
4. Change one of the 'Colors' attribute values to a different value.



Note: Only users with the 'Edit Data Containers' privilege can make edits to data container keys after they have been assigned to data containers.

5. Run the Check Duplicate Keys on the selected data container type (DCMap) again.

The execution report returns stating that there are no duplicate keys found.



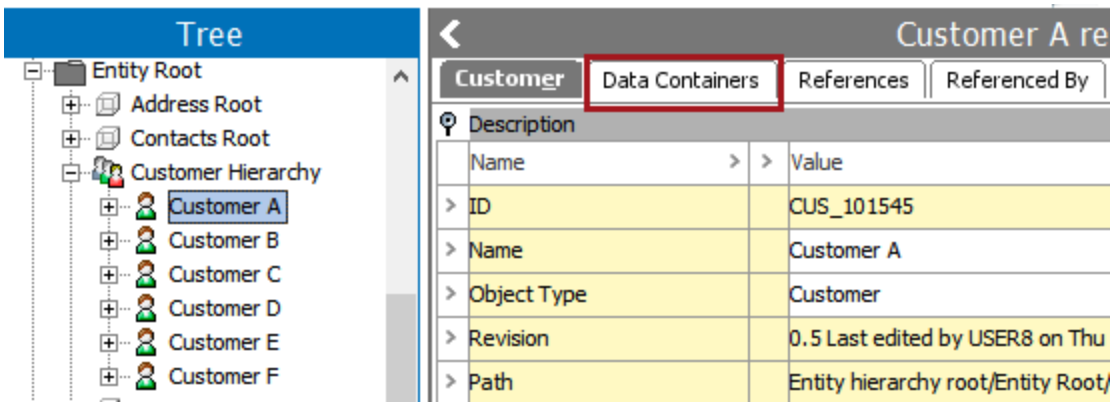
For more information regarding collections, refer to the **Collections** topic of the **Object Maintenance in Tree** section of the **Getting Started** documentation.

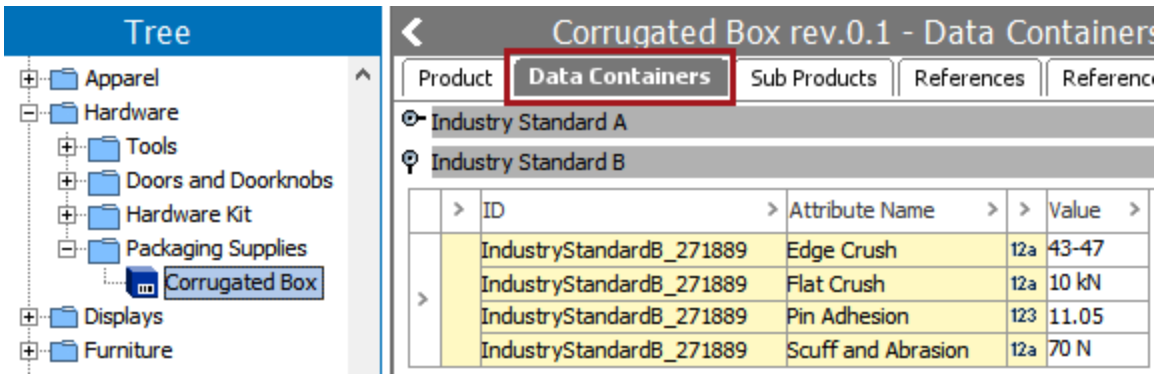
Adding and Maintaining Data Container Instances

After data container setup, a data container instance can be created on entities or products in the Tree. The data container type Validity tab settings determines the object types that display the data container. For more information, refer to the **Setting Up Data Container Types in Workbench** topic.

When a data container is valid for entity object types (a customer in the image below) or for product object types, selecting one of the valid objects in the Tree displays the Data Containers tab shown below. This is where you can add and maintain the attribute values and references for each container.

Note: If a data container instance exists in the Tree editor and has values, removing validity for the object type in System Setup does not remove the data container values in the Tree editor, even though the object type is no longer valid. Instead, the delete button is enabled, which allows you to remove the values, and the 'Add Data Container' link is disabled since the validity has been modified.

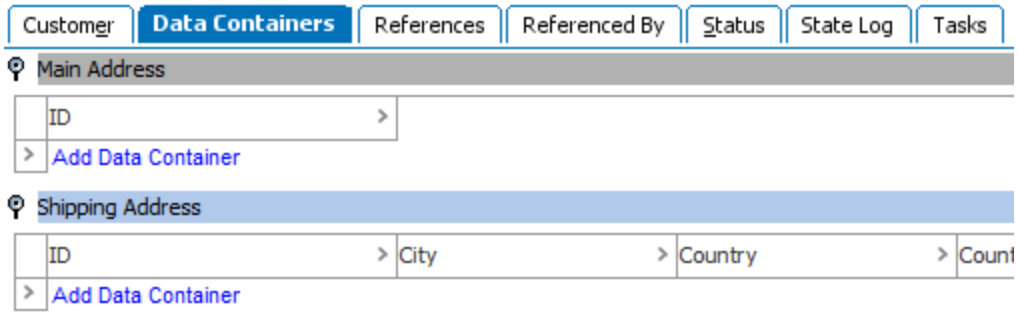


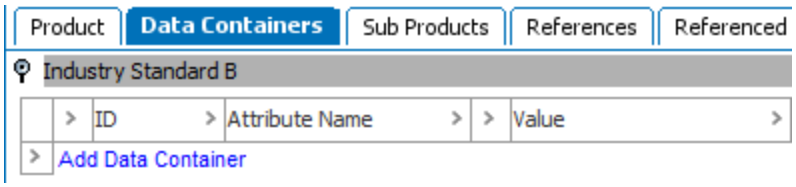


For information about working with and maintaining data containers in Web UI, refer to the **Data Containers in Web UI** topic in the **Web User Interfaces** documentation.

Add a data container instance

1. Click on the Data Containers tab to identify data container types that are valid for that particular object.

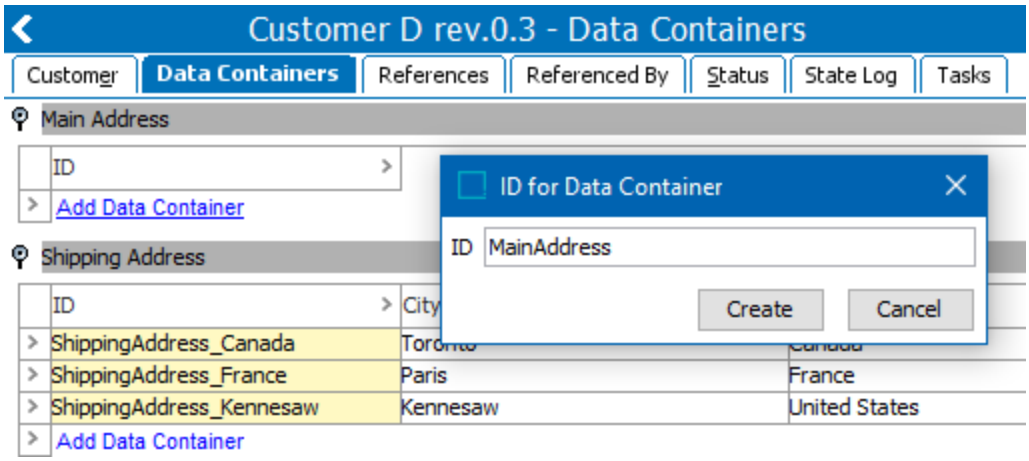


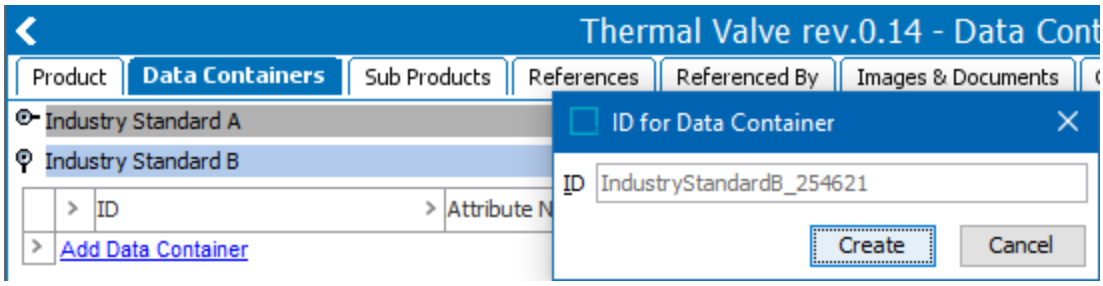


2. Click the **Add Data Container** link below the desired data container type, and supply an **ID** for a new data container instance, and click the **Create** button. If there is an auto-ID pattern set up, then no ID needs to be entered.

   Alternatively, click the **>** button at the beginning of a row to access the Add Data Container option.

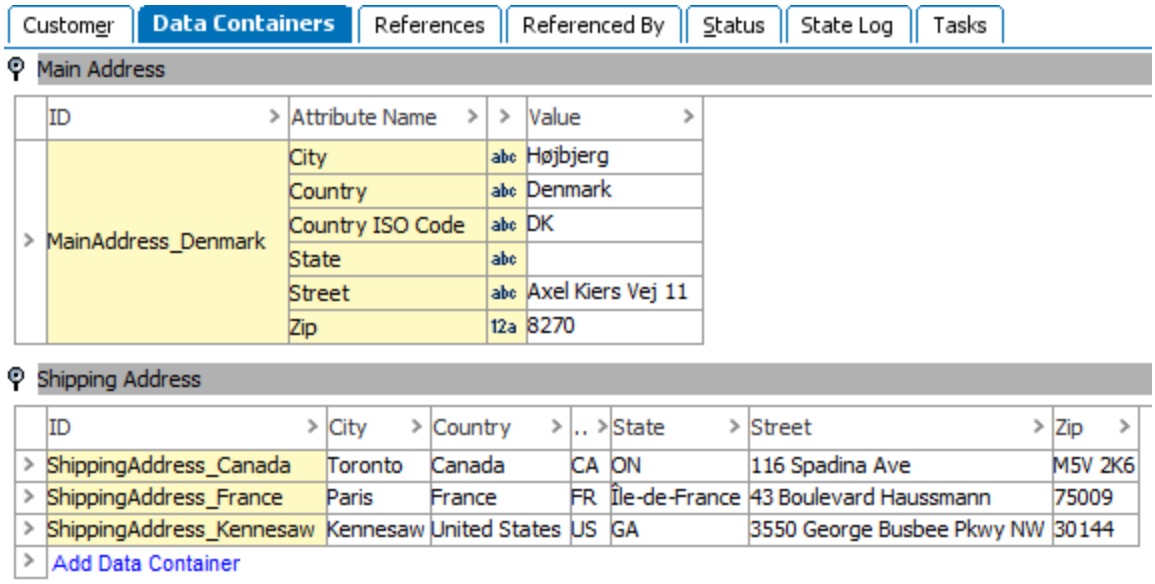
   In the example below, the 'Main Address' data container instance is created to hold values for each of the address attributes.

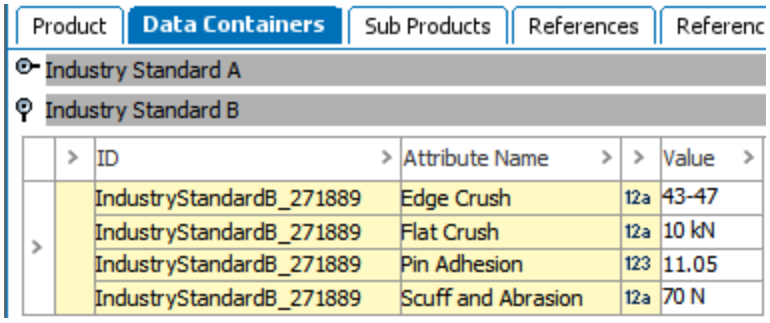




- If a data container type allows for multiple data containers as shown for 'Shipping Address' above, the Add Data Container link continues to display after the first data container is added.
- If multiple data containers are not allowed, as is the case with 'Main Address' and 'Industry Standard B' in the screenshots below, the link is removed after the first one is added.

3. Enter attribute values for each data container attribute.

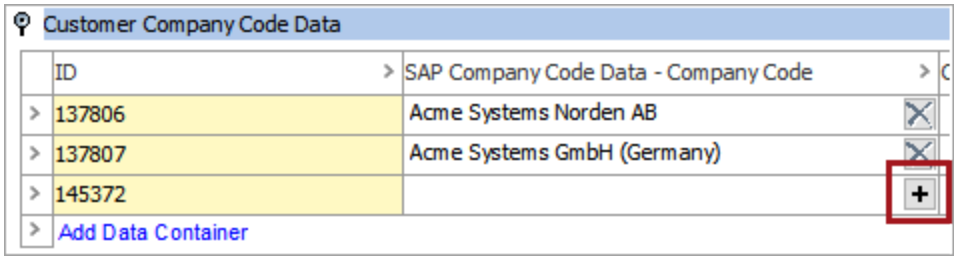




Edit a data container reference

References can also be maintained within the data container workbench tab.

1. To add a reference, navigate to the cell of the relevant reference type and click the + button.

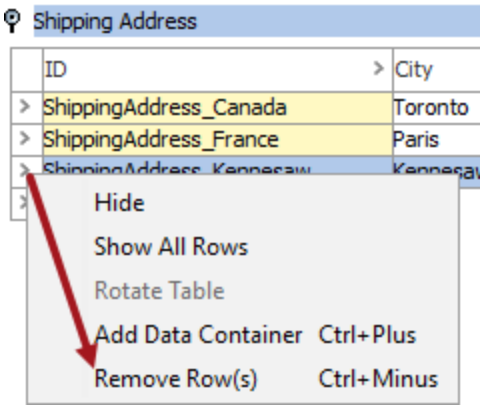


2. In the window that appears, browse or search for the desired object and click **Select**.

To delete a reference, click the ✕ button and confirm the deletion.

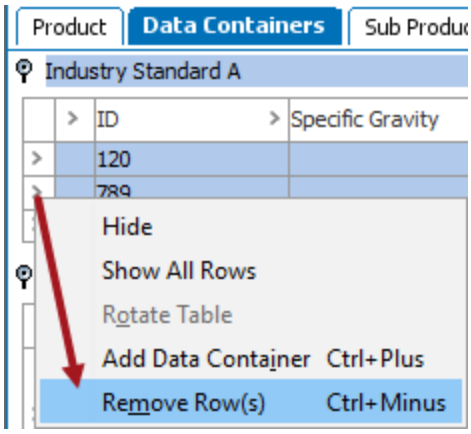
Delete a data container instance

1. Click the **>** button at the beginning of the data container row.
2. Select the **Remove Row(s)** option.



Delete multiple data container instances

1. Click the **>** button at the beginning of the data container row, press the Ctrl key on the keyboard, and continue to click the > button at the beginning of each row to be deleted.
2. Select the **Remove Row(s)** option.



Note: If a data container that was originally created using a manually input ID is deleted, that same ID will not be able to be used again for another data container. To avoid this issue, it is recommended that data containers are created using auto-generated IDs, or in the case where data containers need to be identified using specific details (e.g., a name or number that describes what the data container entails), using data container keys. For information regarding creating auto-generated IDs for data containers, refer to the **Setting Up Data Container Types in Workbench** topic. For information regarding data container keys, refer to the **Data Container Keys** topic.

Description Attributes

These attributes hold characteristics, typically used for internal or search purposes. The contents of description attributes are not normally intended for direct publishing.

Description attributes are directly related to a specific object type such as product, classification, image, document, publication, and are automatically displayed in the **Description** field. There is no value inheritance to the nodes below.

Description attributes can also be applied to references, such as product to product references and also in the link between a product node and an attribute node.

The following are description attribute examples:

- Name (name of the specific object)
- Keywords

Description attributes are typically made globally valid for specific object types.

A description attribute value is the actual content associated with a description attribute.

Description Attribute	Value
Loading date	05-jul-2008
Image quality	• High • Medium • Low

Metadata Attributes

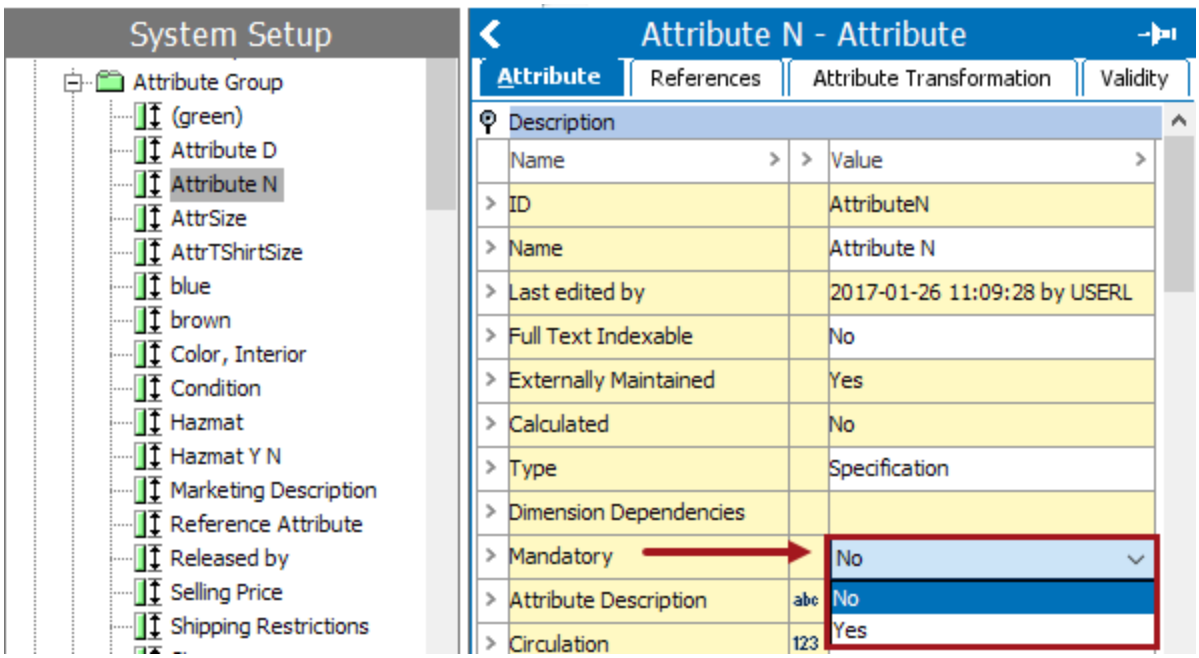
A metadata attribute is a description attribute that can be applied to the link between two objects. A link is, for example, a product to product reference or attribute(s) linked to the product(s). Metadata attributes hold information specific to a link between two nodes.

The following are metadata attribute examples:

- Display sequence, as applied to the link between a product node and an attribute node. It indicates a display sequence for the attributes relevant to the specified product folder or product.
- Mandatory, as applied to the link between a product node and an attribute node. It indicates that the product and all its sub products must have a value for the specified attribute.

  Yes: Must have a value for the specified attribute linked to the product

No: Not Mandatory, may have the value for the specific attribute linked to the product.

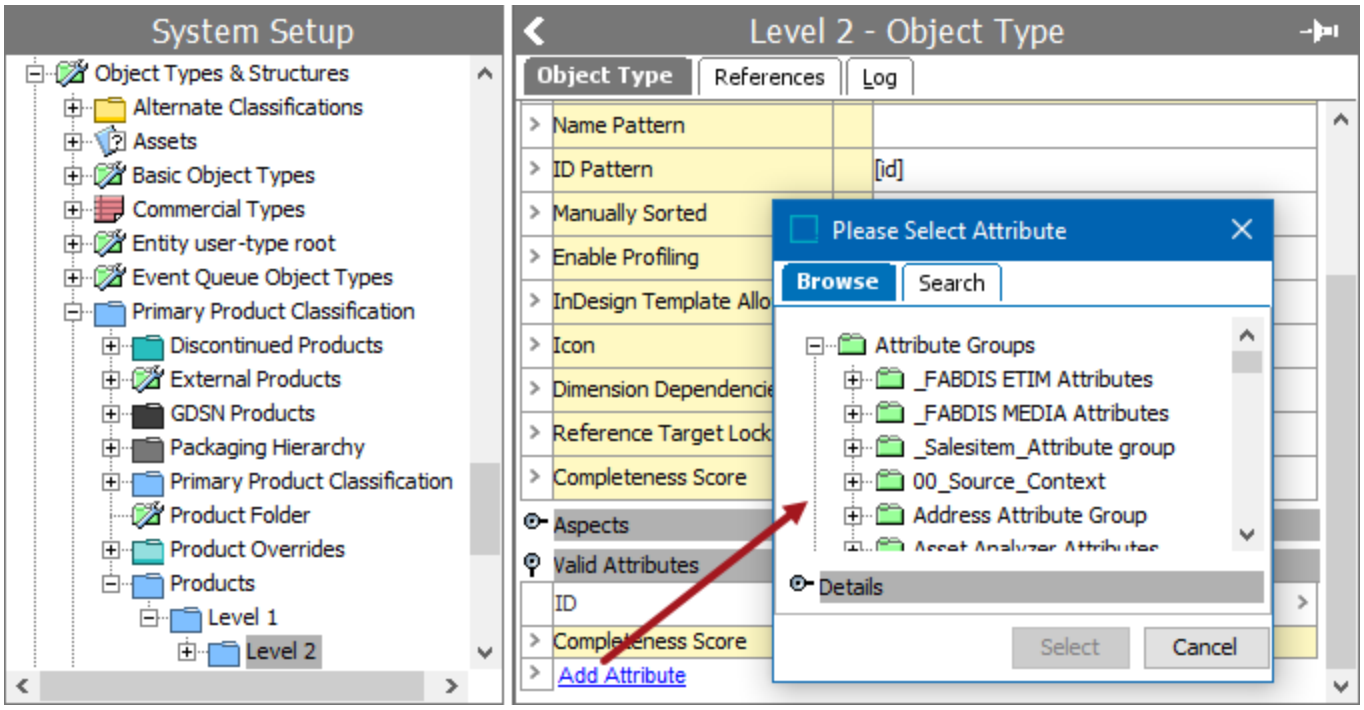


For more information about mandatory option, refer to the **Product Information Manager Default Settings** section of the **System Setup** documentation.

Linking Description Attributes to an Object Type

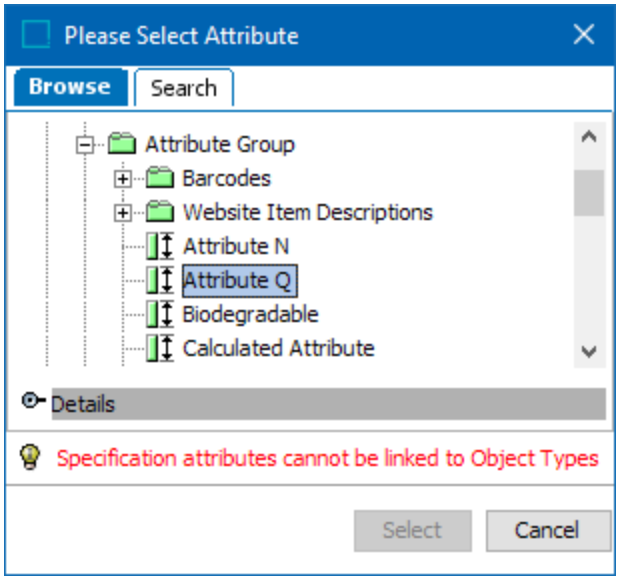
Once description attributes are created, they need to be linked to an object type, as follows.

1. In System Setup, open **Object Types & Structures** and select the relevant Object Type to display the **Object Type** Editor.
2. Open the **Valid attributes** flipper and click the **Add Attribute** link to display the **Select Attributes** dialog.

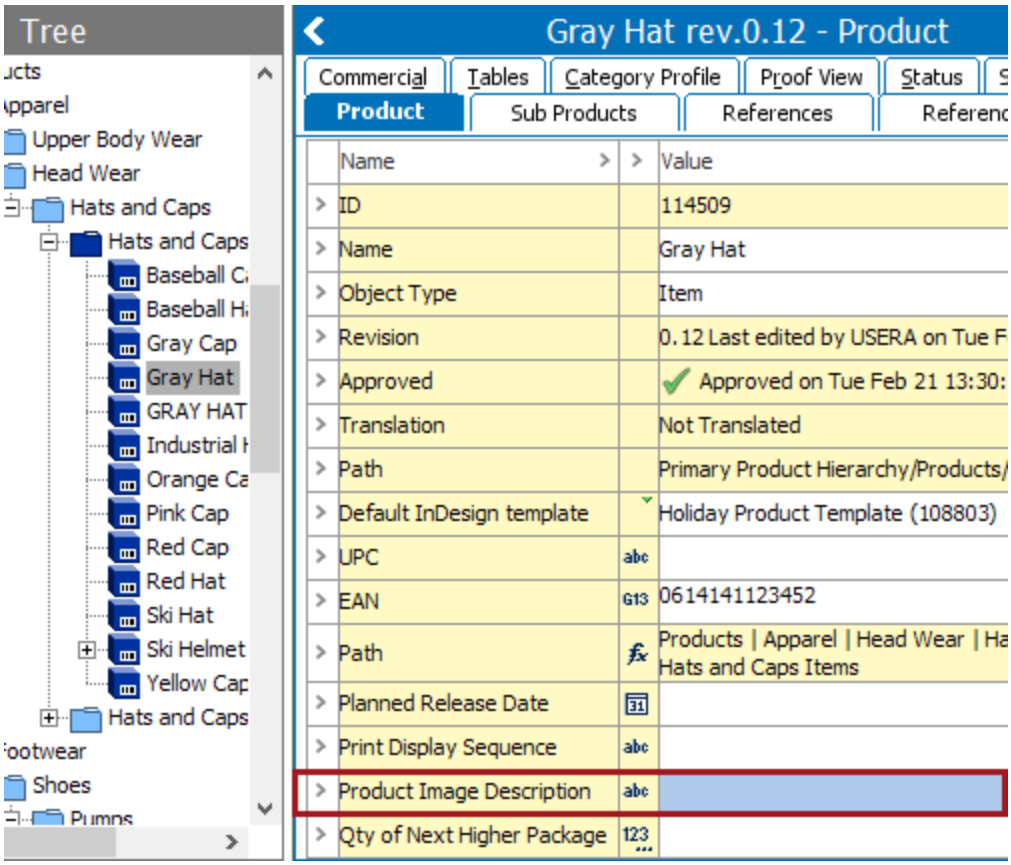


3. Search or browse to the relevant description attribute, select it and click the **Select** button.

> **Note:** The dialog shows both description and specification attributes. A message is displayed when a specification attribute is selected. The 'Select' option will be disabled for the specification attribute.



4. The description attribute displays as a field in the **Description** flipper in the appropriate editor for nodes of the selected Object Type.

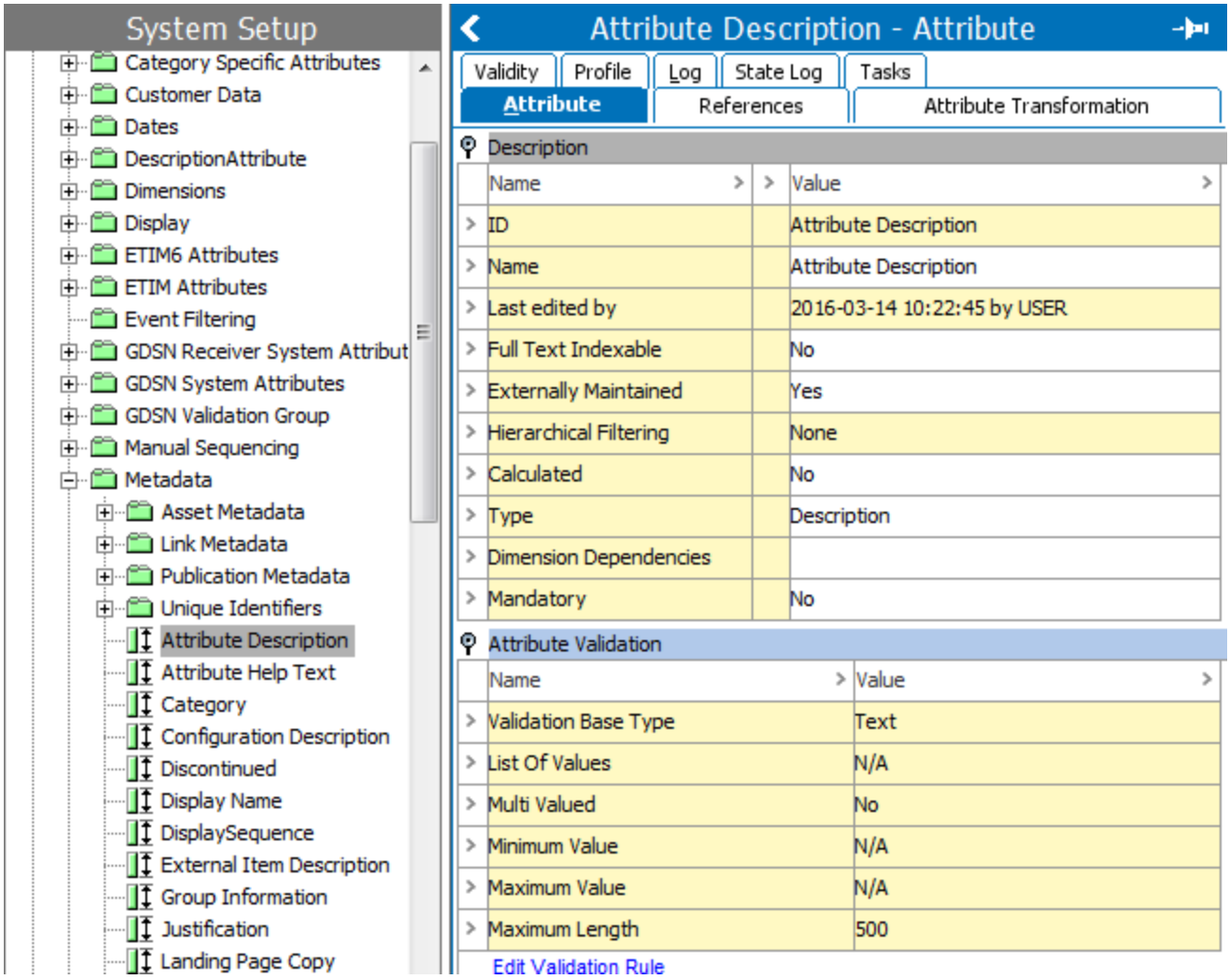

Tree
ucts
pparel
Upper Body Wear
Head Wear
Hats and Caps
Hats and Caps
Baseball C
Baseball H
Gray Cap
Gray Hat
GRAY HAT
Industrial H
Orange Ca
Pink Cap
Red Cap
Red Hat
Ski Hat
Ski Helmet
Yellow Cap
Hats and Caps
ootwear
Shoes
Pumps
Gray Hat rev.0.12 - Product
Commercial
Tables
Category Profile
Proof View
Status
Product
Sub Products
References
Name
Value
ID
114509
Name
Gray Hat
Object Type
Item
Revision
0.12 Last edited by USERA on Tue F
Approved
Approved on Tue Feb 21 13:30:
Translation
Not Translated
Path
Primary Product Hierarchy/Products/
Default InDesign template
Holiday Product Template (108803)
UPC
EAN
0614141123452
Path
Products | Apparel | Head Wear | Ha
Hats and Caps Items
Planned Release Date
Print Display Sequence
Product Image Description
Qty of Next Higher Package

Attribute Metadata on Attributes

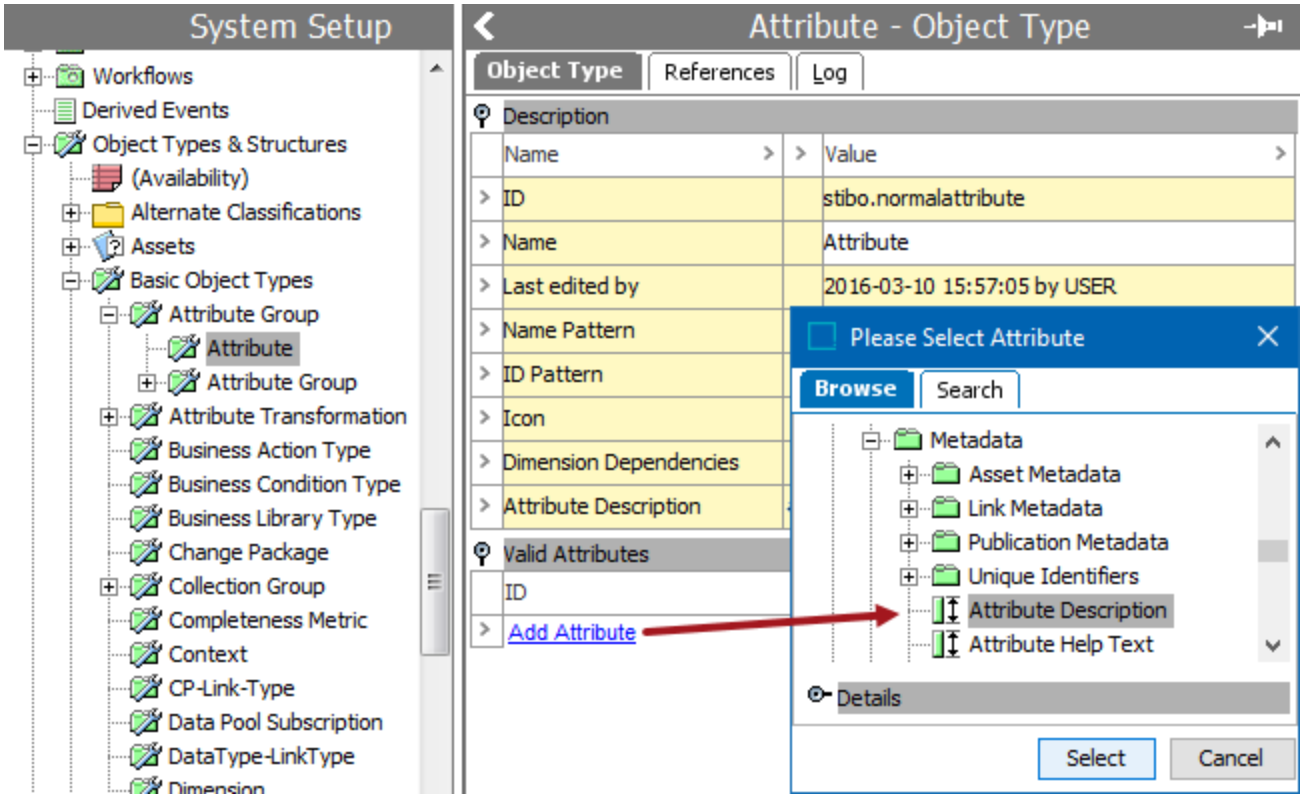
There are occasions when it will be necessary to add a metadata (description) attribute to an attribute. For instance, you might need an attribute to describe what an attribute is used for, or to provide information about an attribute in the help text that appears in the Web UI. Creating and maintaining metadata attributes on attributes is similar to any other metadata attribute in every way *except* in defining the validity of the attribute. Follow these steps to make an attribute valid for another attribute.

Create a Metadata Attribute on an Attribute

1. Create the metadata (description) attribute following the same procedure as you would to create any description attribute. Refer to **Creating Attributes** in the **System Setup** documentation for more information.

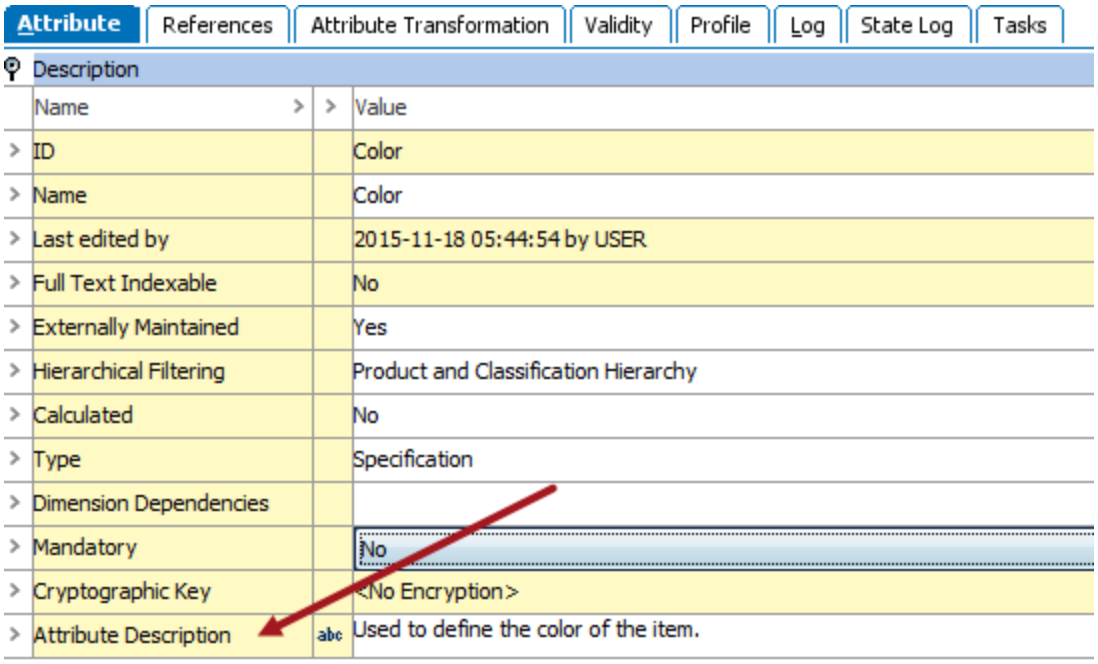


2. After creating the metadata attribute, the attribute must be made valid for the **attribute** object type. Navigate to the attribute object type under System Setup > Object Types & Structures > Basic Object Types > Attribute Group. Select the attribute object type, then click **Add Attribute** to display a dialog.
3. In the dialog, browse to or search for the description attribute that was just created, then click **Select**.



Note: The dialog shows both description and specification attributes. A message is displayed when a specification attribute is selected. Select option will be disabled for the specification attribute.

4. The metadata attribute is now ready for use. Open the attribute editor for the attribute that requires help text, and add the text there.

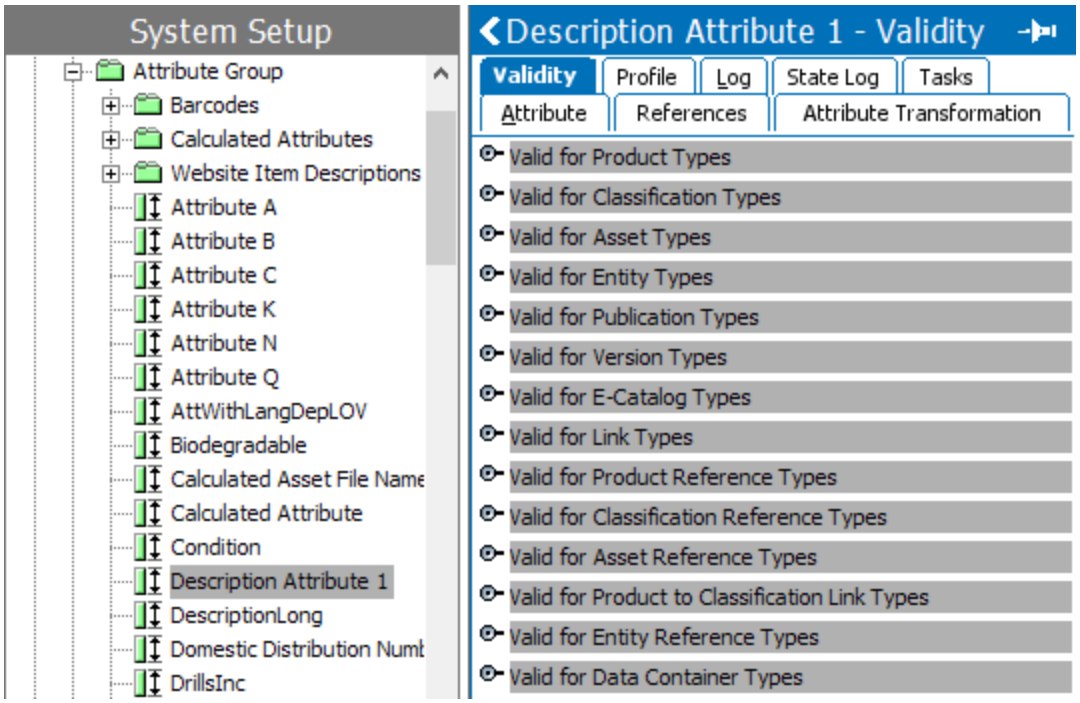


For more information on implementing global help text for attributes, refer to the **Attribute Help Text for Web UI** topic.

Description Attributes and Object Types

Description Attributes can be linked to all Object Types. A Description Attribute that is linked to an Object Type will display automatically in the appropriate editor for all Objects of this Object Type.

Note: Description Attributes can also be linked to Product, Classification and Asset Object Types in the Attribute Editor, under the Validity tab.



Some of the Object Types and linked Attributes are:

Object Type	Attribute
Product Object Types	The Attribute will display automatically for all objects of the specified set of Product Object Types. By selecting the 'All' option the Attribute will be valid for all Product Object Types. It is also possible to select specific Product Object types in the list.
Classification Object Types	The Attribute will display automatically for all Objects of the specified set of Classification Object Types by selecting the 'All' option. It is also possible to select specific Product Object types in the list.

Object Type	Attribute
Asset Object Types	The Attribute will display automatically for all Objects of the specified set of Asset Object Types (Images & Documents) by selecting the 'All' option. It is also possible to select specific Product Object types in the list.

For a description of all Object Types, refer to the **Basic Object types** section and **Object Types** topic in the **System Setup** documentation.

For more information on how to link description attributes to object types, refer to the **Description Attributes** topic in the **System Setup** documentation.

Validity on Description Attributes

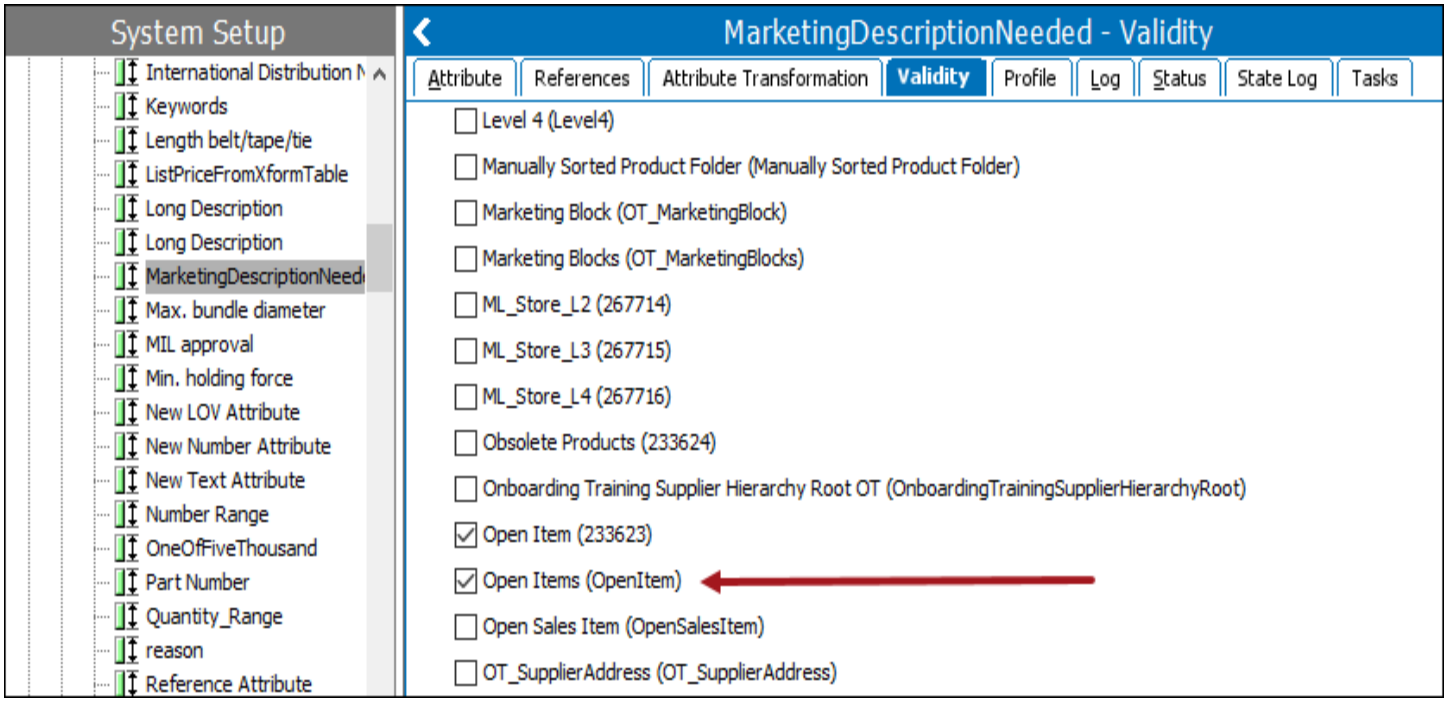
Setting validity for a description attribute identifies when it will display for the selected object types, as defined in the following table.

Object Type	Description
Product	The attribute will be valid for the selected product object types and will display in the Description flipper. **Note:** By default, the attribute is set to be valid for all product object types.
Classification	The attribute will be valid for the selected classification object types and will display in the Description flipper.
Asset	The attribute will be valid for the selected asset object types (Images & Documents) and will display in the Description flipper.
Entity	The attribute will be valid for the selected entity object types and will display in the Description flipper.
Publication	The attribute will be valid for the selected publication object types and will display in the Description flipper.
Attribute Link Types	The attribute will be valid for attribute link types and will display in the Product Attribute Link Type or the Classification Attribute Link Type in the 'Attributes' flipper.
Reference Types	The attribute will be valid for the selected link types and will display in the reference editors in product, classification, and/or asset editors.
Version Types / E-catalog types	The attribute will be valid for the publication version objects / e-catalog objects based on the selection.

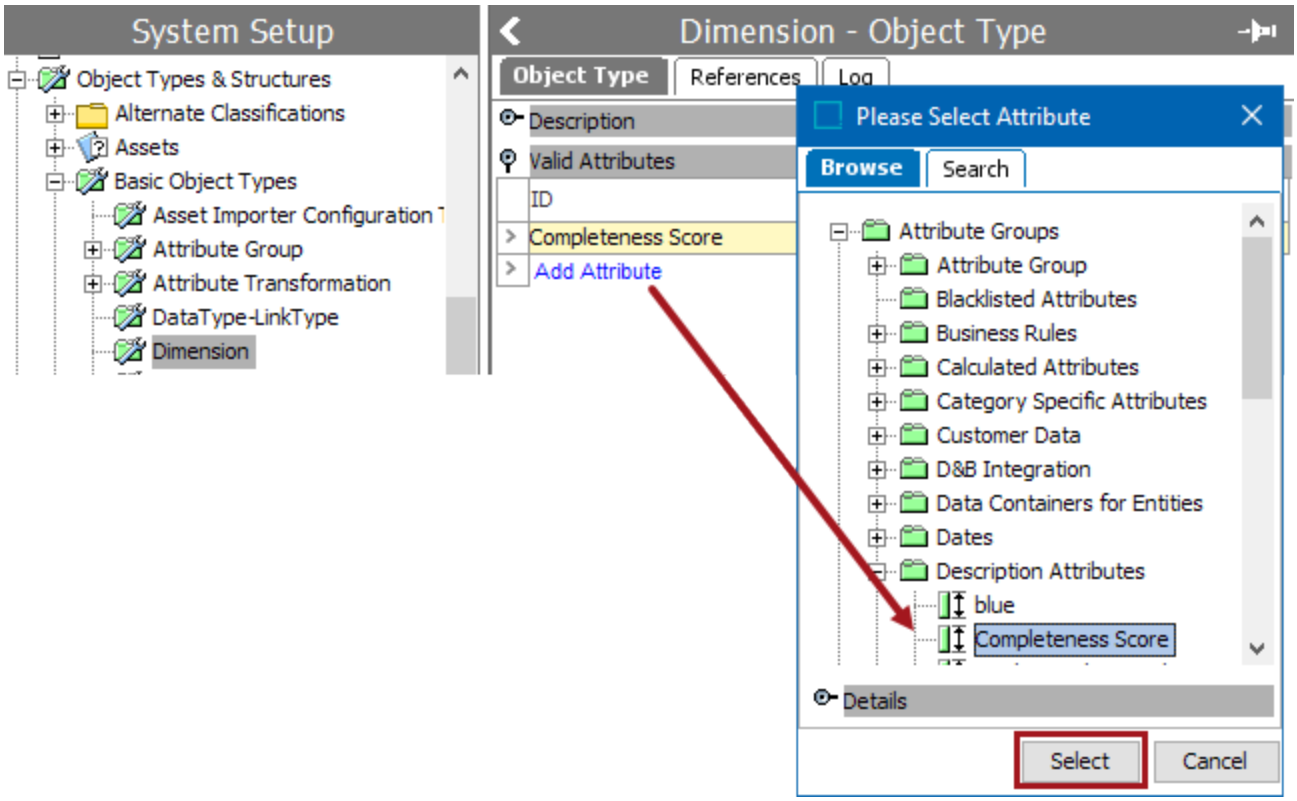
Note: The STEPXML format identifies selected Validity object types within the UserTypeLink tag using the UserTypeID element.

To set validity on description attributes:

1. In System Setup, expand **Attribute Groups**, expand the relevant group, and then select the relevant description attribute. The **Attribute** editor displays.
2. Click the **Validity** tab. The available object types display.



3. Use the checkboxes to select the object type(s) for which the attribute should be valid.
   - Selecting a product, classification, entity, or asset object type displays the attribute in the **Description** flipper of all selected object types.
   - Selecting a link type displays the attribute on product, classification, and/or asset references.
   - Selecting a product / classification attribute link type makes the attribute visible on the Linked Attributes flippers of product / classification Reference tabs or on the attribute object's Reference tab. For more on how to link description attributes to reference types and links, refer to the **Metadata Attributes on Reference and Link Types** documentation.
4. If needed, add the description attribute on any object type (attribute, attribute groups, users, user groups, etc.).
   - In System Setup open the Object Type and Structures node.
   - Select the desired object type and click the **Add Attribute** link to add the desired description attribute.



For more on description attributes and how to link them, refer to the **Description Attributes** topic in the **System Setup** documentation.

Dimension Dependent Attributes

When attribute values need to be dimension dependent—typically for translation purposes—they are made dimension dependent on a one-by-one basis on the attributes themselves.

Note: Dimension dependency can be applied to the attribute object type—and not just to individual attributes—if you need the attribute names translated. This is a global setting, which means that **all** attribute names should be translated. For more on this refer to the **Maintaining Dimension Dependent Object Types** topic in the System Setup documentation. Additionally refer to the **Dimension Dependent Attribute and Attribute Group Recommended Practices** topic for more information on how to work with dimension-dependent attribute object types.

For Oracle databases, this action requires single-update mode (SUM), as defined in the Single-Update Mode topic.For Cassandra databases, this action uses Lock-free Schema Change (LFSC) functionality, as defined in the Lock-free Schema Change topic.

Dimension Dependent Attribute Values

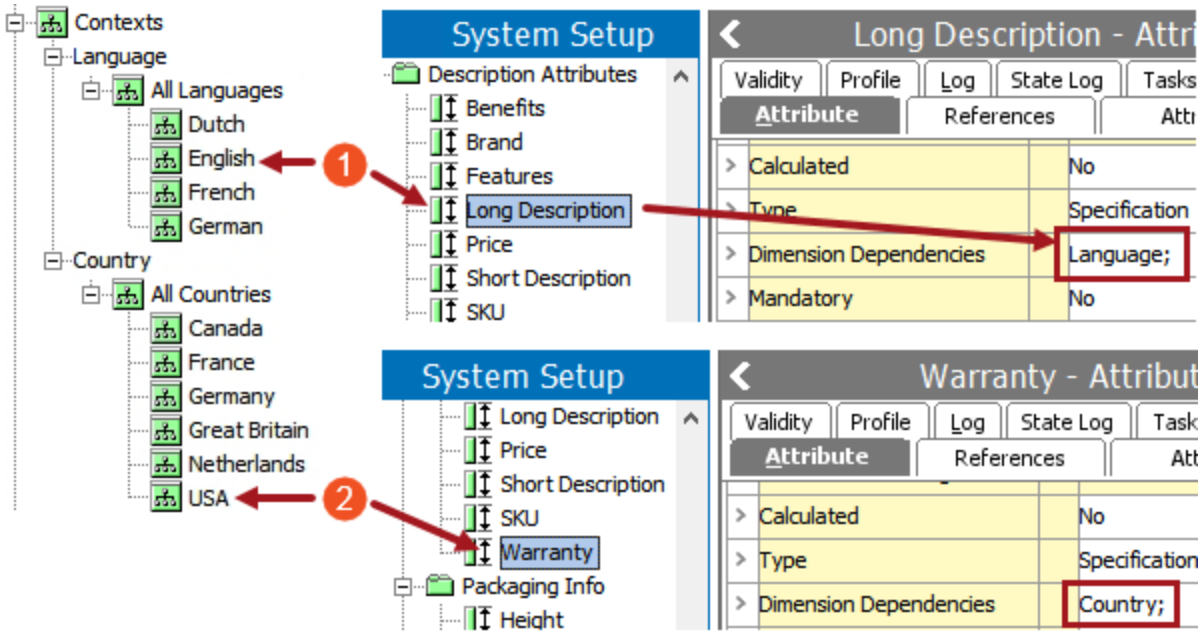
An example of an attribute where the values are dimension dependent on language could be 'Primary Color.' The following also applies to values contained in STEP **names** of objects.

- For **English**, the values would be 'Red', 'Blue', and 'Yellow'
- For **Spanish**, the values would be 'Rojo', 'Azul', and 'Amarillo'
- For **French**, the values would be 'Rouge', 'Bleu', and 'Jaune'

The below screenshot shows two more examples of dimension-dependent attributes, one dependent on a language dimension and one dependent on a country dimension.

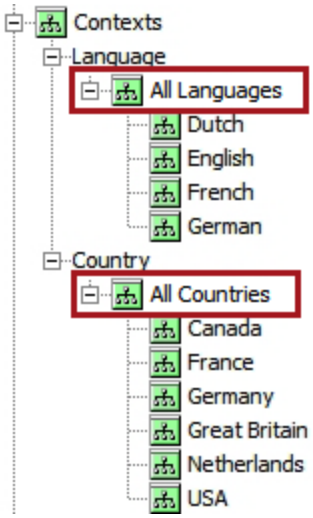
1. The attribute 'Long Description' is dimension dependent on **Language**, meaning that its content may differ based on what language dimension point is used in the context. The typical usage of dimension-dependent data is when content is translated, allowing an attribute to have different values for different languages. For more information on the translation functionality of STEP, refer to the **Translations** documentation.
2. By contrast, the 'Warranty' attribute is dimension dependent on **Country**, meaning that its content may differ based on what country dimension point is used in the context, since a product's warranty period may depend on the country in which it is sold.

A **context** that uses the language dimension point of **English** and the country **dimension point** of **USA** would contain an **English**-language long description and **USA**-specific warranty content. Additionally, Warranty could be made *both* country and language dependent to ensure that the warranty text is always in English.



Non-Dimension Dependent Attribute Values

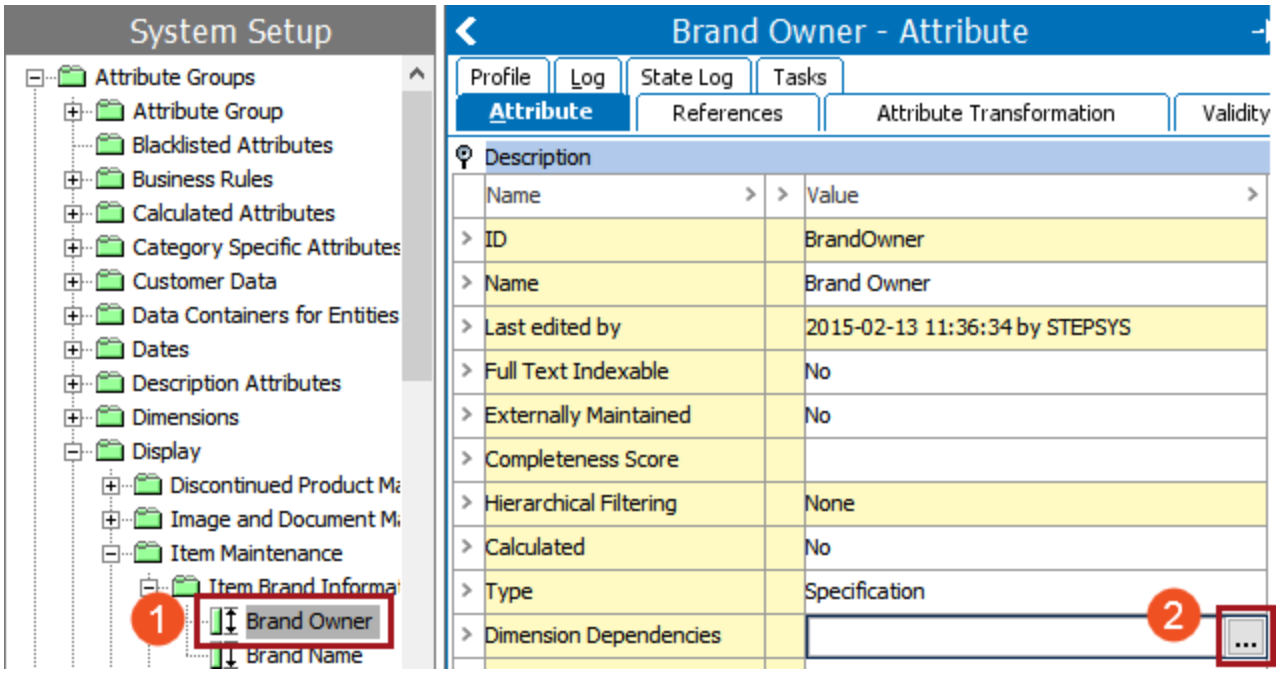
No dimension dependency means that data is stored in the **All** level (also known as the **Root** level) of all dimensions. The following also applies to values contained in STEP **names** of objects.



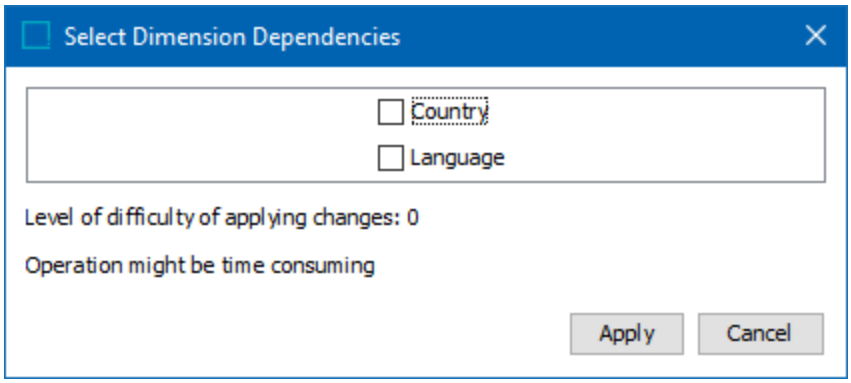
Note: If you have information that will never vary by language or country, you should **never** assign a dimension dependency on it. When you **do** have information that truly will be different by language or country, assign the dimension dependency right away. If you later apply a dimension dependency to an attribute, new data will be stored in the dimension point that you specified and existing data will remain at the 'All' level and should be moved. This can be very difficult to correct later on. For more information on this problem and how to correct it, refer to the **Adding a Dimension Dependency After Loading Data** topic.

Setting Dimension Dependency on Attributes

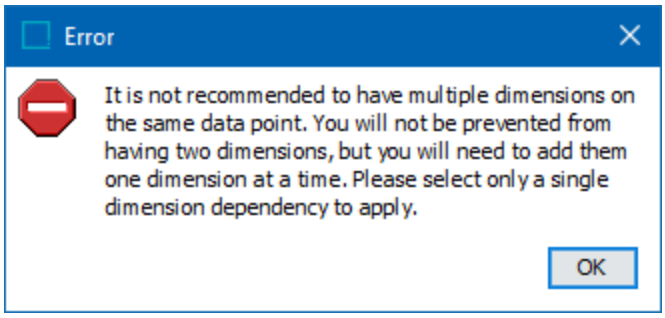
1. In System Setup, navigate to the relevant attribute under Attribute Groups.
2. On the **Attribute** tab, double-click in the **Dimension Dependencies** field, then click the ellipsis button (...).



3. A **Select Dimension Dependencies** dialog box displays showing the configured dimensions accompanied with checkboxes.

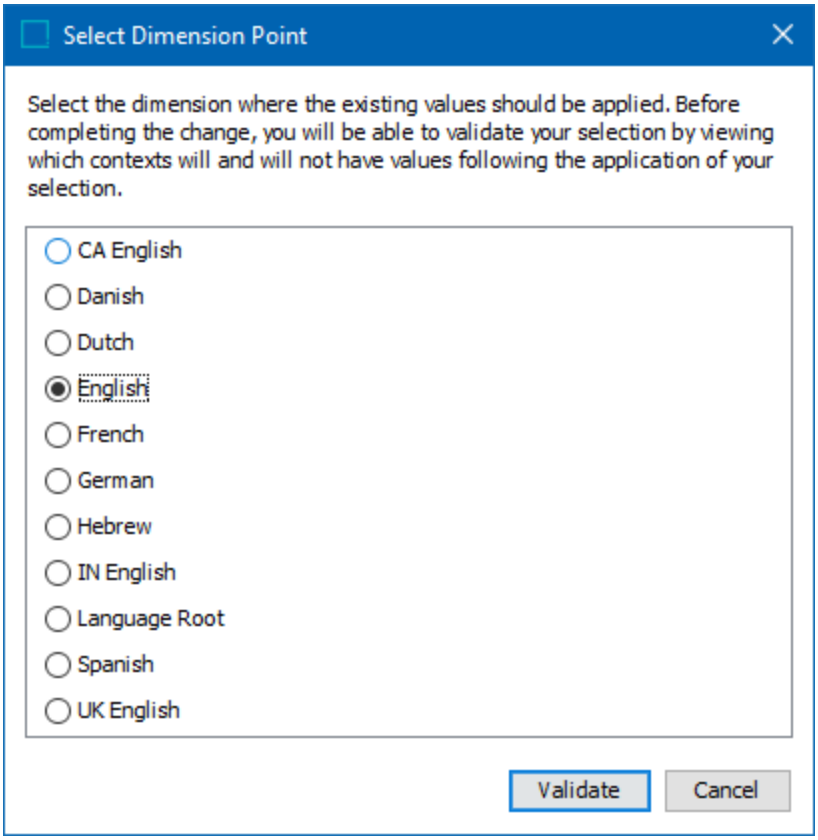


Only one dimension dependency can be selected in a single action, with only two dimension dependencies applied in total. If a user attempts to check two dimensions at once, an error will display:



4. Check the desired box for the relevant dimension(s), then click **Apply** to set the dimension dependency.
5. When adding a dimension dependency to an attribute or LOV, a dialog box will display that enables the user to select the one target dimension to which the existing attribute's or LOV's data should be applied.

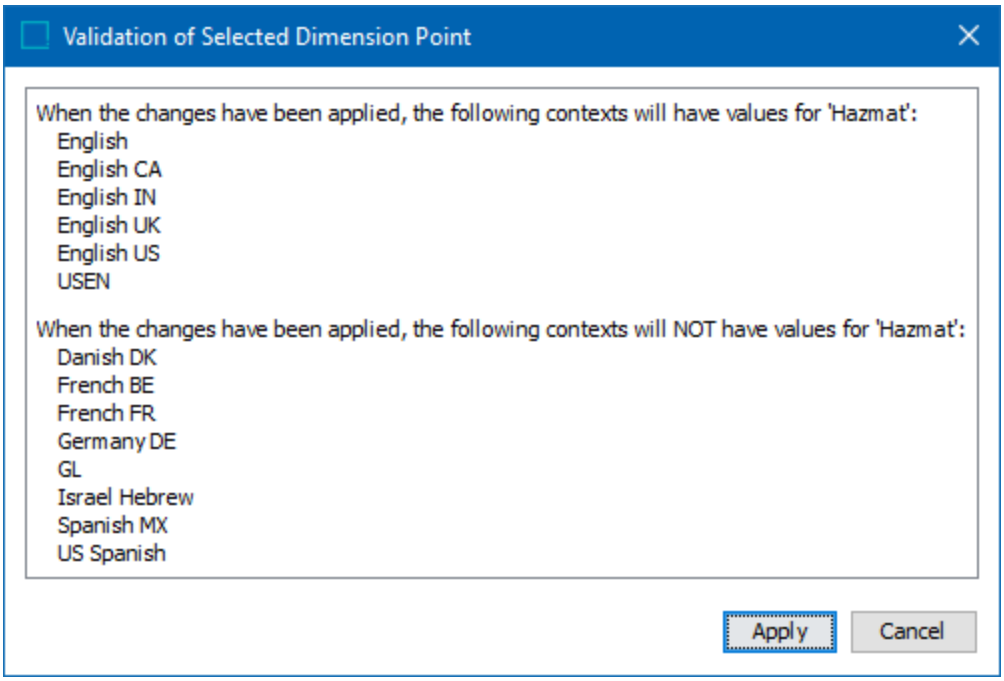
   When a language dimension dependency is being applied, a 'Select Dimension Point' window will display showing all configured dimension points specific to the selected dimension.



Note: Recommended practice for the majority of use cases is not to select the 'All' or 'Global' dimension point (or, as shown in the screenshot above, 'Language Root'). The reason for this is that when the global

dimension point is selected, the attribute or LOV data is stored on the global dimension point. However, he user might expect that by selecting the global dimension point, the data is being stored on all listed dimension point, which is not necessarily the case.

Once the desired dimension point is selected, the 'Validate' button will become active. Once clicked, a 'Validation of Selected Dimension Point' popup will display:

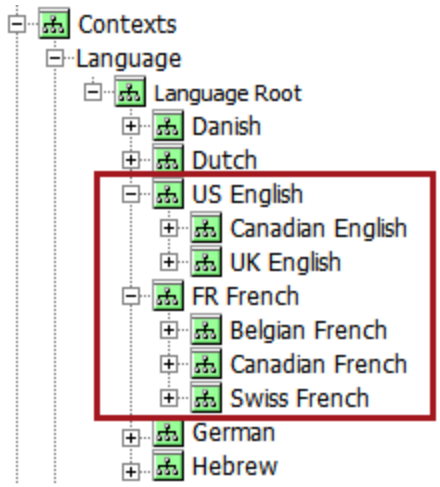


As is made clear by the above screenshot, this validation pop-up lists first which dimension points the data will be applied to, and then lists the dimension points to which no data will be applied. If additional contexts need values, those values can be applied via export from the context that contains the values and then imported into the contexts to which the values should also be applied.

Value Inheritance in Dimension Dependent Attributes

There sometimes may be a need for parent / child relationships between dimensions if you need to maintain many versions of an 'almost the same' language, as pictured in the below screenshot.

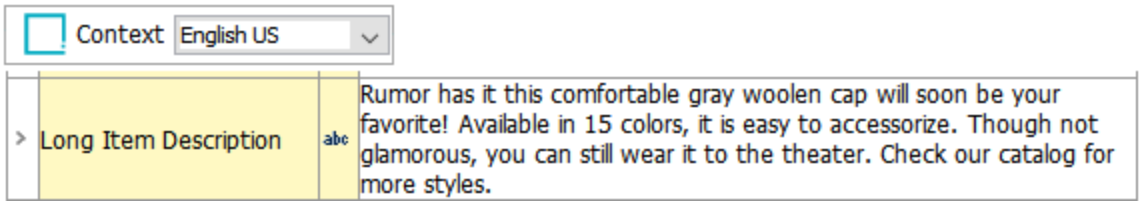
Note: This is not recommended. In most circumstances, dimension points should be created at the same level. For more information on recommended practices with regard to dimensions, refer to the **Dimension and Dimension Points Recommended Practices** topic.



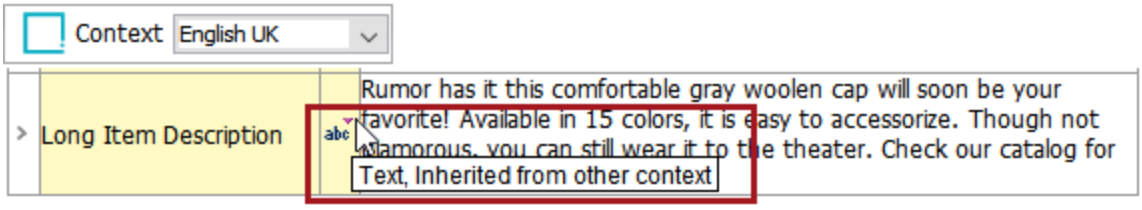
There may be valid use cases to maintain several versions of the same language, for example, US English, Canadian English, and UK English. Since maintaining translations requires effort and carries a cost, it may be of benefit to maintain a base version of English and then only translate a small percentage of the content for Canadian English and UK English. In these cases, there must be a clear owner of the parent language.

The most simple explanation of inheritance of values from dimension points can be explained using the example of a **US English** parent language dimension and a **UK English** child language dimension. Inheritance within dimension points behaves exactly like inheritance in other nodes in STEP, such as the inheritance of attribute values from parent to child product objects.

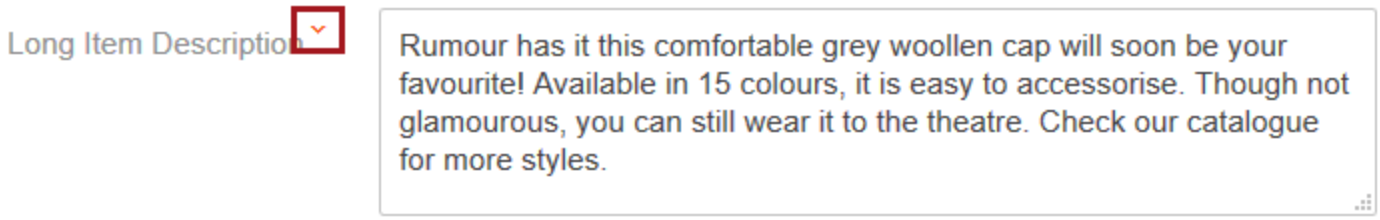
For example, the value of Long Item Description in the parent **US English** language dimension (which is used by the English US context) looks as follows:



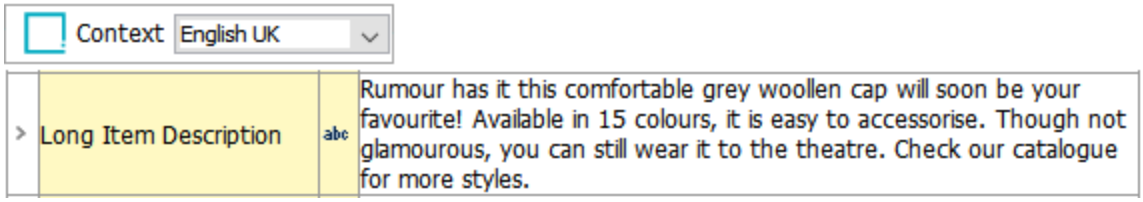
Before translation, the content will inherit to the child context of **UK English** as-is. Inheritance of the value is indicated by a purple triangle. When the triangle is hovered over, the help text 'Text, inherited from other context' displays.



It is worth noting that, in the Web UI, the indicator of an attribute with a value inherited from another context is a downward-pointing red arrow.



After translation, the content for UK English appears as follows. The purple triangle is gone, as the value is no longer inherited but has been overwritten by the inherited content. If the UK English content is deleted, the US English content will reappear.



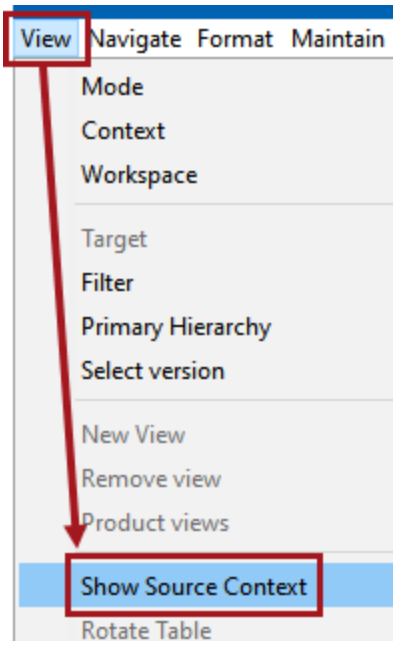
This can save on translation costs because, instead of sending US English content to a translation company to convert it to UK English, the US English content could be exported from STEP, a user could run a find and replace operation on the content to replace a certain subset of words within the content (such as changing 'color' to 'colour'), then the newly 'translated' content can be re-imported into the UK English context to overwrite the US English content.

Showing Source Context (Parent Dimensions)

For an inherited attribute value, you can check to determine what parent dimension it is inherited from by using the **Show Source Context** feature. This is useful for translation purposes to confirm what language owns the content.

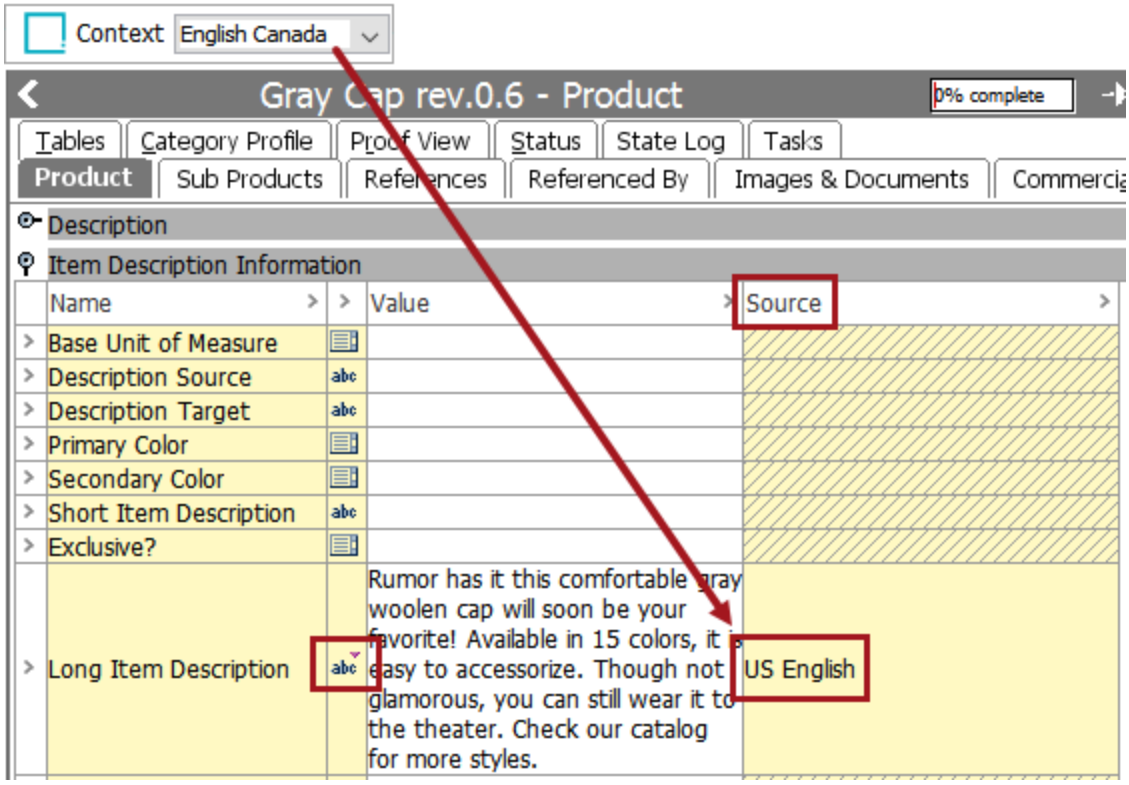
Continuing from the example used in the previous section of this topic, the following steps illustrate the content of the Long Item Description attribute as viewed from the English Canada context and from within the English UK context.

1. With your product object selected in the STEP Workbench **Tree**, click on the Product tab.
2. Choose the relevant context from the **Context** dropdown list in the upper left corner of the GUI.
3. Navigate to View > **Show Source Context**.

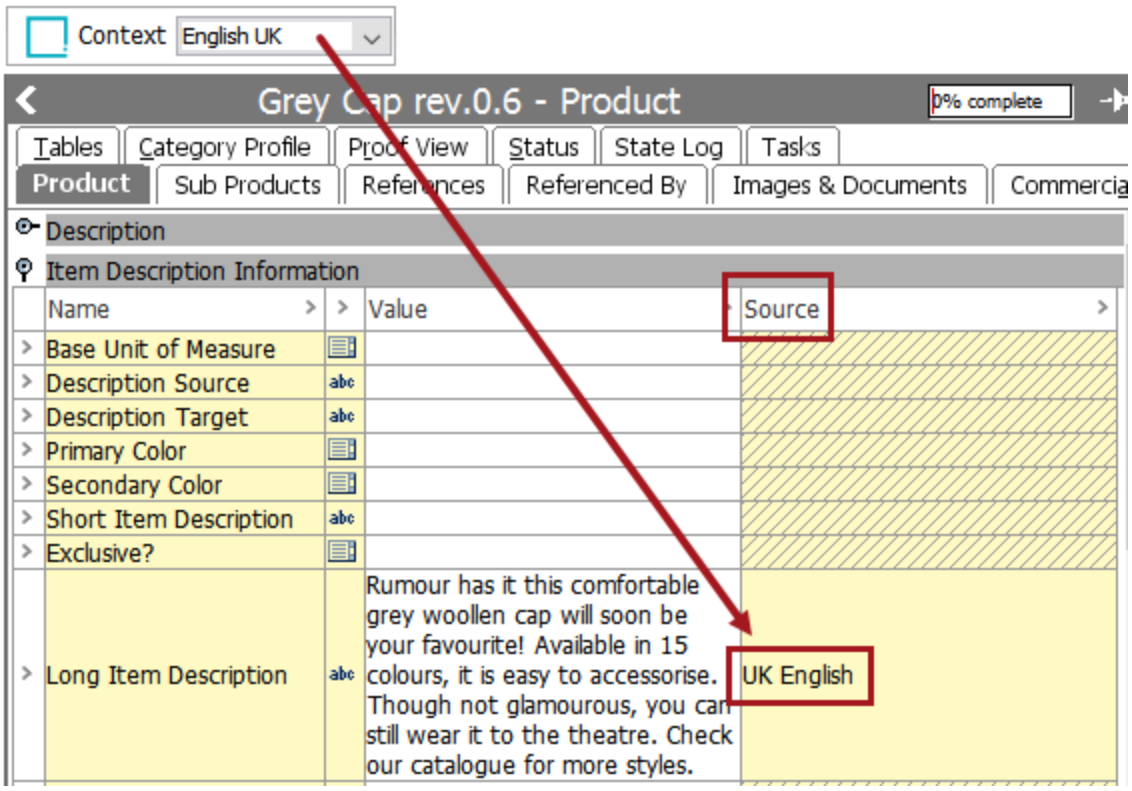


4. A **Source** column displays to the right of the Value column that indicates the source dimension point of the values.

   In this example, the content that exists in the English Canada context is inherited from the US English language dimension point.



In the next example, the content that exists in the English UK context is not inherited from the US English language dimension point, since it has been placed directly into the UK English language dimension point and has overwritten the content that would have been inherited from the US English language dimension point.



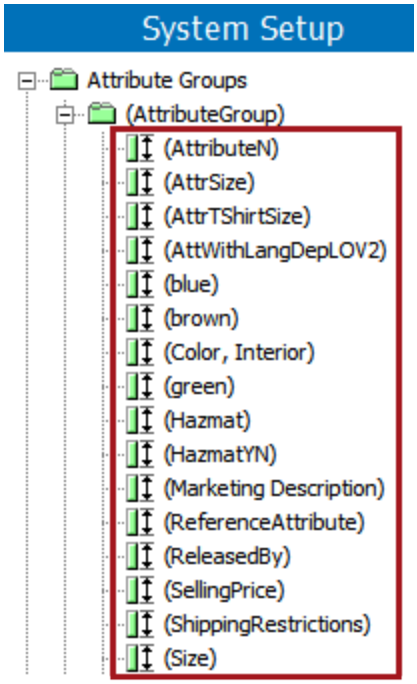
Dimension Dependent Attribute and Attribute Group Recommended Practices

When setting dimension dependency on attributes and attribute groups, there are some considerations. This topic explains several recommendations and warnings when working with dimension dependent attributes and attribute groups.

Dimension Dependent Attribute Recommendations

1. Be consistent about the context in which you create the attributes.

   The names of the attribute will not be visible in other contexts until they are translated and will instead display the attribute ID in parentheses, as pictured below.



2. Carefully consider dimension points when defining attributes.

   Even if you are only publishing in one language or country today, it is much easier to remove a dimension dependency from an attribute than it is to add one later.

   Dimension points should be applied to attributes such as description attributes, feature attributes, and benefit attributes, which truly contain data that could become dimension-dependent in the future. This may seem like an extra task in the beginning, but if business conditions change, it is much easier to remove dimension dependencies from attributes than it is to add a dimension dependency to attributes that already have values.

Note: Remember that if an attribute does not have a dimension dependency assigned, all data values are stored in the 'All' level.

For the step-by-step process for moving data from an top level to a language level, refer to the **Adding a Dimension Dependency After Loading Data** topic.

Dimension Dependent Attribute Warnings

1. Do not create attributes with multiple dimension dependencies.

   Only *language* is supported in translation tracking—no other tools exist in STEP to identify changes in other dimensions. For more information on the translation functionality of STEP, refer to the **Translations** documentation.

2. Do not make attribute links to categories dimension dependent.

   Dimension-dependent attribute links can be handy but be aware that they are also hard to maintain. If for instance, if you want to create / modify these attribute links via STEPXML imports and some links should be visible in more than one context, you are forced to create a 'cross-context' import file with qualifiers, as you cannot make the links visible in one context at a time.

Attributes That Need Dimension Dependencies

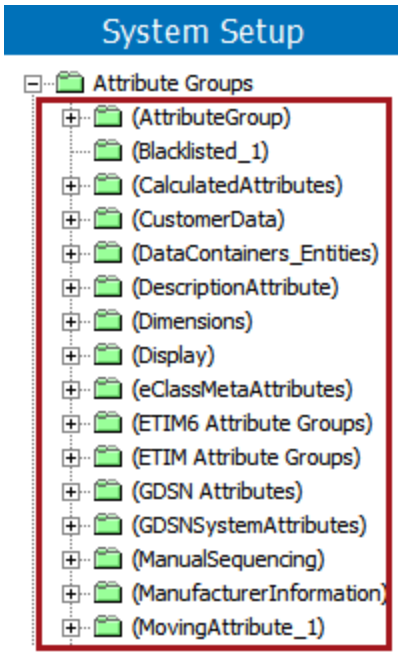
Questions to ask	Recommendation
Would the data be presented differently if it were published in another language (for example, long descriptions or feature bullets)?	If so, make the attribute language dependent, even if you only have one language today.
Would the data appear exactly the same if it were published in another language (for example, Y/N, T/F, and numeric values)?	If so, do not add a dependency
Would the data be presented differently if the product were sold in another country (for example, warranty)?	If so, make the attribute country dependent. If not, do not add a dependency.
If the attribute is owned by another system, does that system have the ability to store multiple language or country-dependent values?	If not, do not add dependencies.

Dimension Dependent Attribute Group Recommendations

Attribute **groups** should have a dimension dependency if you would like to display the attribute group **names** in their own language.

Note: Making attribute groups dimension dependent is a **global** setting and does not affect attributes within the group.

1. If you add a language dependency to attribute groups, be consistent about which context you are in when you create the groups. The names of the groups will not be visible in other contexts until they are translated.



2. Come up with a standard process for translating attribute groups and attributes. Always start in the same language and have a consistent process.

Dimension Dependent Attribute Group Warnings

1. Do not make attribute groups dependent on anything other than language.
2. If there is no requirement to add a dimension dependency, do not add one.

Using Dimension Dependent LOVs With Attributes

Lists of Values (LOVs) can be set up to be dimension dependent, just as attributes. The most common scenario when using dimension-dependent LOVs is to use them along with *non*–dimension-dependent attributes, though other combinations are also applicable.

This topic explains four combinations of dimension dependency between attributes and LOVs, recommended practices in their setup, and use cases:

1. Attribute with no dimension dependency used with a dimension-dependent LOV
2. Attribute with no dimension dependency used with an LOV without a dependency
3. Attribute with a dimension dependency used with a dimension-dependent LOV
4. Attribute with a dimension dependency used with an LOV without a dependency

This topic does not explain how to create an LOV or how to make an LOV or attribute dimension dependent. For more information, refer to the **Creating an LOV** topic and the **Dimension Dependent Attributes** topic.

Note: It is important to set up dimension-dependent LOVs from the start to avoid issues that could arise from setting a dimension dependency later after values have already been added to the attributes that use them. For more information, refer to the **Adding a Dimension Dependency After Loading Data** topic in the **Dimensions, Dimension Points, and Contexts** documentation.

To illustrate the differences between the setups, the screenshots in this topic show attribute values viewed in the **Context** mode in the STEP Workbench

Attribute With No Dependency, LOV With a Dependency

The most typical scenario when using a dimension-dependent LOV is to use it along with an attribute that is **not** dimension dependent. This is used for descriptive information that is true for every language, where the value needs to appear in the local language.

This is a cost-saving benefit of 'pre-translation' when new products use the LOV. Customers who use a lot of LOVs for this purpose can save a lot of money.

		English US	Danish DK	French FR
>	ID	109011	109011	109011
>	Name	109011	20803-03	109011
>	Attribute not language dependent, LOV is	Red	Rød	Rouge

When using an attribute without a dimension dependency and an LOV that has a language dependency, a user working in English can choose the color 'Red' for a new product. If the LOV has already been translated, the French value 'Rouge' will automatically show up, so there is no reason to retranslate this text. Every time Red is chosen, the translation is already in place.

Attribute With No Dependency, LOV Without a Dependency

Another commonly used setup is when neither the attribute nor the LOV it is using are dimension dependent. The value of the LOV is the same in every context

	English US	Danish DK	French FR
ID	109011	109011	109011
Name	109011	20803-03	109011
Attribute not language dependent, LOV is not	Y	Y	Y

The typical use case for this scenario is for numbers or dates or even text that should never change, no matter which language or country is consuming the information. Many values like Y/N flags, availability dates, product weights, dimensions, and measures would not have any dimension dependencies.

Attribute With a Dependency, LOV With a Dependency

This setup is *not* commonly used because values in all dimension points are independent of each other due to there being separate values in each dropdown list. In this example, the value is completely different in English US, Danish DK, and French FR. 'Red' appears in English US, but the Danish word for 'Blue' and the French word for 'Black' appear in the Danish DK and French FR contexts.

	English US	Danish DK	French FR
ID	109011	109011	109011
Name	109011	109011	109011
Attribute language dependent and LOV is too	Red	Blå	Noir

If an English US user chooses 'Red,' a value will not display in the French FR context until a French FR user chooses something from the dropdown, whereas if the attribute does *not* have a dimension dependency and the LOV *does* (per the first example in this topic), if a user chooses 'Red' for English US, then 'Rød' and 'Rouge' will automatically populate in the Danish DK and French FR contexts.

Attribute With a Dependency, LOV Without a Dependency

It is a rare setup to use an attribute with a dimension dependency along with an LOV that does *not* have a dimension dependency because the values can be different in every dimension. In this scenario, everyone uses the same dropdown list—English US values mixed in with Danish DK and French FR values.

	English US	Danish DK	French FR
ID	109011	109011	109011
Name	109011	109011	109011
Attribute language dependent, LOV is not	Y	N	Y

Although not typical, one use case for this might be an 'Available for Sale" attribute using a Y/N global LOV but with a country dependency on the attribute.

In this scenario, when an English US user chooses a value, nothing will appear in the Danish DK or French FR contexts until a user in one of those countries makes a choice from the same dropdown list.

Display Sequence Attribute

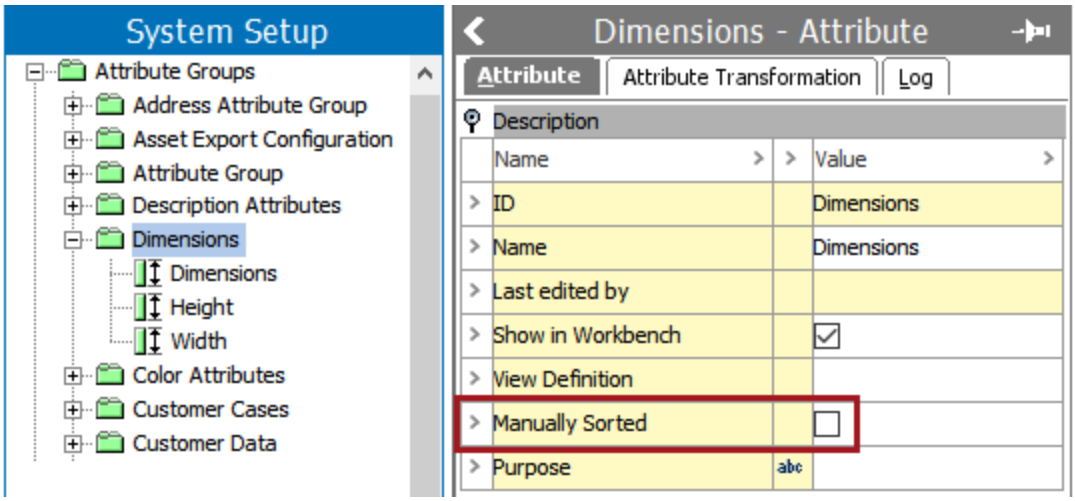
The default function in STEP is that attributes shown in the editor of a product are displayed in alphabetical order. However, if a Display Sequence Attribute has been set up, the attributes shown in the editor are sorted according to the value of the Display Sequence attribute.

Important: The Display Sequence Attribute has no impact on the order in which attributes are exported.

Display Sequence Attribute Setup

This section describes how you can set up the STEP Workbench so that the attributes shown in the product editor display according to the order set in the Display Sequence Attribute.

Before using a display sequence attribute, you must verify that 'Manual Sorting' is not selected on the attribute groups in which the relevant attributes are contained. If enabled on an attribute group, the Manual Sort option will overwrite any attribute sequences you configure. To check if the manual sorting is enabled, select the relevant attribute group in System Setup as shown below.



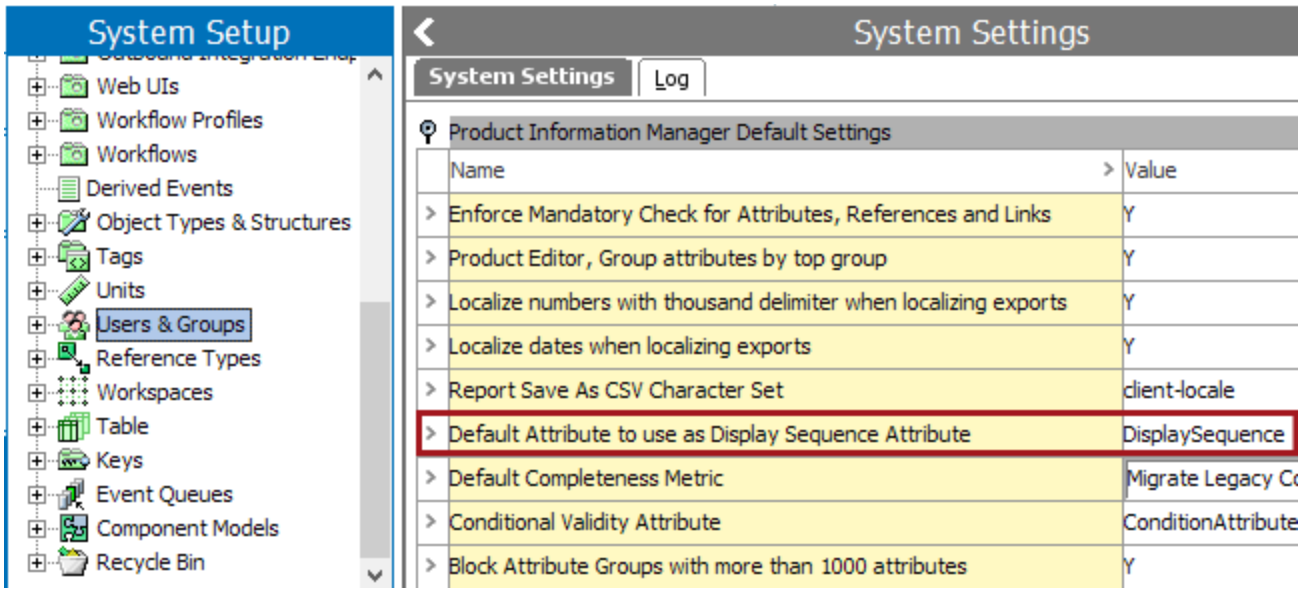
Set Up Display Sequence Attribute

A Display Sequence Attribute is a description attribute that dictates how other attributes will be ordered in an object editor. To configure a Display Sequence Attribute, it must:

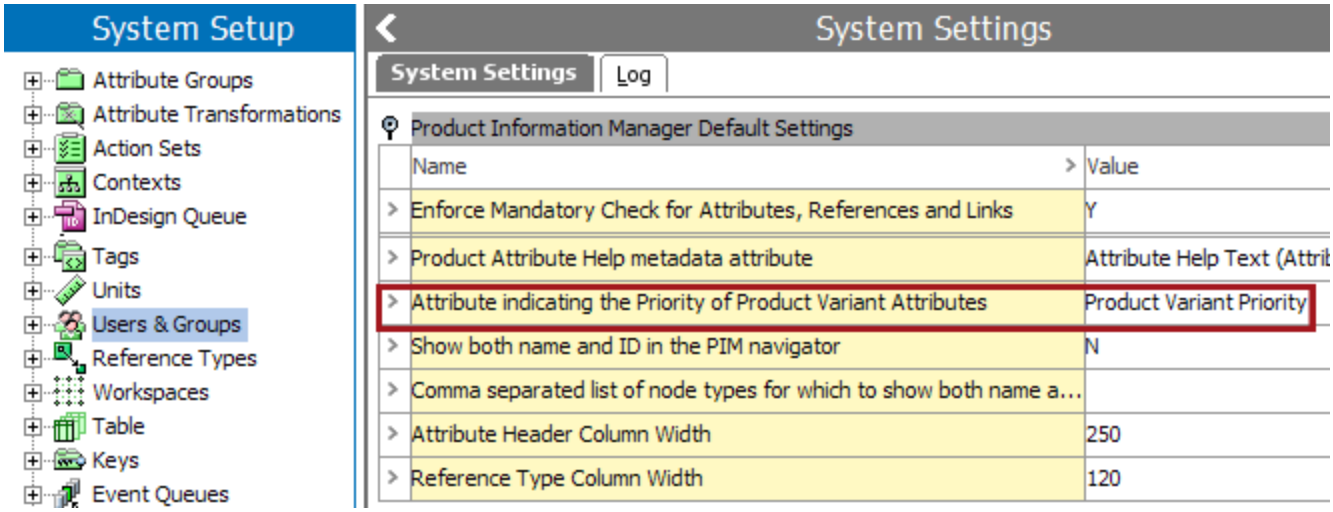
- be a **Description** attribute.
- have a Validation Base Type of either **number** or **integer**.
- be valid for the link type **Product attribute validation** and/or valid for the object type **Attribute**.

To create this type of attribute, refer to the **Creating Attributes** topic.

Select the display sequence attribute in System Setup > Users & Groups > System Settings tab > Product Information Manager Default Settings flipper > **Default Attribute to use as Attribute Display Sequence Attribute**.



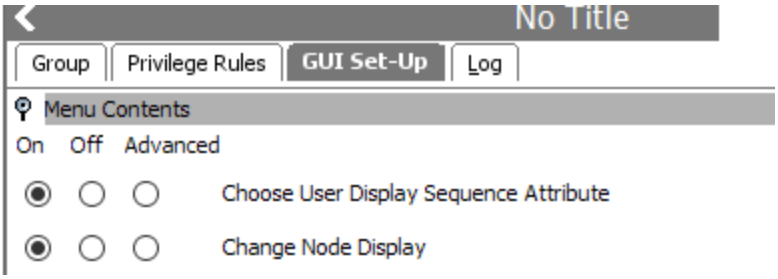
Similarly, select the display sequence for the product variant object types in System Setup> Users & Groups > System Settings tab > Product Information Manager Default Settings flipper > **Attribute indicating the Priority of Product Variant Attributes**.



View Menu: Choose Display Sequence Attribute

By default, users are able to select a display sequence attribute. However, if admin users want to prevent specific users from making this selection, they may disable this privilege by making a change to the user group that contains the relevant users as follows:

1. In System Setup, expand **Users & Groups**, then select the relevant User Group.
2. Select the GUI Set-Up tab, and under the Menu Contents flipper locate the **Choose User Display Sequence Attribute** option.



3. Set the **Choose User Display Sequence Attribute** radio button to Off'. By default it is set to 'On'.

For more information on how to use the Display Sequence Attribute, refer to the **Default Attribute to use as Display Sequence Attribute** heading within the **Product Information Manager Default Settings** topic of the **System Setup** documentation.

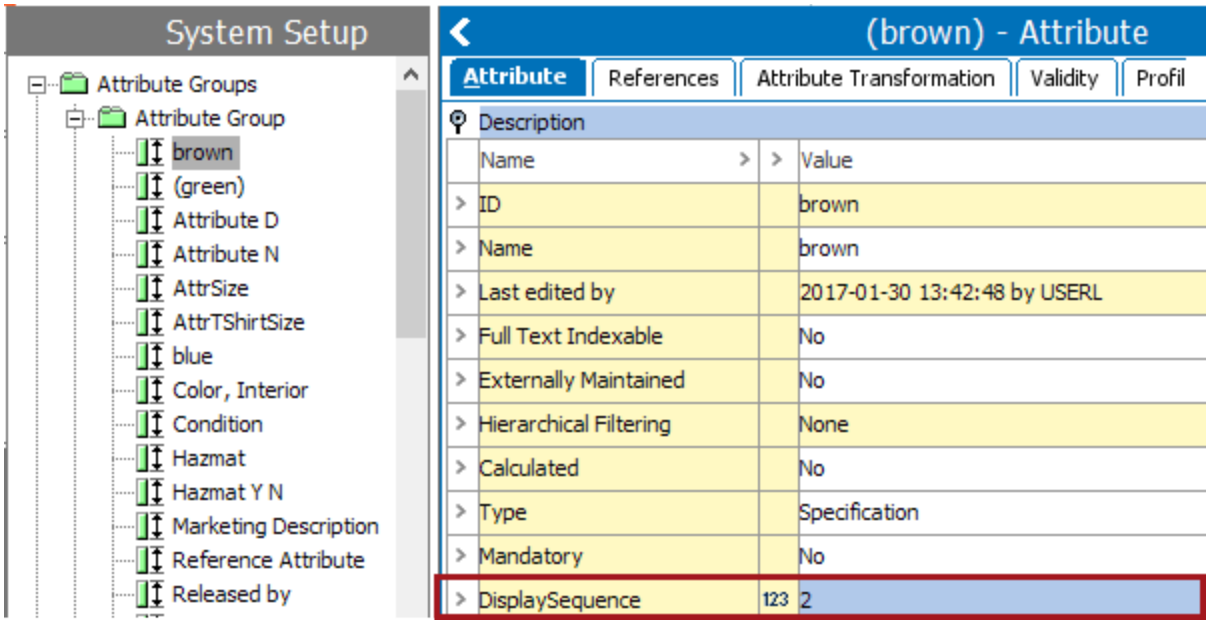
Sorting Attributes

Once the display sequence attribute has been set up, a user can establish the sorting. The attributes shown in the product editor are sorted according to the order set in the display sequence attribute. This can be done in two ways:

- Set a number in the **Display Sequence** field of the attribute itself
- Set a number in the **Display Sequence** column under **Linked Attributes**

Setting a display sequence number on the attribute

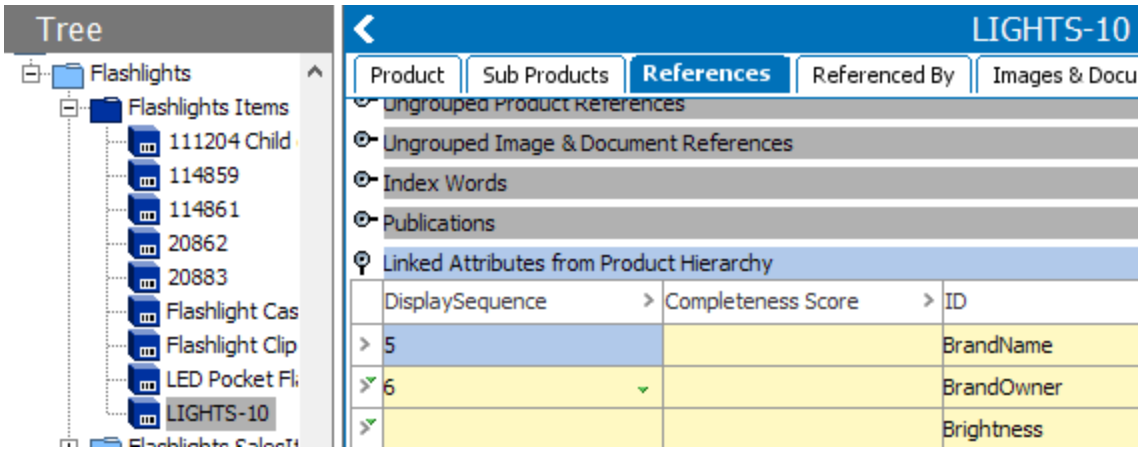
1. In System Setup, expand **Attribute Groups**, then click the relevant attribute. An **Attribute** editor displays.
2. In the Display Sequence field, type the desired number for each attribute in an attribute group. The lower the value, the higher priority it will have compared to other attributes. For example, an attribute with the value of 10 will always have priority over an attribute with the value of 20. Attributes without a display sequence value will display alphabetically after the prioritized attributes.



Note: If you do not know which attribute on your system is set up as the display sequence attribute, go to System Setup > **Users & Groups** > and verify the name of the attribute under **Default Attribute to use as Attribute Display Sequence Attribute**. Alternatively, in Tree, view a product, click the **References** tab. Under **Linked Attributes**, the first column shows the display sequence attribute on your system.

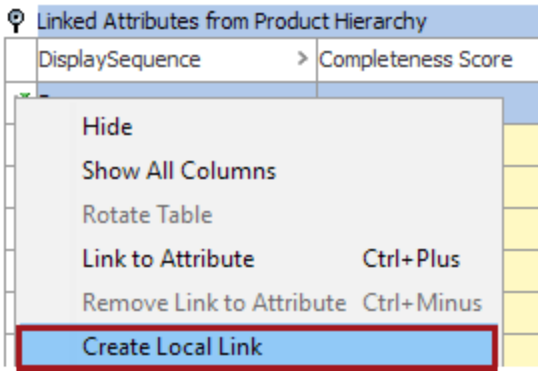
Setting a display sequence number under Linked Attributes

1. In the Tree, expand the Product Hierarchy and then click the relevant product folder or product.
2. Click the **References** tab.
3. Open the Linked Attributes from Product Hierarchy flipper, type a number in the cell related to the display sequence attribute column in front of the relevant attribute, as shown below.

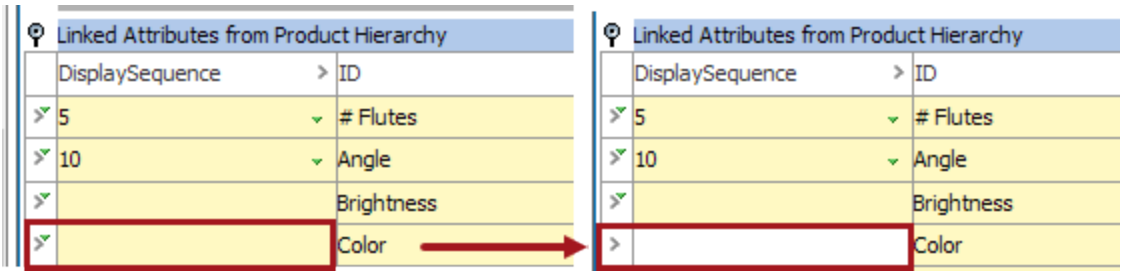


Note: The display sequence attribute column can only be edited if the attribute is linked in at the product hierarchy level you have selected. The **Inherited from** column shows where the attribute is linked in. An attribute can be linked in to one or more attribute groups. In the **Attribute Groups** column, you can identify to which attribute group(s) the attribute belongs.

4. Optionally, if you want to override the display sequence displayed at the level you have selected, right-click the relevant row and click **Create Local link**. You are now able to type a local value in the display sequence column.



The symbol will change in the inherited column and also the background color of the row will change from yellow to white. You are now able to type a local value in the Display Sequence column.



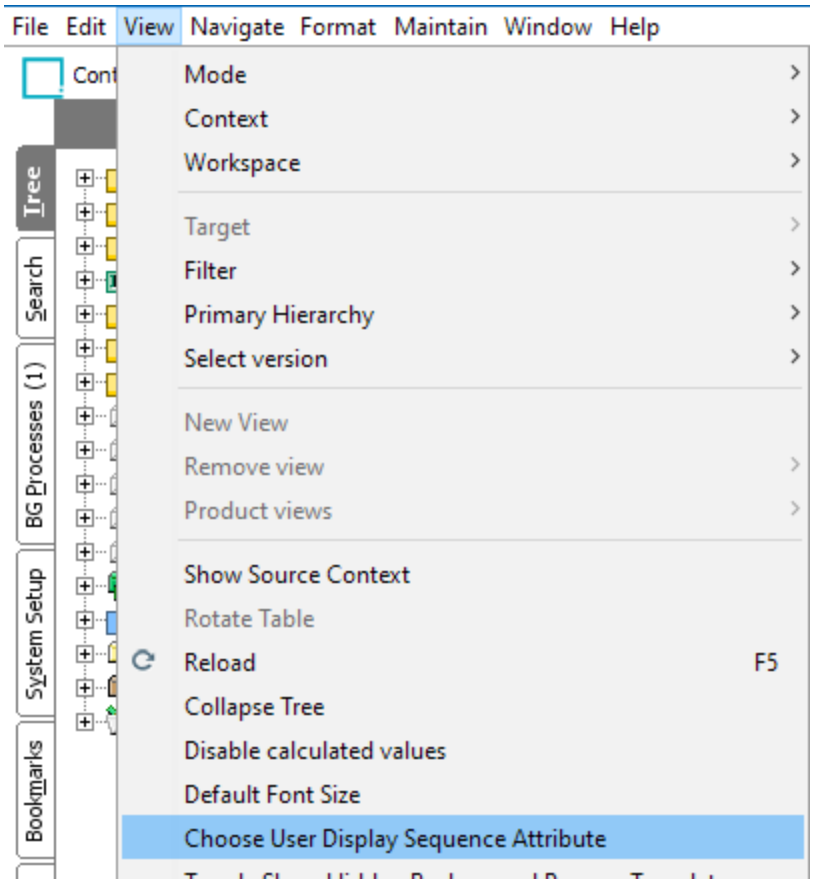
Attributes that have no sequence number, are alphabetically sorted and will be placed last on the list.

Important: Information about the display sequence of attributes is exported in an XML file. If the display sequence number is set on the attribute itself, the XML export will contain the attributes with display sequence attribute value. If the display sequence number is set on the attribute link, the XML export will contain the display sequence information on the attribute links. A combination of the two is possible.

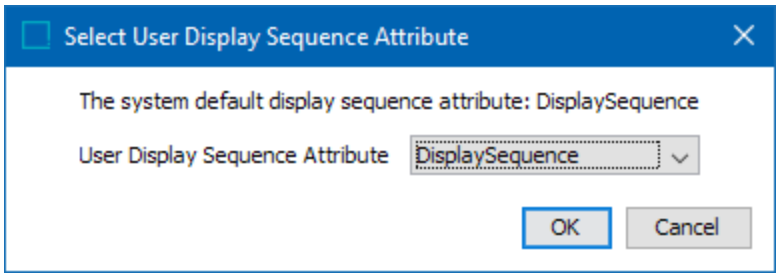
Selecting a Personal Display Sequence Attribute

If you are interested in sorting attributes in the product editor on a different display sequence attribute than the one set in System Setup >Users and Groups> Default Attribute to use as Display Sequence Attribute, do the following:

1. Go to **View** > **Choose User Display Sequence Attribute**.



A **Select User Display Sequence Attribute** dialog box displays.



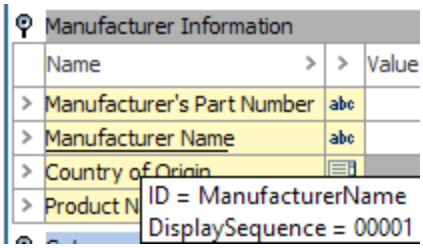
2. Select an attribute and click OK.

   In Tree, select a product object and select the **References** tab. The first column under **Linked Attributes** displays your personal display sequence attribute.

Display Sequence Attribute and the Product Editor Display

In the product editor, within an Attribute Group, the attributes are sorted on the display sequence attribute. If no display sequence attribute is set, the attributes are shown in alphabetical order.

1. Hover over the attribute name and a tool tip displays.



2. The Attribute **ID** and the display sequence attribute is shown.

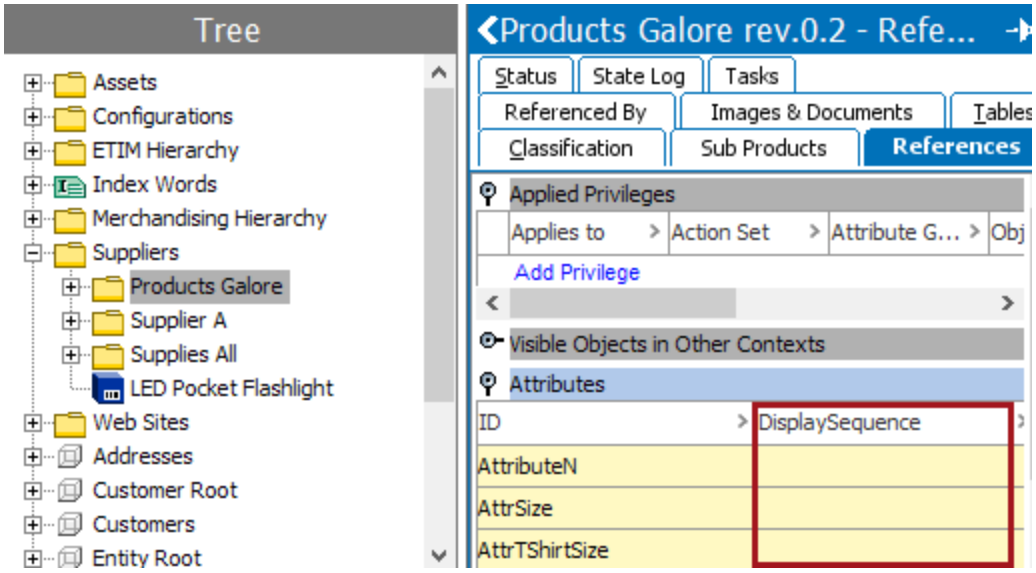
Note: When selecting two or more products, the product editor will show the attributes in alphabetical order since it is possible to select two or more products with the same attributes but with different values for the display sequence attribute.

Display Sequence Attribute and Classifications

Your system can be set up to display the display sequence attribute at the classification level.

1. In the Tree, navigate to a classification and select a folder.
2. Click the **References** tab.

   A display sequence attribute column is shown in the Attributes flipper.

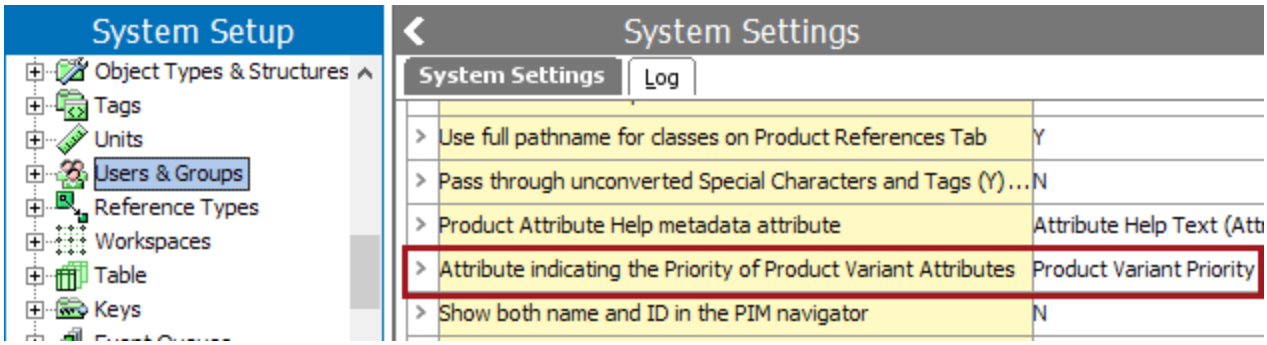


Important: Maintaining attribute display sequence in this area as no effect in either the classification editor or an export.

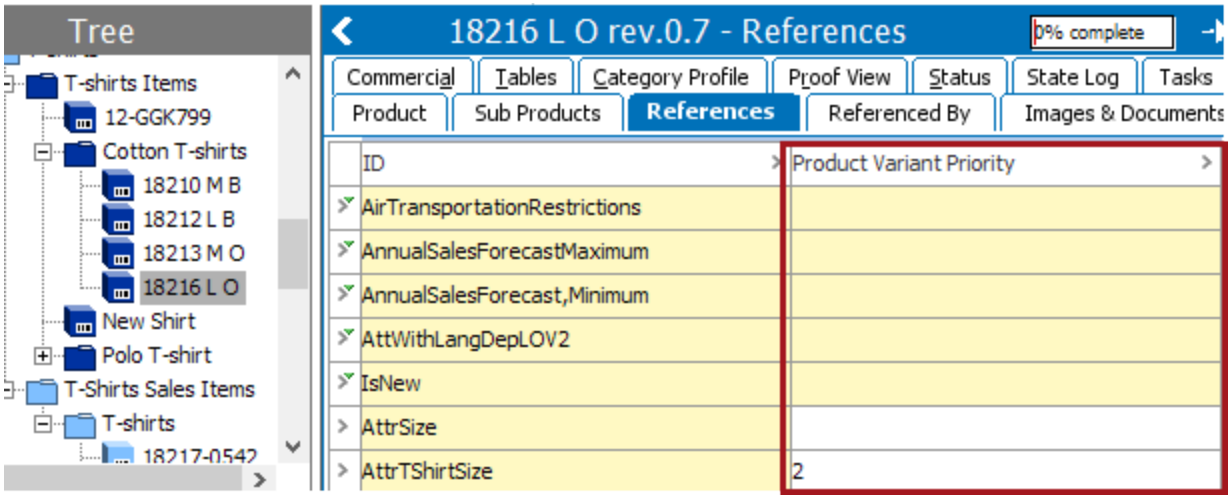
Setting the Priority of a Product Variant Attribute

1. In the Tree, select the parent containing the product variants.

2. Click the **References** tab.
3. Under Linked Attributes, type a number in the column for the **Attribute indicating the Priority of Product Variant Attributes** attribute specified in the User and Groups under the **Product Information Manager Default Settings** flipper.



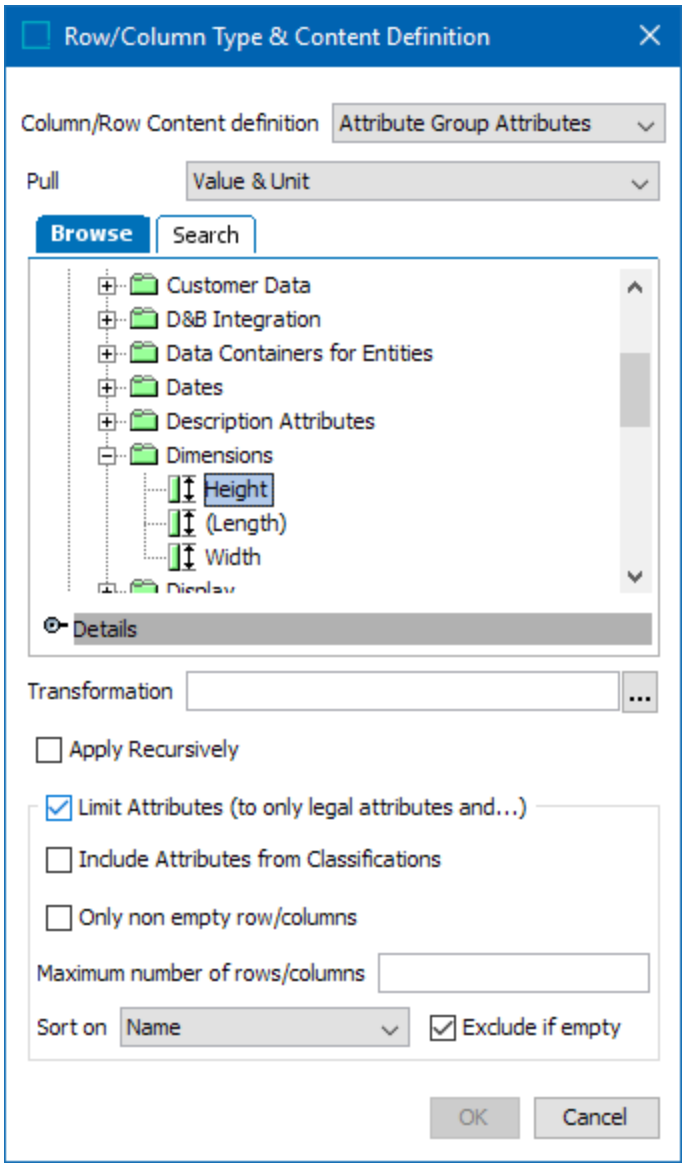
4. Enter the display sequence values in the column related to the respective attributes.



Display Sequence Attribute and Tables

You can use the display sequence attribute to sort attributes within attribute groups in tables. For more information, refer to the **Tables** documentation.

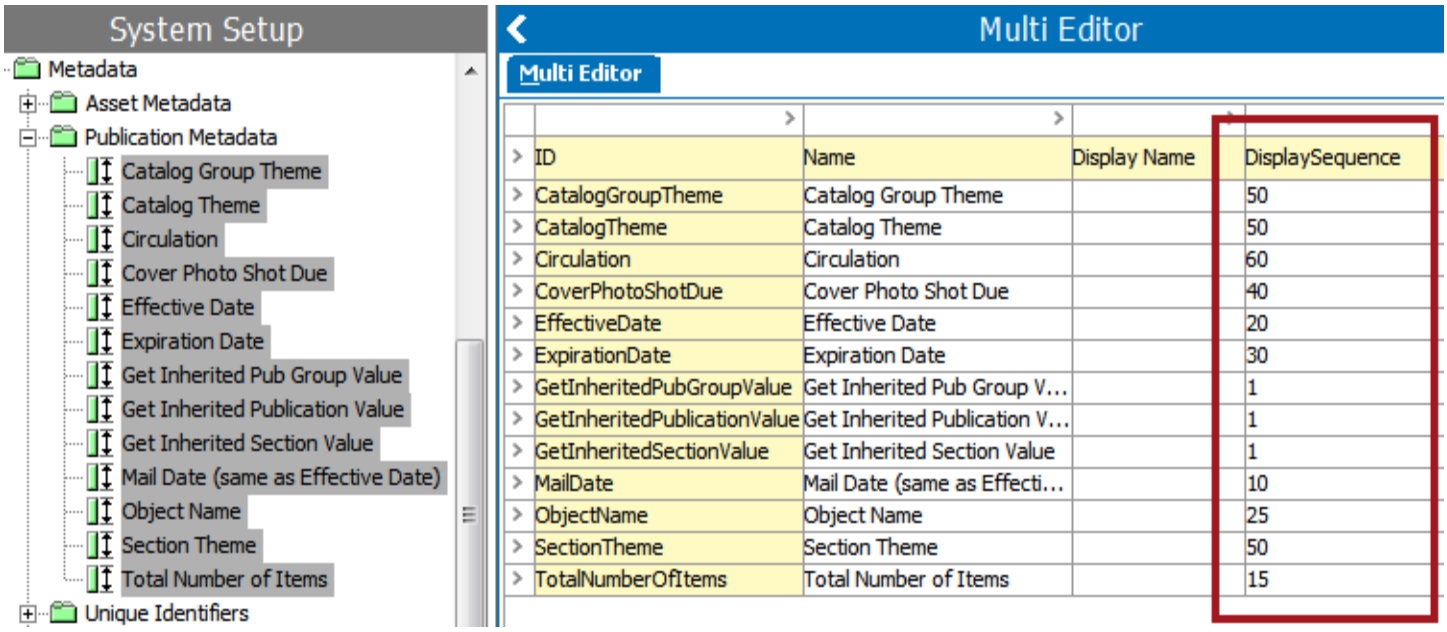
Shown in the screenshot below, in the Sort On parameter, select the display sequence attribute that will determine the order in which the attributes within an attribute group will show in a table.



Setting the Attribute Display Sequence on Publication (Green) Hierarchy Objects

Metadata (or description) attributes on publication hierarchy objects (publication groups, publications, sections, and planned pages) may also be sequenced using a display sequence attribute.

Because publication hierarchy objects do not use reference types, attribute sequencing cannot be set from a 'Linked Attributes' flipper on the References tab. Instead, metadata attribute sequencing must be set up at the attribute level. However, attributes may be multi-selected to allow sequencing from a single location.


System Setup
Metadata
Asset Metadata
Publication Metadata
Catalog Group Theme
Catalog Theme
Circulation
Cover Photo Shot Due
Effective Date
Expiration Date
Get Inherited Pub Group Value
Get Inherited Publication Value
Get Inherited Section Value
Mail Date (same as Effective Date)
Object Name
Section Theme
Total Number of Items
Unique Identifiers
Multi Editor
Multi Editor
ID
Name
Display Name
DisplaySequence
CatalogGroupTheme
Catalog Group Theme
50
CatalogTheme
Catalog Theme
50
Circulation
Circulation
60
CoverPhotoShotDue
Cover Photo Shot Due
40
EffectiveDate
Effective Date
20
ExpirationDate
Expiration Date
30
GetInheritedPubGroupValue
Get Inherited Pub Group V...
1
GetInheritedPublicationValue
Get Inherited Publication V...
1
GetInheritedSectionValue
Get Inherited Section Value
1
MailDate
Mail Date (same as Effecti...
10
ObjectName
Object Name
25
SectionTheme
Section Theme
50
TotalNumberOfItems
Total Number of Items
15

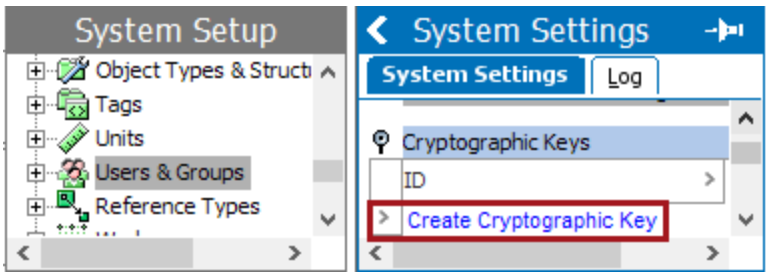
Encrypted Attributes

When dealing with customer data, some of the data is sensitive and needs extra protection. Encrypting an attribute is a way of making its values inaccessible to STEP users who are not allowed to view the values as well as obscuring the data for enhanced security. An attribute should only be encrypted when necessary since it prevents useful functionality such as searching, data profiling, exporting, and more.

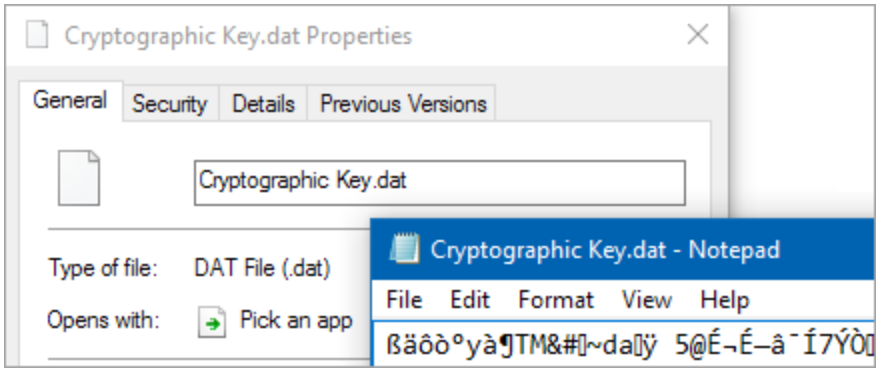
Encrypted attributes require a password to view or edit the values of the attribute. Before creating an encrypted attribute, create a cryptographic key.

Cryptographic Key

To create a cryptographic key, go to System Setup > Users and Groups > Cryptographic Keys flipper > click **Create Cryptographic Key**.

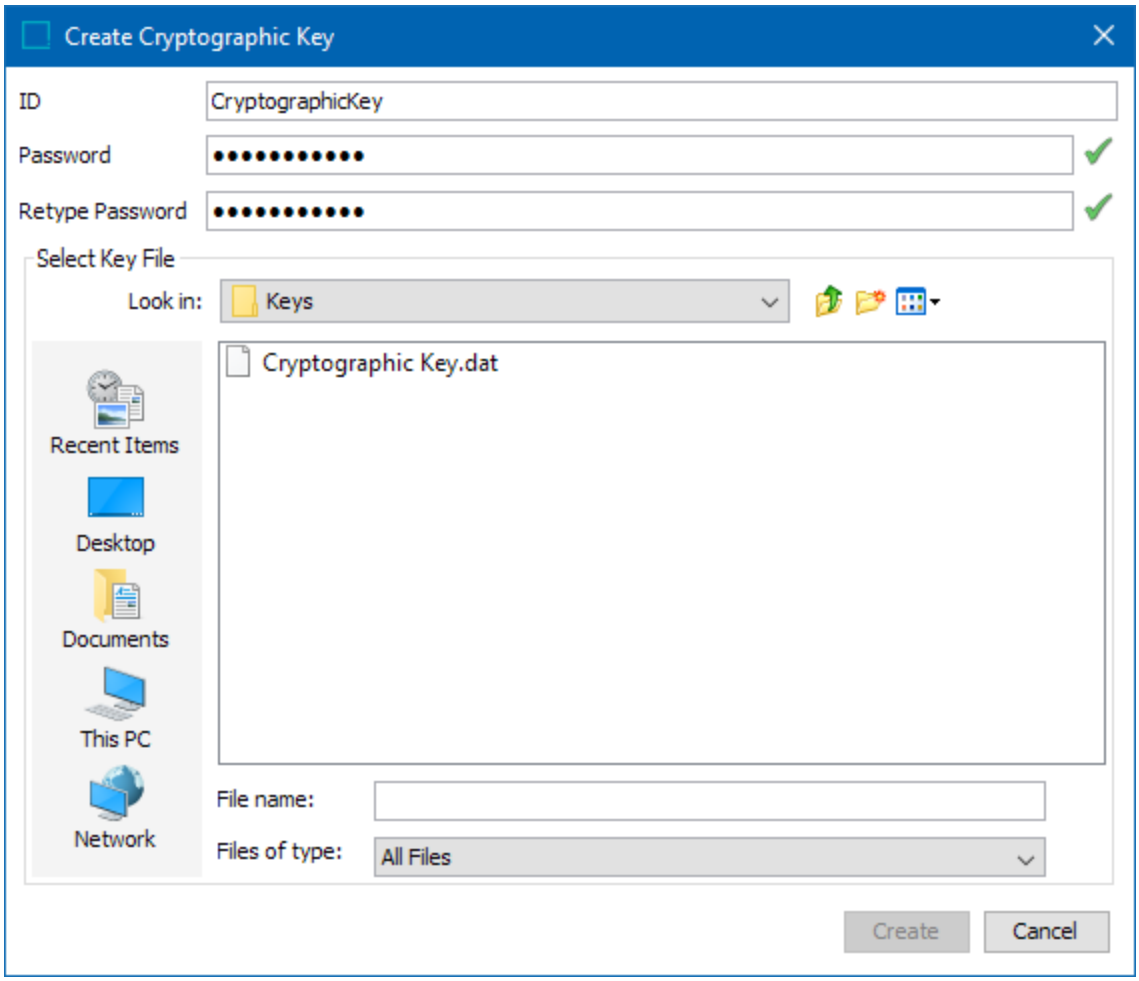


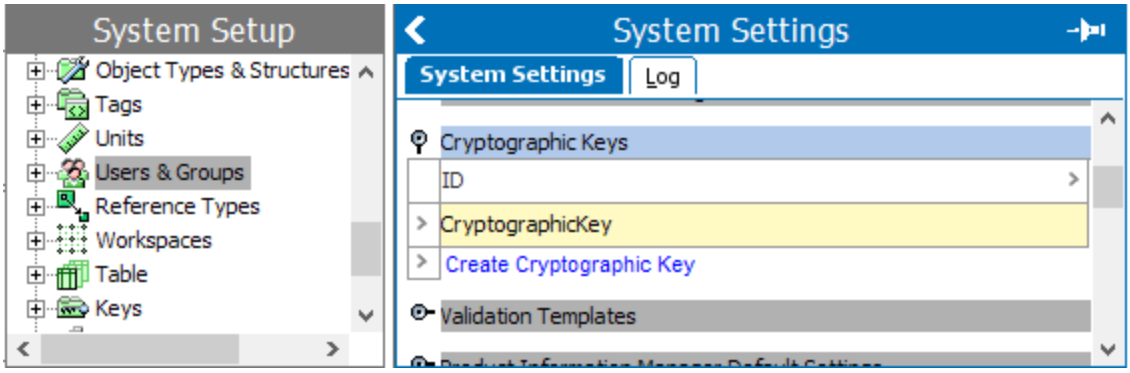
The attribute encryption system implemented in STEP is based on AES 256 bit encryption. It is a symmetric key algorithm which means that the same key is used for encryption and decryption. The system can hold multiple keys, and each key can have one unique password. This password then will be shared between users. For instance, the members of a specific group could be the only ones that should have access to the values of attributes Attr_A and Attr_B. In that case, only one key would be used for encryption of the values of Attr_A and Attr_B, and the password of the key would be shared among the users of the group.



When creating a new cryptographic key in STEP, a 32 byte file with the actual key is required. Keep this key file in a safe place, possibly encrypted as well, where it will remain secure. In addition to the key file, an ID and a password must be supplied.

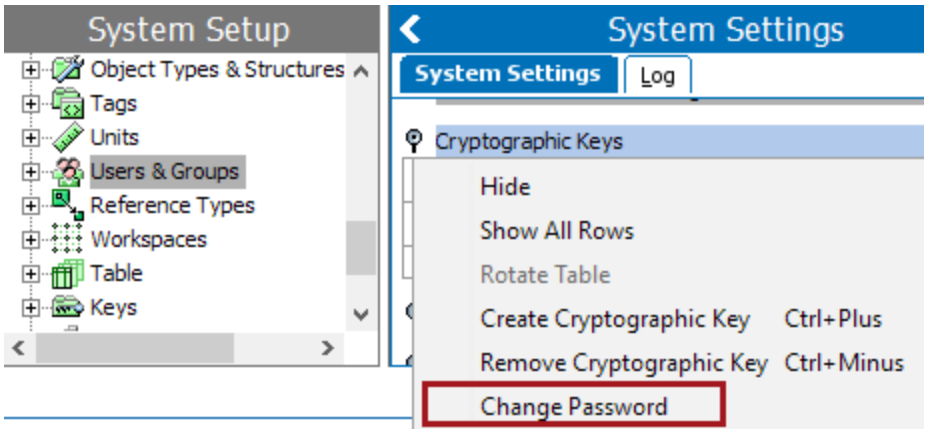
Note: Cryptographic keys are stored in STEP protected by a password that is neither the original key, nor the original password.





The ID is shown to users when prompting for the password. Therefore, the ID should be human-readable. The password is required each time attributes using this key are encrypted or decrypted.

The password can be changed when a cryptographic key has been created. After changing the password, all attributes using the cryptographic key use the new password, but the data values are not modified.



Password requirements

The minimum requirements for passwords are 8 characters containing at least three of these four groups:

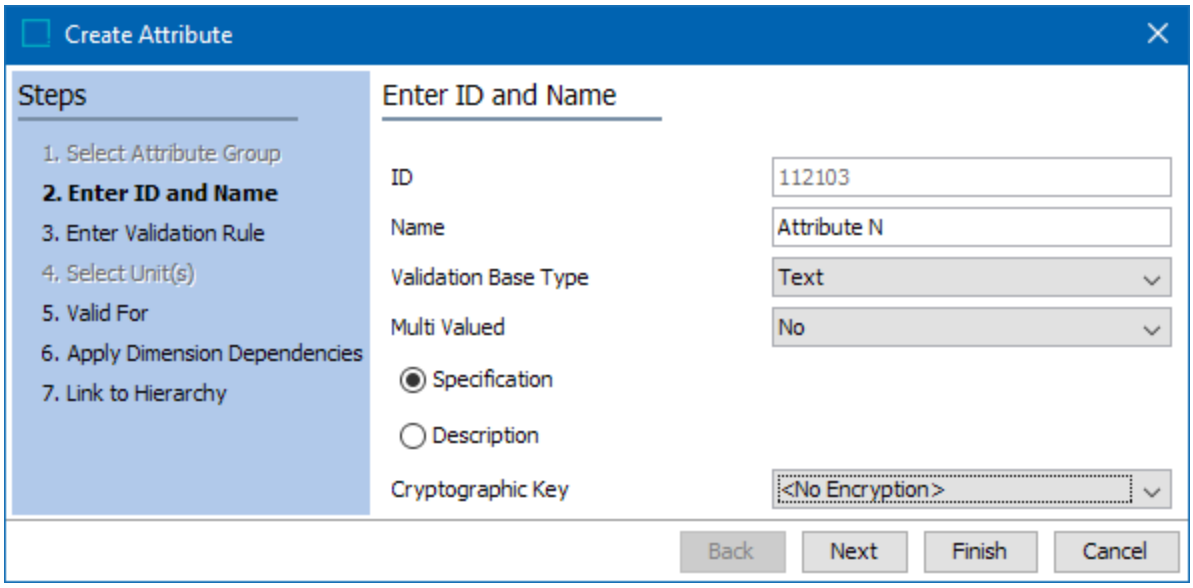
- Lower case characters a-z
- Upper case characters A-Z
- Digits 0-9
- Symbols

The setup action 'Maintain cryptographic keys' is required to create or delete cryptographic keys, and to change their passwords.

Creating Encrypted Attributes

When creating a new attribute, it is possible to select an encryption key. To do so, follow the steps below:

1. Go to System Setup ad expand the attribute groups node.
2. Select and right-click on the desired attribute group under which the new attribute is to be created, and click on ' New Attribute'.
3. On step 2, Enter ID and Name, there is an option called 'Cryptographic Key' with a dropdown list. Select the appropriate Cryptographic Key and proceed.



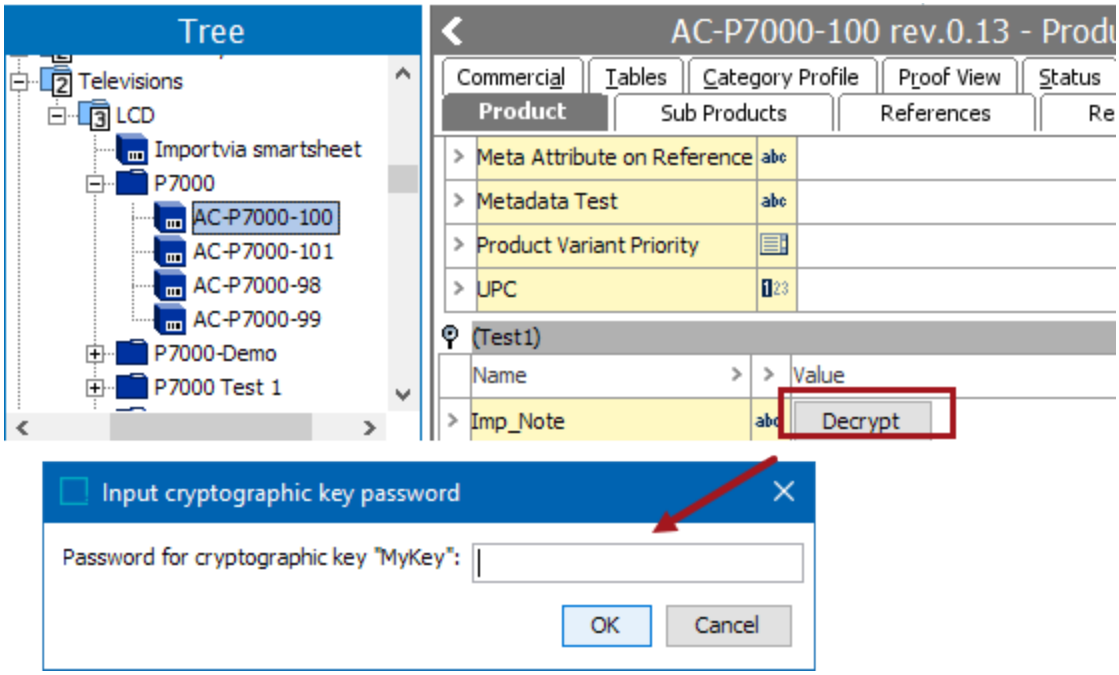
Note: The cryptographic key cannot be changed or set after creation.

Properties of attributes that cannot be used with encryption

- LOV validation - since an LOV can be shared between multiple attributes, it cannot be encrypted.
- Full Text Indexable - because the value is stored encrypted, this would represent a security risk.
- Calculated - a calculated value is usually not stored as a value, but derived from other data.
- The validation rules cannot be changed after creation, except multi-valued if the data allows it.

Accessing encrypted data

An encrypted attribute will not initially show any value in STEP Workbench or Web UI. Instead, a **Decrypt** button displays in its place. Clicking this button prompts the user for the cryptographic key file password for the key file used on the attribute.



When the correct password is entered, the attribute looks like any other attribute, showing its value. In this state, it is also possible to edit the value. The client remembers the password for the key file for a limited time, which allows editing multiple attributes without having to re-enter the password.

Each time a user decrypts an encrypted attribute, it is logged in the System Setup Log (available via workbench).

Restrictions of Encrypted Data

- Encrypted data cannot be recovered if the key or password is lost. Keep a backup of the original key file used when creating the key in STEP.
- Keys cannot be exported from or imported into STEP.
- Encrypted attributes cannot be exported.
- Encrypted attributes cannot be profiled in data quality.
- It is not possible to search for values of encrypted attributes.
- It is not possible to add / remove encryption to an attribute after it has been created.
- Background processes cannot access encrypted values.

Important: When using encryption in STEP, it is very important that the system is set up to use https, otherwise passwords, values to be encrypted, and decrypted values are transferred in clear text and security is compromised.

Externally Maintained Attributes

An externally maintained attribute 'lives' outside of STEP because the values are housed in an external system. A typical example is the prices that are maintained in the ERP environment and transferred to STEP for publishing and distribution or addresses maintained in an electronic medical record (EMR). Another example is to use the externally maintained attribute for storing a unique ID (EAN, Manufacturer Part Number, etc.) that is not a STEP ID. It could be generated by other systems like an ERP. An example of externally maintained attributes are 'unique keys'. To know more about unique keys, refer to the **Creating and Deleting Keys** topic in the **System Setup** documentation.

For Oracle databases, this action requires single-update mode (SUM), as defined in the Single-Update Mode topic.For Cassandra databases, this action uses Lock-free Schema Change (LFSC) functionality, as defined in the Lock-free Schema Change topic.

Revision Control

Externally maintained attributes are not included in revision control. This means that when a value is imported to one of the workspaces, the new value is automatically applied to all other workspaces. For example, if a supplier enters a value in the 'Main' workspace for an externally maintained attribute, this value is automatically transferred to the other workspaces, e.g., 'Approved'.

When you change an existing internally maintained attribute to an externally maintained attribute (Externally Maintained field changed from No to Yes), you must select the workspace from which values should be taken from and kept on the system. Typically this will be the workspace that contains the most recent updates, e.g., 'Main'.

Note: No revisions are made due to a change on an externally maintained attribute, even if another user modifies it. The data change does generate an event, however, a revision is only generated if some internally maintained attribute is changed.

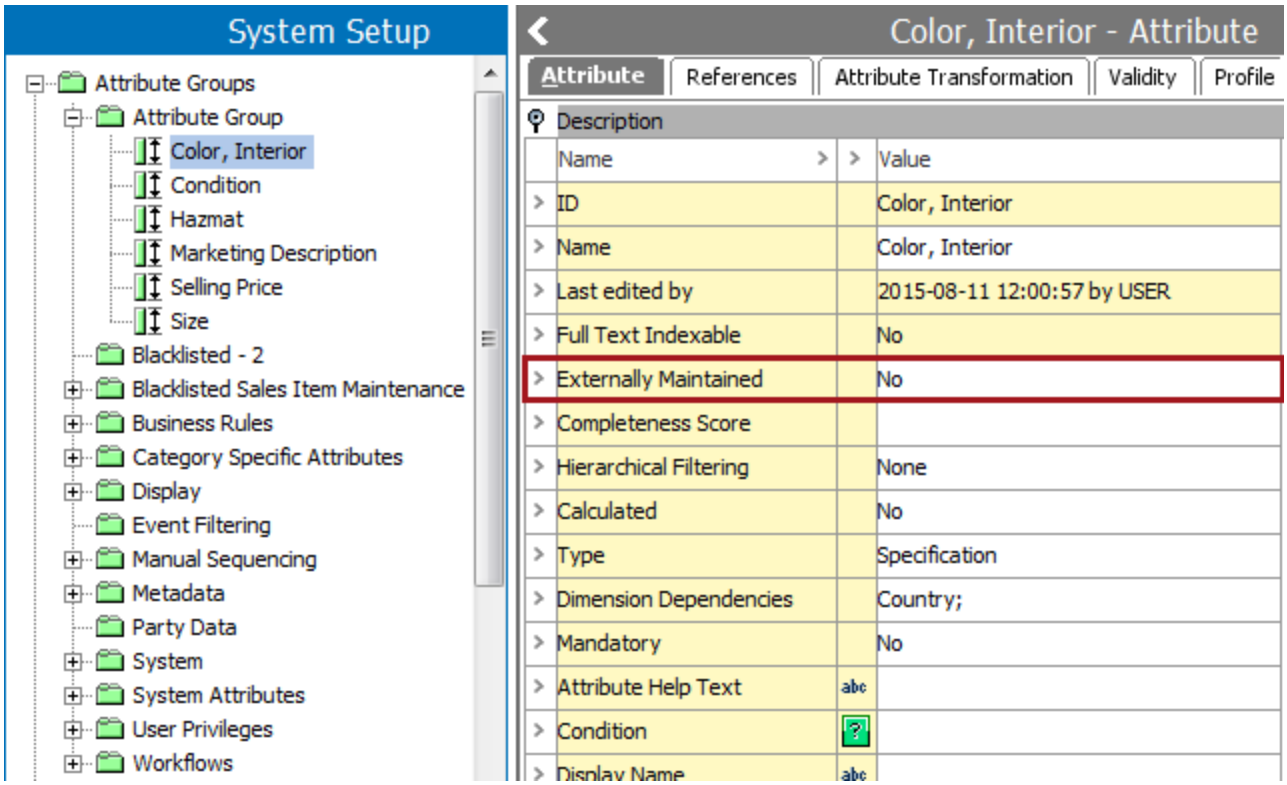
Sharing LOVs

Externally maintained attributes cannot share LOVs with internally maintained attributes, as values cannot be maintained both internally and externally.

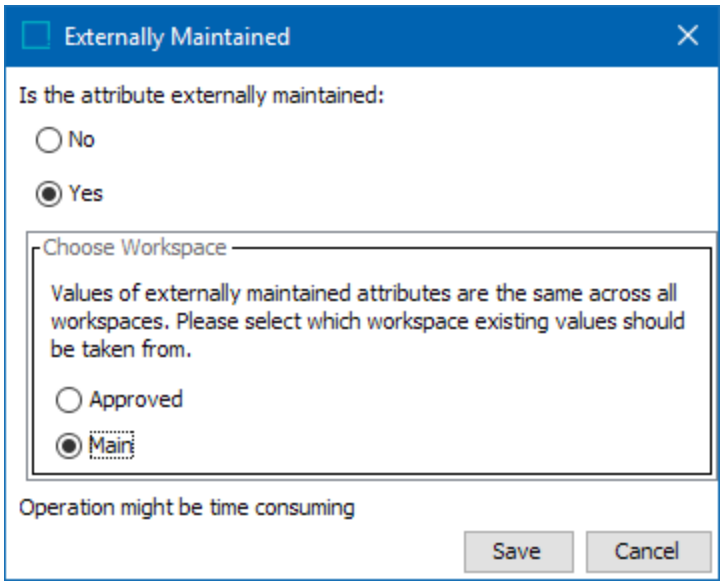
- Setting as externally maintained: If an LOV that is used by any internally maintained attributes is selected, and the attribute is then set as externally maintained, all attributes will become externally maintained.
- Setting as internally maintained: If an LOV that is used by one or more externally maintained attributes is selected, and the attribute is then set as internally maintained, all attributes will become internally maintained.

Setting as Externally Maintained

1. In System Setup, expand **Attribute Groups**, expand the relevant group, and then select the attribute you want to set as externally maintained.



2. On the attribute editor > Attribute tab > Description flipper > double-click the **Externally Maintained** parameter to display the Externally Maintained dialog.



3. For 'Is the attribute externally maintained:' radio button, choose **Yes** to enable the Choose Workspace parameter.
4. Select the workspace that contains the existing values that will be used across all workspaces.
5. Click **Save**.

Note: The number of values that already exist for the attribute affects the time required to complete this operation.

Full Text Indexable Attributes

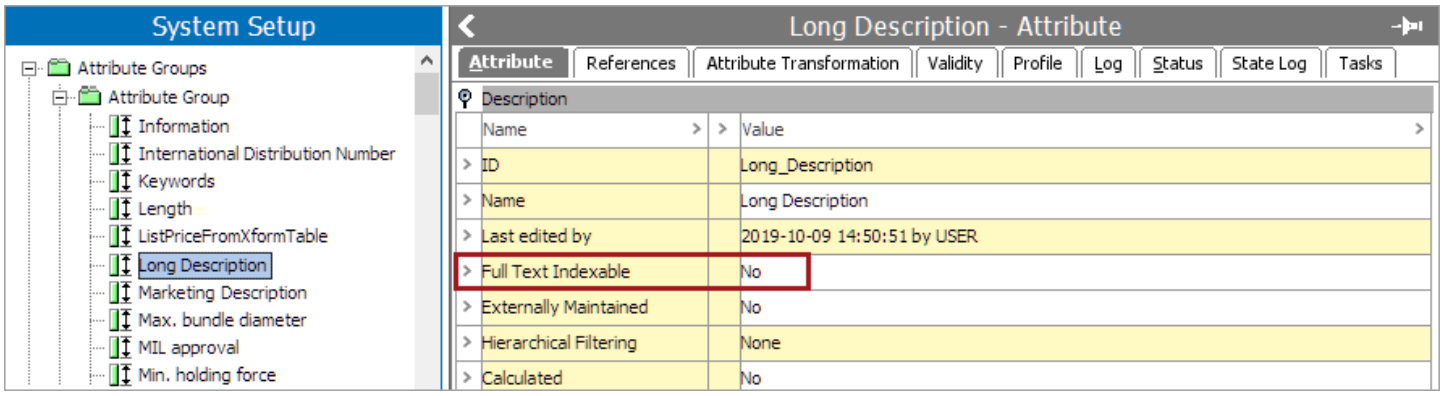
Full text indexable is a way of indexing the values of an Attribute with validation base type 'text' in words. This will enable you to search for words within 'text' values. Without the full text indexable option, you can still search for values. This option is only needed if you want to search for objects based on a word or set of words in a sentence in an attribute value.

Note: Customers with a SaaS deployed or with In-Memory enabled cannot use this feature and should instead use the Elasticsearch functionality. For more information, refer to the **Search Screen** topic in the **Web User Interfaces** documentation.

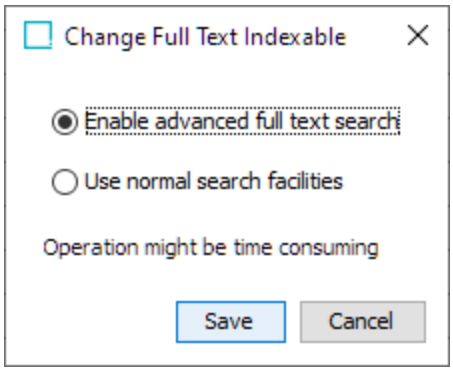
Important: Changing the Full Text Indexable parameter is time consuming, and is based on the values present for that attribute. Enabling the parameter can have a negative system-wide impact on performance because it is time-intensive to read, write, and search for such values. **Only apply this option to attributes if absolutely necessary, and all other options have been explored.**

To modify the setting:

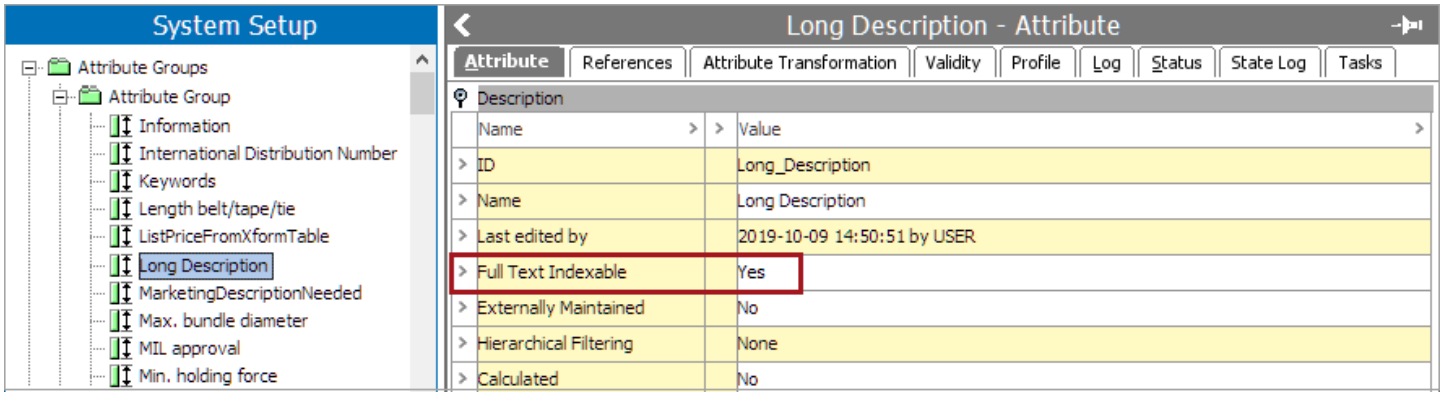
1. In System Setup, expand **Attribute Groups**, expand the relevant Group, and then select the Attribute to be set as full text indexable.



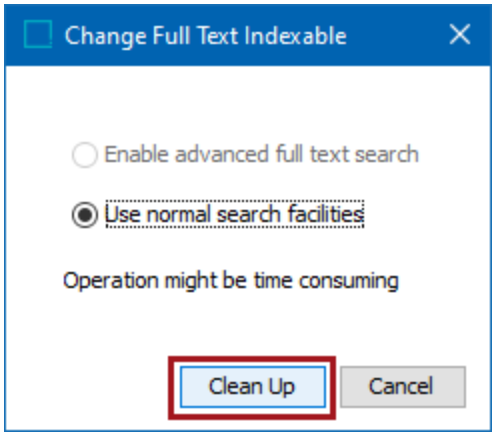
2. Click the **Attribute** tab.
3. Under **Description**, double-click the **Full text indexable** field. The **Change Full Text Indexable** dialog box appears.



4. Click **Enable advanced full text search** and **Save** to display Full Text Indexable = 'Yes.'



To remove the Full text Indexable = 'Yes' setting, select the field and choose **Use normal search facilities** and click the **Save** button. If this operation fails, choose it again, and click the **Clean Up** button.



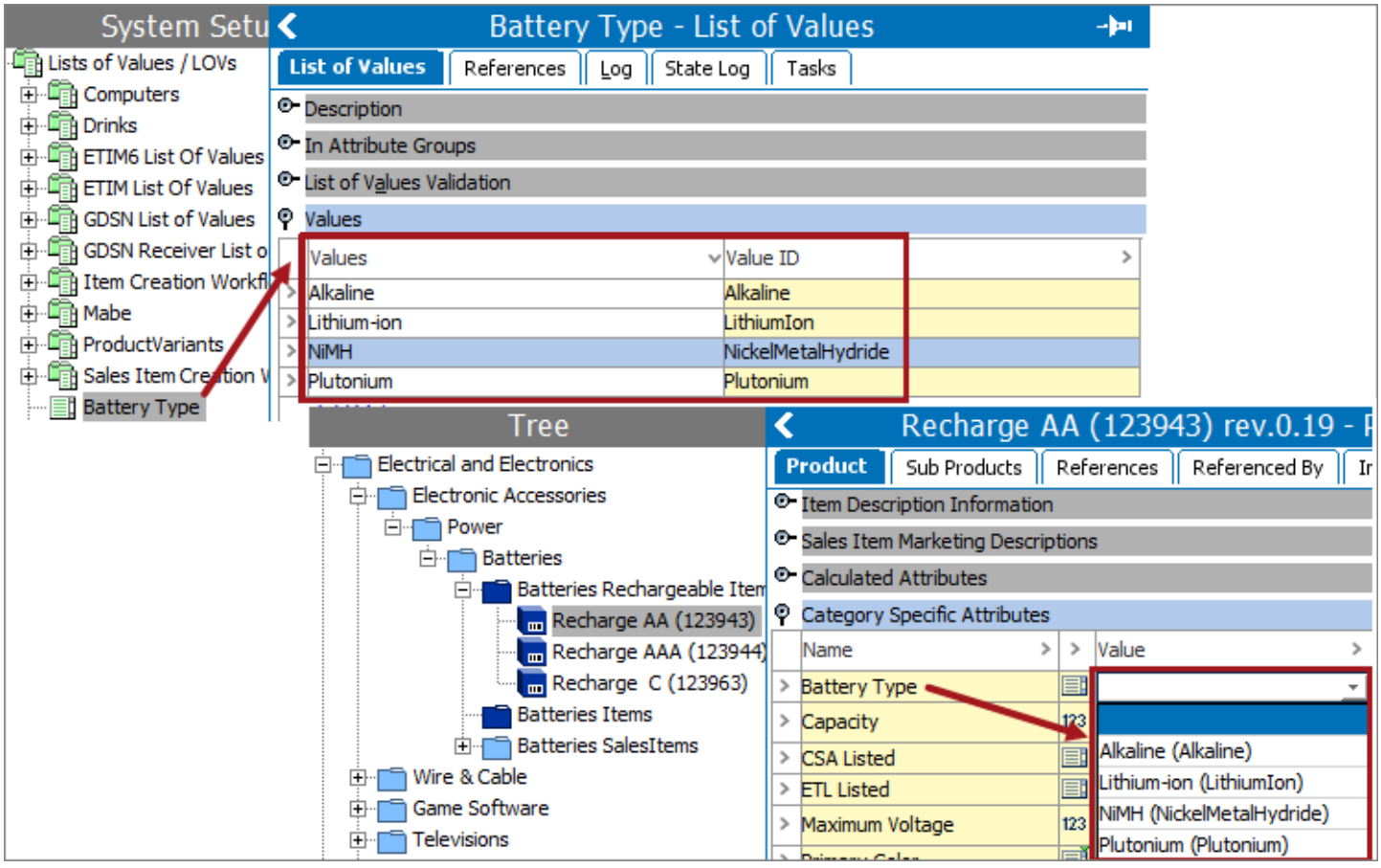
Important: If the **Enable advanced full text search** option is disabled, you must contact Stibo Systems' Technical Support via the Stibo Systems Service Portal to enable the full text index functionality. This is not standard functionality, so the Technical Support team will go over your options for running a SQL script (either by Stibo Systems or by the customer), which will activate **Enable advanced full text search** option.

In the background, these attribute values will be indexed, helping users to search by the respective attribute values. Keep in mind the performance issues you may encounter upon enabling, and why Stibo Systems recommends that you explore other options prior to enabling.

List of Values (LOV)

A List of Values (LOV) is a defined set of values that can be selected for an attribute with the validation base type of LOV. LOVs are maintained on the System Setup tab under List of Values/ LOVs. As described below, an LOV is only used after it has been selected on an attribute.

- LOV attributes reference a separate 'List of Values' (LOV) object that holds a list of possible values to choose from.
- LOVs come in two variants; one that allows users to add new values when populating attributes that use the LOV (a medium domain LOV), and one that does not allow a user to add new values (a hard domain LOV).
- LOVs are sometimes referred to as 'Domains.'
- The values that exist on an LOV are available for selection on an attribute via a dropdown, as shown below.



Ideally, each LOV value is unique. Unique values prevent duplicate data and the confusion about the "correct" selection. For example:

- Battery Size—AA, AAA, D, C, 9V
- Material—Brick, Steel, Wood, Plastic, Granite
- Country Code—001, 007, 045, 086, 506, 044

LOV Features

- LOV objects have a Validation Base Type setting of their own, and a list of values must be selected.
- A single LOV can be used by multiple attributes. For example, a single list of colors could hold all possible colors for your products.
- When used for multiple attributes, a filter can be applied so only a subset of the values is selectable for the attribute. For example, a user would be limited to only the colors that are valid for a specific product, and not the entire list of colors.
- If the attribute is a specification attribute it is possible to filter legal values on the links from the instantiated hierarchy so only specific values are legal for specific branches. For example, the colors available in the clothing line of products may not be the same as those in the tools line.
- Export and import the values of an LOV (List of Values) via Excel when as defined in the Excel List of Values topic in the Data Exchange documentation.

For Oracle databases, this action requires single-update mode (SUM), as defined in the Single-Update Mode topic.For Cassandra databases, this action uses Lock-free Schema Change (LFSC) functionality, as defined in the Lock-free Schema Change topic.

Values by Reference

Values in the LOV are assigned to an attribute 'by reference.' This means that if the values in the LOV are edited, then the changes are immediately reflected in the attributes associated with the LOV.

Revision Control

Revision control of the LOV is determined by the Externally Maintained status of the attribute using the LOV.

- **Externally Maintained = No** on an attribute using the LOV means that the attribute and the LOV are under revision control.
- **Externally Maintained = Yes** on an attribute using the LOV means that the attribute and the LOV are not under revision control.

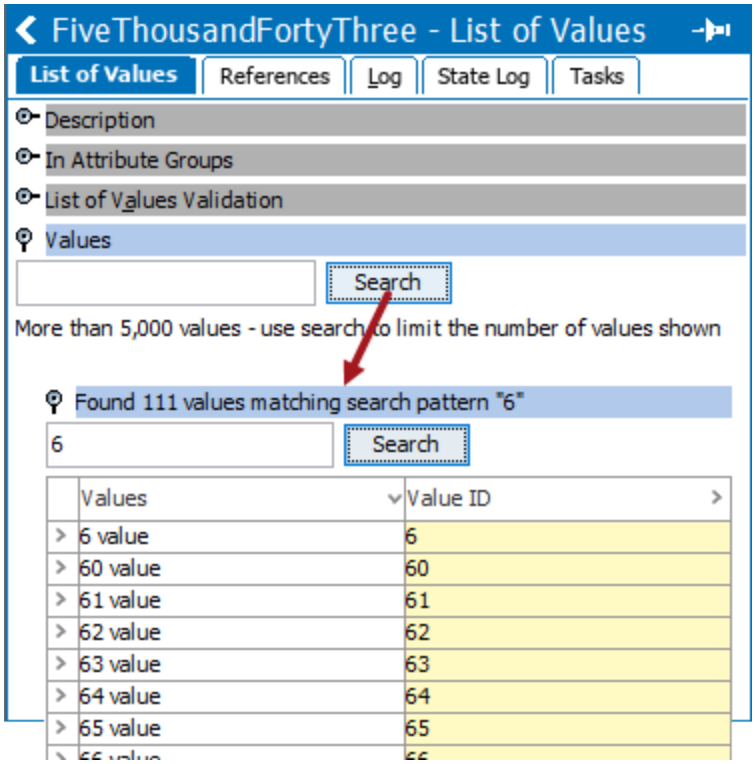
Validation Base Type

The validation base type for an existing LOV can be changed. When merging multiple LOVs into one LOV, all LOVs being merged must first share the same validation base type.

Working with Large LOVs

When an LOV has over 6000 values, the full list of values cannot be instantly viewed as it would be for a smaller list of values. To find a specific LOV value, type a few characters to search for a partial or complete match.

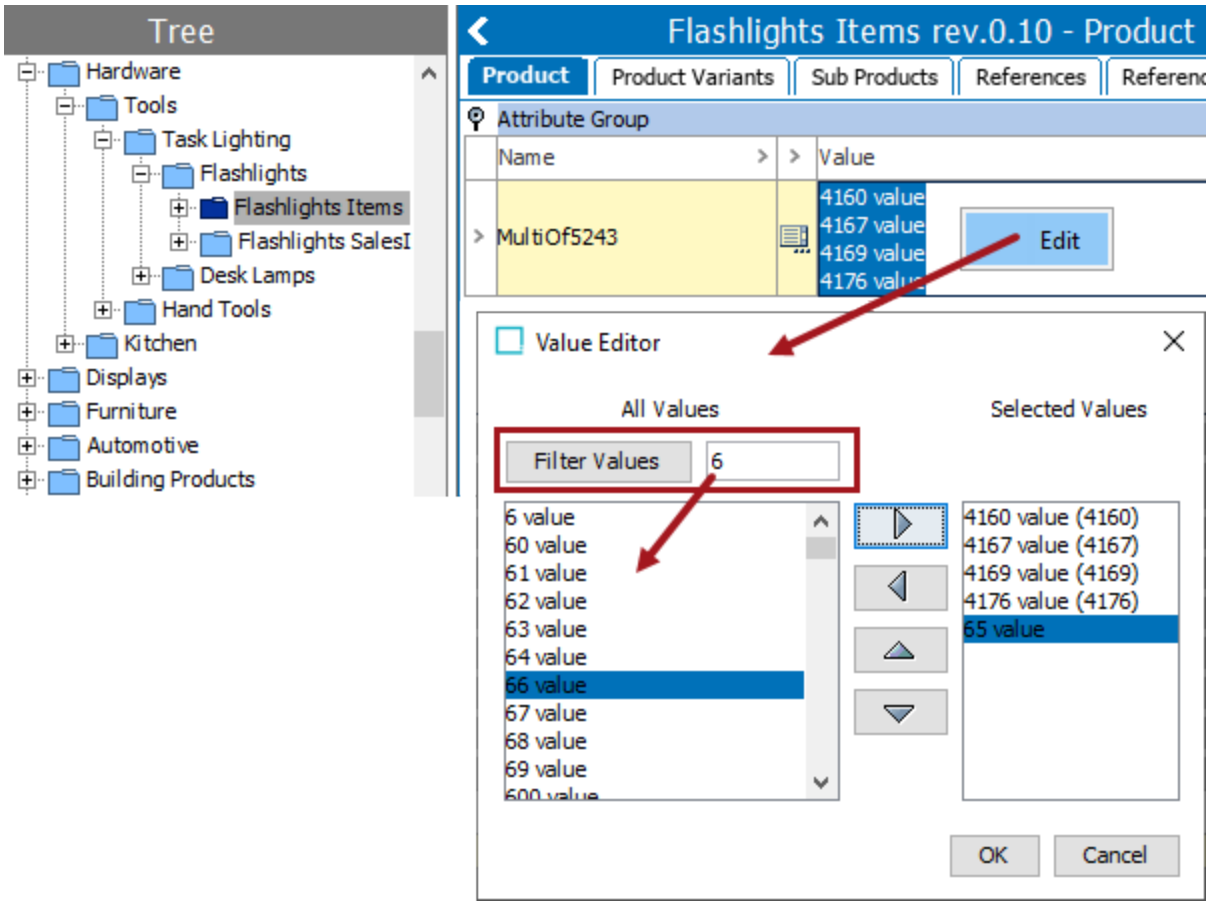
In System Setup, on the List of Values editor tab, open the Values flipper. Enter characters in the text box and click Search to display the results. The flipper label changes to show the values that match the search, and the values are displayed below the search field.



In Tree, when editing an attribute that uses a large list of values, click into the value field, right-click to display and click the Edit option (or click Alt+F2). On the Value Editor dialog:

- Enter a character in the text box to limit the listed available values. Click the Filter Values button to update the available values list.
- Double click a value in the left column to move it to the Selected Values list, or select multiple values and click the right arrow button ( ).
- Double click a value in the Selected Values column to return it to the available values list and remove it from the attribute. You can also select an item in the Selected Values list and click the left arrow to remove an item from the list ( ).
- Use the up ( ) and down ( ) arrow buttons to change the order of the highlighted value in the Selected Values list.
- Click OK to update the values in the product editor.

The values shown in the Selected Values list will be displayed in the attribute editor.

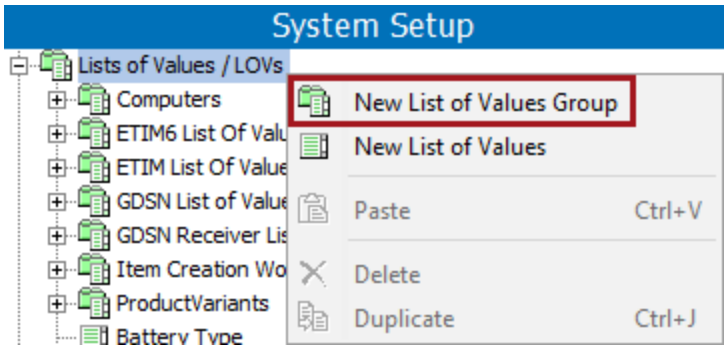

Tree
Hardware
Tools
Task Lighting
Flashlights
Flashlights Items
Flashlights SalesI
Desk Lamps
Hand Tools
Kitchen
Displays
Furniture
Automotive
Building Products
Flashlights Items rev.0.10 - Product
Product
Product Variants
Sub Products
References
Attribute Group
Name
Value
MultiOf5243
4160 value
4167 value
4169 value
Edit
Value Editor
All Values
Selected Values
Filter Values
6
6 value
60 value
61 value
62 value
63 value
64 value
66 value
67 value
68 value
69 value
4160 value (4160)
4167 value (4167)
4169 value (4169)
4176 value (4176)
65 value
OK
Cancel

Creating an LOV Group

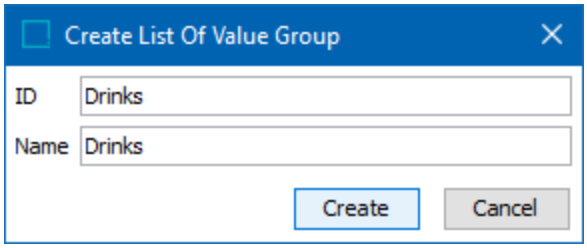
A Lists of Values / LOV group can be used to collect individual, but related, LOVs. The LOV group can be linked to an attribute group, and used in combination with privileges to restrict users in maintaining certain lists of values.

Below are steps to create a new lists of values group.

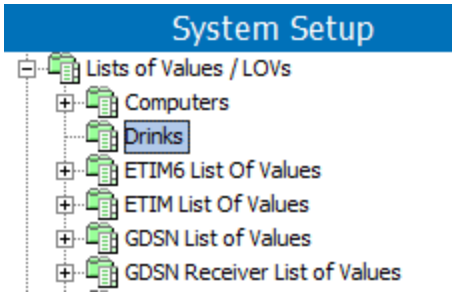
1. Go to System Setup > Lists of Values / LOVs, right-click **List of Values /LOVs**, and click the **New List of Values Group** option.



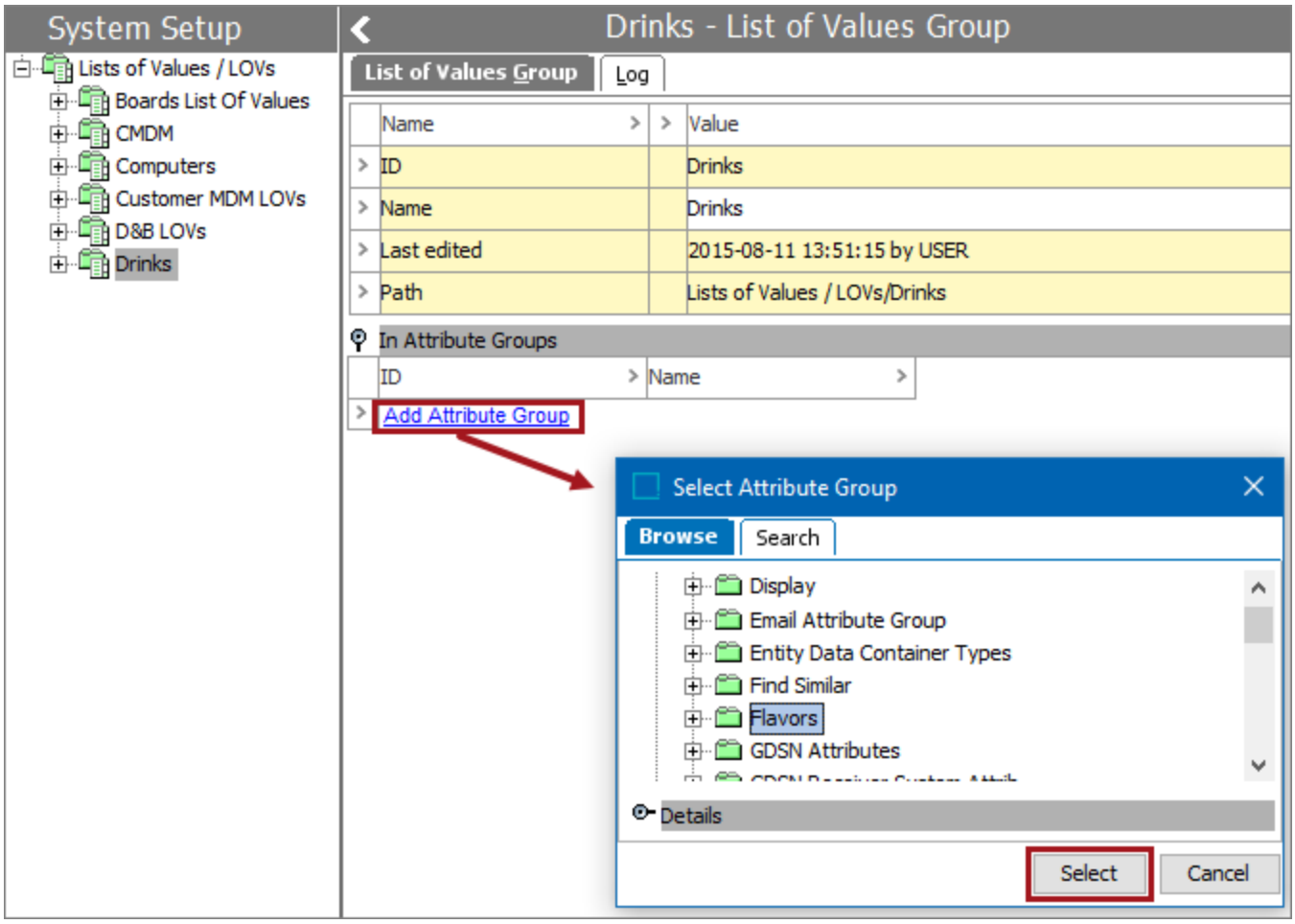
2. Enter an **ID** and **Name**, then click the **Create** button.



3. The newly created LOV group will display within the List of Values / LOVs, as shown below.



4. To add an LOV to the LOV group, follow the steps in the **Creating a List of Values** topic within this guide.
5. To link an LOV group to an attribute group, click the **Add Attribute Group** link within the 'In Attribute Groups' flipper of the List of Values Group editor, as shown below.



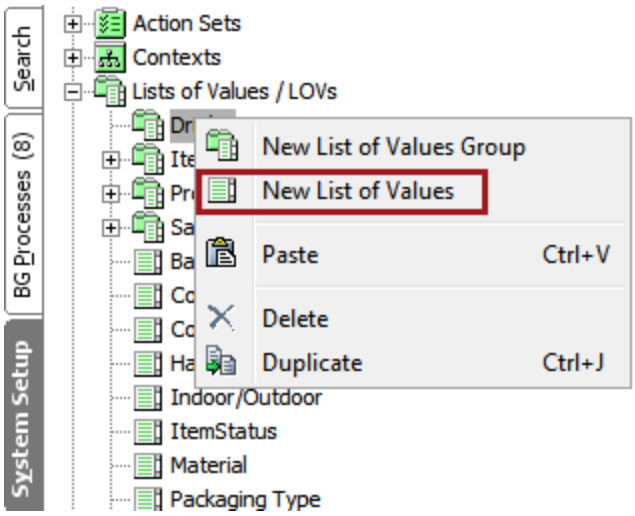
Creating an LOV

Creating an LOV (List of Values) involves:

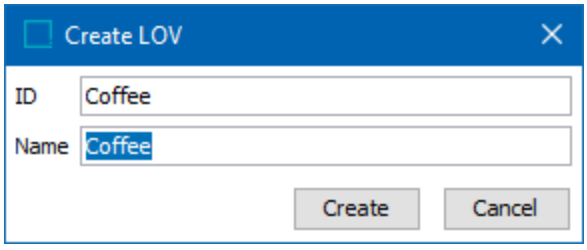
- Setting validation rules
- Selecting valid units
- Selecting dimension dependencies
- Adding values

Below are the steps to create an LOV.

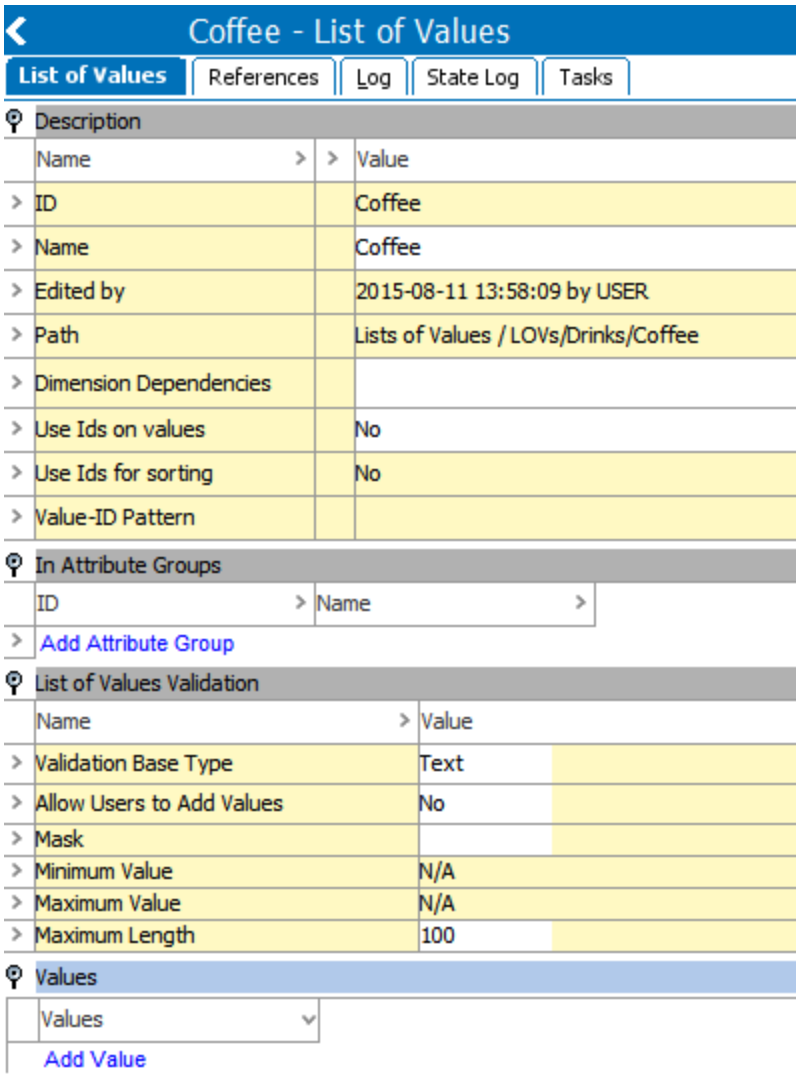
1. Go to System Setup > Lists of Values / LOVs, right-click the List of Values / LOVs folder (or a desired LOVs group folder where you want to group the new LOV), and click **New List of Values**.



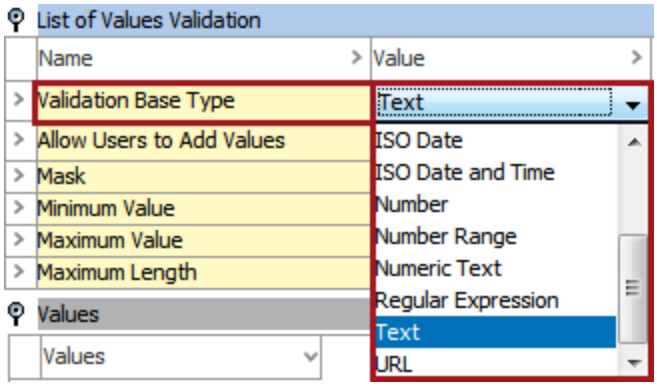
2. The Create LOV dialog will display. Enter an **ID** and a **Name**.



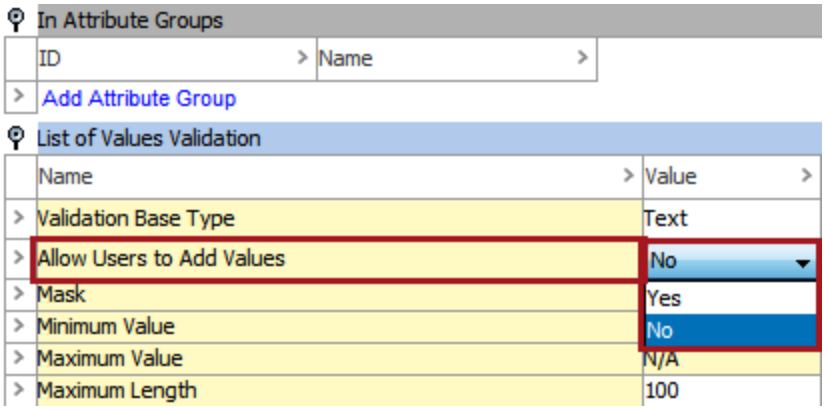
3. Click the **Create** button, and the List of Values editor will display (as shown below).



4. Expand the **List of Values Validation** flipper, and click the **Validation Base Type** parameter field to select the desired validation base type from the dropdown menu.



5. Within the **List of Values Validation** flipper, click the **Allow Users to Add Values** parameter field to select either **Yes** or **No** from the dropdown menu (as shown below).



   - **Yes:** allows the user to add values to the existing list from the object editor.
   - **No:** does not allow the user to add values, thus requiring them to select a value that already exists in the list. New values can only be added from System Setup.

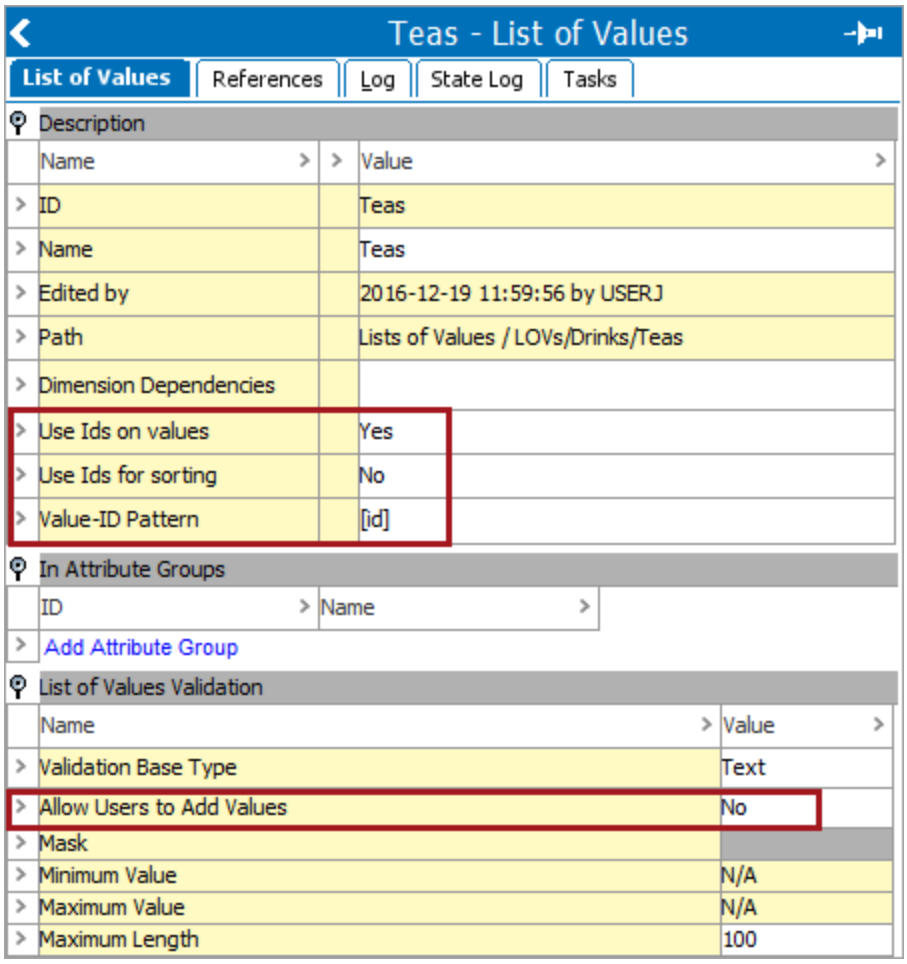
6. **Use Ids on values:** Optionally allows the use on an ID for each value within the LOV. Can be useful when importing object data and applying a certain value with a specific ID.

   Important: Exports run on the selected context, which means that to output all the values for a dimension dependent LOV, an export needs to be run for each context.

   Setting **Use Ids on Values** to **Yes**:

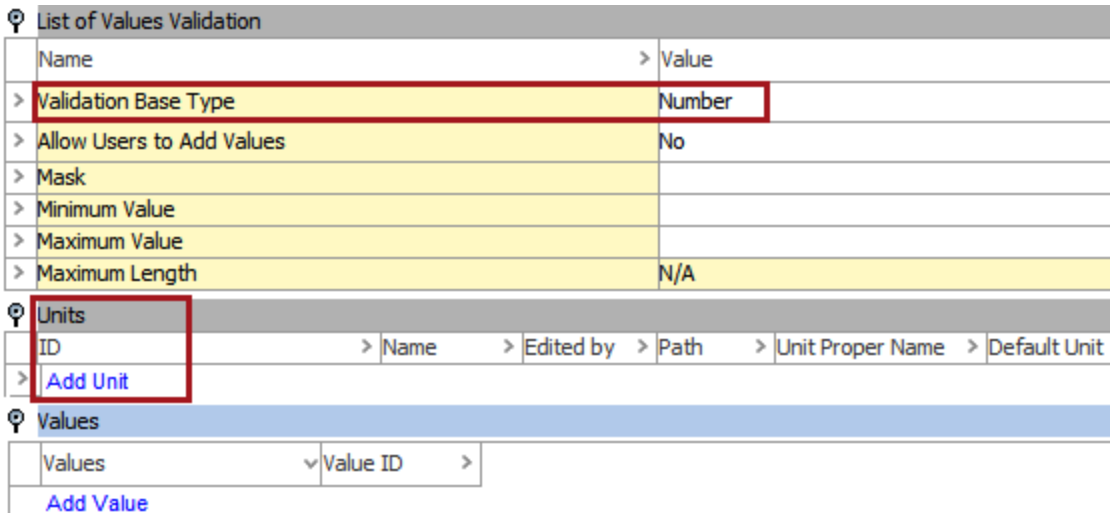
   - enables the **Value ID Pattern** parameter, where a pattern can be keyed to autogenerate IDs. A simple pattern could be [id], which will auto generate a unique ID for each value created in the LOV. The pattern [id] can be combined with a prefix or suffix if needed.
   - enables the **Use Ids for Sorting** parameter, where Yes means that the values are sorted based on the IDs. No means that the values are sorted based on the Values, not based on the IDs.

   Note: The **Use IDs on Values**, **Use Ids for Sorting**, and **Value-ID Pattern** parameters are hidden when the **Allow Users to Add Values** is set to **Yes**.

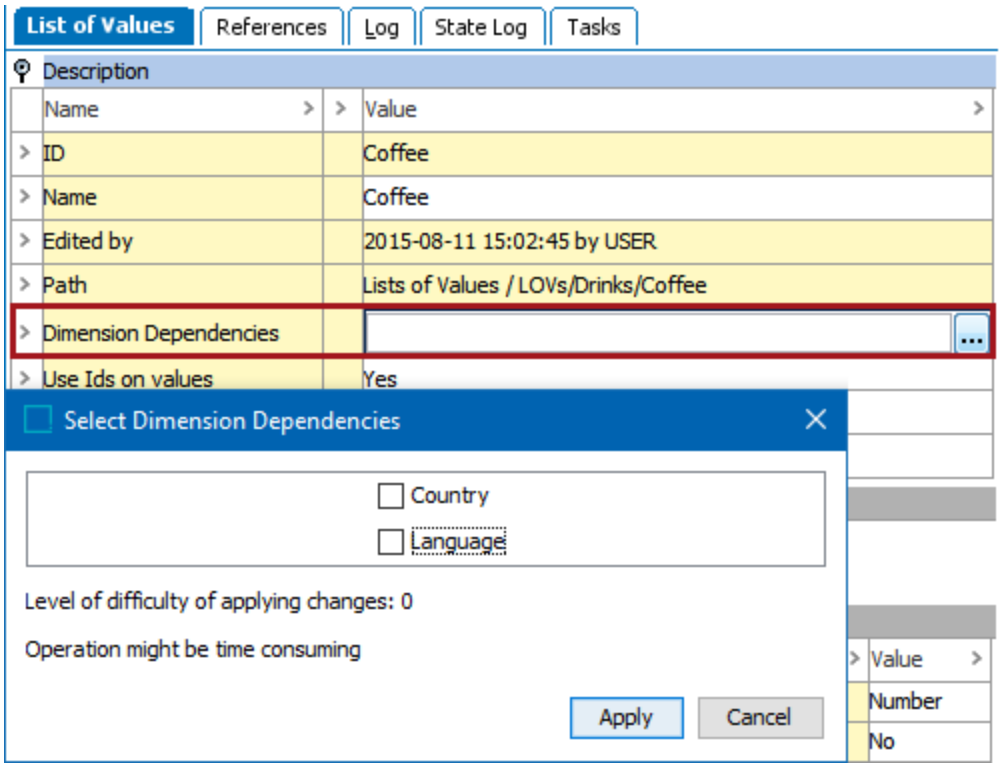


Note: Setting **Use Ids on Values** to **Yes** on an LOV that already contains values displays a dialog with options to generate IDs for the existing values. For more information, refer to the **Adding IDs to Values in LOV** topic within this section.

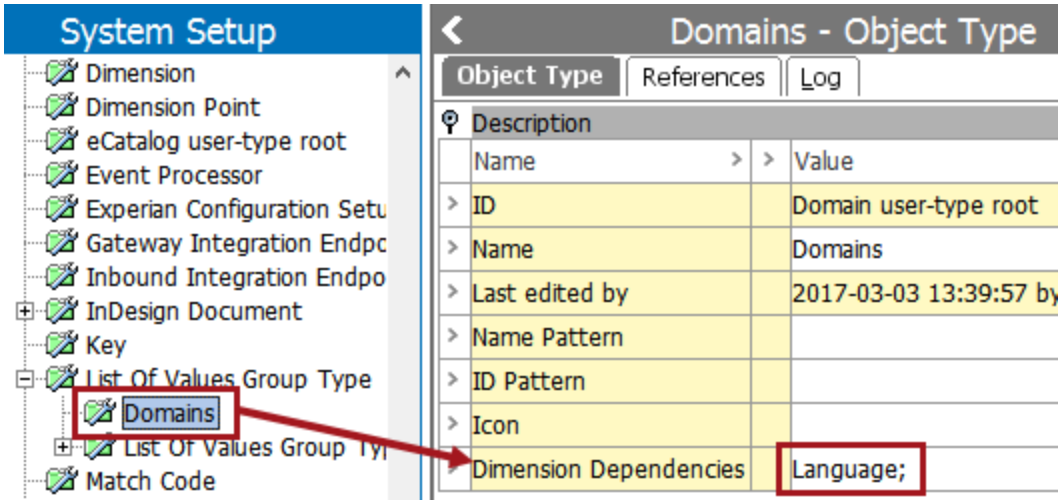
7. **Units**: Optionally allows for the use of units. The Unit field is only shown in the LOV editor if a numeric validation base type has been selected. For more information, refer to the **Units** section of the **System Setup** documentation.



8. **Dimension Dependencies**: Optionally allows for the use of more than one dimension. To enable, click the ellipsis button (...), and select one or more dimensions.
   - Setting a dimension dependency of Language allows your LOV values to be translatable and thus appear differently when viewed in different contexts. For more information on making objects and object types dimension dependent, refer to the **Maintaining Dimension Dependent Object Types** topic. For more information on using attributes with dimension dependent LOVs, refer to the **Using Dimension Dependent LOVs With Attributes** topic.



Note: To make the LOV object type *itself* dimension dependent so the names of your LOVs can be translated, you must set a language dimension dependency on the Domains object type, located at: System Setup > Object Types & Structures > Basic Object Types > List Of Values Group Type > **Domains**.



9. Add all required values to the LOV by following the steps in the **Adding Values to an LOV** topic within this guide.
10. Assign the LOV to the relevant attributes to allow selection of the values.

Adding Values to an LOV

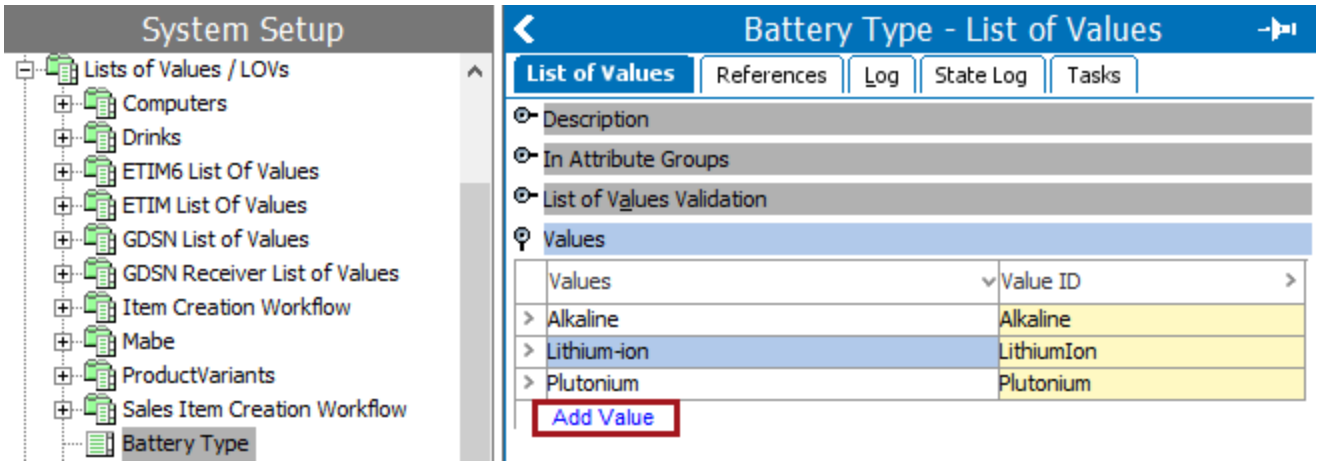
Adding new values to an LOV can be done one-at-a-time or in bulk. However, with the necessary privileges, values can always be added to the LOV from the System Setup tab. This topic addresses adding a single LOV value, and adding a group of LOV values.

Important: Exports run on the selected context, which means that to output all the values for a dimension dependent LOV, an export needs to be run for each context.

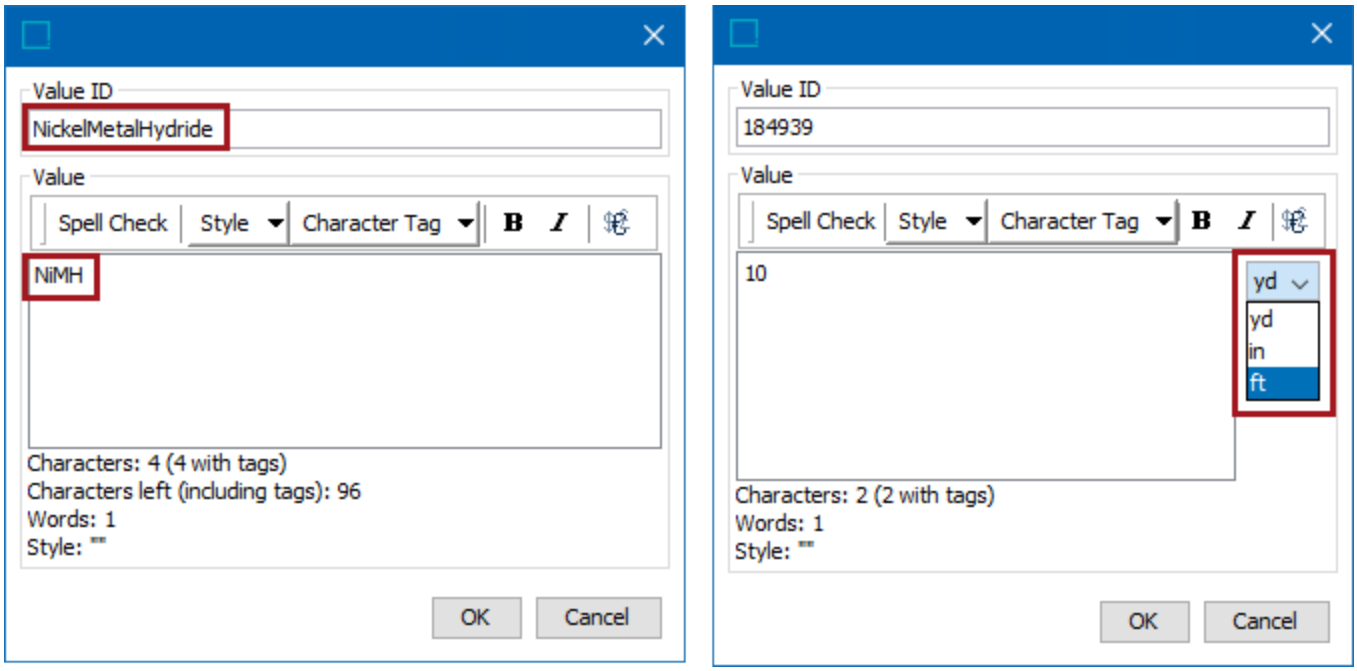
Adding a Single LOV Value

When only a few new values are required, it is simple to add them individually from the System Setup tab.

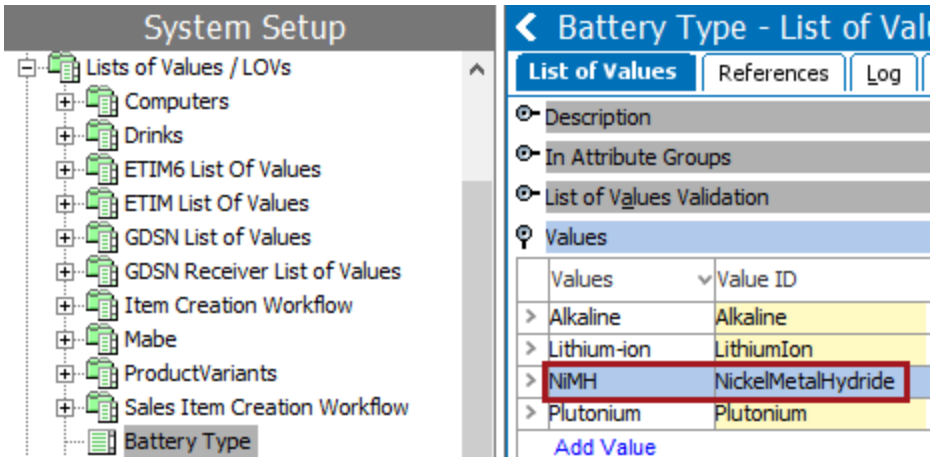
1. In System Setup, select the relevant LOV, open the Values flipper and click the **Add Value** link.



2. Enter a **Value ID** (if required use ValueID parameter) and a **Value**.
   - If units are not defined for the LOV, then enter a value (as shown in the screenshot below on the left).
   - If units are defined for the LOV, select the appropriate unit for the value from the available dropdown (as shown in the screenshot below on the right).



3. Once all the proper selections are made, click the **OK** button to add it to the LOV.
4. Verify the new value is displayed for the LOV.



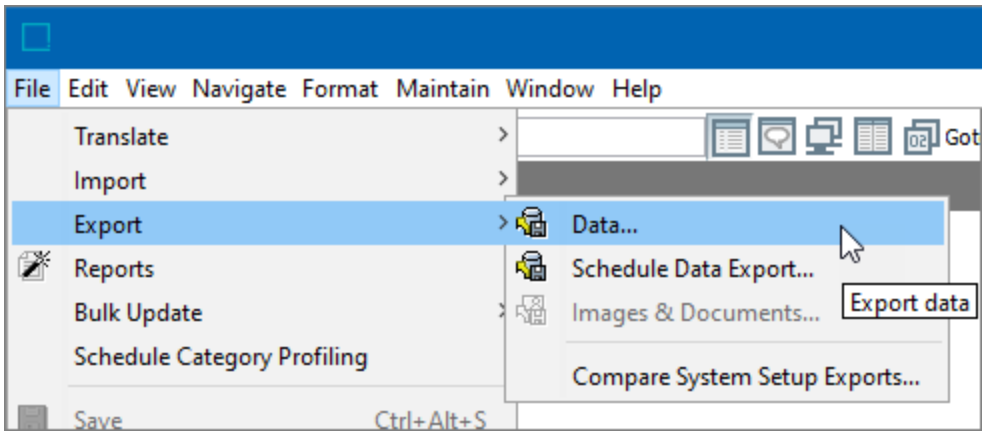
Adding a Group of LOV Values

When many new values are required, it may be easier to import the values using STEPXML. This process involves exporting the existing LOV to create a STEPXML file, modifying the file to include the new values, and then importing those new values back into STEP.

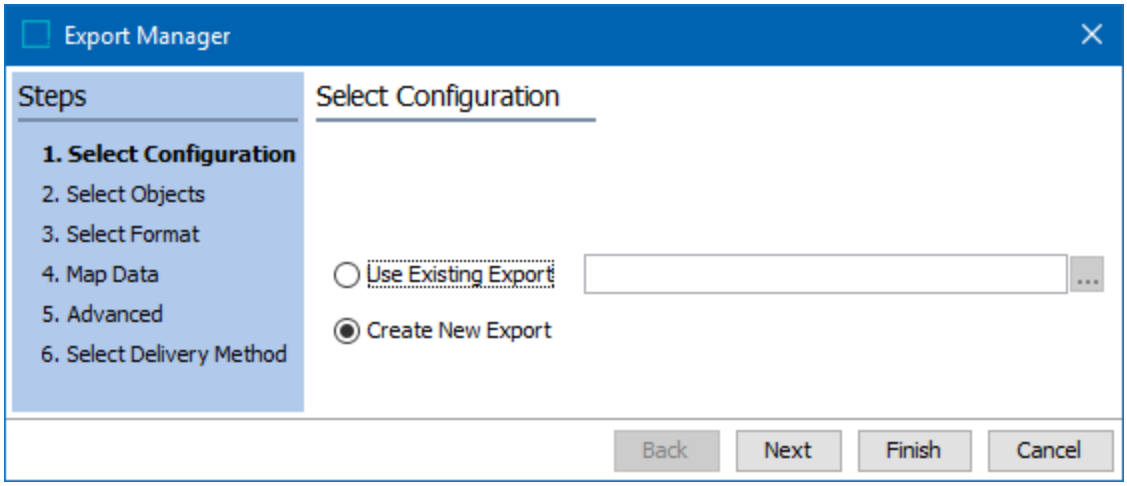
Important: Export and import the values of an LOV (List of Values) via Excel when as defined in the Excel List of Values topic in the Data Exchange documentation.

Exporting the Existing LOV to Create a STEPXML File

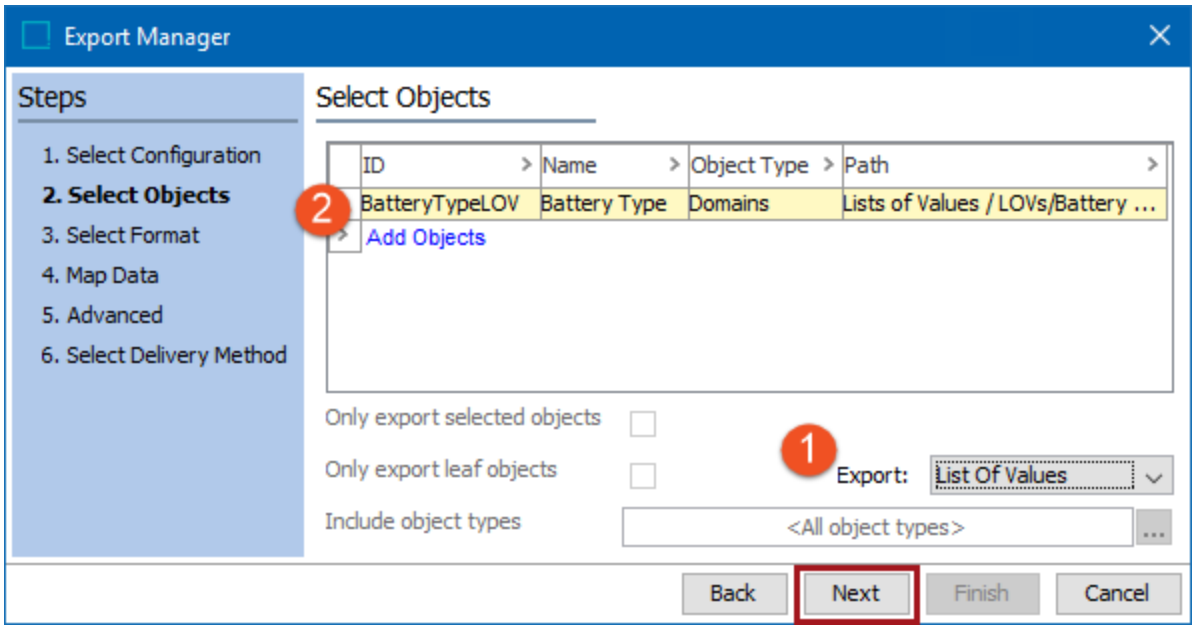
1. Go to Workbench > File > Export > Data



2. The Export Manager dialog will display, as shown below.



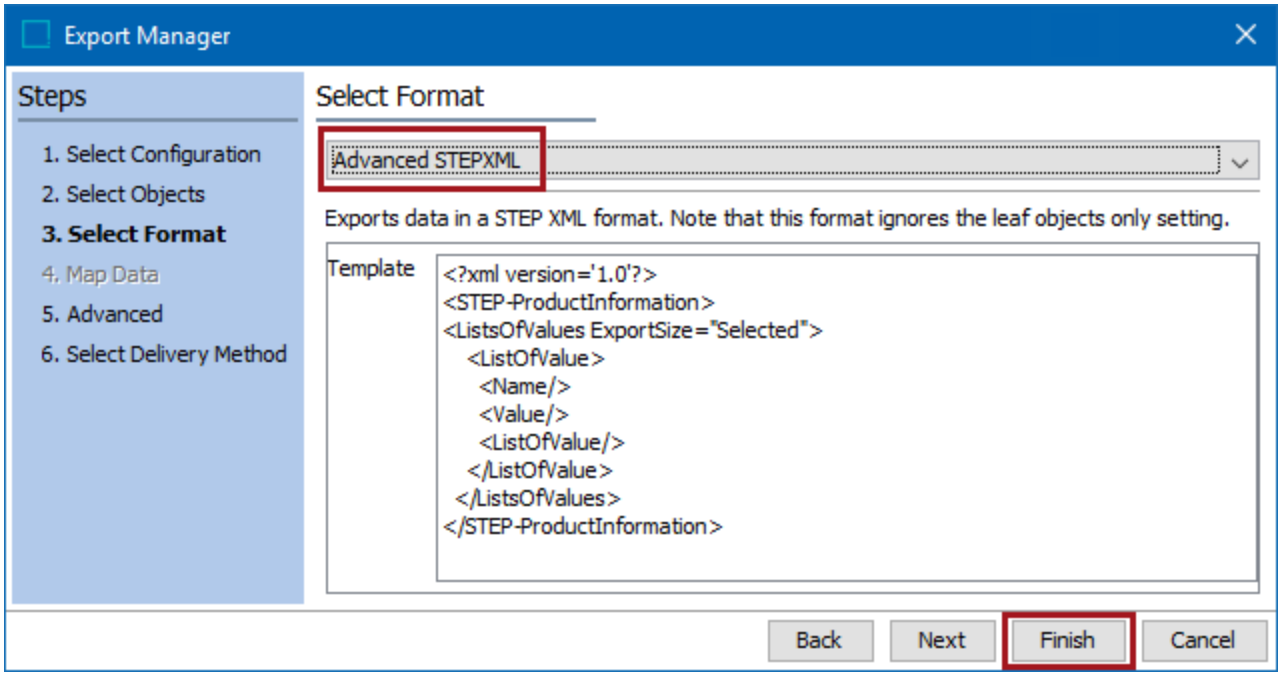
3. Click the **Next** button and Select Objects will display.



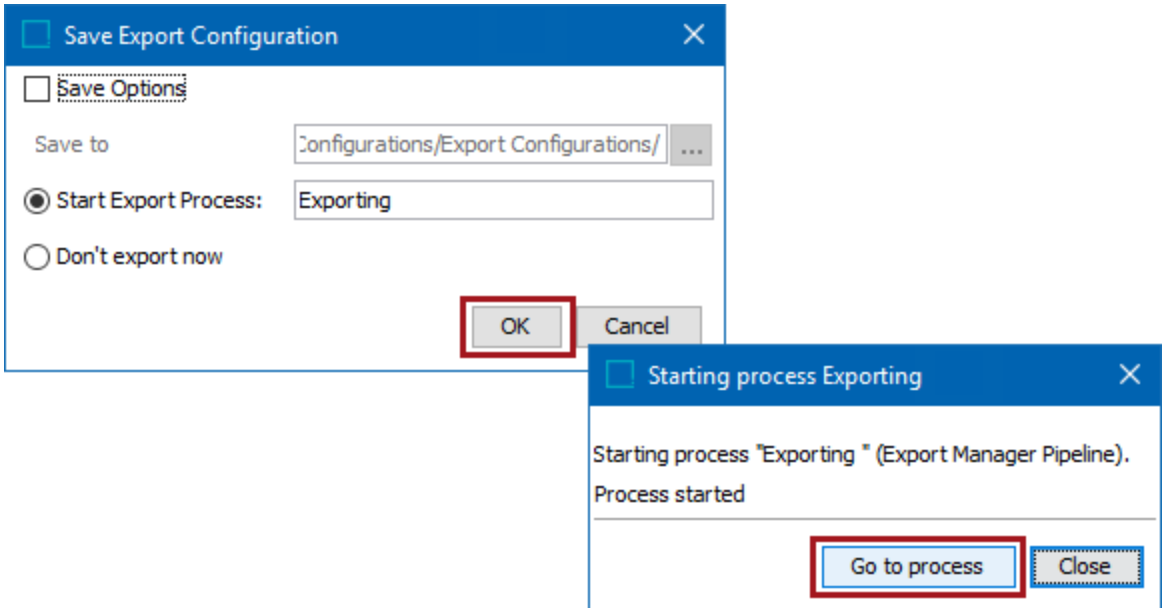
- In the Export field, select **List of Values**.
- In the objects list, use the **Add Objects** link to select the LOV (object type of Domain) that will get the new values.
- Click the **Next** button.

For details about each step and parameter of the Export Manager wizard, refer to the **Creating a Data Export** section of the **Data Exchange** documentation.

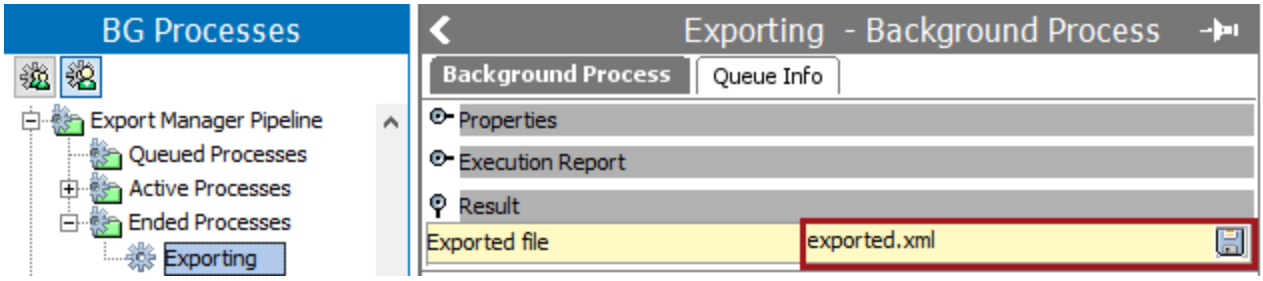
4. On Select Format, select **Advanced STEPXML** and click the **Finish** button.



5. On the Save Export Configuration dialog, click **OK** to start the export, and on the Starting process dialog, click the **Go to process** button.



6. On the displayed background process editor, open the output file.



Modifying the File to Include the New Values

1. In the output file, notice the **UseValueID** setting and the **Value** tags.

```
<?xml version="1.0" encoding="utf-8"?>
<!-- Configuration:
<?xml version='1.0'?>
<STEP-ProductInformation ResolveInlineRefs="true">
<ListsOfValues ExportSize="Selected">
    <ListOfValue>
      <Name/>
      <Value/>
      <ListOfValue/>
    </ListOfValue>
  </ListsOfValues>
</STEP-ProductInformation>
Export from Primary Product Hierarchy
Classifications All
Products All
Assets All
-->
<STEP-ProductInformation ExportTime="2016-09-08 16:27:37" ExportContext="Context1" ContextID="Context1" WorkspaceID="Main" UseContextLocale="false">

  <ListsOfValues>
    <ListOfValue ID="BatteryTypeLOV" ParentID="List Of Values group root" AllowUserValueAddition="false" UseValueID="true" Selected="true" Referenced="true">
      <Name>Battery Type</Name>
      <Validation BaseType="text" MinValue="" MaxValue="" MaxLength="100" InputMask=""/>
      <Value ID="Plutonium">Plutonium</Value>
      <Value ID="LithiumIon">Lithium-ion</Value>
      <Value ID="NickelMetalHydride">NiMH</Value>
      <Value ID="Alkaline">Alkaline</Value>
    </ListOfValue>
  </ListsOfValues>
</STEP-ProductInformation>
```

- Additionally, if **Units** are being used by the LOV, notice the valid options.

```
<STEP-ProductInformation ExportTime="2016-09-12 16:47:34" ExportContext="Context1" ContextID="Context1" WorkspaceID="Main" UseContextLocale="false">

  <ListsOfValues>
    <ListOfValue ID="Variants" ParentID="List Of Values group root" AllowUserValueAddition="false" UseValueID="true" IDPattern="[id]" Selected="true" Referenced="true">
      <Name>Variants</Name>
      <Validation BaseType="number" MinValue="" MaxValue="" MaxLength="" InputMask="">
        <UnitLink UnitID="unece.unit.INH"/>
        <UnitLink UnitID="unece.unit.YRD"/>
        <UnitLink UnitID="unece.unit.FOT"/>
      </Validation>
      <Value ID="184941" UnitID="unece.unit.FOT">15</Value>
      <Value ID="184940" UnitID="unece.unit.YRD">10</Value>
      <Value ID="184942" UnitID="unece.unit.INH">27</Value>
    </ListOfValue>
  </ListsOfValues>
</STEP-ProductInformation>
```

2. Copy the output text file and save it with a **new name** to create an **import** file.
3. Create new value data in Excel, using a column to hold each individual element of the required STEPXML tags and one additional column to hold the concatenated string.
   - If the LOV parameter **UseValueID="true"**, the Value tag must include a ValueID as shown in column B below, in addition to the actual value text, shown in column D. The result of the concatenate function in column F combines all data for the XML file in the expected format.

	A	B	C	D	E	F
1	<Value ID="	BatType1	">	Battery Type 1	</Value>	<Value ID="BatType1">Battery Type 1</Value>
2	<Value ID="	BatType2	">	Battery Type 2	</Value>	<Value ID="BatType2">Battery Type 2</Value>

   - If the LOV parameter **UseValueID="false"**, include only the new value text, as shown in column B below. The result of the concatenate function in column D shows all data for the XML file in the expected format.

	A	B	C	D
1	<Value ID>	Battery Type 1	</Value>	<Value ID>Battery Type 1</Value>
2	<Value ID>	Battery Type 2	</Value>	<Value ID>Battery Type 2</Value>

- If the LOV uses **Units**, include the ValueID if necessary as shown in column B below, the UnitID as shown in column E, and the new value text, as shown in column G. The result of the concatenate function in column I shows all data for the XML file in the expected format.

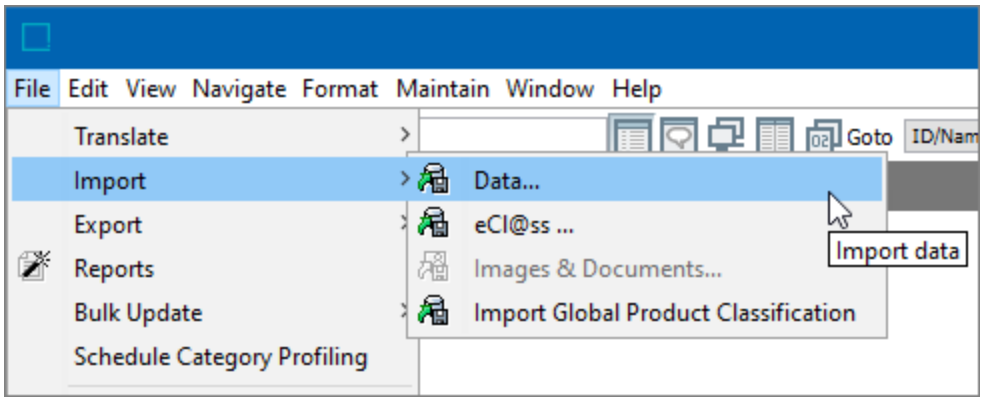
	A	B	C	D	E	F	G	H	I
1	<Value ID="	Var1	"	UnitID="	unece.unit.INH	">	32	</Value>	<Value ID="Var1" UnitID="unece.unit.INH">32</Value>
2	<Value ID="	Var2	"	UnitID="	unece.unit.FOT	">	45	</Value>	<Value ID="Var2" UnitID="unece.unit.FOT">45</Value>
3	<Value ID="	Var3	"	UnitID="	unece.unit.INH	">	58	</Value>	<Value ID="Var3" UnitID="unece.unit.INH">58</Value>
4	<Value ID="	Var4	"	UnitID="	unece.unit.YRD	">	72	</Value>	<Value ID="Var4" UnitID="unece.unit.YRD">72</Value>

4. Copy and paste the new value data into your import file and save it.

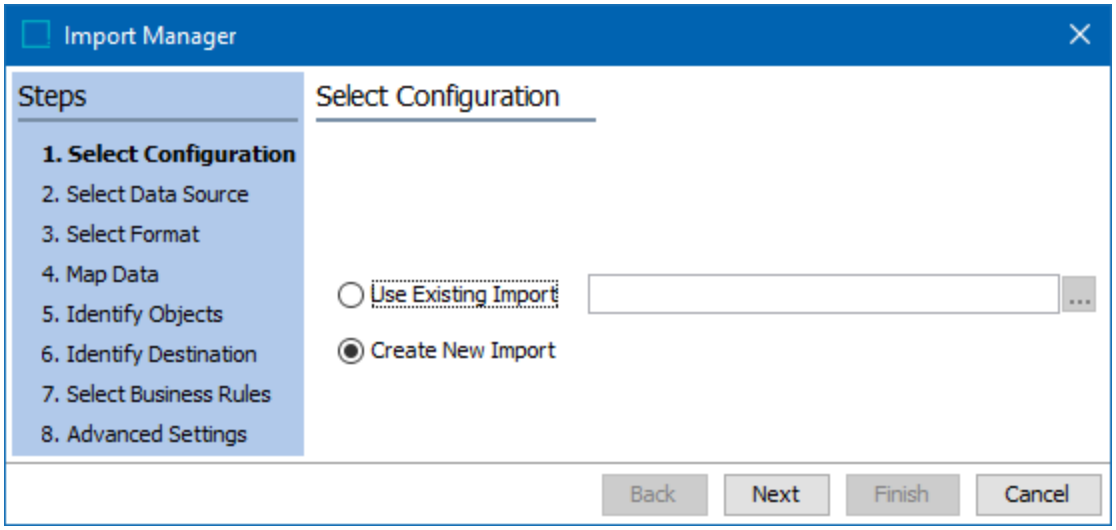
```
<STEP-ProductInformation ExportTime="2016-09-08 16:27:37" Export

  <ListsOfValues>
    <ListOfValue ID="BatteryTypeLOV" ParentID="List Of Values gr
      <Name>Battery Type</Name>
      <Validation BaseType="text" MinValue="" MaxValue="" MaxLer
<Value ID="BatType1">Battery Type 1</Value>
<Value ID="BatType2">Battery Type 2</Value>
<Value ID="BatType3">Battery Type 3</Value>
<Value ID="BatType4">Battery Type 4</Value>
<Value ID="BatType5">Battery Type 5</Value>
<Value ID="BatType6">Battery Type 6</Value>
<Value ID="BatType7">Battery Type 7</Value>
<Value ID="BatType8">Battery Type 8</Value>
<Value ID="BatType9">Battery Type 9</Value>
<Value ID="BatType10">Battery Type 10</Value>
    </ListOfValue>
  </ListsOfValues>
</STEP-ProductInformation>
```

Importing New Values Into STEP

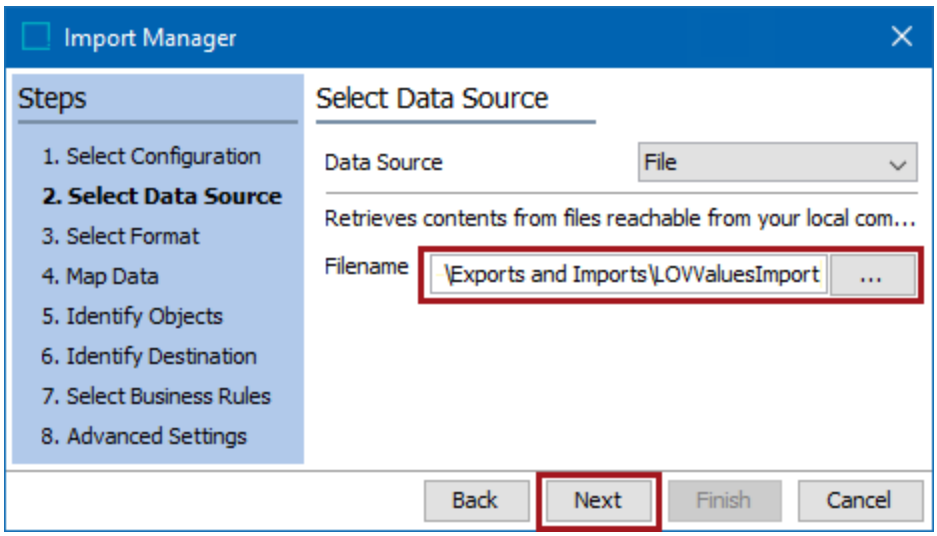
1. Go to Workbench > File > Import > Data



2. The Import Manager dialog will display, as shown below.



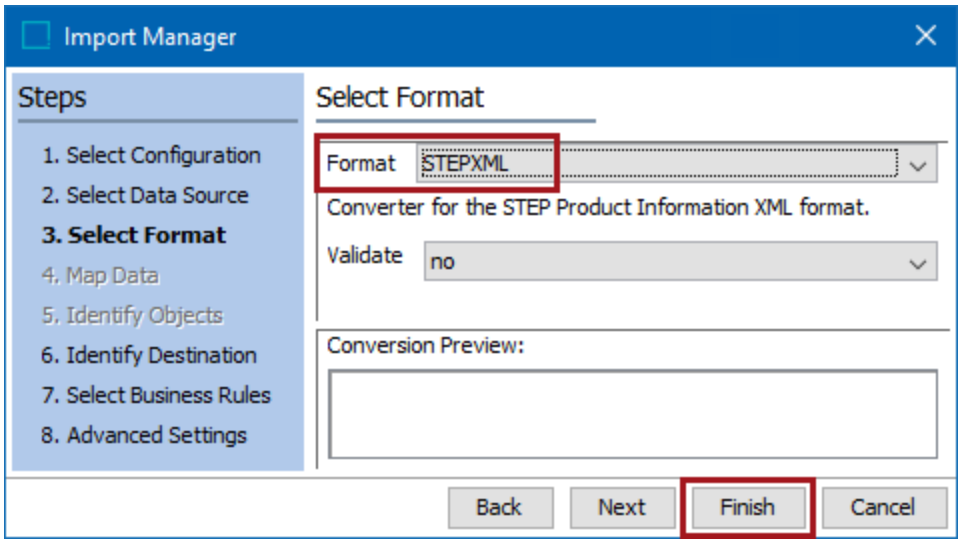
3. Click the **Next** button and Select Data Source will display.



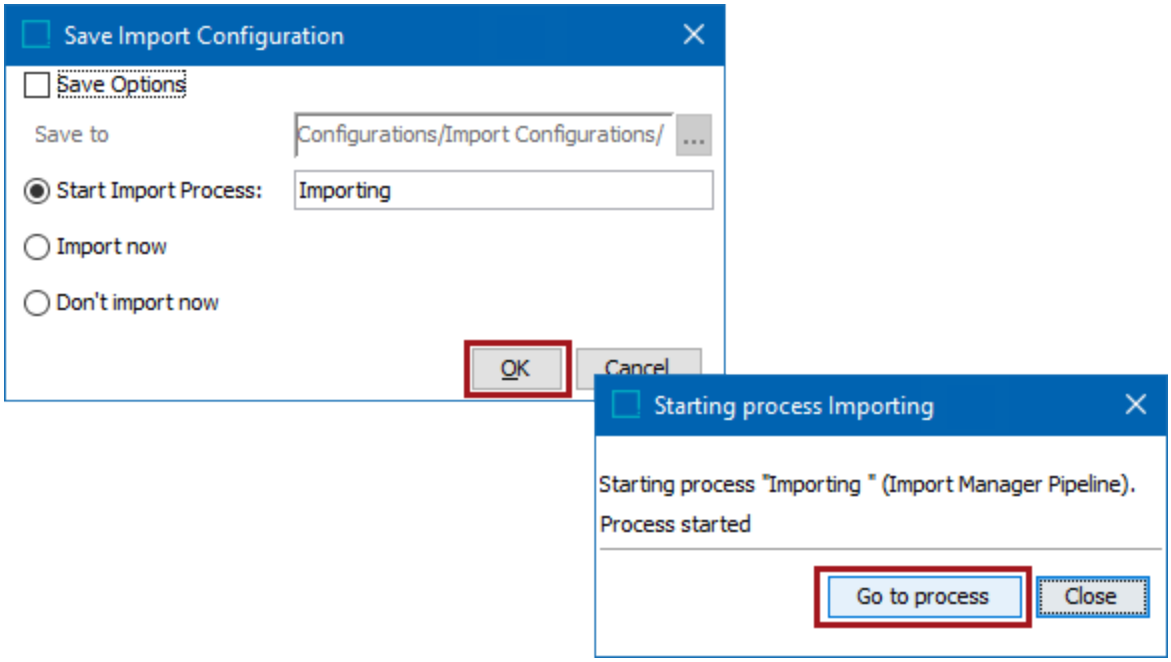
4. On Select Data Source:
   - In the Filename field, select the **import file name**.
   - Click the **Next** button.

   For details about each step and parameter of the Import Manager wizard, refer to the **Creating a Data Import** section of the **Data Exchange** documentation.

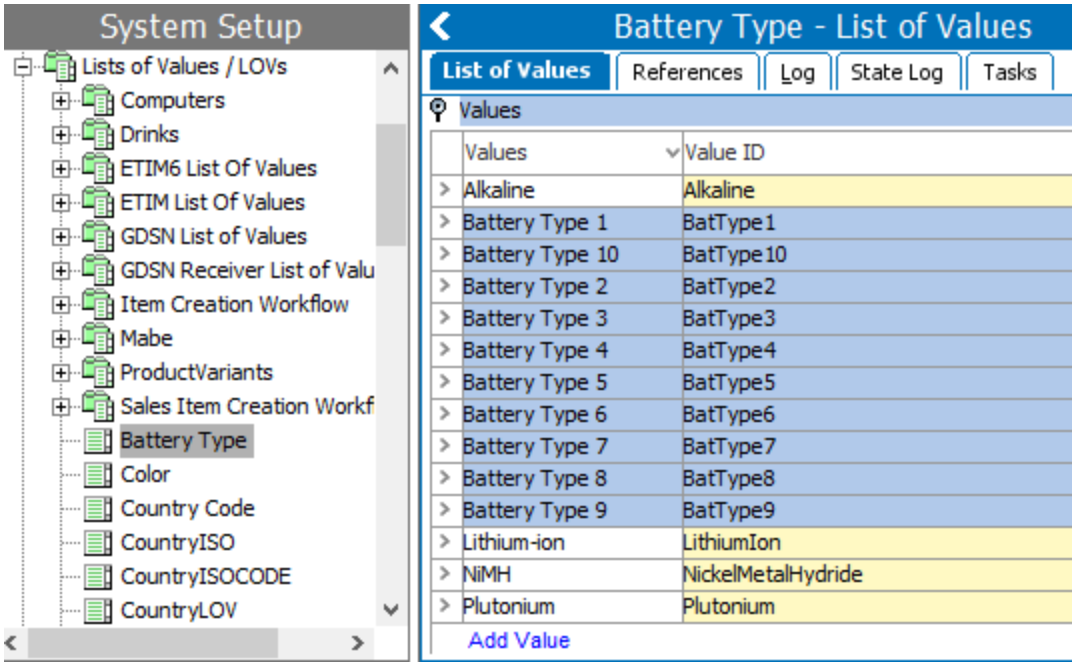
5. On Select Format, select **STEPXML** and click the **Finish** button.



6. On the Save Import Configuration dialog, click the **OK** button to start the import, and on the Starting process dialog, click **Go to process.**



7. On the displayed background process editor, verify the import succeeded.
8. In System Setup, verify the new values are displayed for the LOV.



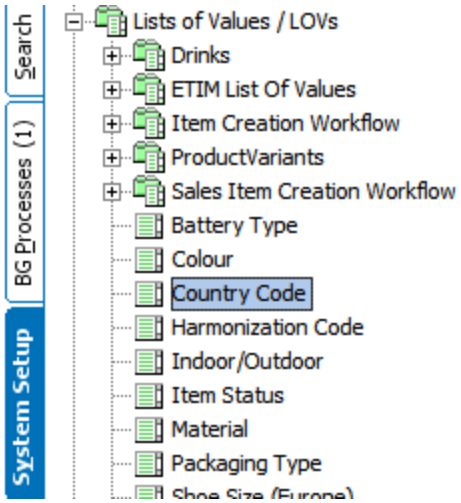
Adding IDs to Existing Values in LOV

For LOVs that already contain values, Value ID generation adds an ID to each value in the LOV. For example, it is possible to map the LOV values to the international standard codes as 'value ID' (i.e., color code, abbreviations of country or cities, ISO codes).

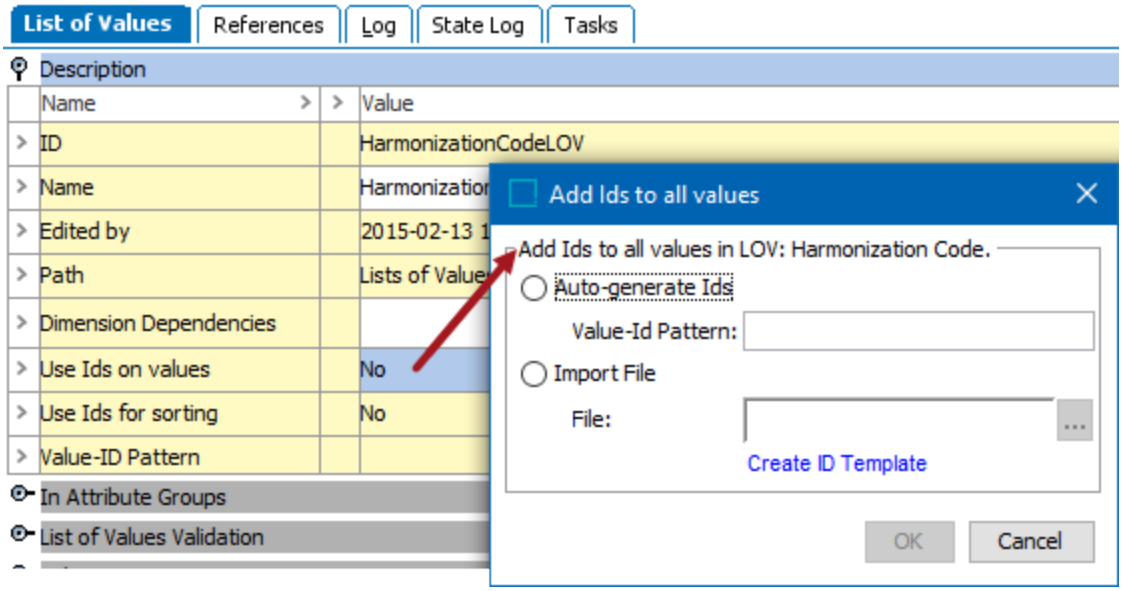
Configuring IDs for Existing LOV Values

IDs can be added to existing LOV values one of two ways: 'auto-generated IDs' or 'import files.' The following configuration is required for either option.

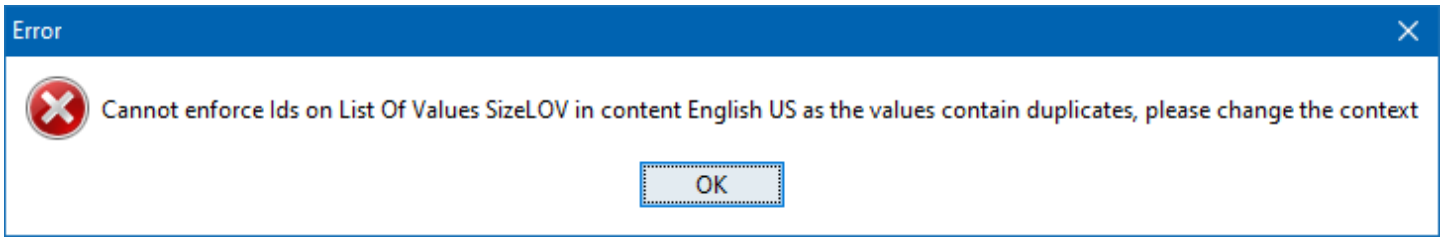
1. Go to System Setup > Lists of Values / LOVs > click on the relevant LOV.



2. On the List of Values tab, double-click the value column of the **Use Ids on values** parameter.
   - If the 'Add IDs to all values' dialog displays, select a radio button to determine how IDs are created. Each option is addressed below in the **Using the Auto-generate IDs option** section or the **Using the Import File option** section.



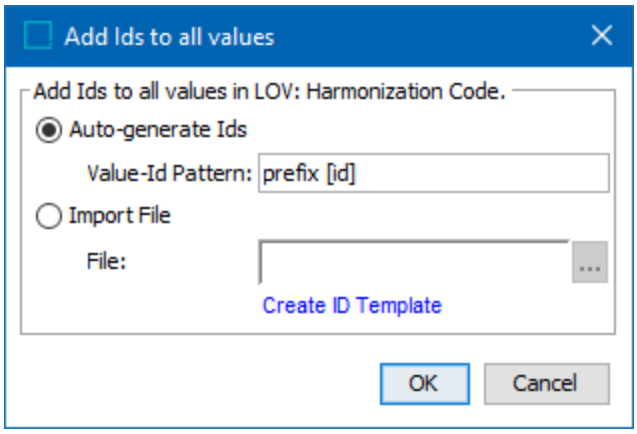
- If an error similar to the following is displayed, click **OK** to close the error and refer to the **Allowing Value IDs to be Added to an LOV** topic for additional required configuration.



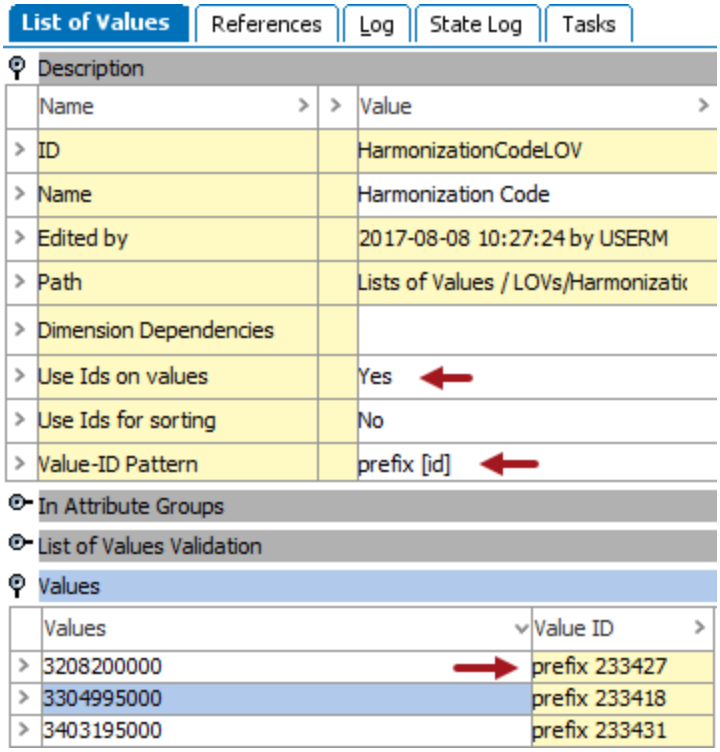
Using the Auto-generate IDs option

This option allows customization of the ID by using a specified Value-ID Pattern with an auto-generated ID.

1. Select the Auto-generate IDs radio button.
2. In the Value-ID Pattern field, add the case-sensitive ID pattern '[id]' and any other additional desired value. The additional text can precede or follow the [id] as needed.



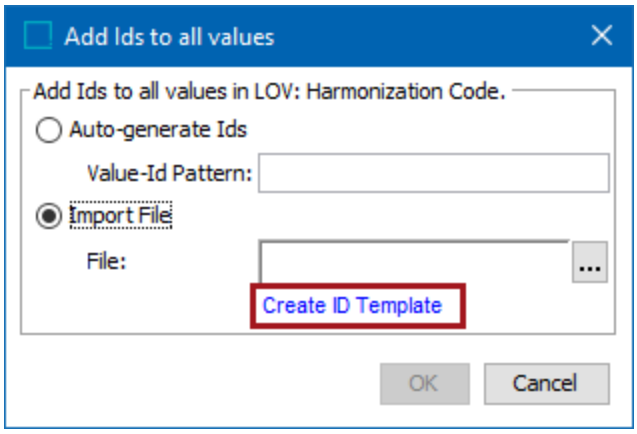
3. Click the **OK** button to apply the Value-ID Pattern on existing values. The LOV editor will display the newly applied ID added to the existing value according to the ID pattern and the 'Value ID' column will display the respective IDs for the present values within the Values flipper (as shown below).



Using the Import File option

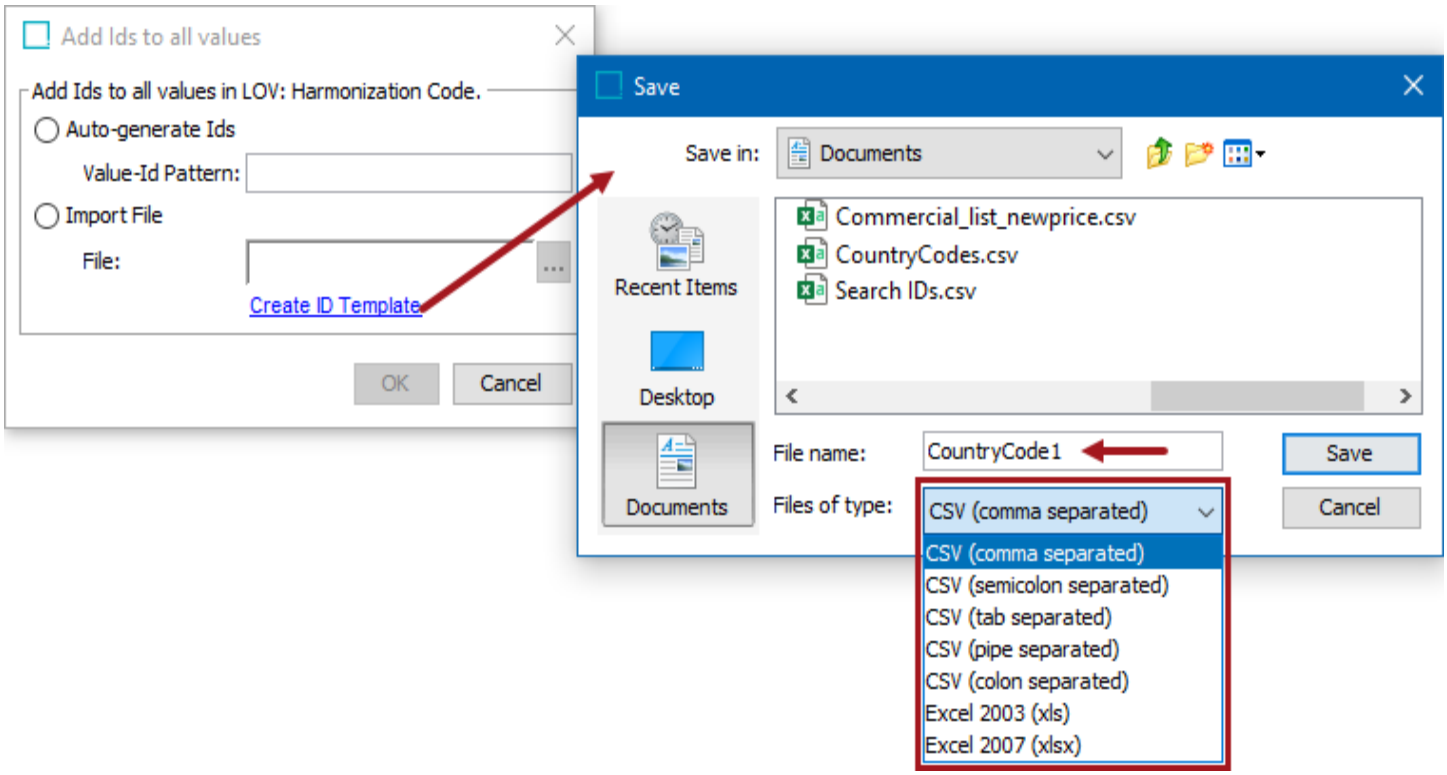
This option uses the selected import file to determine the value for each ID.

1. Select the **Import File** radio button.
2. Click the **Create ID Template** link.

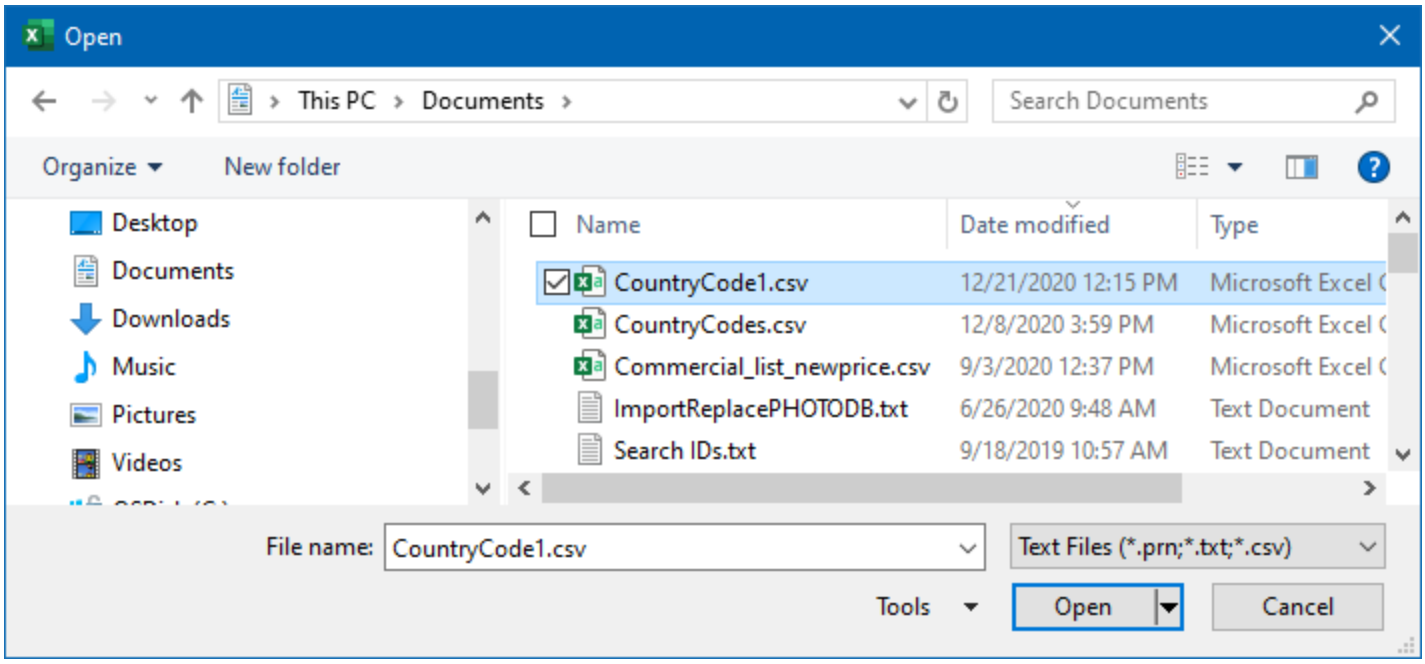


3. Choose the destination of the saved template, and name the template.

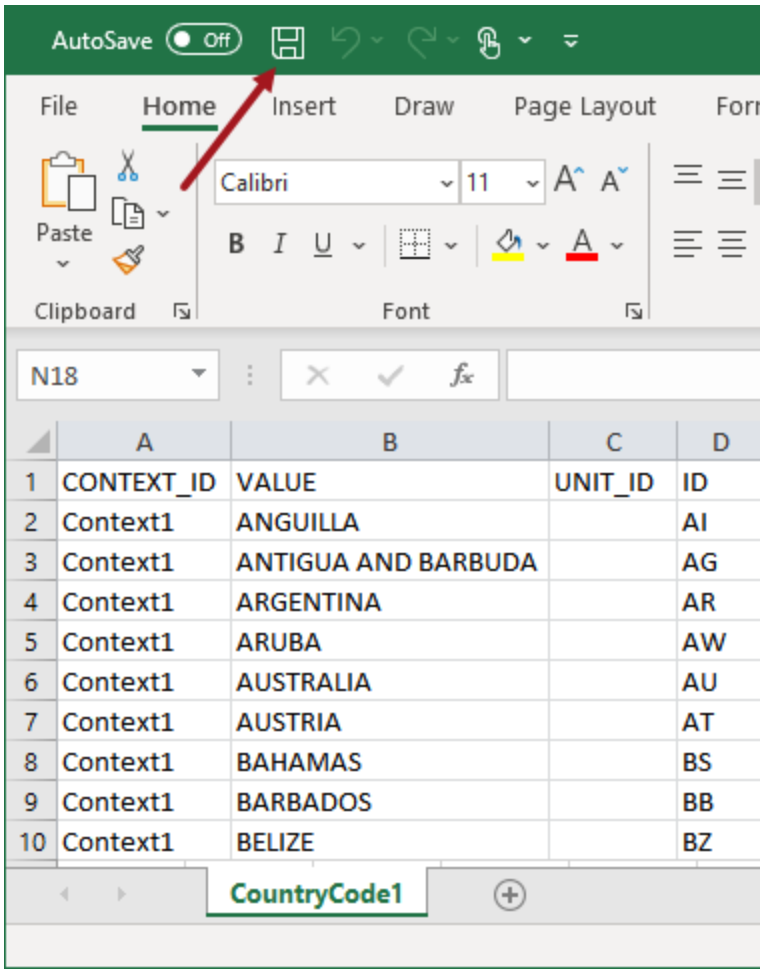
Note: An ID template can be saved in CSV (comma, semicolon, tab, pipe, or color separated) or Excel 2007 format. It is recommended to use the newest, supportable version of Excel.



4. Click **Save**, leaving the **Add IDs to all values** dialog open.
5. Open your template using to the program used to create the template.



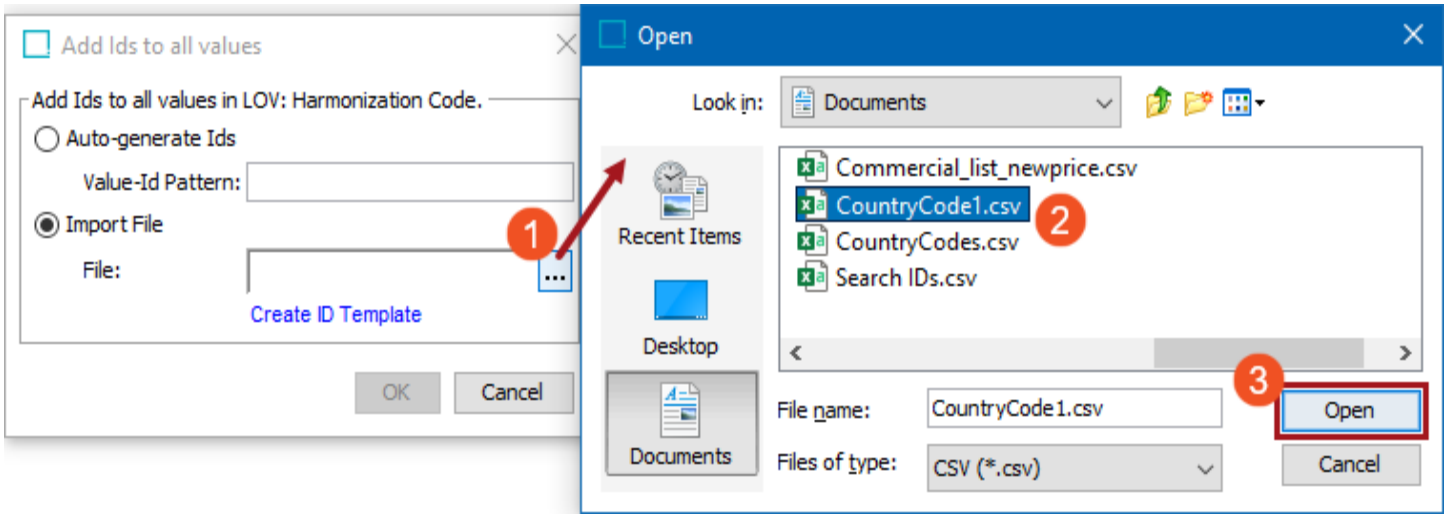
6. Once the template file is open, populate the name and ID column accordingly, and save the file.



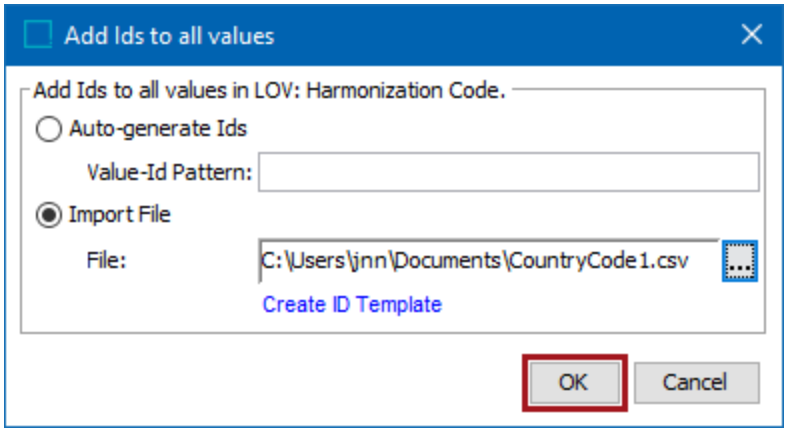
	A	B	C	D
1	CONTEXT_ID	VALUE	UNIT_ID	ID
2	Context1	ANGUILLA		AI
3	Context1	ANTIGUA AND BARBUDA		AG
4	Context1	ARGENTINA		AR
5	Context1	ARUBA		AW
6	Context1	AUSTRALIA		AU
7	Context1	AUSTRIA		AT
8	Context1	BAHAMAS		BS
9	Context1	BARBADOS		BB
10	Context1	BELIZE		BZ

Note: Unit ID column is only filled if there are units (i.e., inches, pounds, centimeters).

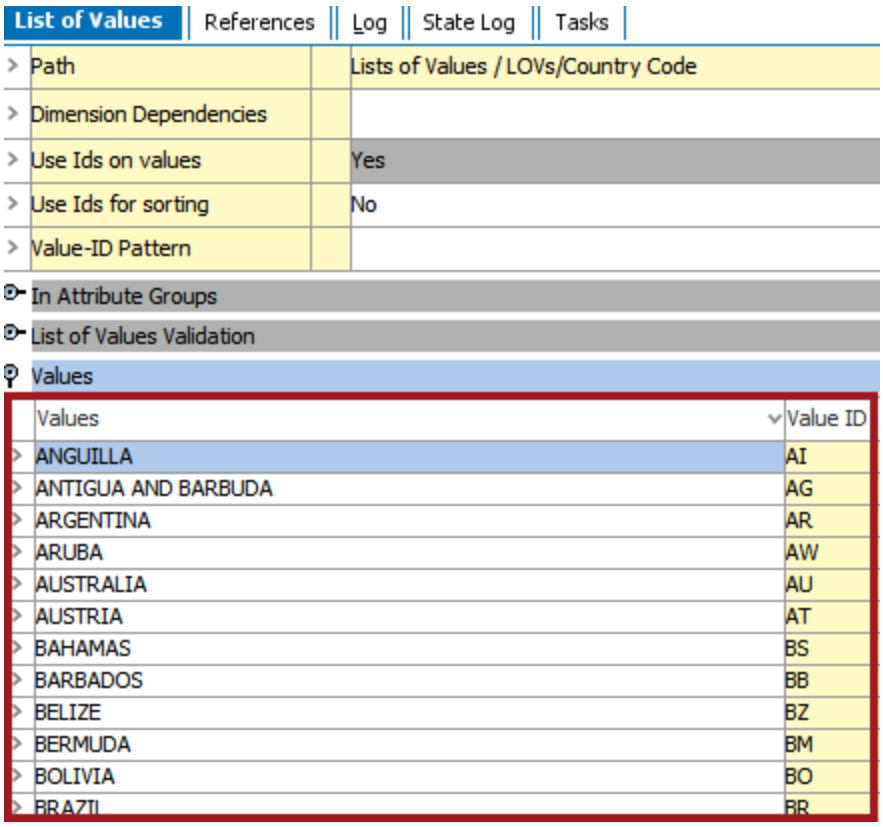
7. On the **Add IDs to all values** dialog, click the ellipsis button (...) and select your file. Click the **Open** button.



8. On the **Add IDs to all values** dialog click the **OK** button.

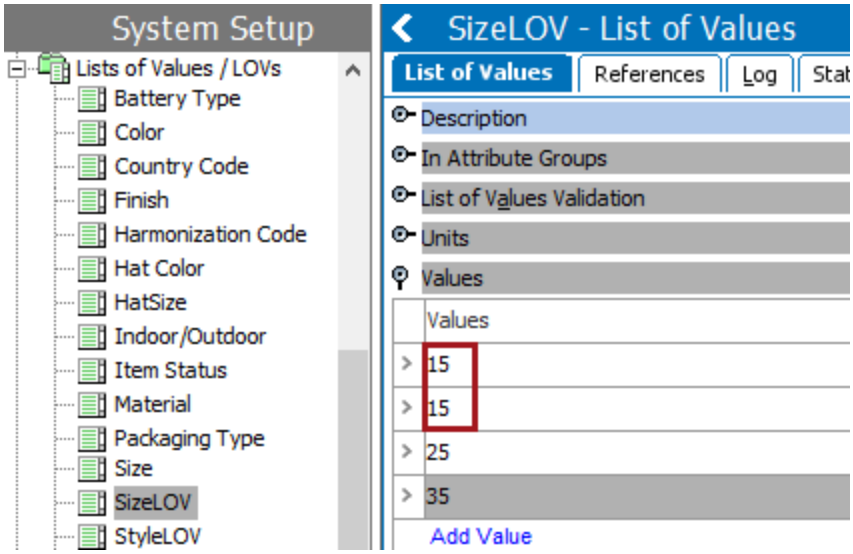


9. The imported data displays in the Values flipper with the new IDs.

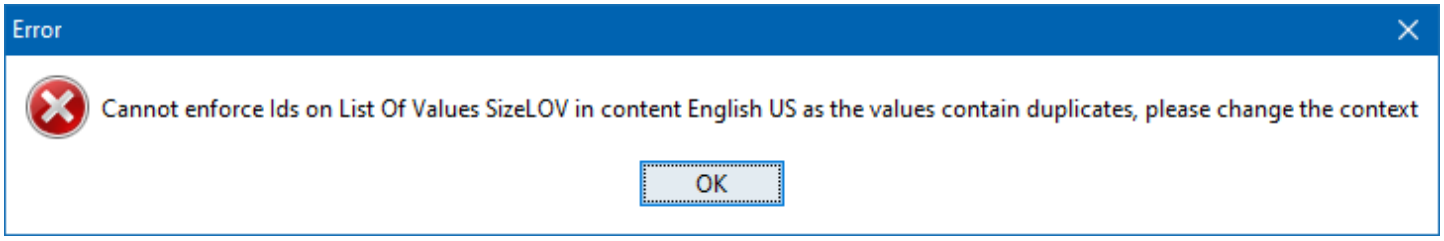


Allowing Value IDs to be Added to an LOV

Merging values in an LOV requires that Value IDs are used. Adding Value IDs requires that no duplicate LOV values exist. For example, the SizeLOV list of values has a Language dimension dependency and contains duplicate values for the English US context.



Attempting to set the 'Use Ids on values' parameter (in the Description flipper) to Yes, results in the displaying the following error:

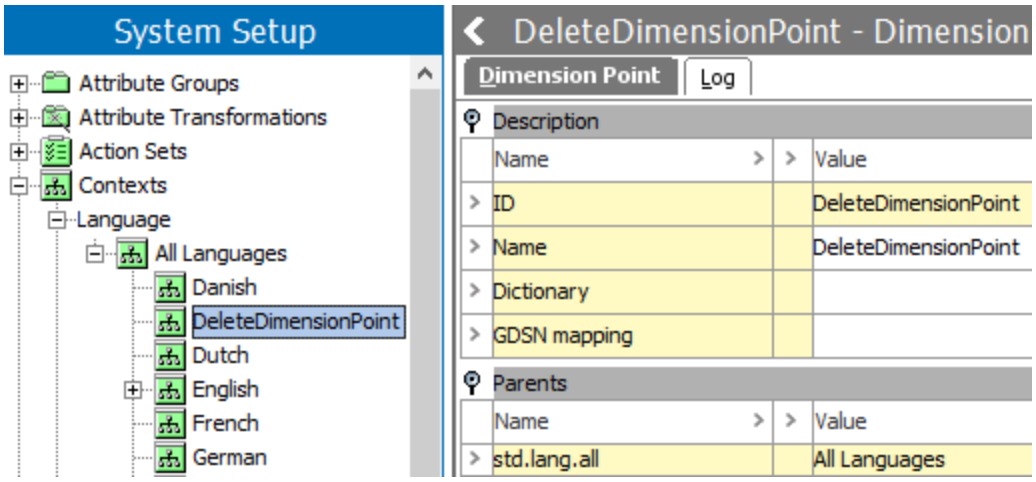


To resolve this issue and allow Value IDs to be used, first a new (temporary) dimension point and context are created. Unique values are then added for the temporary context and the Value IDs are applied. Finally, the temporary context is deleted. This process allows unique Value IDs to be assigned to the duplicate values (in other contexts), which then allows those duplicate values to be merged successfully.

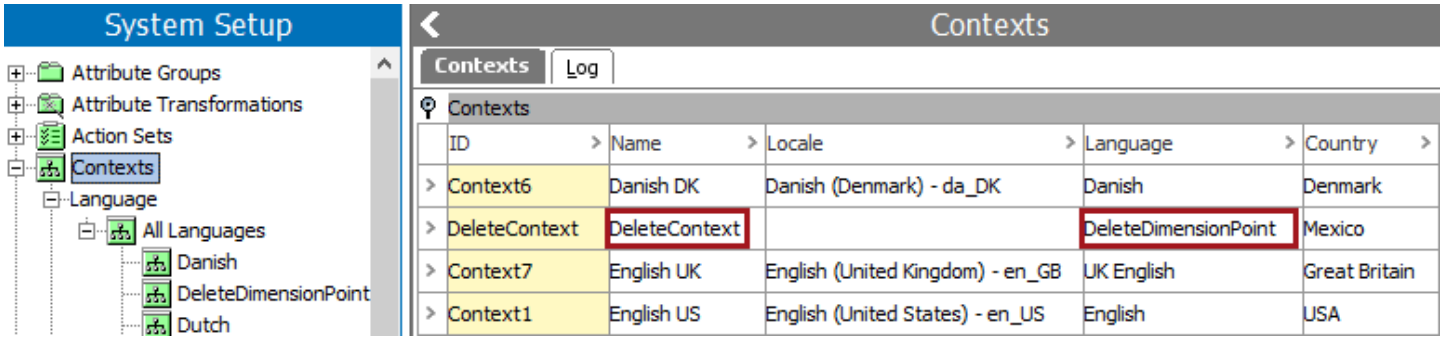
Important: These steps require care since they involve creating and deleting a temporary dimension point and context.

Configuration

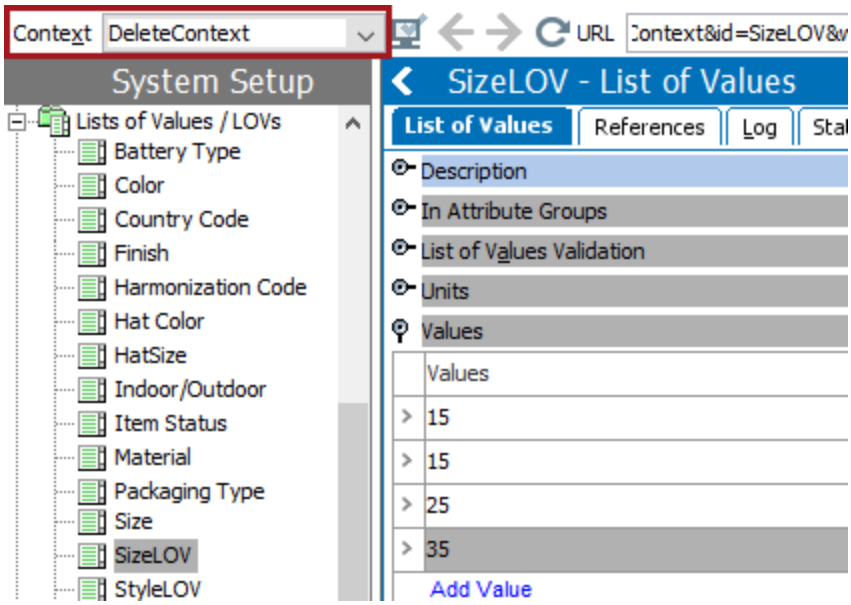
1. In System Setup, open the Contexts node, right-click a dimension point (Language in the example below), and add an ID and Name for a new (temporary) dimension point. Click **Create**. For example, the following image shows a dimension point named 'DeleteDimensionPoint' so it is not confused with the active dimension points.



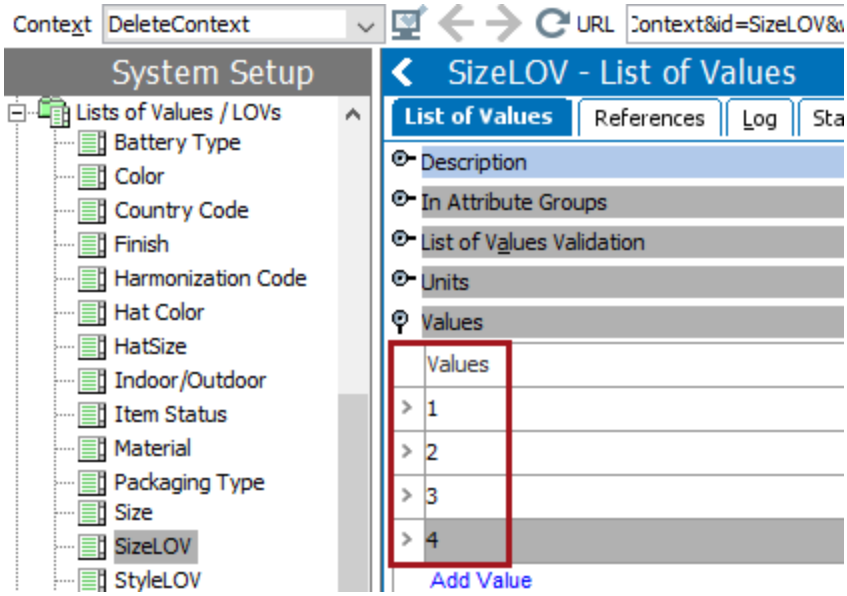
2. Select the Contexts node, click the **Add New Context** link to create a temporary context. Add a context name and click **OK**. In this example, the new context is named 'DeleteContext'.



3. For the new temporary context (DeleteContext), select the new temporary dimension point. In this example, DeleteDimensionPoint is selected for Language. The other settings are irrelevant.
4. Click on the LOV, and select the temporary context 'DeleteContext'.



5. Add unique values for each row of the temporary context, including replacing inherited values if displayed.



6. While continuing to display the temporary context (DeleteContext), proceed to add IDs to all values as described in the Configuration steps of the **Adding IDs to Values in LOV** topic. During this configuration, setting the LOV 'Use Ids on values' parameter applies IDs to values in all contexts.
7. Once IDs are successfully added to the LOV values, delete the temporary dimension point and the temporary context.

> **Note:** For steps to merge duplicate values in an LOV, refer to the **Merging Values in an LOV** topic.

Consolidating LOVs

Merging List of Values (LOVs) can involve the consolidation of two LOV lists or the consolidation of multiple LOV values. Ideally, LOVs and their values are unique selections. Merging is needed when duplicate lists or values exist due to different spellings, capitalization, or other insignificant discrepancies.

Merging LOVs

The Merge LOVs option can be used to combine two LOVs into a single selected master list.

For example, when two individual LOVs exist for the same set of values:

- Screwdriver Color with the values Black, Gray, and Blue
- Tool Color with the values Red, Black, Gray, and White

After the merge, a single, case sensitive, LOV exists with the values: Red, Black, Gray, White, and Blue.

For more information, refer to **Merging LOVs**.

Merge Values in LOV

The Merge Values in LOV option can be used to combine all duplicated values into a single selected master value.

For example, when a single LOV has duplicate existing values:

- yes
- Yes
- YES

After the merge, a single LOV value exists for 'yes.'

For more information, refer to **Merging Values in an LOV**.

Merging LOV Values in Bulk

The 'Merge LOV Values' option greatly eases the maintenance of LOVs that contain misaligned, repeated, or incorrect values across multiple contexts. This functionality allows users to upload a semicolon-separated CSV file containing the IDs of the LOVs in which values should be merged, the Value ID of the source value, and the Value ID of the target value. Multiple LOVs can be actioned at once, with a limit of 1,000 total values (i.e., 1,000 lines in the file).

For more information, refer to **Merging LOV Values in Bulk**.

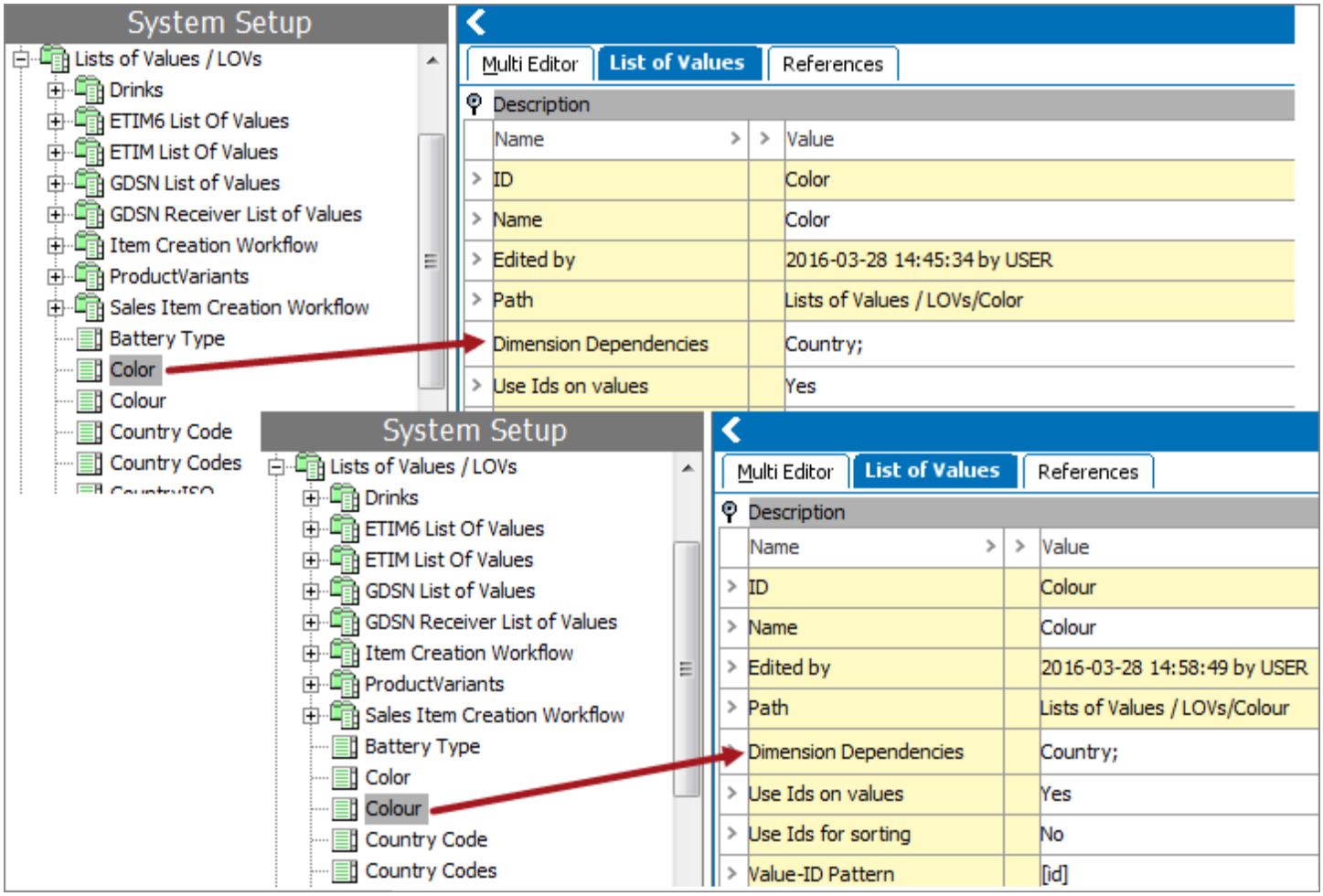
Merging LOVs

The Merge LOVs option can be used when LOVs with similar characteristics can be combined into one LOV, easing the maintenance burden.

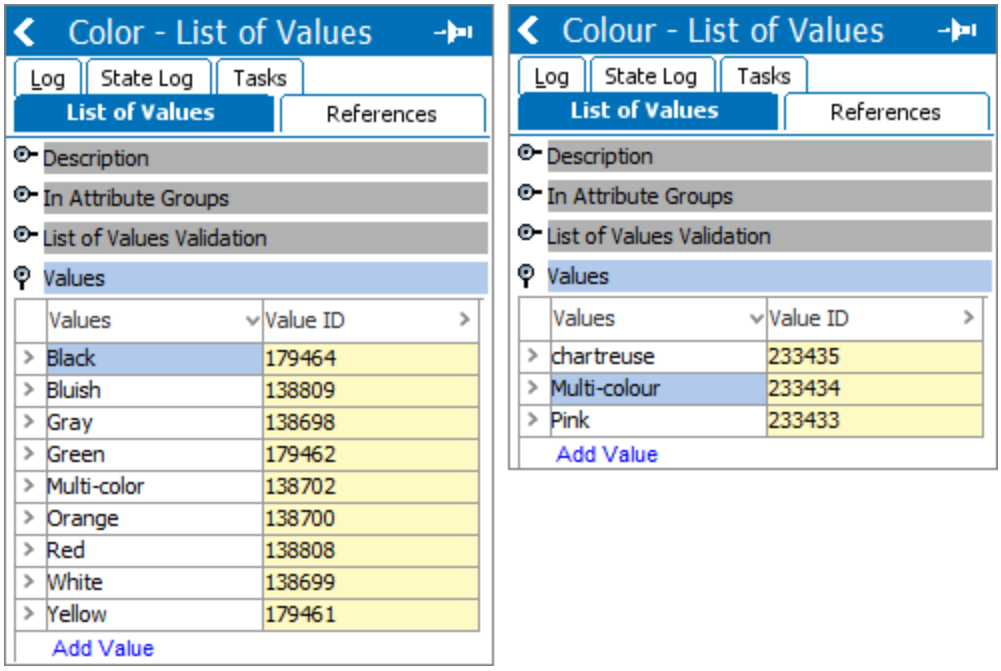
For Oracle databases, this action requires single-update mode (SUM), as defined in the Single-Update Mode topic. For Cassandra databases, this action uses Lock-free Schema Change (LFSC) functionality, as defined in the Lock-free Schema Change topic.

Configuration

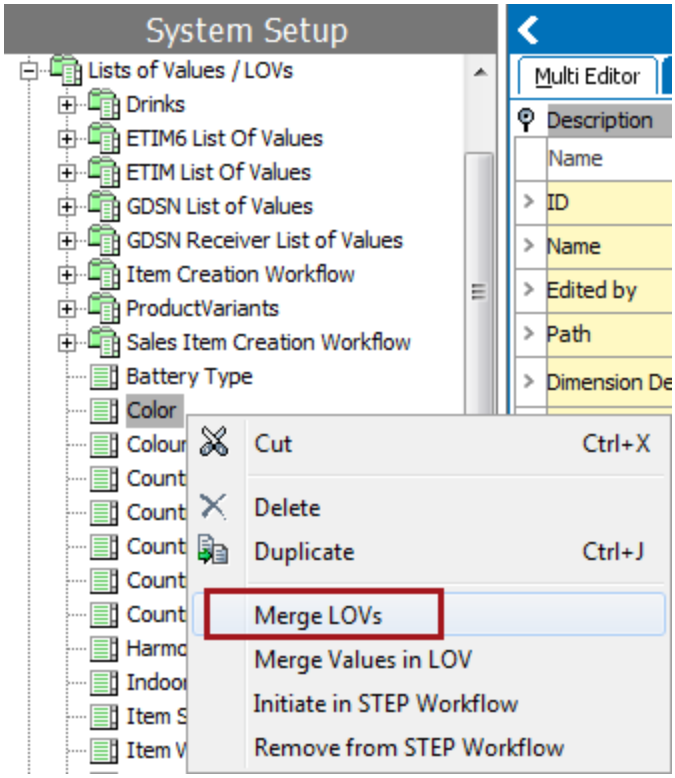
1. Go to System Setup > Lists of Values / LOVs > click on **each of the LOVs to be merged** and ensure the settings within the Dimension Dependencies parameter match. For the example below, the two attributes 'Color' and 'Colour' have the same value for the Dimension Dependencies parameter.



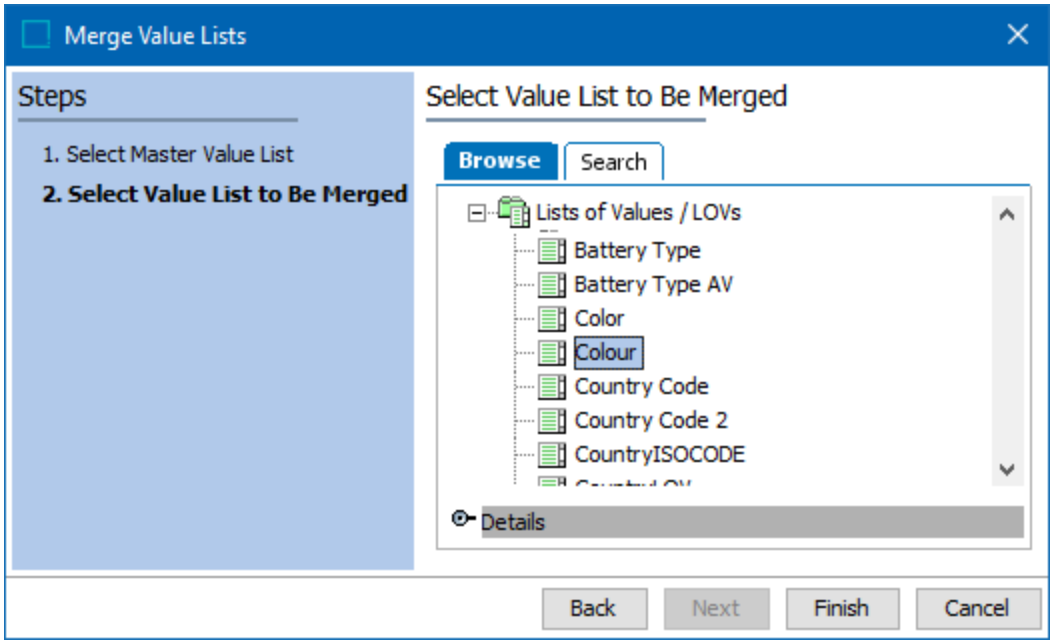
For this example, prior to merging the LOVs, the values for each of the LOVs can be found in the screenshot below.



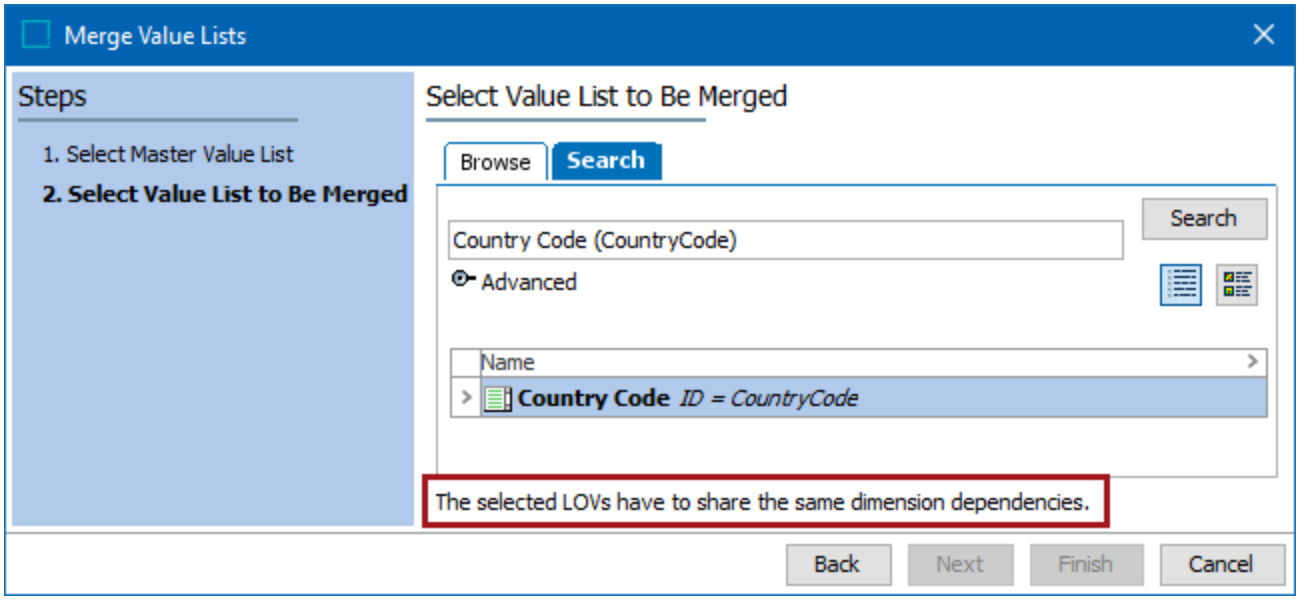
2. Highlight the master LOV (the LOV that will remain after the merge), right-click and select **Merge LOVs**.



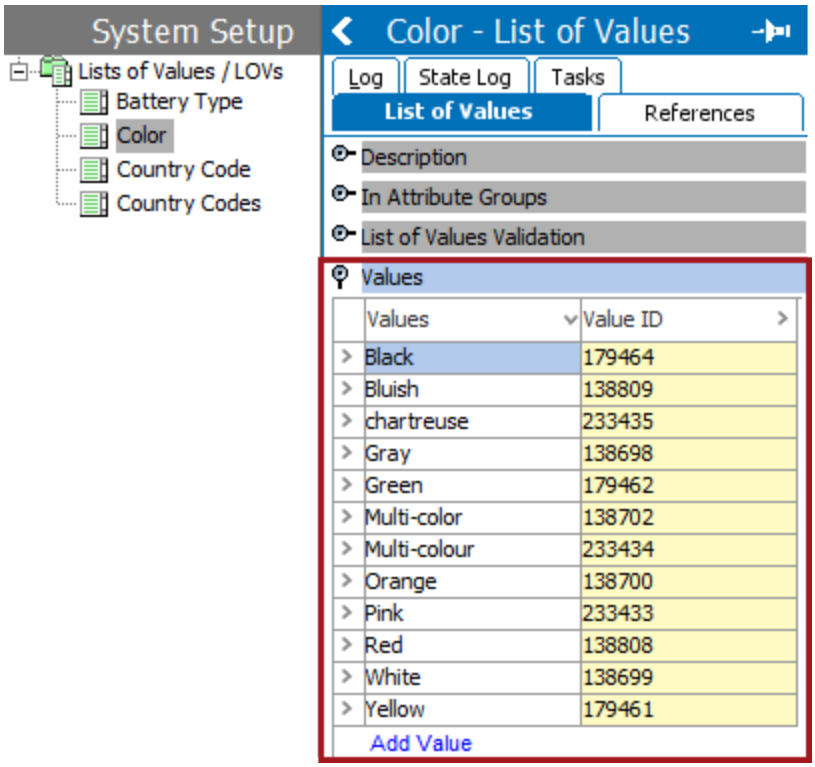
3. The Merge Value Lists wizard will display. Use the Browse or Search tabs to find and select the LOV to be merged (the LOV that will be deleted) with the master LOV.



If an LOV with dimension dependency values that are different from the master LOV is selected, then a warning will display and the Finish button will not be enabled (as shown below).



4. Click the **Finish** button to complete the merge process. The master LOV remains with all the values from the two LOVs, and the merged LOV has been deleted.


System Setup
Lists of Values / LOVs
Battery Type
Color
Country Code
Country Codes
Color - List of Values
Log
State Log
Tasks
List of Values
References
Description
In Attribute Groups
List of Values Validation
Values
Values
Value ID
Black 179464
Bluish 138809
chartreuse 233435
Gray 138698
Green 179462
Multi-color 138702
Multi-colour 233434
Orange 138700
Pink 233433
Red 138808
White 138699
Yellow 179461
Add Value

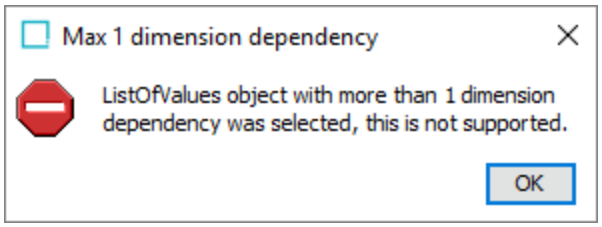
Merging Values in an LOV

If multiple sets of duplicate values exist within a single LOV, run the merge operation multiple times to eliminate each of the duplicate sets. This also applies to dimension dependent LOVs.

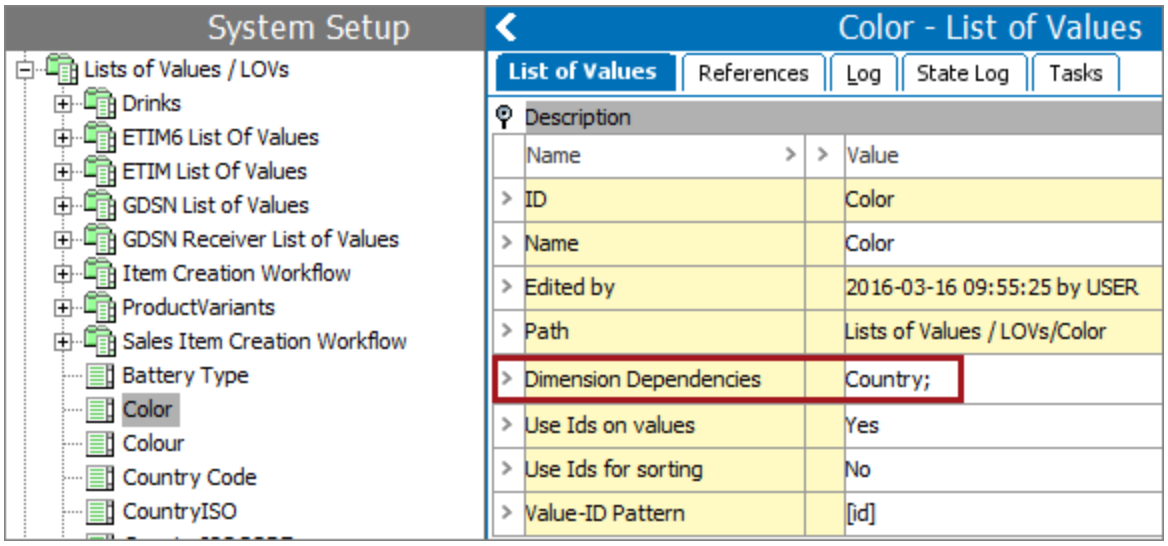
Verify the following prerequisites have been met before completing the configuration.

Prerequisites

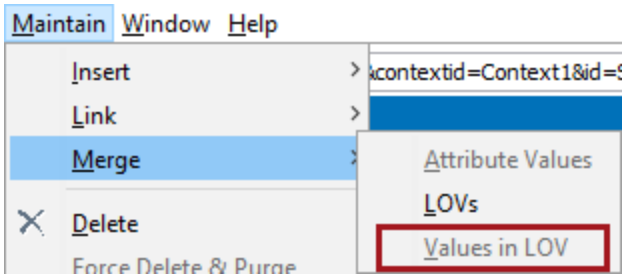
1. The LOV must have fewer than two dimension dependencies, otherwise the following warning dialog is displayed:



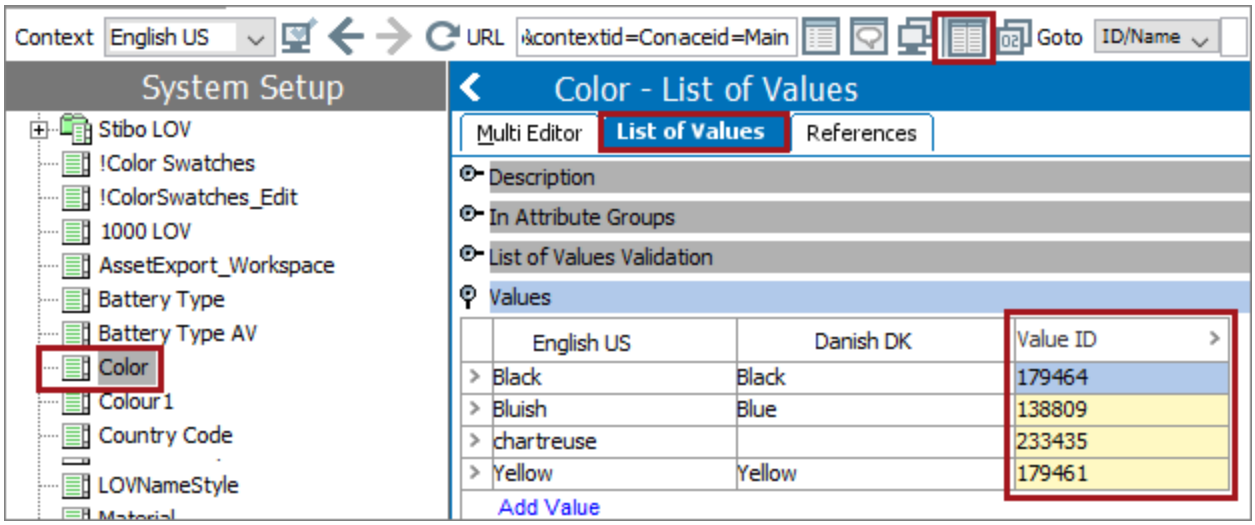
   To confirm the dimension dependencies of an LOV, in workbench System Setup > Lists of Values / LOVs > select the desired LOV to display the List of Values tab in the editor. Confirm the Dimension Dependencies parameter lists no more than one dimension dependency.



2. The LOV must use Value IDs, otherwise the menu option to Maintain > Merge > Values in LOV option is disabled:



To confirm the LOV uses value IDs, in workbench System Setup > Lists of Values / LOVs > select the desired LOV to display the List of Values tab in the editor. Click the **Context Mode** button ( ) in the toolbar and open the Values flipper to display the **Value ID** column as shown below.



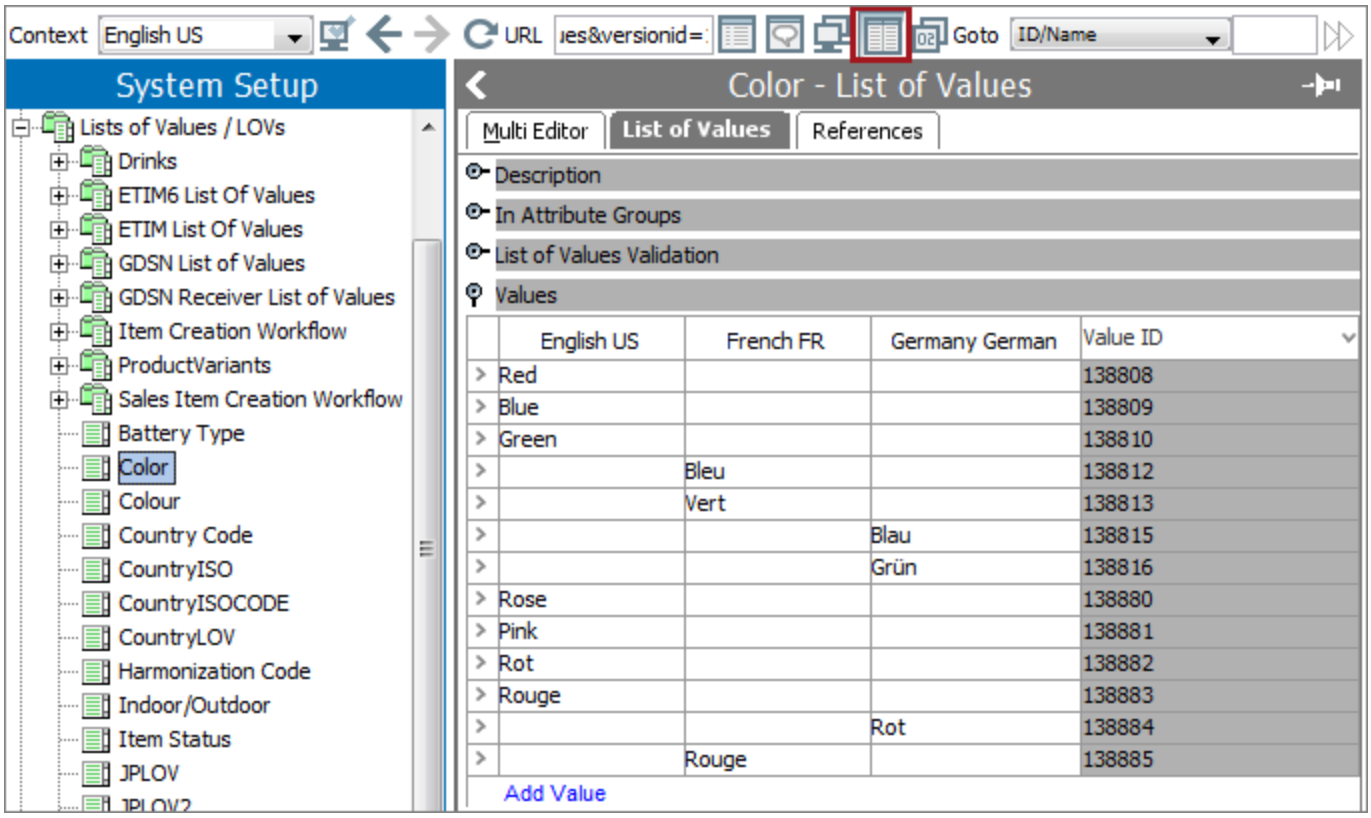
Note: Because the LOVs are dimension dependent each LOV value has a different 'Value ID'. This is important to notice for later steps.

If the Values in LOV option is disabled and the LOV does not have Value IDs, refer to the **Adding IDs to Values in LOV** topic.

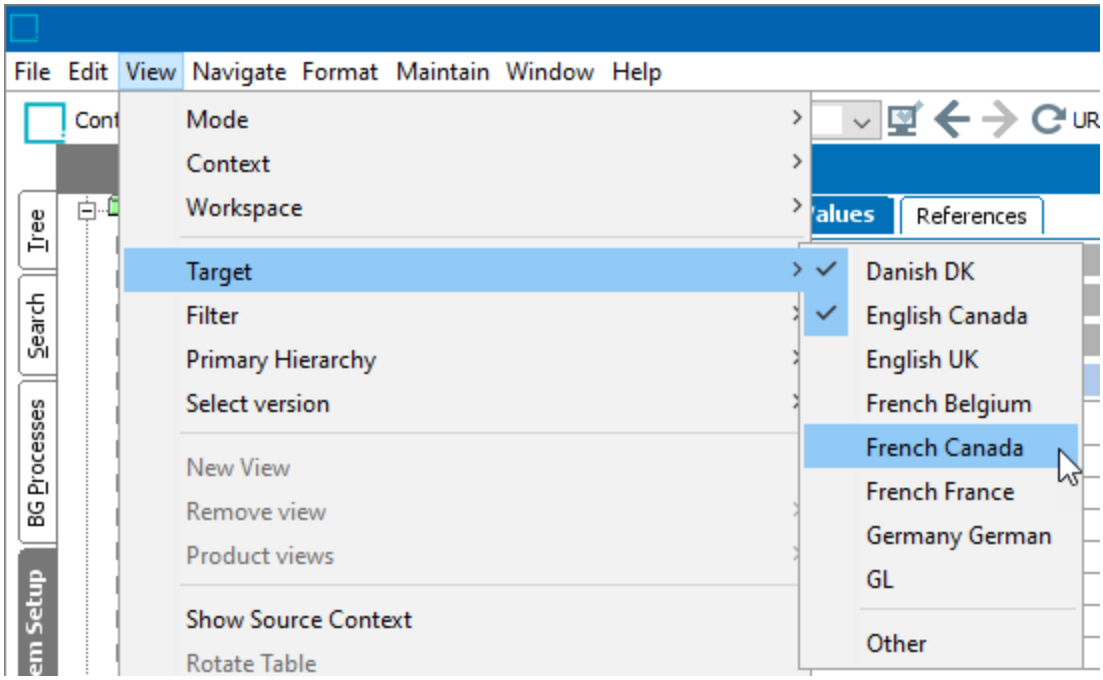
Configuration

Once the prerequisites have been confirmed, follow the steps below to merge values in an LOV.

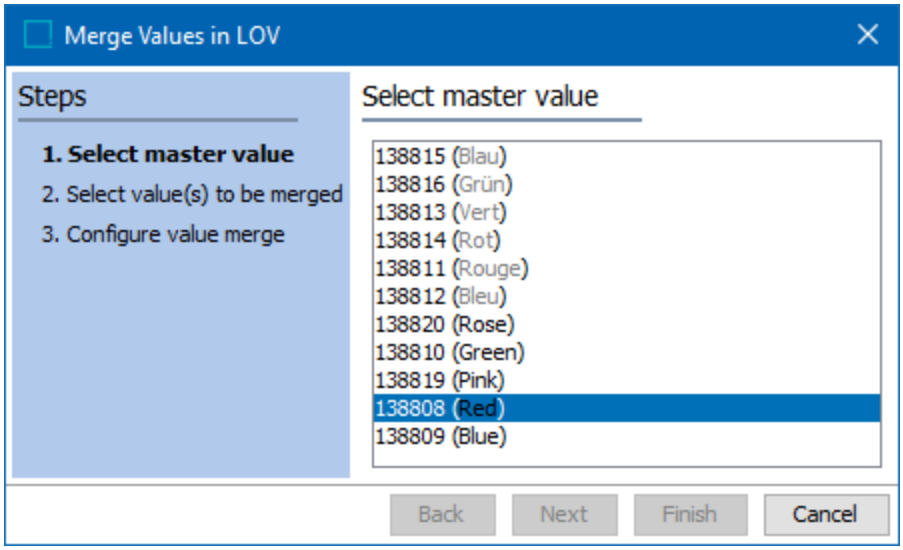
1. In workbench > System Setup > select the desired LOV > select the List of Values tab > click the **Context Mode** button in the toolbar to view all available values for an LOV in other contexts.



2. Optionally, choose the desired Target Contexts to display within the editor. From the menu bar, click View > Target > and click on the desired contexts to display.

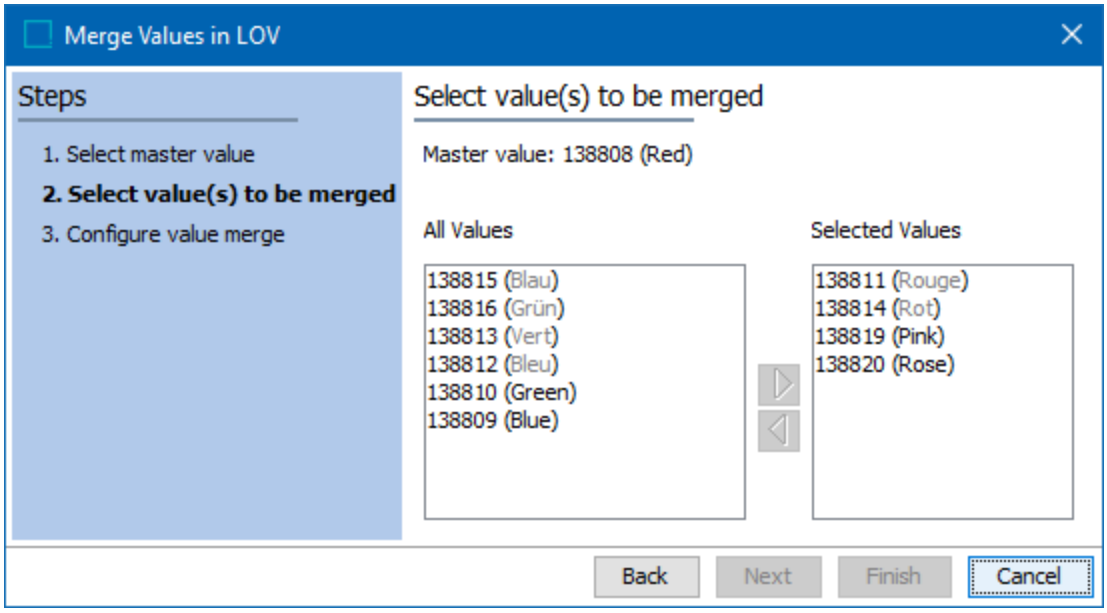


3. On System Setup > Lists of Values / LOVs > select the desired LOV > right-click the selected LOV > select **Merge Values in LOV**. The Merge Values in LOV dialog will display.



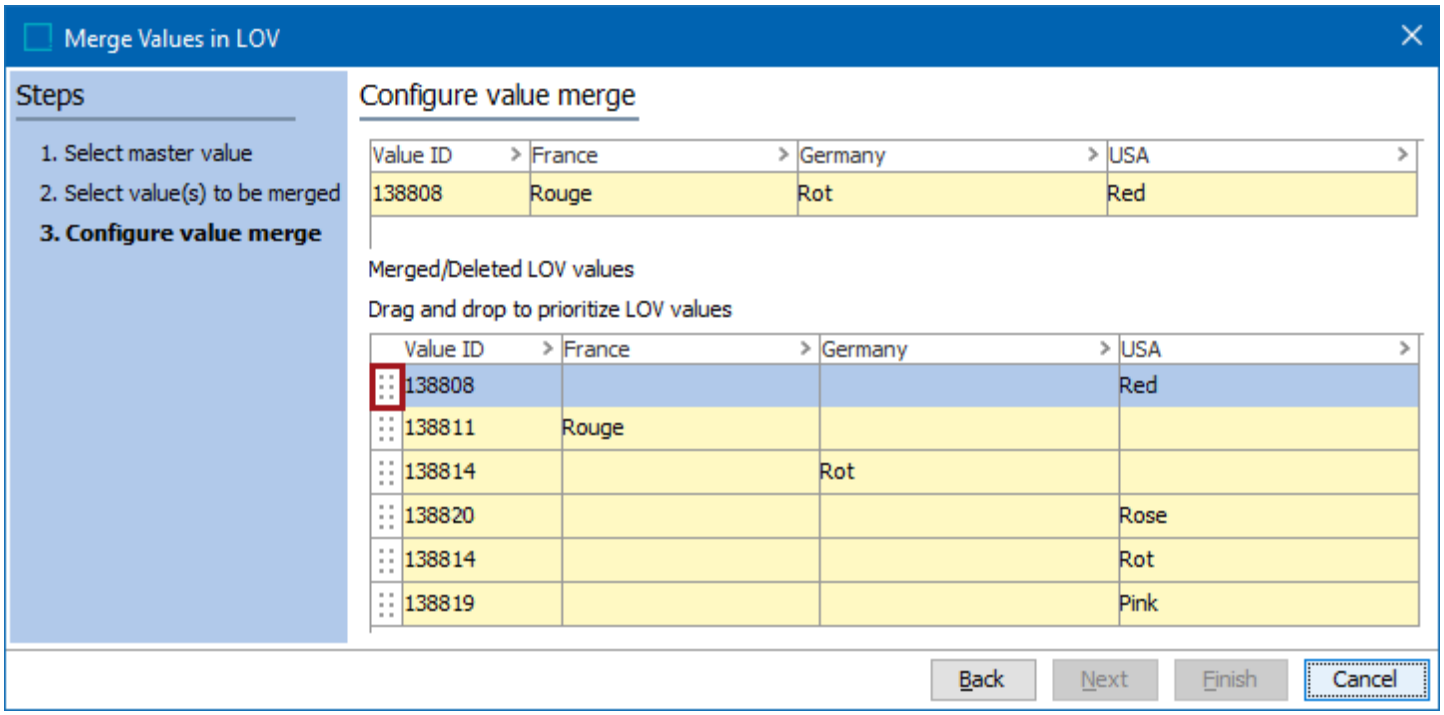
4. Select the value to be the master (the value that will remain after the merge), and click the **Next** button.
5. Identify the values to be deleted by highlighting a value in the **All Values** column, clicking the right arrow button and moving it to the **Selected Values** column. All Selected Values will be deleted.

   Repeat this process for all values to be merged into the master value and click the **Next** button.

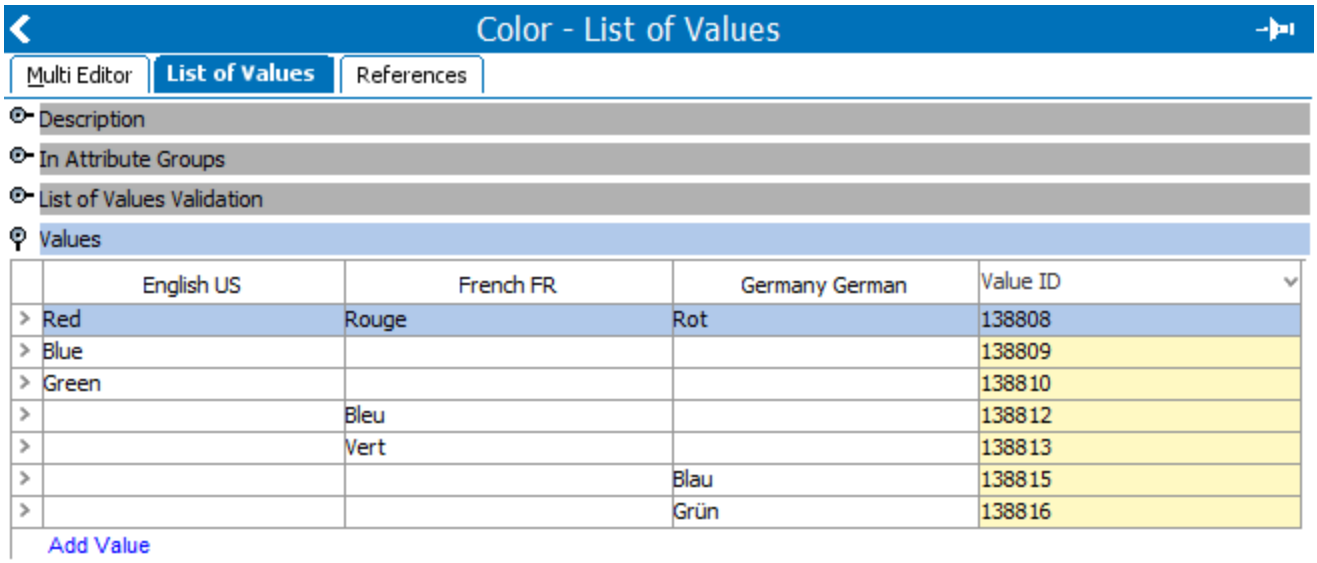


Note: Remove a value from the 'Selected Values' list by selecting it and clicking the left arrow button.

6. The 'Configure value merge' step will display. Within the Merged / Deleted LOV values table, use the handles to drag LOV values and reorder as necessary. The topmost value in the respective column will be the master for the respective context. For example, in the image below, when viewing the LOV using the 'France' context the value ID '138808' will display as 'Rouge,' whereas for the 'Germany' context the same value ID will display as 'Rot.'



7. Click the **Finish** button to complete the merge process. In the example below, the duplicate values that were in the 'USA' context have been merged, and the values for the other context are aligned with the single ID (138808).



Merging LOV Values in Bulk

LOV values across multiple LOVs can be merged in bulk through the 'Merge LOV Values' feature, which is available as a right-click action on LOV groups in System Setup.

When 'Merge LOV Values' is selected, a dialog displays that prompts users to upload a semicolon-separated CSV file containing the IDs of the LOVs in which values should be merged, the ID of the source value, and the ID of the target value. Multiple LOVs can be actioned at once, with a limit of 1,000 total values (i.e., 1,000 lines in the file). This functionality greatly eases the maintenance of LOVs that contain misaligned, repeated, or incorrect values across multiple contexts.

Note: This functionality can only be used on LOVs that use value IDs. If your LOVs do not already contain value IDs, refer to the **Adding IDs to Values in LOV** topic for more information.

Prerequisites

Users must be granted the following setup actions in order to merge LOV values in bulk:

- View domain
- Merge value in hard/medium domain
- Delete value in hard/medium domain

Creating and Formatting the CSV File

The Merge LOV Values functionality accepts a CSV with the following file format. Any other format will result in an error. The file must not contain headers.

Note: The file must either have a .csv or .txt file extension. STEP will not accept Excel file extensions (e.g., .xslx)

LOVID	SourceValueID	TargetValueID
LOV1	VAL1	Value1
LOV1	VAL2	Value1
LOV2	VAL3	Value2

• The **LOVID** column accepts an LOVID

• The **SourceValueID** column accepts a LOV Value ID, which is to be used as source

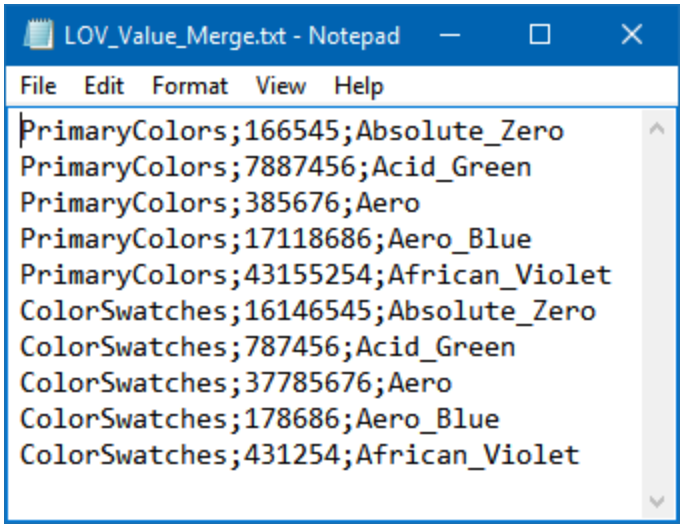
• The **TargetValueID** column accepts a LOV Value ID, which is to be used as target for the merge

Note: The 'Merge LOV Values' CSV sheet must contain *semicolon*-separated values, not *comma*-separated values. If you are a user in a region where commas are not used as decimal separators in numbers—such as the United States—you may need to adjust your advanced Excel options or the regional settings in your operating system to change the default list separator from a comma to a semicolon. Additional information on how to adjust these settings can be found on the web.

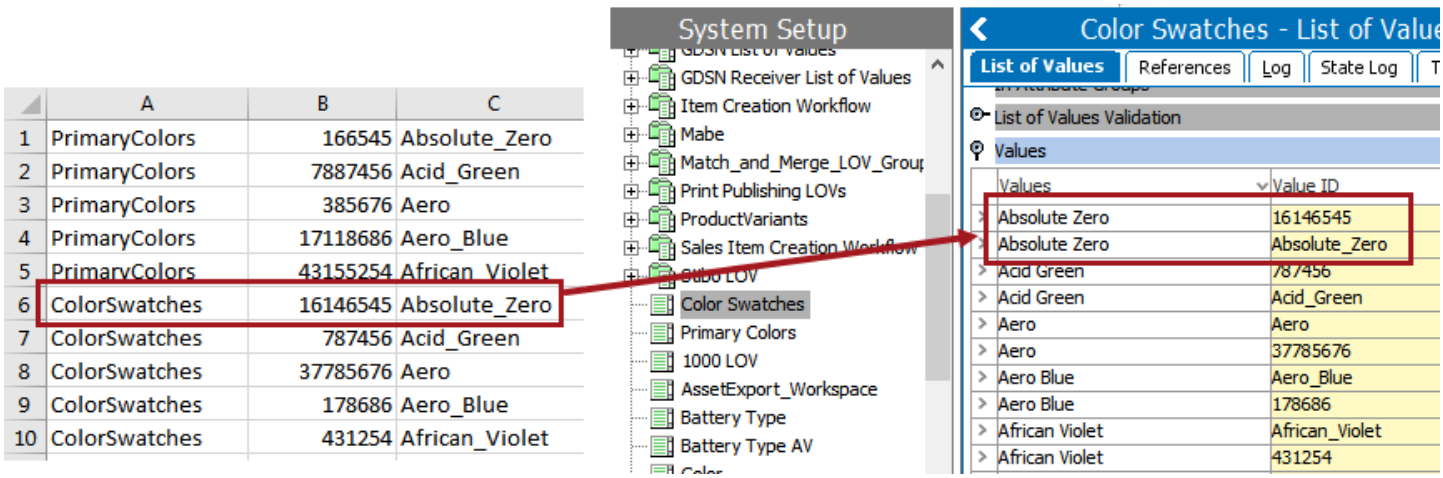
The below screenshot shows a sample file that can be used to merge values within two different LOVs at one time—one with the ID of PrimaryColors and a second with the ID of ColorSwatches. Column B contains the IDs of the LOV values that will be removed (source values) when the file is imported. Column C contains the IDs of the LOV values that will remain (target values) after the file is imported. (Even though multiple LOVs can be included in a single sheet, values are only merged within the same LOV, not across multiple LOVs.)

	A	B	C
1	PrimaryColors	166545	Absolute_Zero
2	PrimaryColors	7887456	Acid_Green
3	PrimaryColors	385676	Aero
4	PrimaryColors	17118686	Aero_Blue
5	PrimaryColors	43155254	African_Violet
6	ColorSwatches	16146545	Absolute_Zero
7	ColorSwatches	787456	Acid_Green
8	ColorSwatches	37785676	Aero
9	ColorSwatches	178686	Aero_Blue
10	ColorSwatches	431254	African_Violet

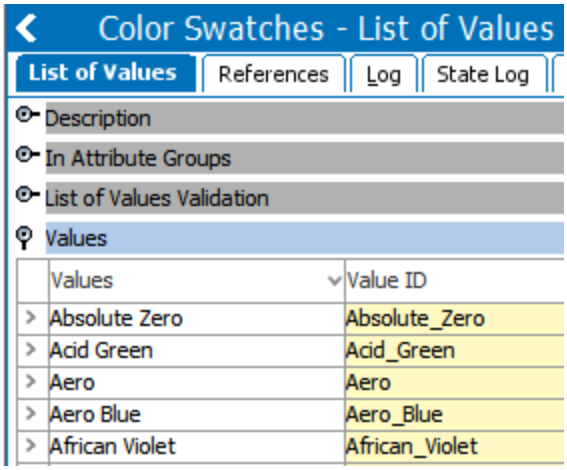
A .txt file containing semicolon-separated values may also be used.



The following screenshot shows the same sample CSV from above but with a highlighted example of two values that will be merged. After the file is imported, the 'Absolute Zero' value with the ID of 16146545 will be removed and the 'Absolute Zero' value with the ID of Absolute_Zero will remain.



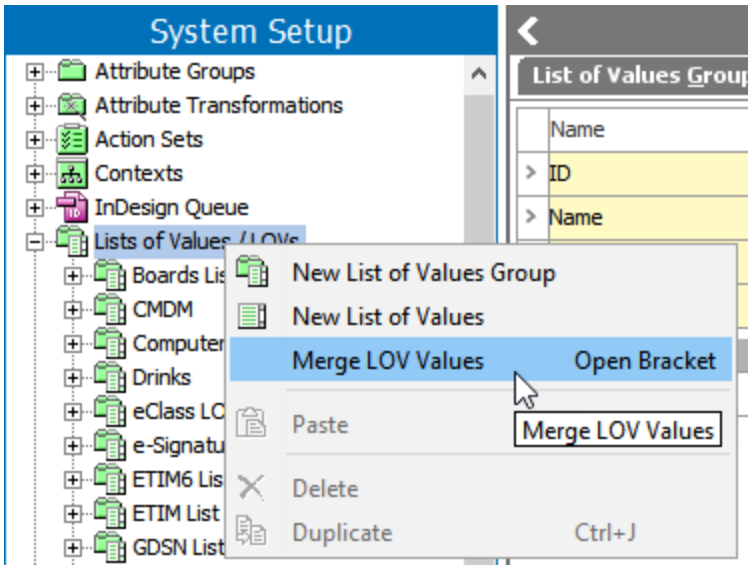
After the sheet is uploaded, the ColorSwatches LOV in this example will look as follows, with only the values in column C of the CSV sheet remaining.



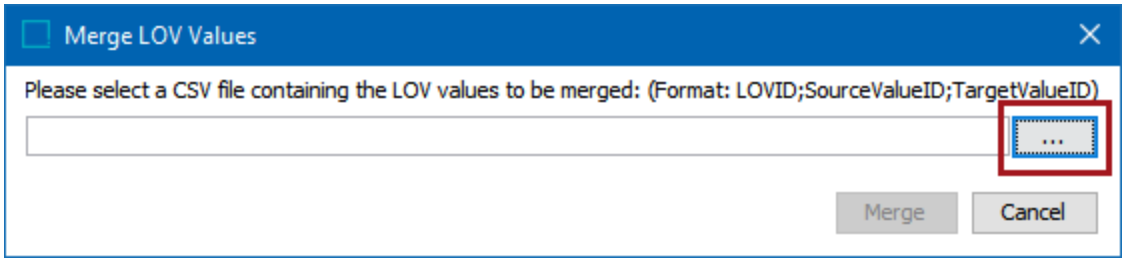
Uploading the Merge LOV Values CSV Sheet

1. Navigate to System Setup, open Lists of Values / LOVs, then right-click on any LOV group (including the root node) and select **Merge LOV Values**. Or use the shortcut

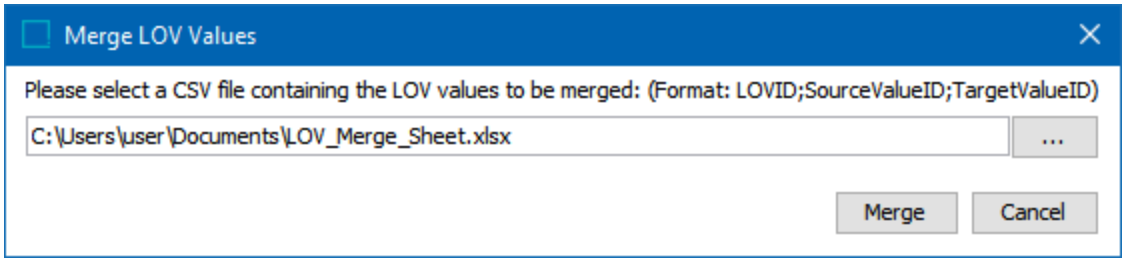
> **Note:** 'Merge LOV Values' should not be confused with 'Merge Values in LOV,' which is the manual process for merging values within an individual LOV and is only available when right-clicking on an LOV, not on an LOV group. For more information on this function, refer to the **Merging Values in an LOV** topic.



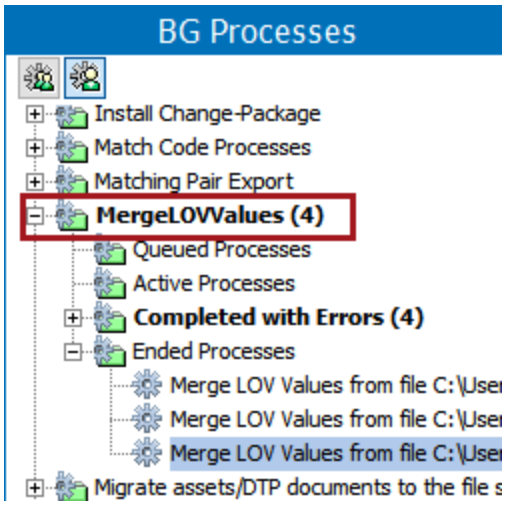
2. Click the ellipsis button (...) on the **Merge LOV Values** dialog to select the CSV file containing the LOV values to be merged.



3. Navigate to your CSV file in the Select File dialog, then click **Select File**.
4. After selecting your file, click **Merge** on the Merge LOV Values dialog.



5. A 'Background process status' dialog displays. Click 'Go to process' if you would like to view the background process for the LOV value merge.
6. The background process will display on the BG Processes tab within the 'MergeLOVValues' queue.



Monitoring LOV Value Merge Events

When values in an LOV are merged, STEP generates events that can be monitored in an event processor that uses the 'Expand LOV Value Changes' event processor plugin. For more information, refer to the **Expand LOV Value Changes Processing Plugin Parameters and Triggers** section of the **Event Processors** documentation.

Deleting LOV Values in Bulk

Values can be deleted in bulk from a List of Values (LOV) by importing a STEPXML file that contains a **<DeleteValue/>** tag nested within the parent <ListOfValue></ListOfValue> tag.

This file is imported into STEP like any other STEPXML file, by navigating to File > Import > Data. For more information on how to import files into STEP, refer to the **Creating a Data Import** section of the **Import Manager** documentation.

The bulk deletion of LOV values using a STEPXML import does not cause STEP to enter Single Update Mode (SUM). For more information, refer to the **Single-Update Mode** topic in **System Setup** documentation.

Note: This functionality can only be used on LOVs that use value IDs. If your LOVs do not already contain value IDs, refer to the **Adding IDs to Values in LOV** topic for more information.

Prerequisites

Users must be granted the following setup actions in order to delete LOV values in bulk:

- View domain
- Delete value in hard/medium domain

DeleteValue Tag and XML Attributes

The <DeleteValue/> tag can contain three XML attributes: **ID**, **Force**, and **GenerateEvents**. Of these three, **ID** is mandatory, as it identifies the value to be deleted from the LOV. The Force and GenerateEvents attributes are optional.

```
<ListsOfValues>
  <ListOfValue ID="ColorSwatches" ParentID="List Of Values group root"
  AllowUserValueAddition="false" UseValueID="true" Selected="true" Referenced="true">
     <Name>Color Swatches</Name>
    <Validation BaseType="text" MinValue="" MaxValue="" MaxLength="100" InputMask=""/>
    <DeleteValue Force="true" GenerateEvents="true" ID="Red"/>
    </ListOfValue>
</ListsOfValues>
```

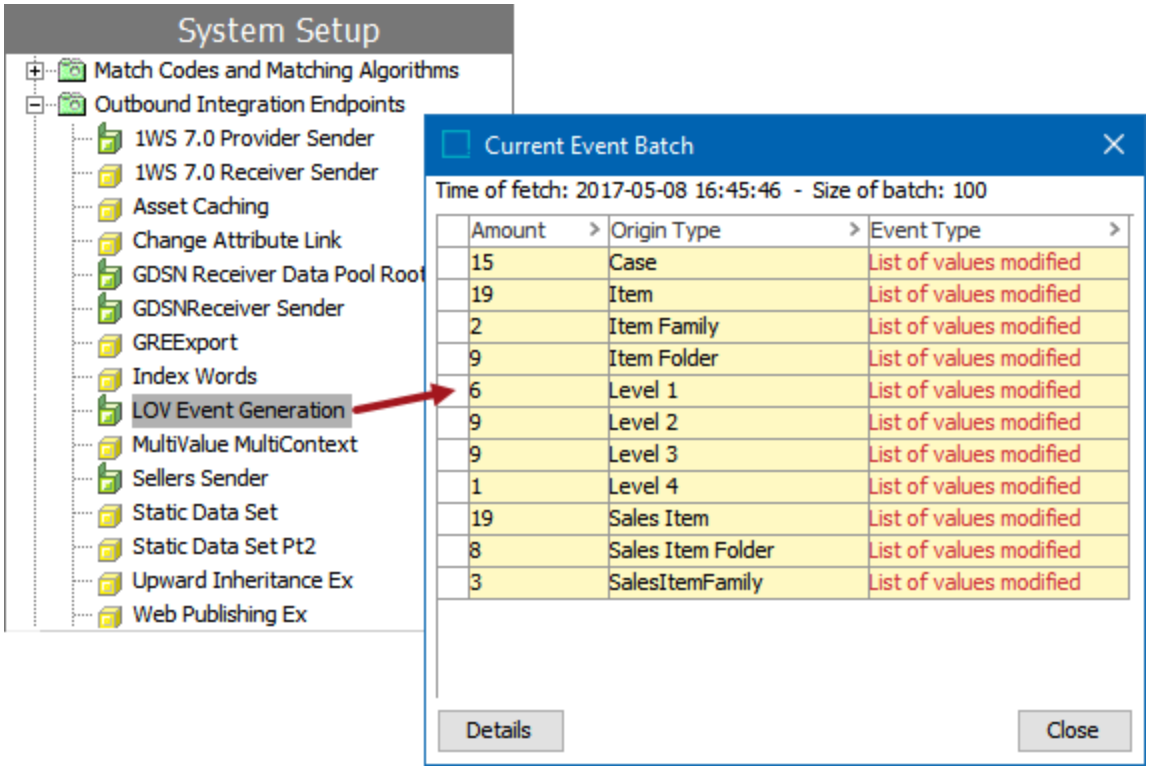
Force can have a value of 'true' or 'false.' If set to true, the value will be deleted from the LOV even if there are attributes using the value. If approved objects in STEP are using the attribute that contained the deleted value, the approval status of these objects will not be affected, i.e., the objects will remain approved.

If Force is set to 'false,' or if the Force attribute is excluded altogether, the value will be deleted as long as there are no attributes using the value. If attributes *are* using the value, the import will fail, and the value will not be deleted from the LOV. The default value for 'Force' is false.

GenerateEvents also can have a value of 'true' or 'false.' If set to true, events will be generated on objects that are using the attribute that contained the force-deleted value. If set to false, no events will be generated. The default value for 'GenerateEvents' is false.

An example of how to tell if events have been generated is to configure an event-based outbound integration endpoint (OIEP) to listen for 'Modify' events on object types that are affected when the LOV value is deleted. The configuration also specifies which attributes will trigger the events; in this case, the attribute(s) that use the LOV (s) from which the values have been deleted. As with this example, any object that had an attribute value removed when the value was force deleted from the LOV will display as a 'List of values modified' event.

Note: *Approve* events cannot be generated for deletions of LOV values. i.e., if a product uses an attribute based on the LOV and contained the value that was deleted from the LOV, the deletion of the LOV values through the STEPXML import does not unapprove the product.

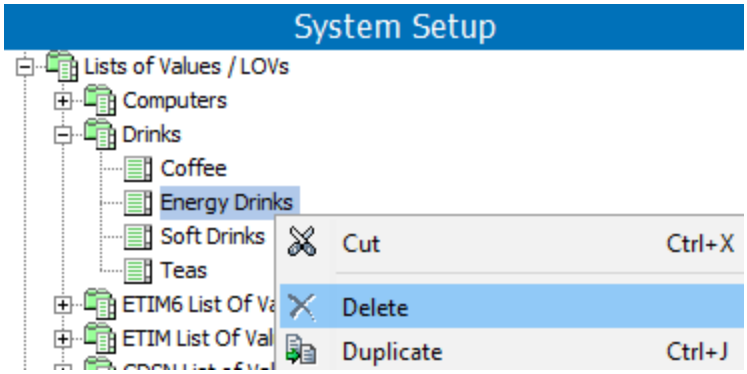


For more information on event generation, refer to the **Events** section of the **System Setup** documentation. For more information on event-based OIEPs, refer to the **Creating an Event-Based Outbound Integration Endpoint** section of the **Data Exchange** documentation.

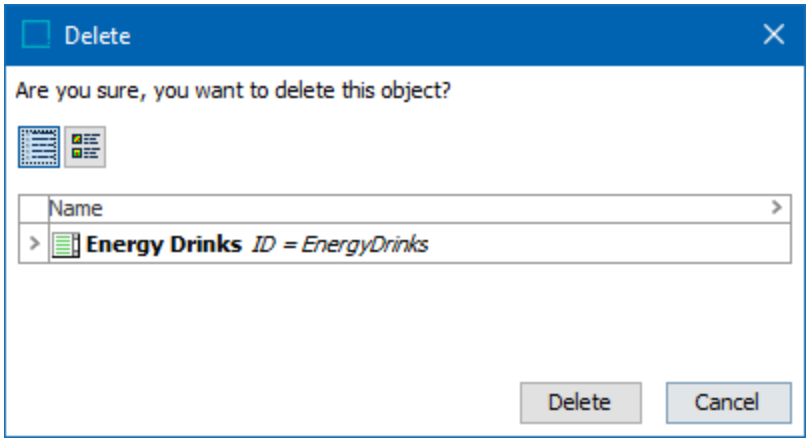
Important: Export and import the values of an LOV (List of Values) via Excel when as defined in the Excel List of Values topic in the Data Exchange documentation.

Deleting LOVs

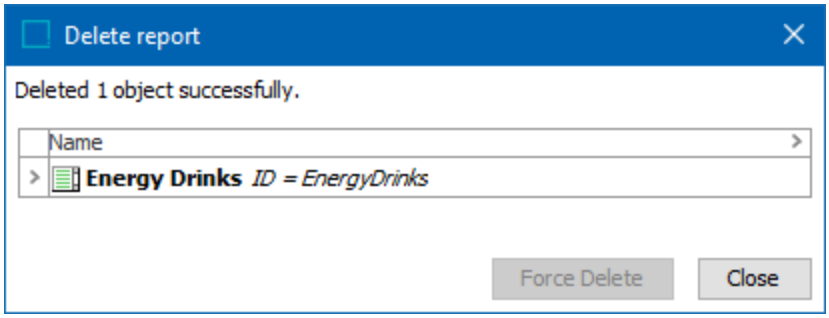
1. Go to System Setup > List of Values / LOVs > Select **the LOV to be deleted**.
2. Right-click **the LOV to be deleted**, and the menu will display as shown below.



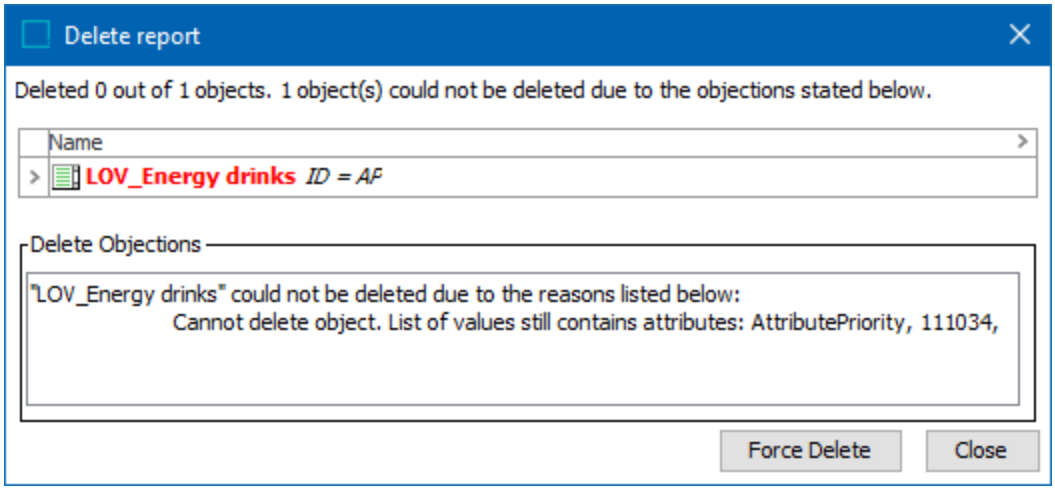
3. Click **Delete** and a Delete dialog displays.



4. Click the **Cancel** button to return to System Setup without deleting. Click the **Delete** button to delete the List of Values, and display the Delete report dialog.



Note: If the LOV being deleted contains values used for an object, then the LOV cannot be deleted and the Delete report will display the Delete Objections (as shown below).



Filtering LOVs

The following LOV filtering options are cumulative and work together to provide only the necessary values at each point of filtering:

1. **Attribute filtering** - used when not all of the values that exist in the LOV are needed by all attributes using the LOV. This is important since an LOV can be used by more than one attribute.
2. **Hierarchy node filtering** - used when the need for the LOV values is determined by the location of the object in the hierarchy (product hierarchy or classification hierarchy).

Consider an LOV with 18 values. When used by attribute A, only 11 values are legal; the seven (7) other LOV values are not relevant for attribute A. When the same LOV is used on attribute B, 15 LOV values are legal. This can be achieved with attribute level LOV filtering.

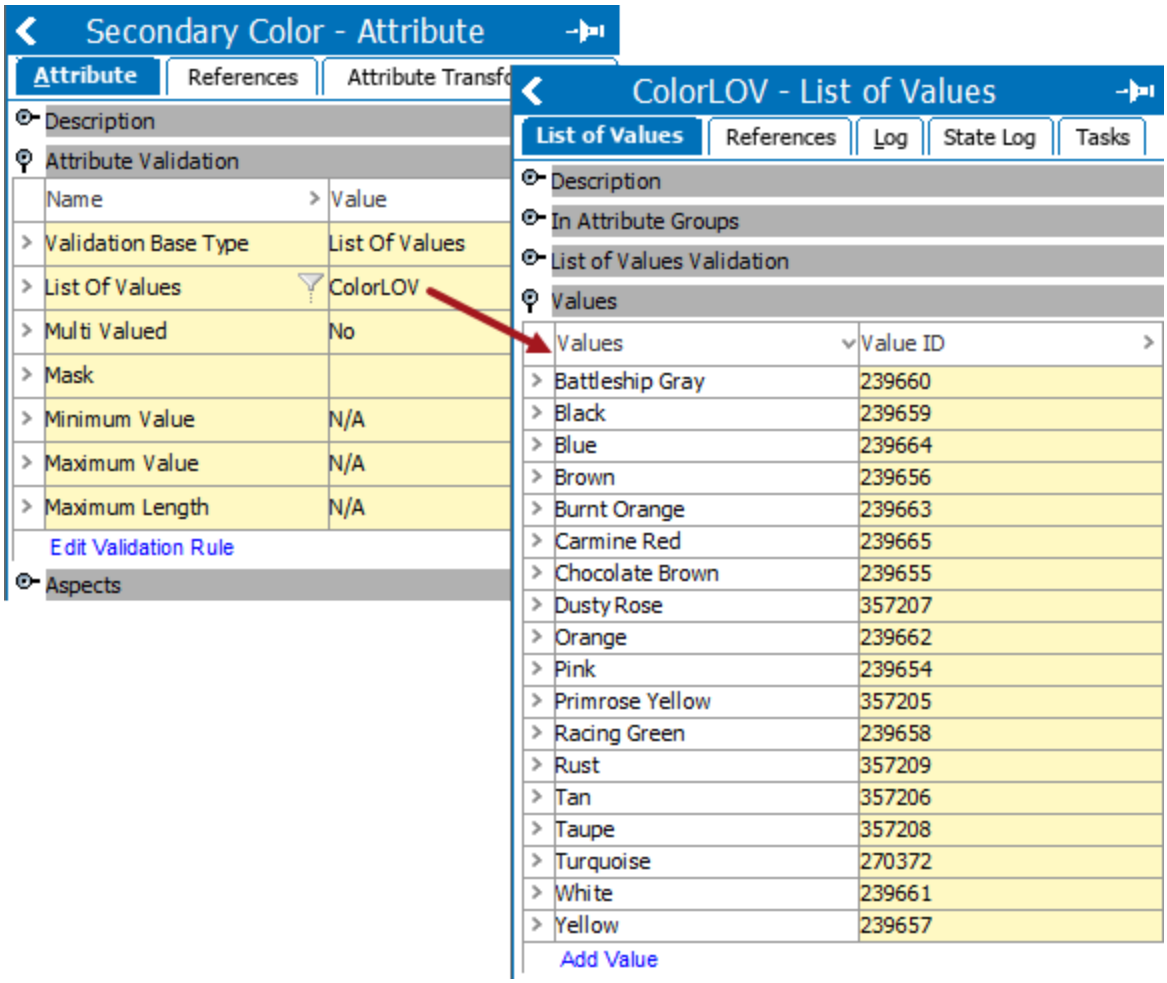
Considering the same 18 LOV values above, the 11 legal LOV values for attribute A can be further constrained when hierarchy filtering is applied at different levels in the primary product hierarchy (PPH). This allows attribute A to display only five (5) legal LOV values within the 'Shirts' family, while displaying four (4) legal LOV values for the 'Pants' family.

Filtering on Attribute and PPH

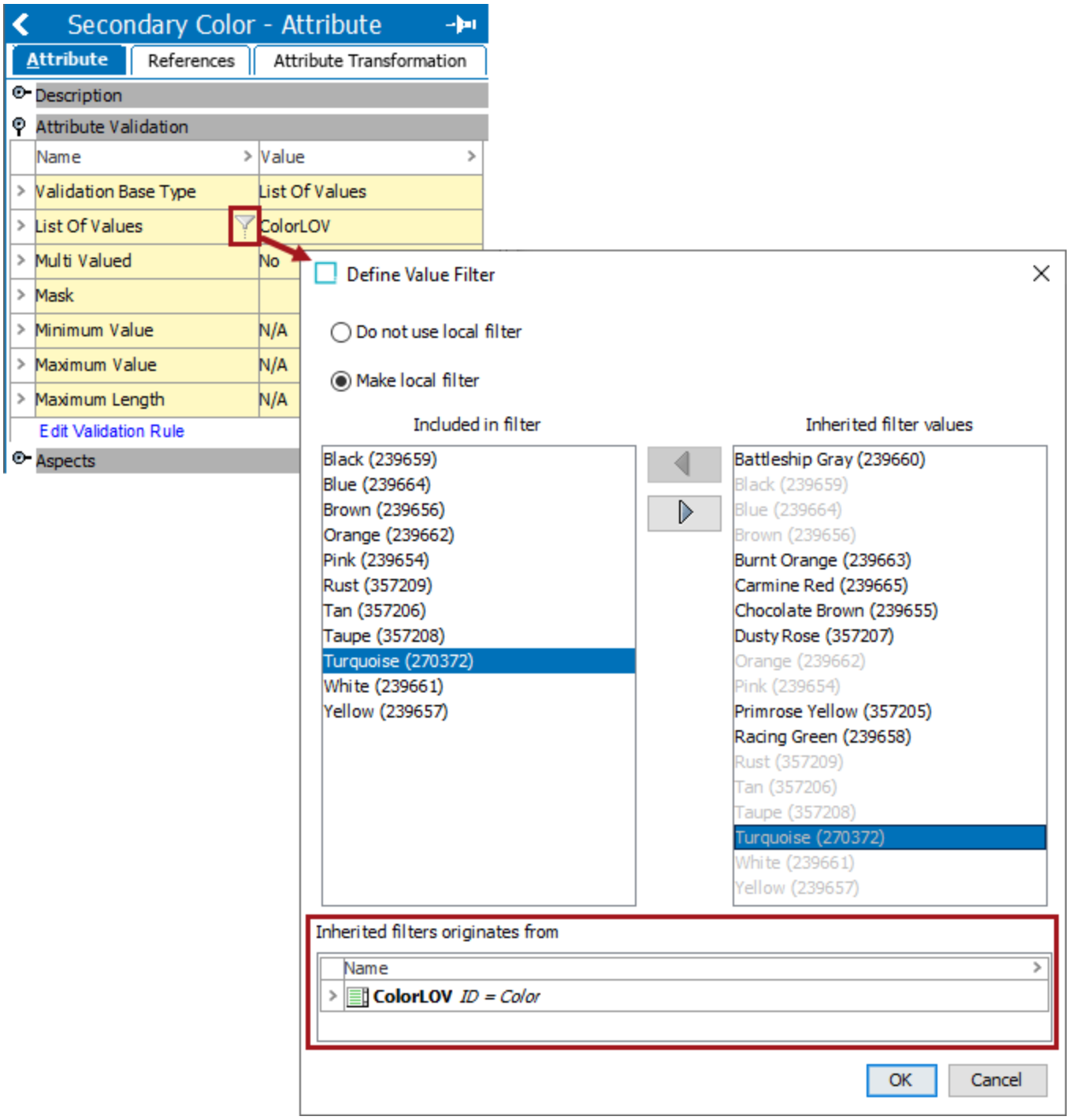
The cumulative effect of applying filters at both the attribute and the primary product hierarchy means increasingly more filtering can be added at lower levels of the PPH.

Note: An LOV value cannot be made available at a lower level of the PPH if it has been filtered out higher up in the hierarchy.

The 'Secondary Color' attribute uses the 'ColorLOV' list of values, which has 18 values:

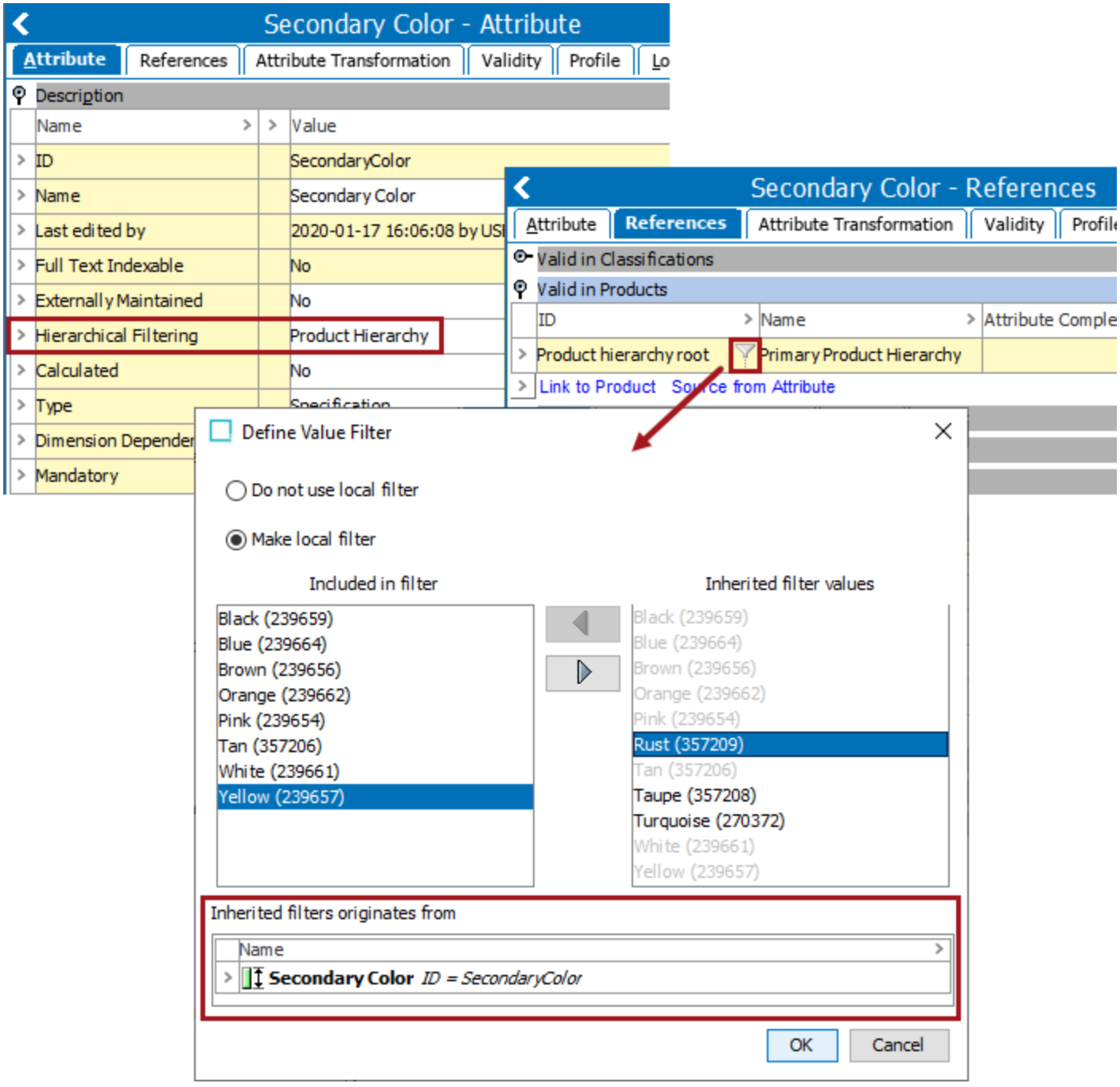


On the 'Secondary Color' attribute, display the attribute filter by clicking the List Of Values filter and show the 'Define Value Filter' dialog. The 'Inherited filters originates from' section shows the corresponding LOV, which in this example is the 'ColorLOV' list of values.



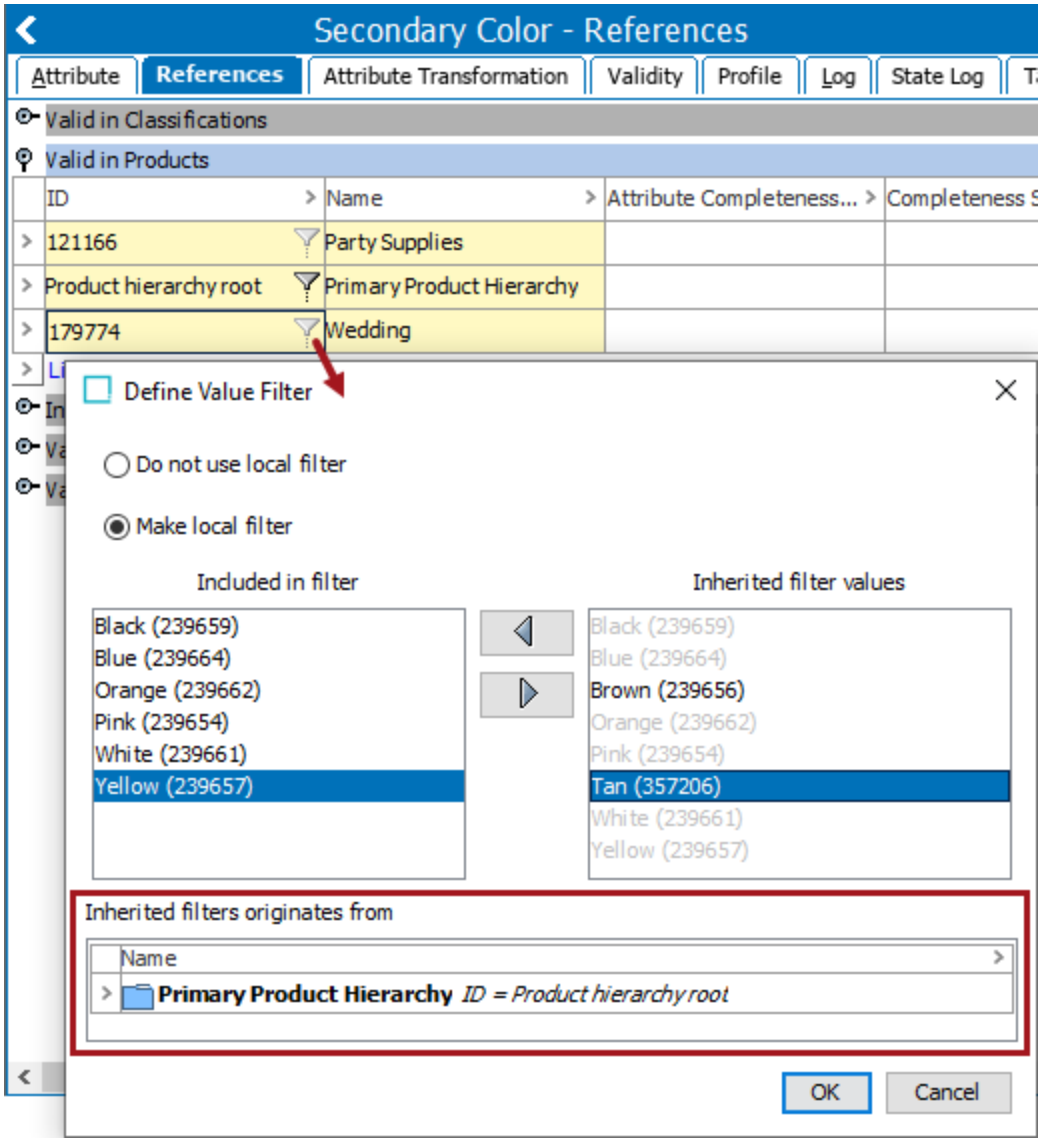
In the case of the removed values (shown as gray text) in the above image, this considers that the primary product hierarchy is organized according to similar product specifications. This shows that certain LOV values are not applicable for some product lines, while the same values are applicable in other product lines.

If the 'Secondary Color' attribute is linked to the PPH at the top level it can further be filtered, as shown below. With this filter, two additional LOV values ('Rust' and 'Taupe') have been removed from the list of valid values, and the 'Inherited filters originates from' section shows the values are derived from the 'Secondary Color' attribute.



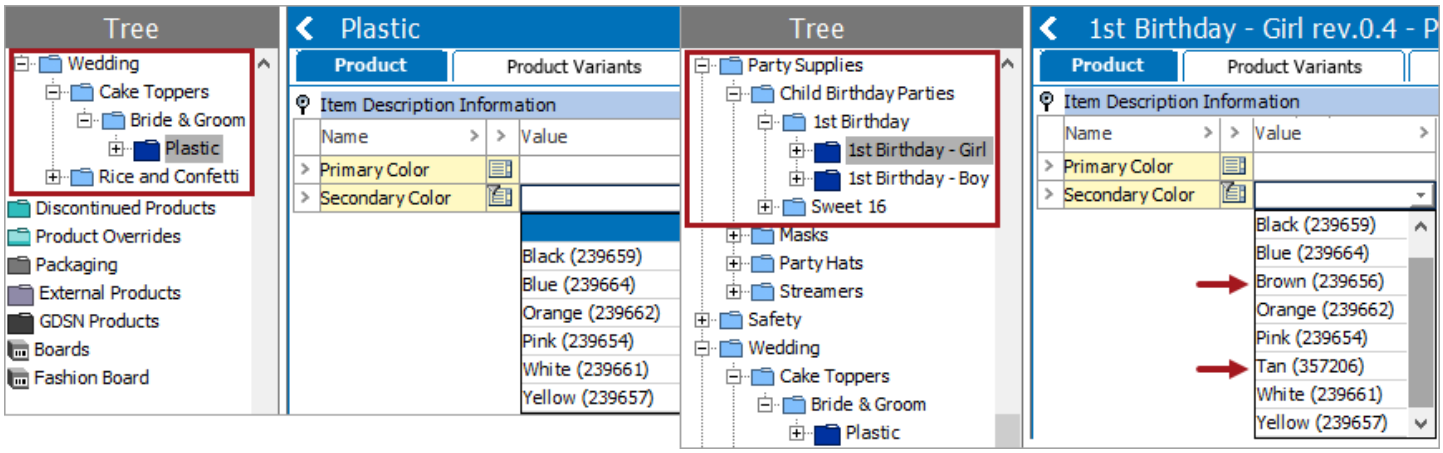
Consider that when the attribute is used in a particular product line, the values are further limited. On the 'Secondary Color' References tab, the filter will be set on the 'Wedding' node. The gray color of the filter buttons indicates that no filter is applied at the 'Party Supplies' nor the 'Wedding' nodes.

For the 'Wedding' node, two further values have been removed from the valid selection of values, and the 'Inherited filters originates from' section shows the values are derived from the 'Primary Product Hierarchy' (PPH) node.



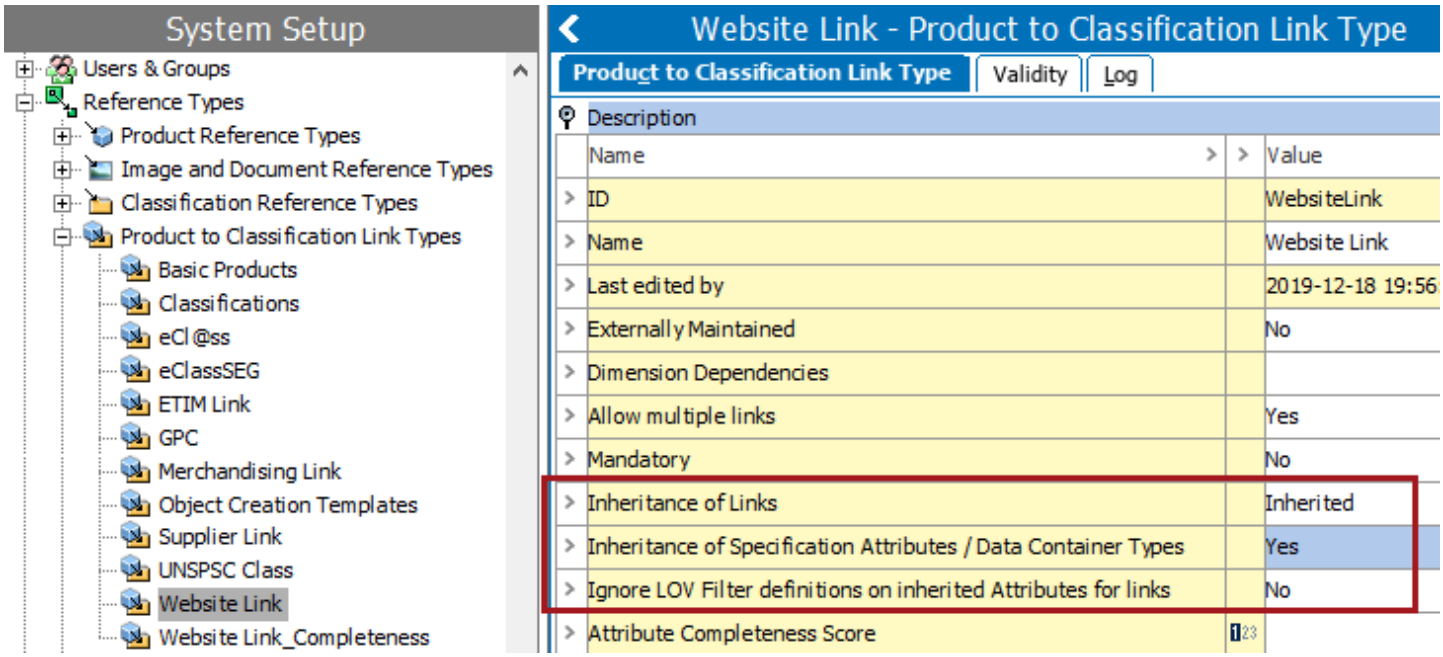
This shows that while at any point in the hierarchy a further filter may be applied, the available values for a level are based on the selection made at the higher level in the hierarchy. For example, you cannot reintroduce the value of 'Rust' at this lower level because it has already been filtered out at the top level of the hierarchy.

The result of these filters are found in Tree by comparing the LOV values available on products within the filtered 'Wedding' and unfiltered 'Party Supplies' nodes.



Filtering on Attribute and Classification Hierarchy

Filtering on classification hierarchies works in the same way as the product hierarchy. However, configuration on the Product to Classification Link Type is required to define the behavior.



The parameters identified control the effects of the LOV filtering applied:

- **Inheritance of Links** - set to either Inherited or Accumulative.
- **Inheritance of Specification Attributes / Data Container Types** - set to Yes.
- **Ignore LOV Filter definitions on inherited attributes for links** - set to No to enable LOV filtering on the Classification for the selected Product to Classification Link Type.

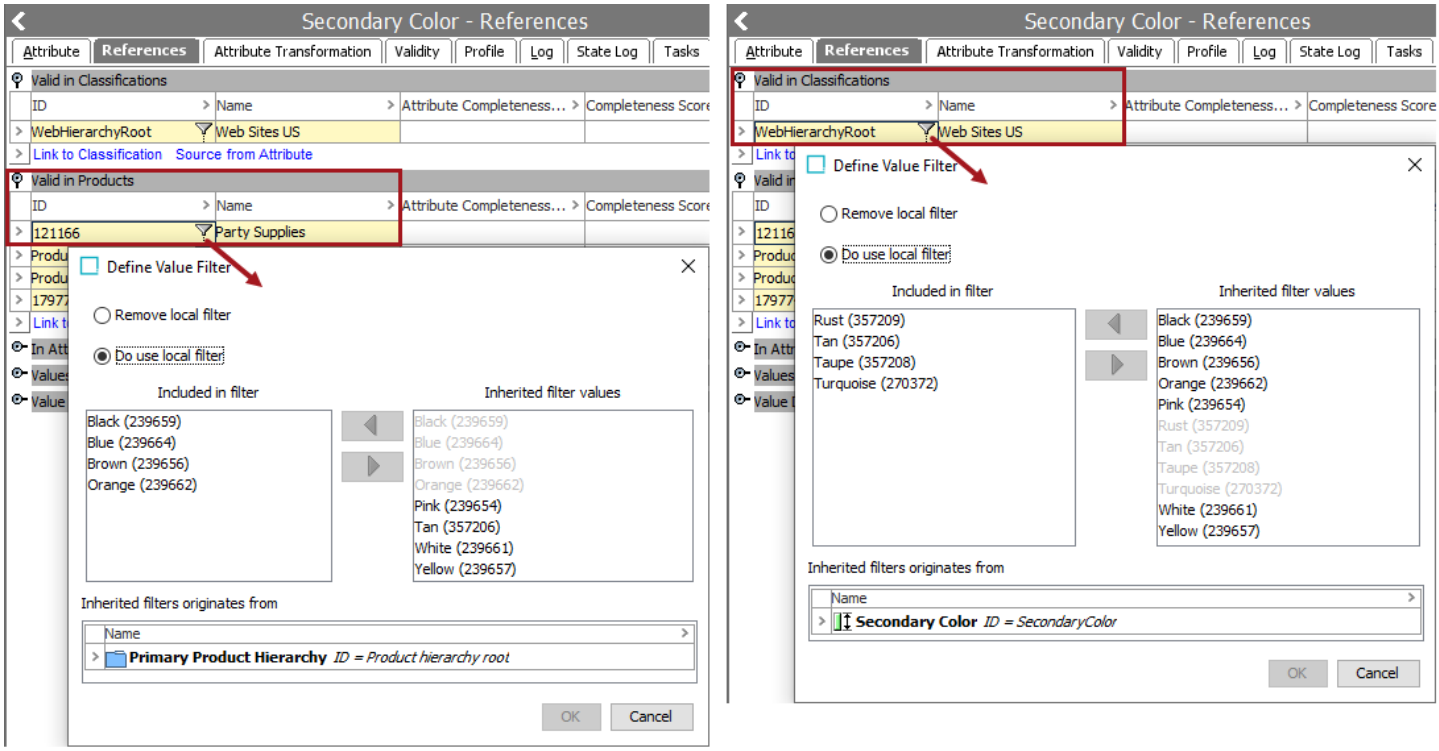
For more information on these parameters, refer to the **Product to Classification Link Type - Advanced** topic in the **Reference and Link Types** section of this guide.

Combining PPH and Classification Hierarchy LOV Filtering

Although combining LOV filtering on the PPH and on the classification hierarchy is possible, it is not recommended because it is difficult to maintain.

Important: Avoid setting a filter on both the PPH and also on a Classification since invalid LOV values can be added. Filtering that is applied on the PPH is not displayed and cannot be disabled when applying filters in the classification hierarchy.

To illustrate this issue, in the image below, the only valid values on the PPH (left image) are Black, Blue, Brown, and Orange. However, when setting the classification filter (right image), all of the LOV values are available to set as a local filter. In this example, four invalid values have been selected on the Classification filter. For the user enriching data in Tree, the PPH filter overrides the Classification filter settings.



Important: When LOV filtering is desired for an attribute, recommended practice is to choose to filter on either the PPH or on the Classification, but do not filter on both.

Filtering LOV Values

When setting a List of Values filter, it is possible to define which values are valid for a certain attribute.

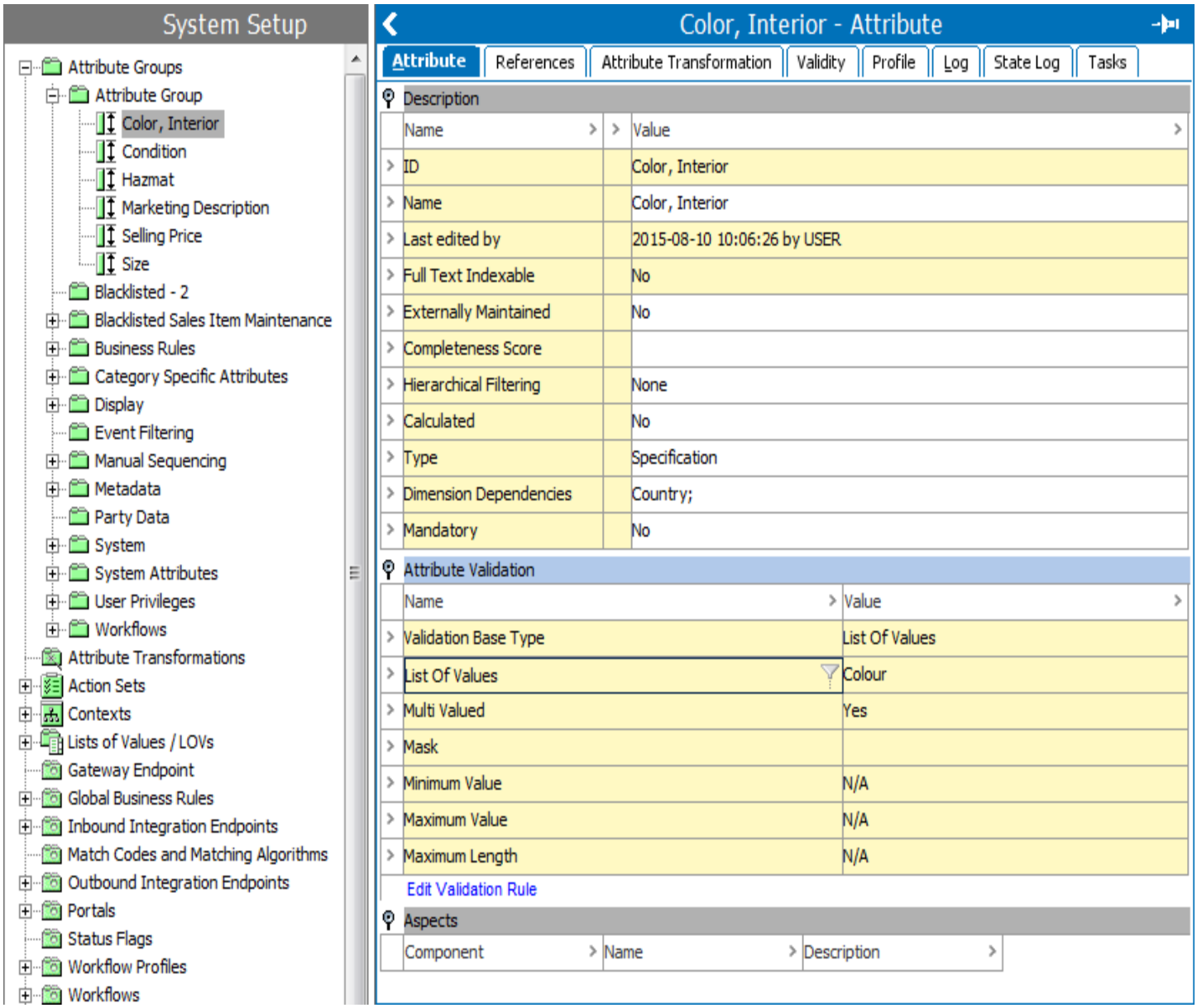
This is useful when you want to gather the information in one place and use only one LOV containing all the values, and at the same time be able to differentiate the values available for different attributes. As shown in the following table, a single LOV named 'Color' includes five values, but only three are allowed for each of the two attributes.

'Color' LOV Values	Legal Values for Attribute 1	Legal Values for Attribute 2
• Green • Red • Yellow • Blue • White	Filter Includes • Green • Yellow • White	Filter Includes • Green • Red • Blue

Important: Before filtering an LOV, review the **Considerations** section of the **Filtering LOVs** topic.

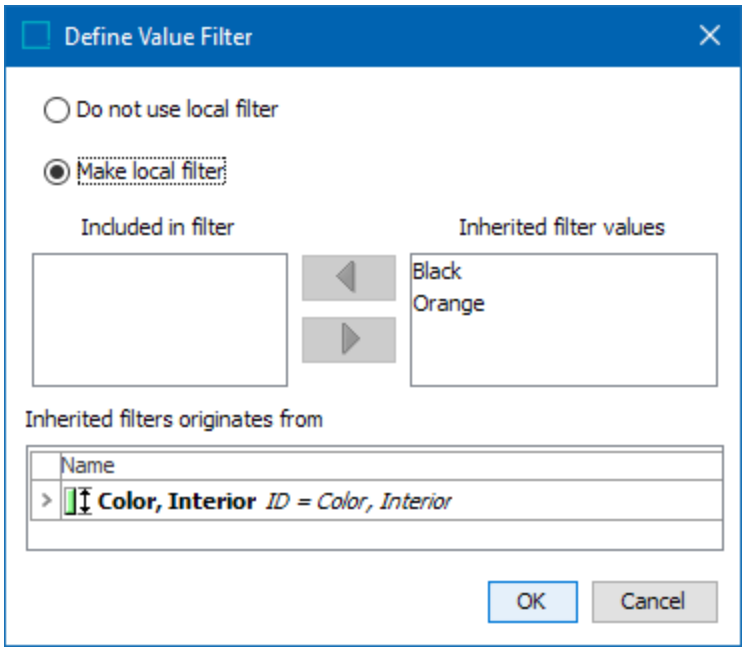
To filter LOV values based on an attribute:

1. In System Setup, expand **Attribute Groups**, expand the relevant attribute group, and then select the relevant attribute.



2. Click the **Attribute** tab.
3. Under the **Attribute Validation** flipper, click the filter icon ( ) in the **List of Values** field to display the 'Define Value Filter' dialog.

> **Note:** To modify filters you must have privileges to maintain attributes.



4. Click the **Make local filter** radio button.
5. Move the values to be included in the filter to the 'Included in filter' list, as follows:
   - Double-click a value in the 'Inherited filter values' list.
   - Select a value in the 'Inherited filter values' list and click the left arrow button ( ).
6. Click **OK**. Values in the 'Included in filter' list are available in the relevant editor (product and/or classification) displaying the attribute (both specification and description). For more information, refer to the **Attributes** topic.

Filtering by Hierarchy on LOV Attributes

Hierarchical filtering is a way of setting a filter on an LOV attribute that is used on a specific product, product family, or classification and defines which values are valid for a certain area within a hierarchy, based on references.

Hierarchical filters enable the use of only one LOV with an assortment of values, while differentiating the values available for different areas in a hierarchy.

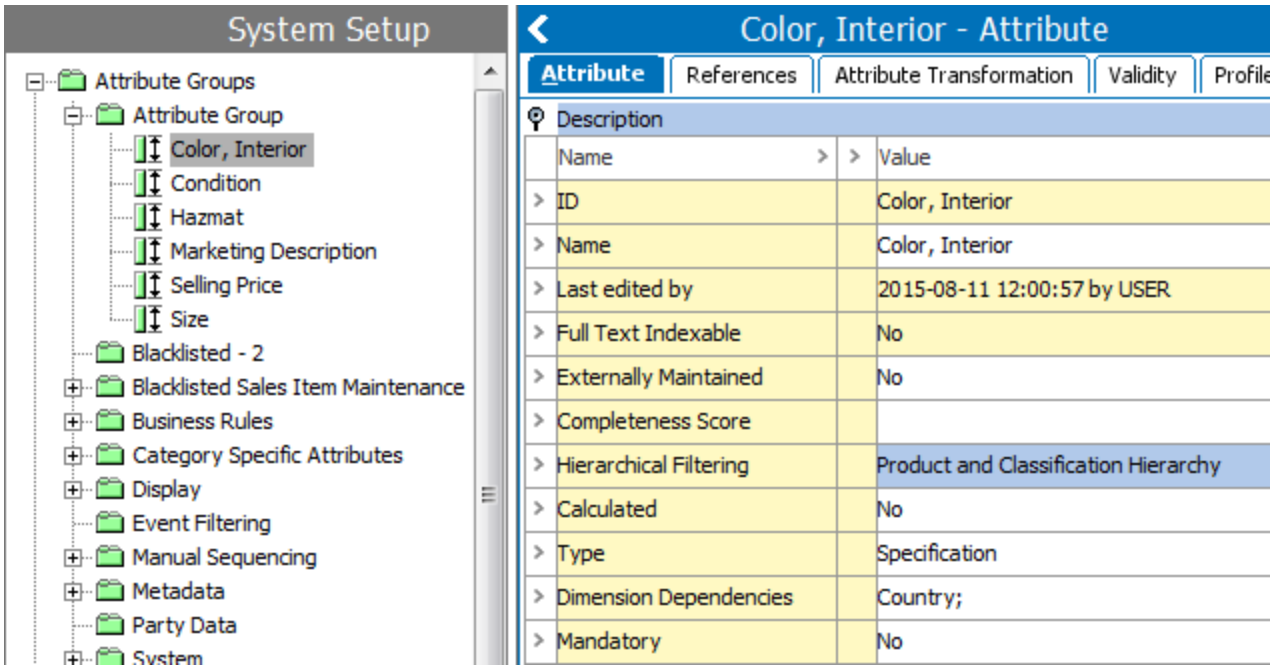
As shown in the table below, the 'Color' attribute uses the 'ColorLOV' but is filtered differently based on the location in the hierarchy. For the plastic product node of the product hierarchy, the ColorLOV allows three values, while the wood products node allows two different values.

'ColorLOV' Values	Legal Values for the 'Color' attribute on the Plastic Products Node	Legal Values for the 'Color' attribute on the Wood Products Node
• Green • Red • Yellow • Oak • Mahogany	Filter Includes • Green • Red • Yellow	Filter Includes • Oak • Mahogany

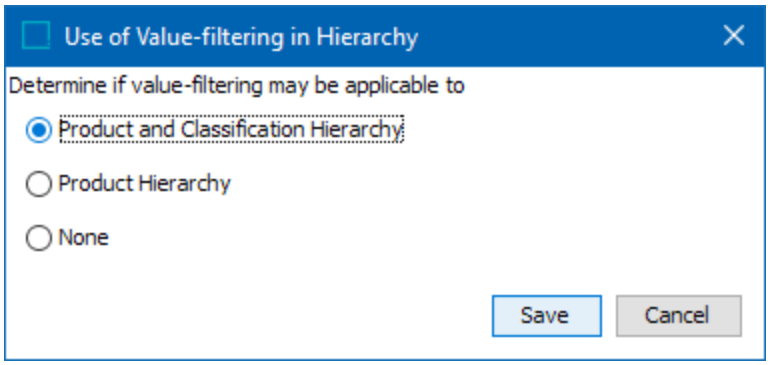
Important: Before filtering an LOV, review the **Considerations** section of the **Filtering LOVs** topic.

Filter an LOV Based on Hierarchy

1. In System Setup, expand **Attribute Groups**, expand the relevant group, and then select the attribute to be set to hierarchical filtering.



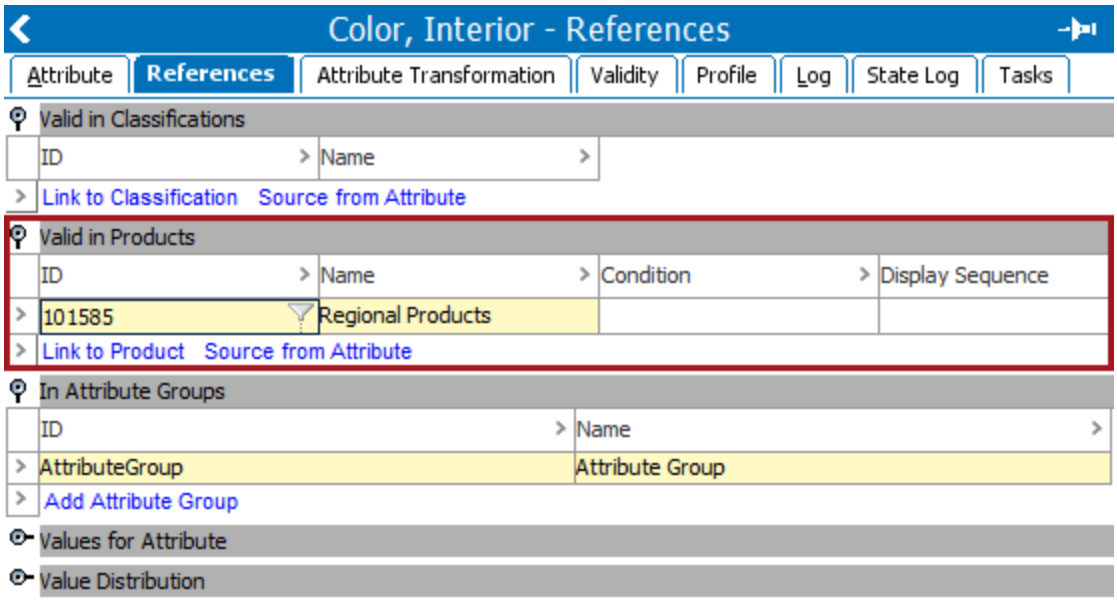
2. Click the **Attribute** tab.
3. Under the Description flipper, double-click the **Hierarchical Filtering** parameter to display the 'Use of Value-filtering in Hierarchy' dialog.



4. Select a radio button as follow:
   - **Product and Classification Hierarchy** - to display a filter option on the References tab for the 'Valid in Classifications' and 'Valid in Products ' flippers.

     Avoid hierarchical filtering on product and classification hierarchy where possible since it can negatively affect performance. For more information, refer to the **LOV Filtering Recommendations** topic in the **System Administration** online help.

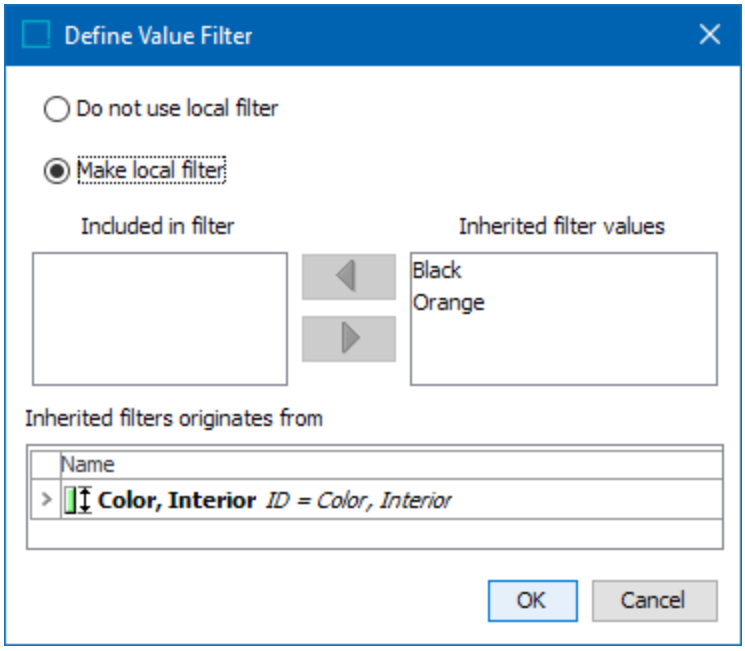
   - **Product Hierarchy** - to display a filter option on the References tab for only the 'Valid in Products ' flipper.
5. Click **Save**.
6. Click the **References** tab.



7. Under the **Valid in Products** flipper (shown above) and/or the **Valid in Classifications** flipper (based on your selection in the 'Use of Value-filtering in Hierarchy' dialog above), click the filtering icon ( ) in the field containing the relevant product and/or classification.

Note: To modify filters you must have privileges to maintain attributes.

The **Define Value Filter** dialog displays showing the values from the LOV under the 'Inherited filter values' list.

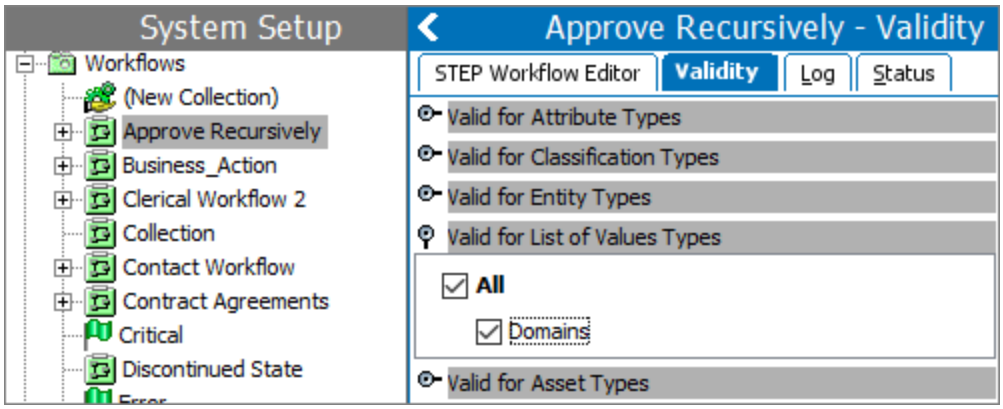


8. Click **Make local filter** radio button.
9. Move the values to be included in the filter to the 'Included in filter' list, as follows:
   - Select a value in the 'Inherited filter values' list and click the left arrow button ( ).
   - Double-click a value in the 'Inherited filter values' list.
10. Click **OK**. Values in the 'Included in filter' list are available in the relevant editor (product and/or classification) displaying the attribute (both specification and description). For more information, refer to the **Attributes** topic.

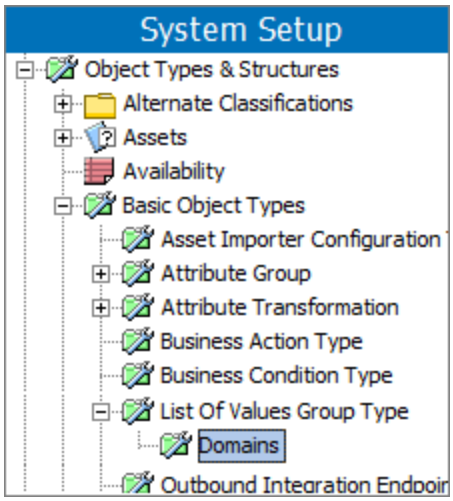
Workflows and LOVs

An LOV can be initiated into and/or removed from a workflow the same way as products, classification, entities, and assets. LOVs can be assigned to a respective user or user group to update the LOV values, similar to the enrichment of product attributes.

The workflow must be valid for the LOV object type 'Domains' as shown in the image below.



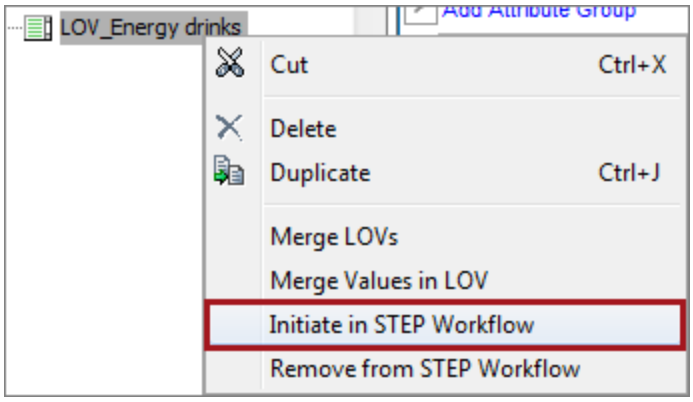
Domains are the only object type for LOVs and are found in workbench in System Setup > Object Types & Structures > Basic Object Types > List Of Values Group Type (as shown in the image below).



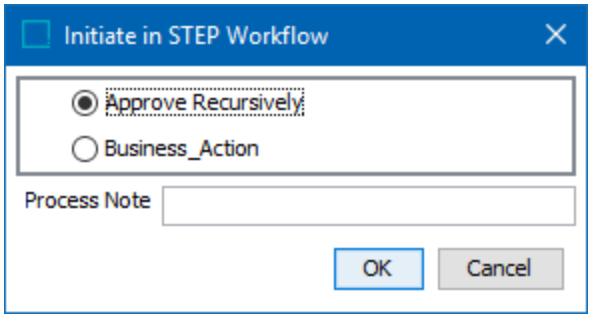
Initiate an LOV in a Workflow

Below are steps to initiate one LOV to a Workflow, however more than one LOV can be initiated to the same workflow.

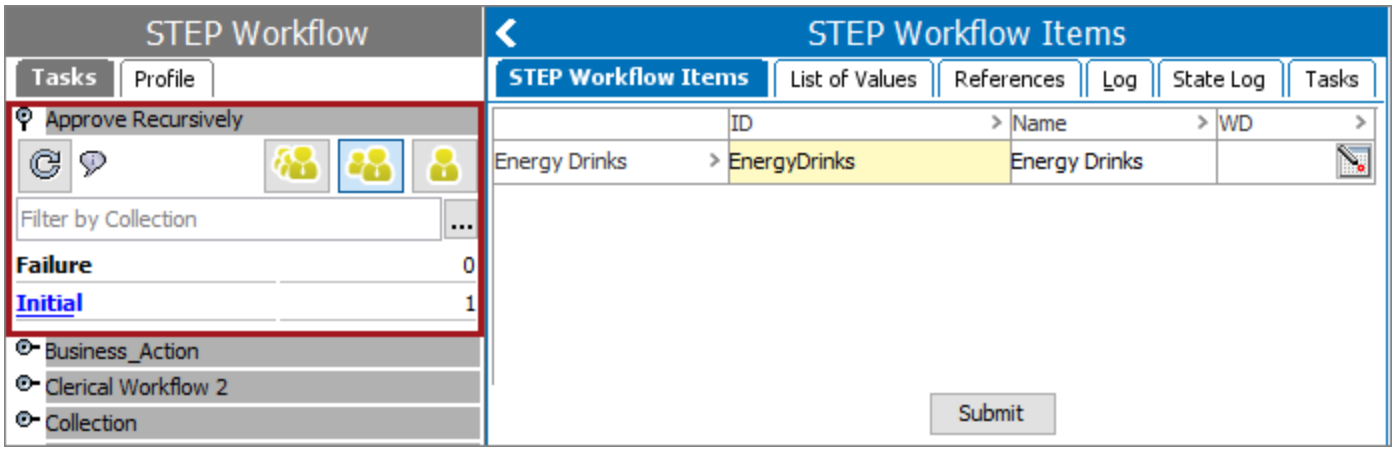
1. Right-click on an LOV, and select 'Initiate in STEP Workflow.'



2. The Initiate in STEP Workflow dialog will display listing only those workflows configured with validity for Domains (LOVs). Select the appropriate workflow, optionally enter text within the Process Note parameter, and click the **OK** button.



The LOV has now been initiated into the workflow. This can be viewed by going to STEP Workflow > Expanding the respective workflow flipper and selecting the workflow state. The workflow editor will display. Click the STEP Workflow Items tab and the LOV will display.

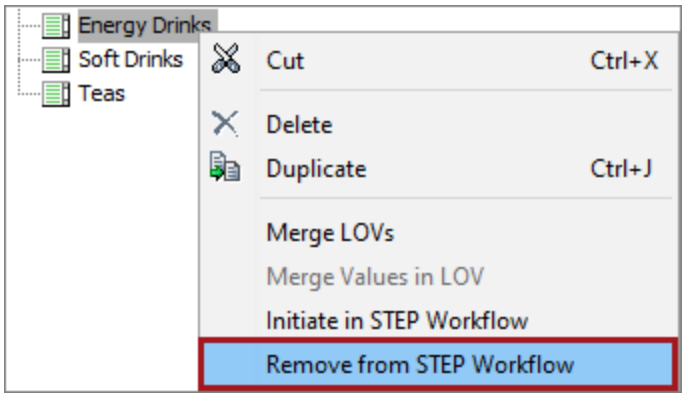


For more information, refer to the **Working with Tasks in Workflows** section of the **Workflows** documentation.

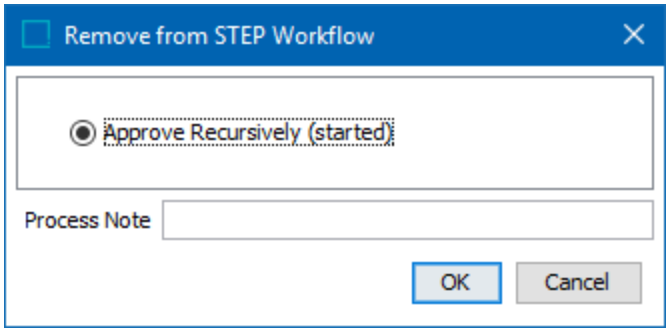
Remove an LOV from a Workflow

Below are steps to remove an LOV from a Workflow.

1. Right-click on the LOV which is already in a workflow, and select the option ‘Remove from the STEP Workflow' as shown below.



2. The Remove from STEP Workflow dialog will display with the workflow in which the LOV has been initiated for. If required add text to the Process Note parameter, then click the **OK** button.



The LOV has now been removed from the workflow. For more information on workflows, refer to the **Workflows** guide.

Maintaining Attributes

Once an attribute is created, there are changes made to that attribute based on user requirements. Such requirements could entail attribute validation, changing the attribute types, and many more.

This section discusses how to create an attribute and then modify it based on your requirements. You will find information including setting validity, using inline references for values, and converting for certain scenarios.

For information on maintaining LOV attributes, refer to the **List of Value (LOVs)** section.

For information on deleting attributes, refer to the **Delete Objects in STEPXML** topic in the Data Exchange documentation.

Attribute Value Migration

STEP 8.1 introduced the Compact Value Storage (CVS), a new storage model for non-LOV attribute values. The benefits of this storage model are that less space is required for storage and that the reading and writing of values can be performed faster. The CVS model is automatically used for attributes created in STEP 8.1 and newer systems.

To take advantage of CVS and migrate attribute values that were created on pre-8.1 STEP systems, the workbench includes the **Migrate Attribute Values** option for users to configure and schedule the migration. Refer to the **Technical Migration Details** section below for a detailed explanation of what the migration process entails.

Note: You cannot perform schema maintenance actions like changing the validation base type or attribute dimension dependencies while values for an attribute are being migrated.

Prerequisites

The attribute value migration should be configured and run by an admin or super user who has knowledge about the system utilization. The user configuring and running the migration must have the setup action privilege 'Modify definition of product attribute (domain and default unit)' for all attributes on the system. For more information on this privilege, refer to the **Attributes** section of the **Setup Actions and Error Descriptions** topic in the **System Setup** documentation.

Important: It is advised to perform the migration, at least partially, on a test system with the same hardware setup to validate the settings before starting the migration on a production system.

Technical Migration Details

The migration functionality deletes rows from the 'valuemap', 'valuemodel' and 'value7' database tables, and inserts rows in the 'softvalue' table. Bulk deleting rows from Oracle tables, however, cause at least two issues:

- As data is deleted, blocks and segments become sparsely populated. This may lead to Oracle selecting inefficient execution plans, again causing an observable performance decrease.
- Tablespace is not released for 'reuse' automatically. This means that if nothing is done to prevent it, the migration requires as much additional tablespace as is required for the 'softvalue' table inserts.

To counteract these issues, the migration functionality not only deletes and inserts rows, but it also compacts tables and indexes. The following types of compactions are used:

1. 'valuemap', 'valuemodel' and 'value7' index compaction – This type of compaction can be performed while the migration is running and does not require any restrictions to be imposed on the system usage.

2. Table compaction of 'valuemap' and 'valuemodel' – This type of compaction cannot be performed while the 'database mode importer' is running and therefore, when configuring the migration schedule, it is possible to specify windows where the database mode importer can be disabled. The 'database mode importer' is only available to super users with all data node dependent privileges. It allows import processes to batch insert unrevised data directly in the database and may provide performance benefits for very specific use cases. The database mode importer is not available on systems running In-Memory.
3. Shrinking 'valuemap' and 'valuemodel' – This operation requires a short-lived Single-Update Mode (SUM) lock. Therefore, when configuring the migration schedule, it is possible to specify windows where a SUM lock can be taken. Refer to the **Single-Update Mode** section of the **System Setup** documentation.
4. Shrinking 'value7' – Due to the 'value7' table having a function-based index, the shrink space approach used for 'valuemap' and 'valuemodel' cannot be used while STEP is running. Thus, when all values have been migrated, it is possible to schedule the required 'value7' operations for next system restart. The function-based index is dropped, the table is shrunk, and the index is rebuilt. Refer to the **Completing the Migration** section of the **Running the Attribute Value Migration** topic.

Migration Preparation

Important: Ideally, perform attribute value migration during off peak hours and for as long as possible in one session.

After any error, restart the attribute value migration process to test if the migration has failed. Restarting the migration process often fixes issues, such as 'undo segment' errors.

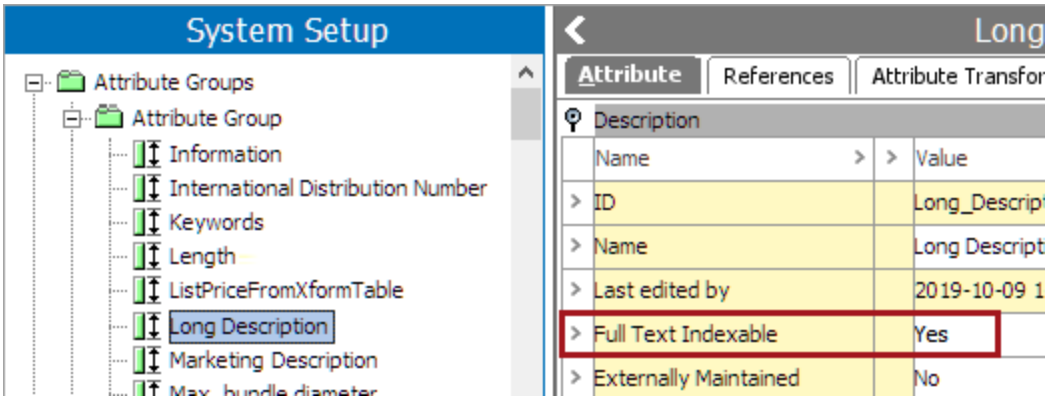
To avoid common issues, perform the following steps before running the attribute value migration to avoid common issues:

1. If possible, upgrade to the latest version of STEP.

   For environments running STEP 9.0-mp5, search the release notes for 'ISSUE-513717 - Compact Soft Migration tablespace fix' and contact Stibo Systems Support to apply the hotfix.
2. Restart STEP and suspend all processes, including:
   - Background Processes
   - Integration Endpoints
   - Bulk Update Processes
   - Business Rules
3. Review the Full Text Search setting and disable it during the migration since an enabled full text index ('value_ctxix') has a negative impact on the migration performance. For details about this feature, refer to the 'Important' information in the **Full Text Indexable Attributes** topic.

   In the workbench, determine if the full text index is enabled, navigate to an attribute in System Setup.

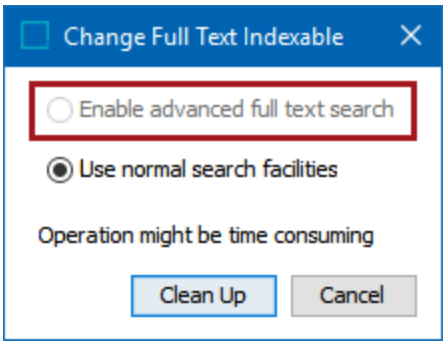
- **Enabled** - If the 'Full text indexable' parameter is set to Yes, then full text index is enabled.



It is recommended to drop the index before starting the migration. It can be enabled again once the migration is complete.

To drop the 'value_ctxix' index, delete the **dropfulltextsearchindex.sql** file from the STEP_HOME/admin/sqlhome folder.

- **Disabled** - If the 'Full text indexable' parameter is set to No, double-click the field to display the Change Full Text Indexable dialog. If the 'Enable advanced full text search' option is disabled in the dialog, the index is disabled for your system.



4. Run a Full Analyze maintenance job through the Stibo Systems database toolbox or manually on the database via **exec adminpck.analyze(true);**
5. Verify system requirements:
   - JAVA Heap Size is no less than 8-12 GB in production environments.
   - Allocate enough memory for both the OS (24 GB free) and, if applicable, In-Memory hugepages.

> **Note:** Carefully monitor system RAM and hugepage usage during the attribute value migration process as out of memory (OOM) issues are common.

- Increase STEPSYSDATA (or any tablespaces that were renamed but serve the purpose of STEPSYSDATA) as necessary. While this varies by database, generally, 20 percent free space is enough.

  Note: Carefully monitor your file system size to avoid running out of space, which can cause STEP to crash and/or not function properly.

  - Frequent crashes can generate enough heap dumps to max out STEP Home file system.
  - Heap dumps can generate from different issues but a common one is crashing due to out of memory (OOM).
  - Archive logs can increase significantly.

Begin the migration process as defined in the **Running the Attribute Value Migration** topic.

Running the Attribute Value Migration

Before starting the attribute value migration, review the information and complete the steps included on the **Attribute Value Migration** topic.

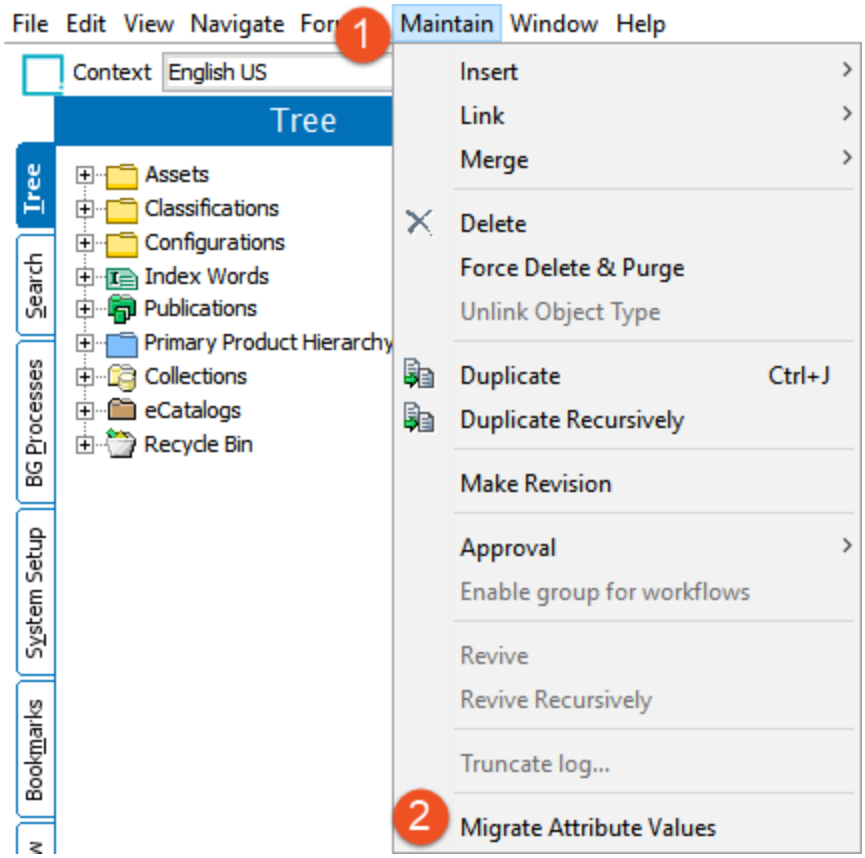
Note: While running the attribute value migration, carefully monitor:

- System RAM and hugepage usage as out of memory (OOM) issues are common.
- Your file system size to avoid running out of space, which can cause STEP to crash and/or not function properly.
  - Frequent crashes can generate enough heap dumps to max out STEP Home file system.
  - Heap dumps can generate from different issues but a common one is crashing due to out of memory (OOM).
  - Archive logs can increase significantly.

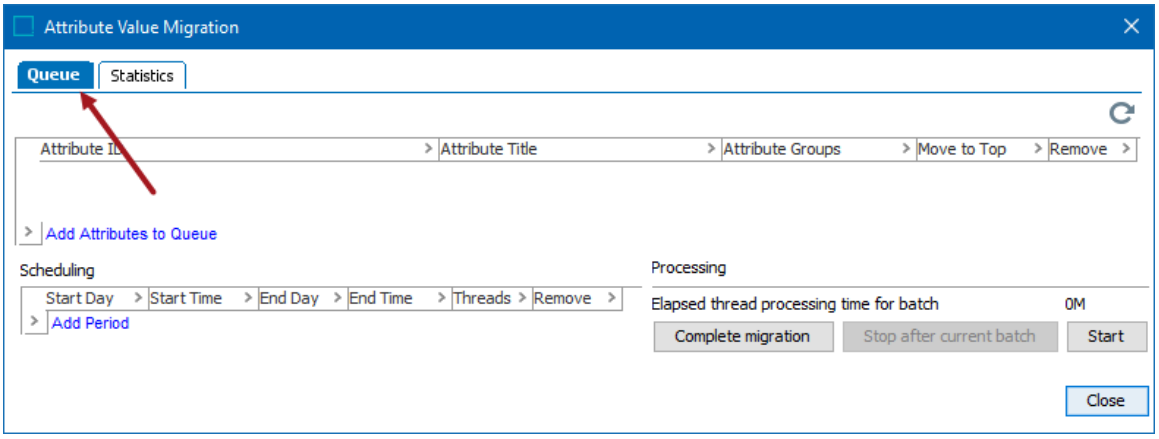
Running the attribute value migration process includes queuing, scheduling, starting, and completing the migration.

Queuing Attributes for Migration

1. From the **Maintain** menu, select **Migrate Attribute Values**.

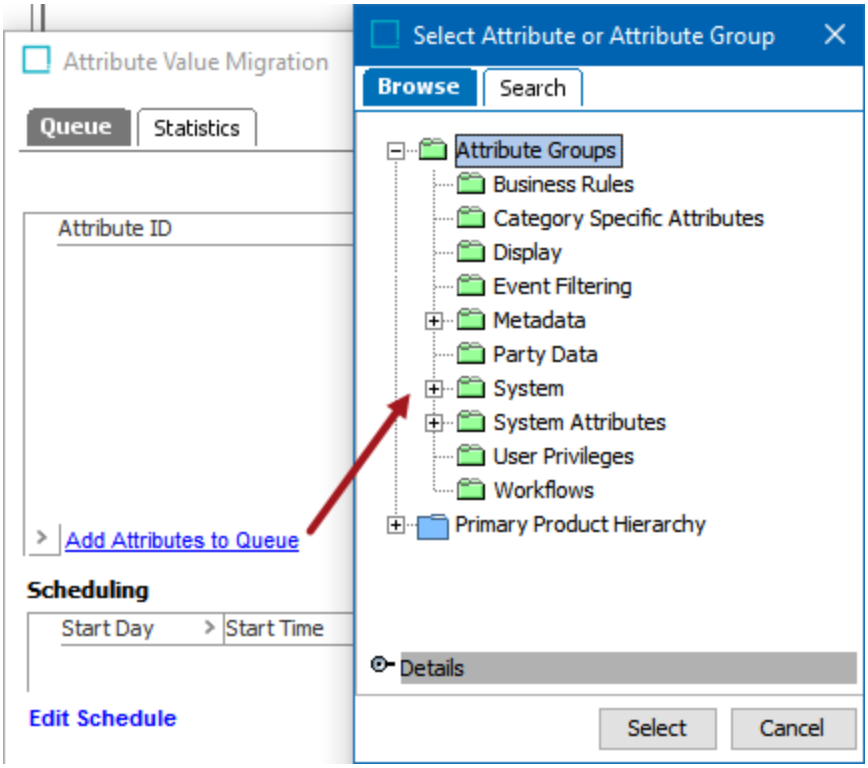


The 'Attribute Value Migration' dialog displays and the Queue tab is selected.

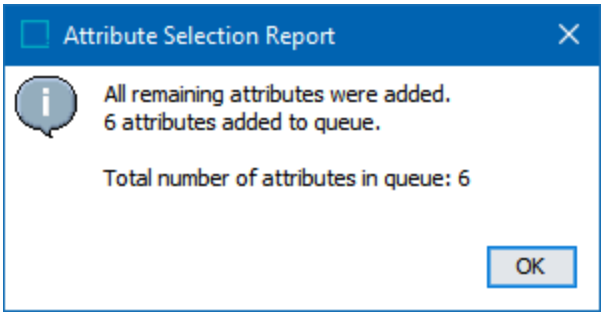


2. Click the **Add Attributes to Queue** link. A list of the migratable attributes displays. Choose the desired attributes to add them to the queue and click **Select**.

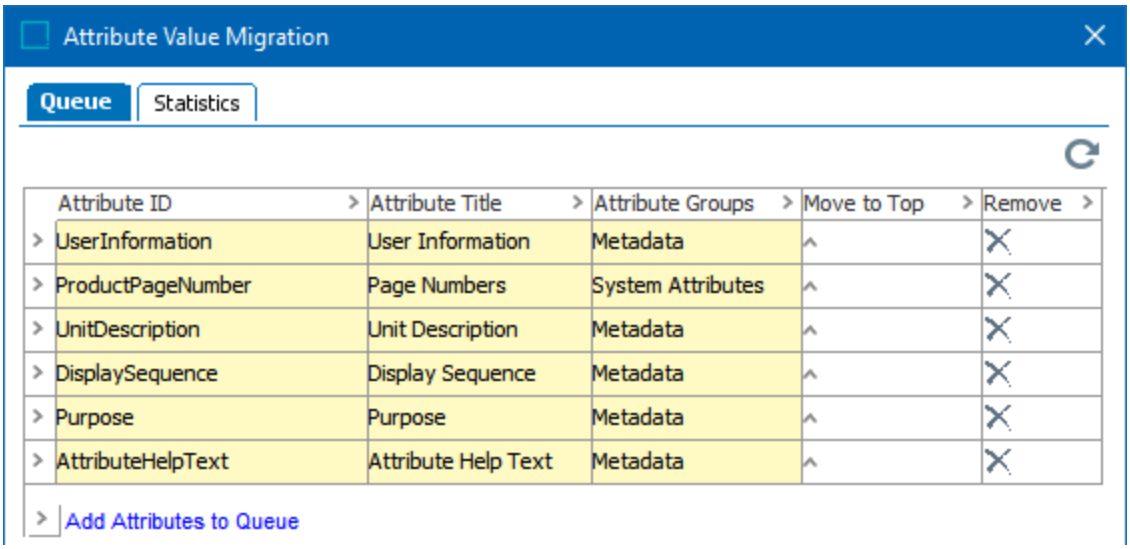
Note: If an attribute group is selected, all attributes belonging to that group are added to the queue. In this example, 'Attribute Groups' is selected, therefore, all the groups below it, as well as all the attributes under each attribute group, are included.



A report of the number of added attributes displays. Click **OK**.



The attributes are added to the queue. Select additional attributes or remove undesired attributes from the queue.



Note: When using the SQL API, for scenarios where the CSV model requires different SQL API views to be used for querying values, the migration of values for certain attributes must be postponed until the SQL has been updated. For details, refer to the SQL API documentation by clicking the **Technical Documentation** button on the Start Page.

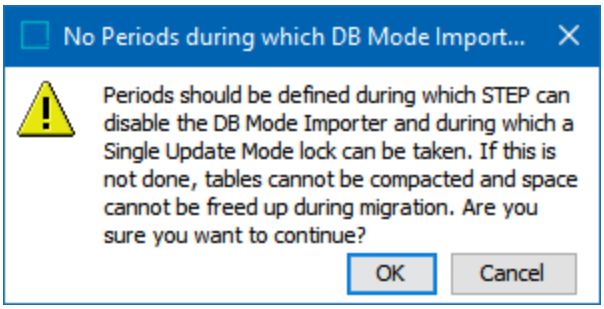
Scheduling the Migration

A schedule is required to run the migration.

Considerations

Review these items before scheduling the attribute value migration:

- The schedule uses the server time.
- If the End Day and End Time are identical to the Start Day and Start Time, the period is a full week.
- If overlapping schedule periods are defined, the period with the fewest restrictions and the highest number of threads is used.
- A warning displays if periods defined do not allow the process to disable the database mode importer and/or take a SUM lock. Schedule periods are required to complete the migration.



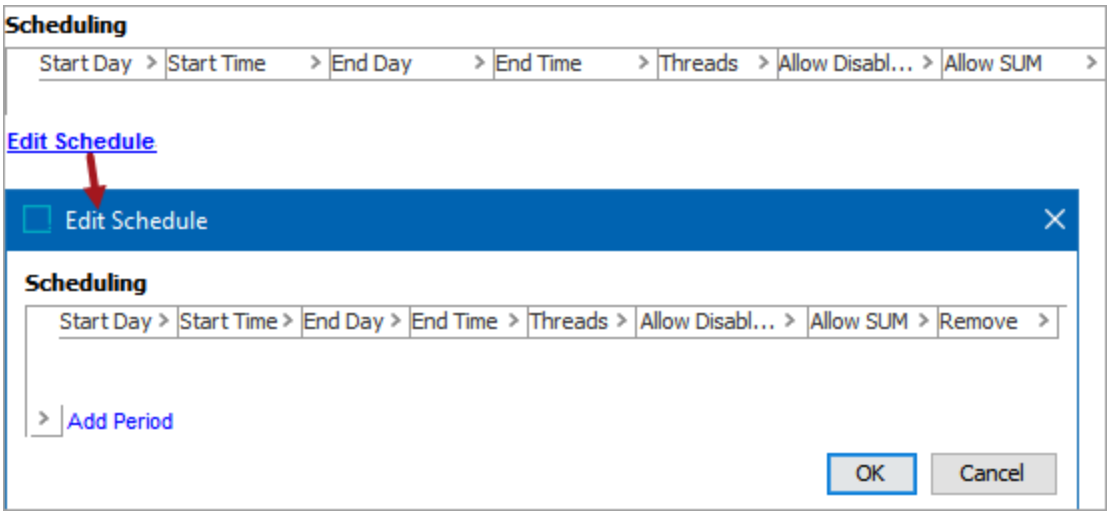
- The migration process only runs on a single application server in a clustered setup. Consider this when specifying the number of threads for a processing period. The number of threads to use depends on the system hardware and the system utilization. Typically, one or two threads are reasonable for periods where the system is heavily used while 16 threads is reasonable during off-peak hours. It is advised to perform the migration, at least partially, on a test system with the same hardware setup to validate the settings before starting the migration on a production system.

Creating a Schedule

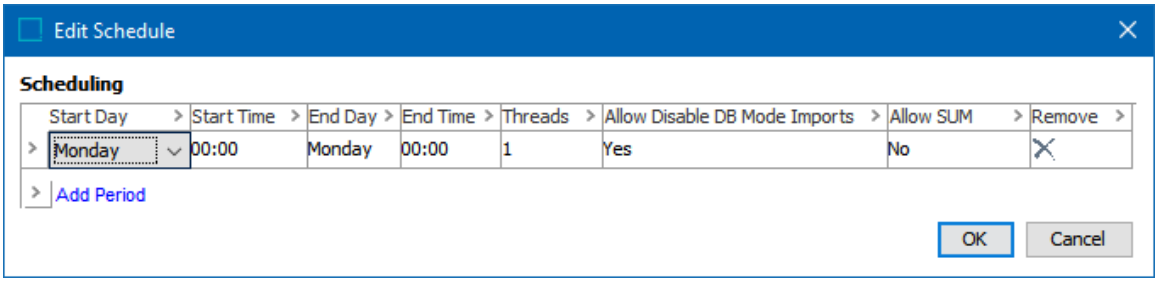
Before scheduling the migration and following the next steps, review the **Considerations** section above.

Important: Consider the time zone of the application server compared to that of the workbench (the client) where the schedule is created or viewed. When scheduling a job, the local time zone is displayed in the workbench, but the time zone of the server is used to run the background process. Although displayed, the time zone of the client is not included in the instruction to the server to run the job. This can cause confusion about when the job will run since the scheduled time is not automatically converted to accommodate potential differences in time zones.

1. From the scheduling section of the 'Attribute Value Migration' dialog, select **Edit Schedule**. The 'Edit Schedule' dialog displays.



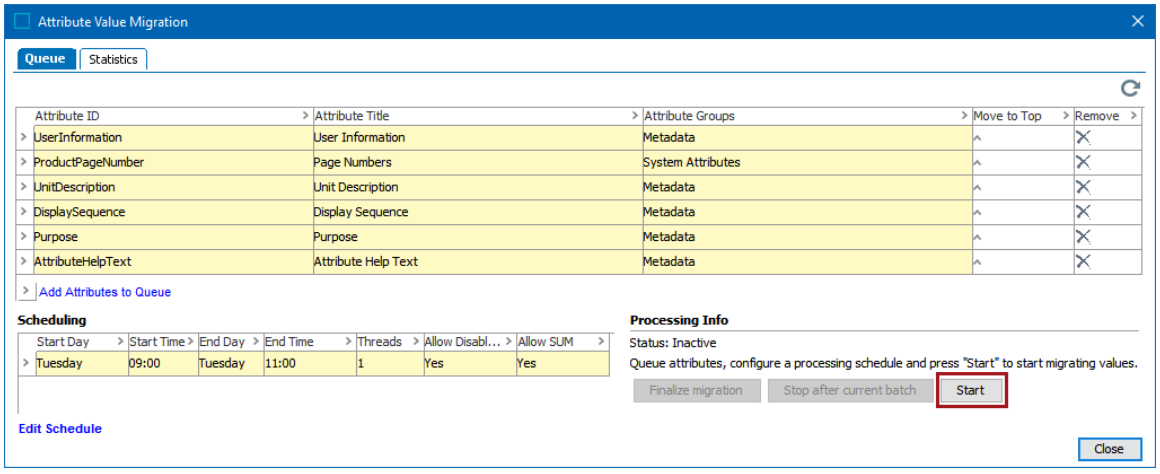
2. Select **Add Period** and a default time is added. Configure by clicking on each column and selecting from the dropdown menu.



- **Start Day** - The day the scheduling period starts.
- **Start Time** - The time on the starting day that the period starts.
- **End Day** - The day the scheduling period ends.
- **End Time** - The time on the ending day that the period ends.
- **Threads** - Indicates how many threads the migration process may use during the period.
- **Allow Disable DB Mode Imports** - Indicates if the process is allowed to disable the database mode importer within the period / window. In most cases, it is safe to set this value to 'Yes.' With In-Memory systems, it should always be set to 'Yes' since the database mode importer is disabled.
- **Allow SUM** - Indicates if the process is allowed to take a Single-Update Mode lock within the period / window. For more information about Single-Update Mode, refer to the **Single-Update Mode** topic.
- **Remove** - Clicking the X deletes the selected period.

Starting the Migration

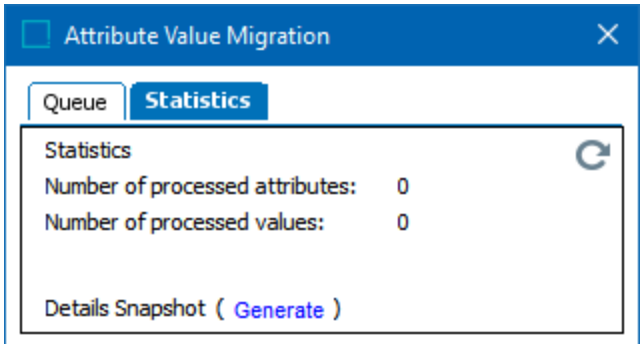
After configuring your migration schedule, click **Start**.



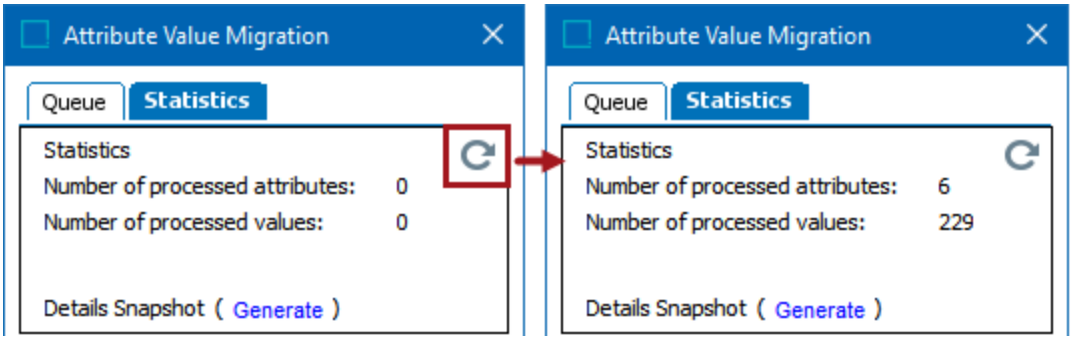
Your migration is now scheduled, and the process begins at the earliest set period.

Statistics

The Statistics tab shows details about the migration. The following image shows how the Statistics tab looks before migration has begun.

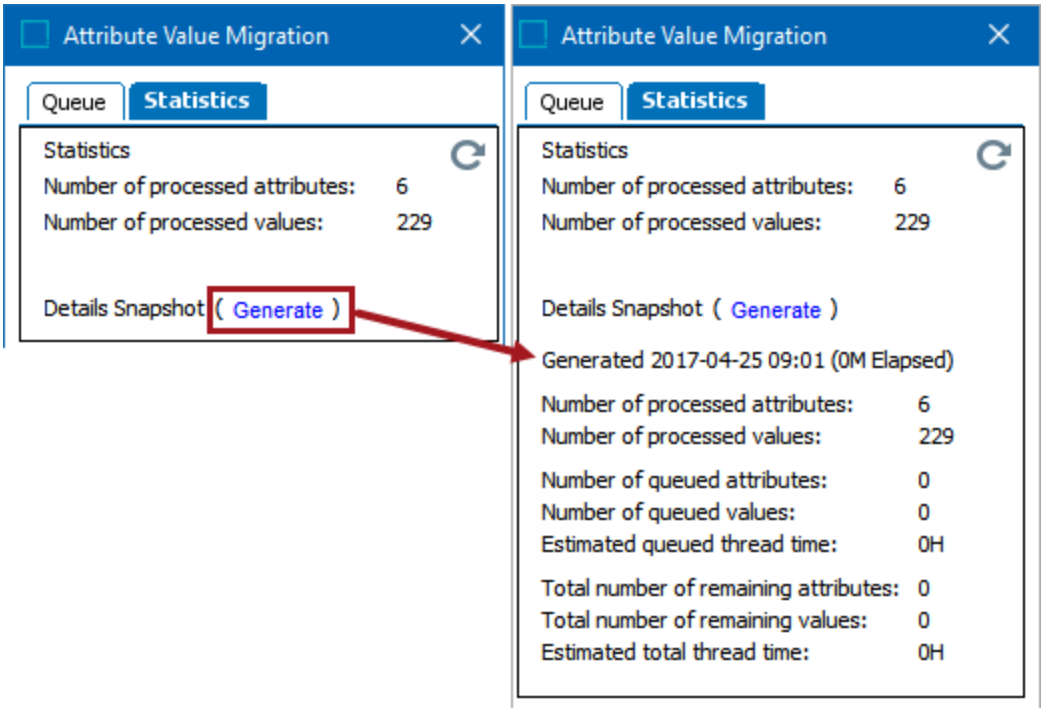


- **Number of processed attributes** - The number of attributes that have been migrated.
- **Number of processed values** - The number of values that have been migrated.
- **Refresh icon** - Refreshes the GUI, allowing for data updated values to display.



- **Details Snapshot** - Selecting the 'Generate' link creates a snapshot report. This report has information about attributes / values that have been processed as well as queued attributes / values to be processed.

Finally, it displays the estimates for the remaining processing time.



In the generated report, the 'Estimated queued thread time' and 'Estimated total thread time' are the estimated times to process all queued attributes and all migratable attributes, respectively. This does not consider the time spent doing other tasks such as the waiting period for the SUM lock.

Note: The estimates are based on processing using a single thread. Ideally, if the processing is run with two threads, the duration is half of the estimate, and with four threads, it would be a quarter of the processing time, and so forth.

Completing the Migration

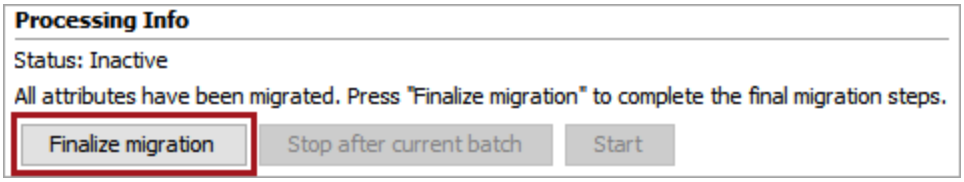
After the values for all migratable attributes on the system have been migrated, the final steps for the migration are ready to be initiated. This status can be noted on the 'Processing Info' section of the 'Attribute Value Migration' dialog.

When the button is clicked, a dialog displays and allows you to schedule the 'value7' operations for the next STEP system restart.

If the full text index functionality is enabled on the system on which the migration is being performed, the 'value_ctxix' index is dropped and recreated during the system restart. Once the system is started again, the index is populated asynchronously and until complete, users may get fewer search results for full text index searches.

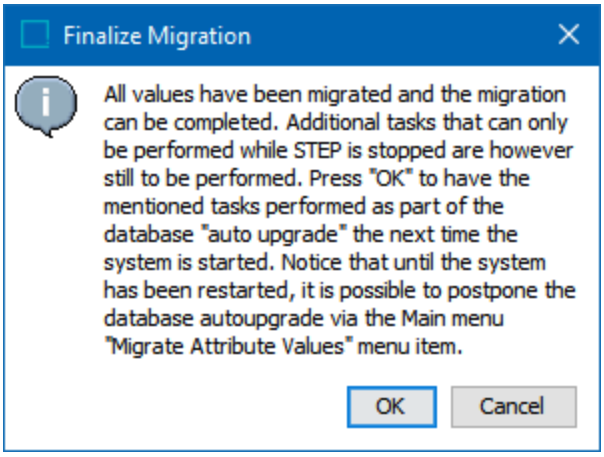
Important: The final step of the migration requires the STEP system to be restarted.

1. Click **Finalize migration** to generate a prompt noting that the migration is ready to be completed.

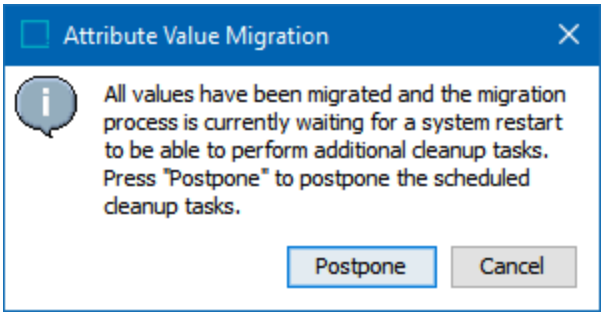


2. Click **OK** to schedule the final operations of the migration for the next system restart.

Important: The system may be offline for an extended period of time while the processes finish migrating. Plan for a period of downtime before restarting STEP.

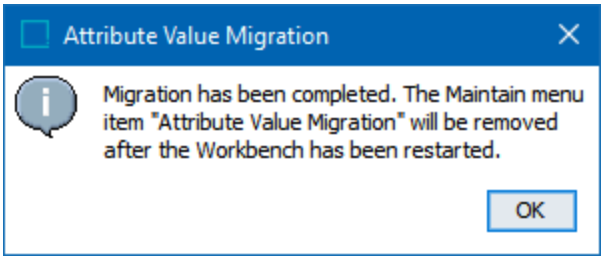


To postpone completing the migration for any reason, in the workbench, on the **Maintain** menu, navigate to and select the **Migrate Attribute Values** option. On the dialog box, click the **Postpone** button to postpone the final steps of this migration. Selecting this option requires that you finalize the migration again from the **Attribute Value Migration** tool.

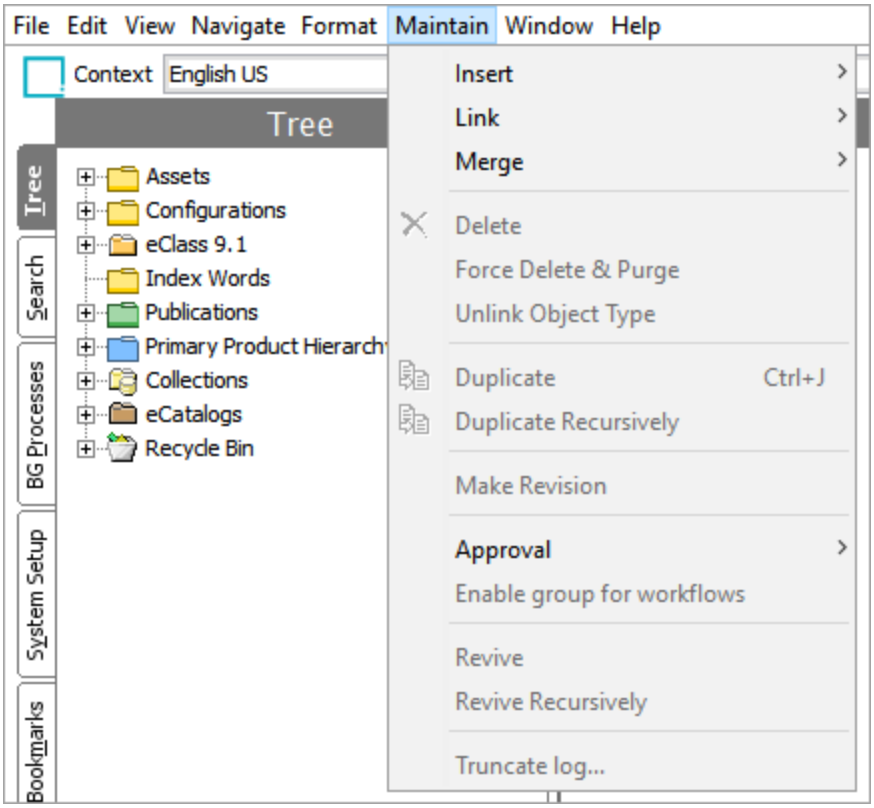


3. Restart the STEP system.

4. In the workbench, navigate to the **Maintain** menu and click the **Migrate Attribute Values** option to display a successful migration dialog. Click **OK**.



5. Restart the workbench, navigate to the **Maintain** menu and verify that the **Migrate Attribute Values** option no longer. All attribute values have been migrated to compact value storage.



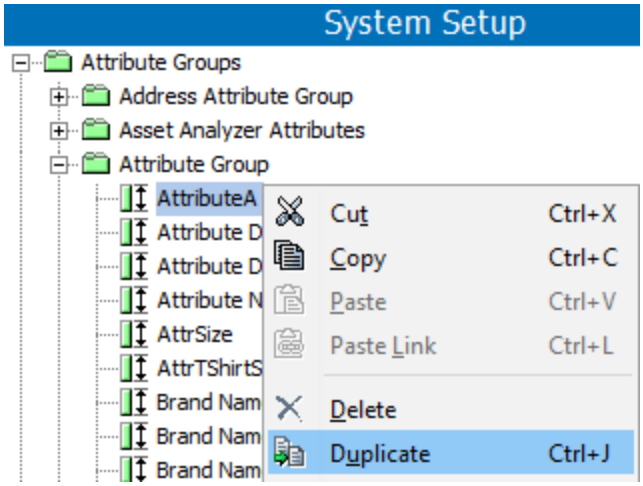
Changing an Attribute ID

The 'Switch Attribute IDs' option allows the user to switch the ID of two attributes. This functionality avoids entering single update mode for changes to attribute definitions (such as externally maintained, full-text indexable, multi-valued, data type, or LOV). Be aware that this method results in the loss of revision history on values of the attribute being changed.

Note: Removing a dimension dependency requires the use of a bulk update operation in a relevant context to repetitively move attribute values from relevant dimension points to the target attribute. This will then implement the prioritization of values. For more information, refer to the **Attribute Values: Merge Attribute Values Operation** topic in the **Bulk Updates** documentation.

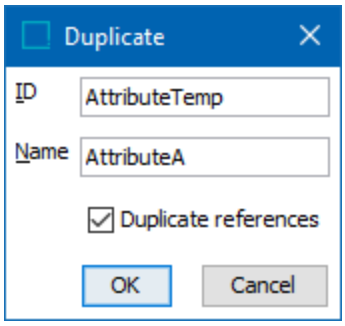
The following example shows switching the ID of an original non-externally maintained attribute (ID = AttributeA) that contains values, with a new externally maintained version of the same attribute via the Switch Attribute IDs option.

1. In System Setup, select the original attribute, right-click and choose the **Duplicate** option to make a copy of the attribute (i.e., same object validity and attribute links).

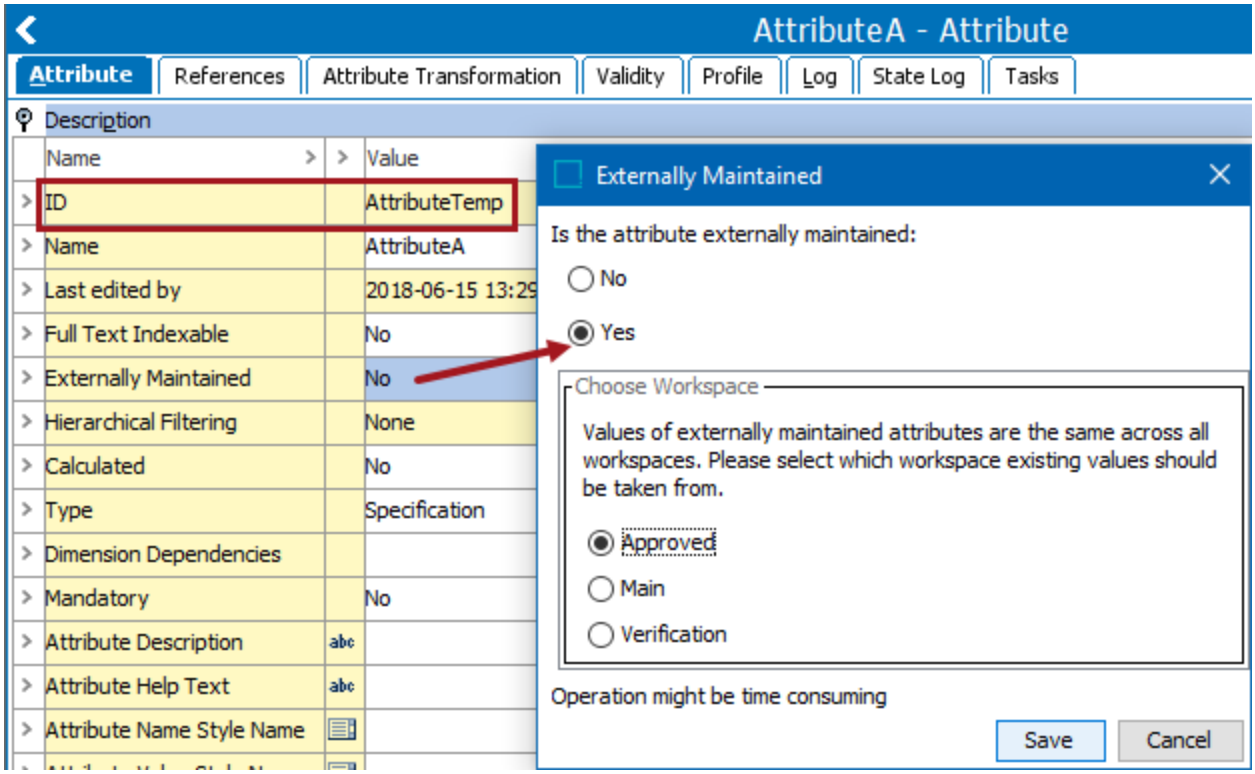


2. On the Duplicate dialog, check the '**Duplicate references**' checkbox, add a unique **ID**, set the **Name** to be the same as the original attribute, and click **OK**. This example shows 'AttributeTemp' as the ID.

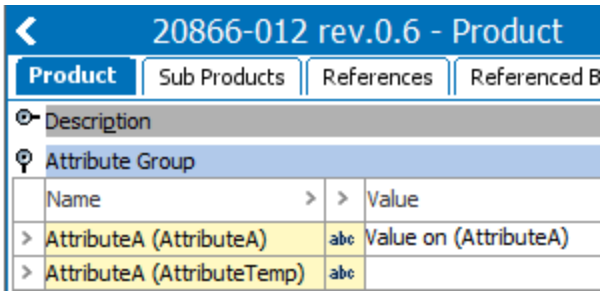
   Note: Attribute IDs are case sensitive.



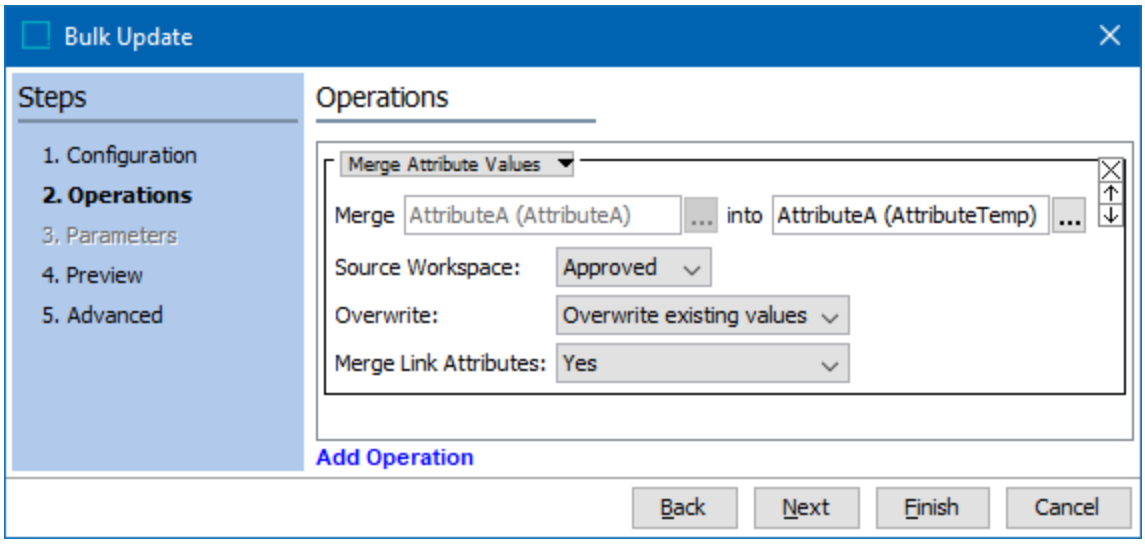
3. Select the new attribute (AttributeTemp), double click the **Externally Maintained** parameter, select the **Yes** radio button and the **Approved** workspace (no values exist but a selection is required), and click **Save**.



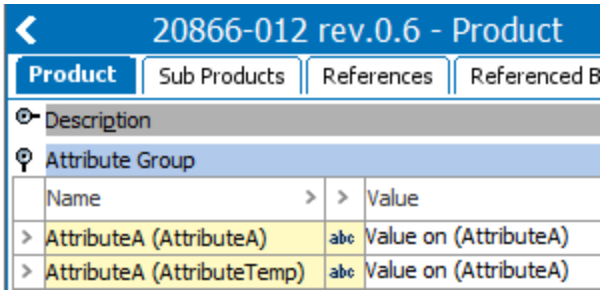
4. In Tree, verify both attributes are displayed on an object for which they are valid. Only the original attribute has a value. In this image, the ID was added into the Name field to distinguish the two attributes with the same name.



5. In System Setup, select the original attribute (AttributeA), right-click, and select the **Merge Attribute Values** option. The Bulk Update wizard is displayed. To complete the merge, follow the steps defined in the **Merge Attribute Values Operation** section of the **Attribute Values: Merge Attribute Values Operation** topic in the **Bulk Updates** documentation.

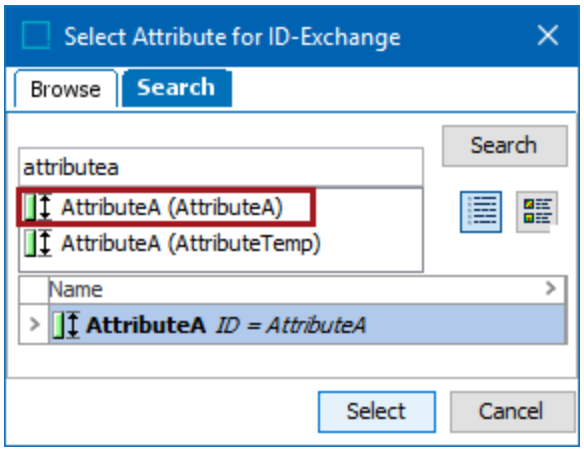


6. In Tree, on an object for which the attributes are valid, verify that value from ID AttributeA was copied to ID AttributeTemp. In this image, the ID was added into the Name field to distinguish the two attributes with the same name.



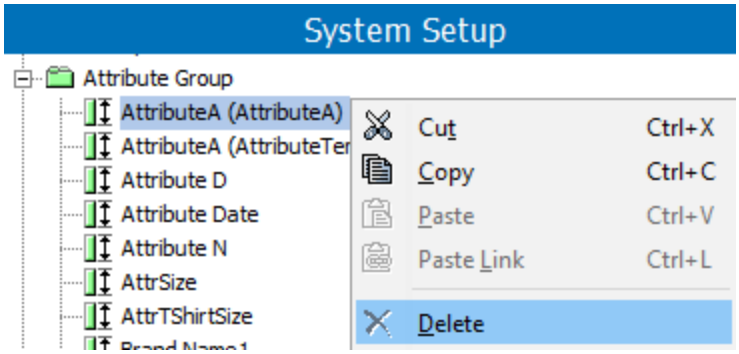
7. In System Setup, select ID AttributeTemp, right-click and choose the **Switch Attribute IDs** option to display the Select Attribute for ID-Exchange dialog.

   Because the attributes have the same name, use the **Search** tab to select the original attribute, click **Search**, and click **Select**. In this example, the ID = AttributeA.

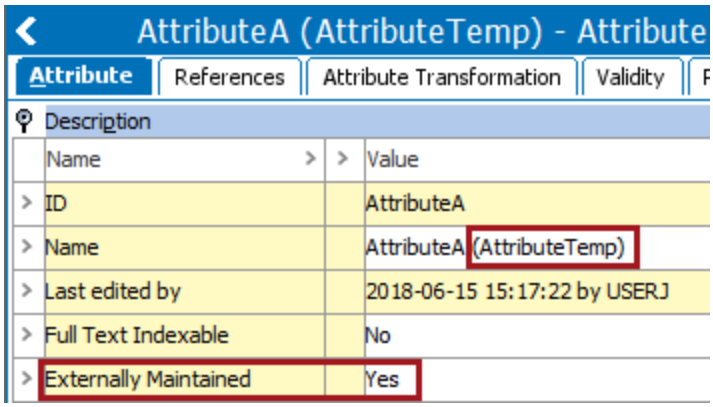


The IDs are exchanged between the two attributes.

8. Select the original AttributeA, which is not externally maintained and that now has the ID AttributeTemp, right-click, choose the **Delete** option. Use the **Force Delete** option to remove the attribute, values, and links, and bypass the Recycle Bin.



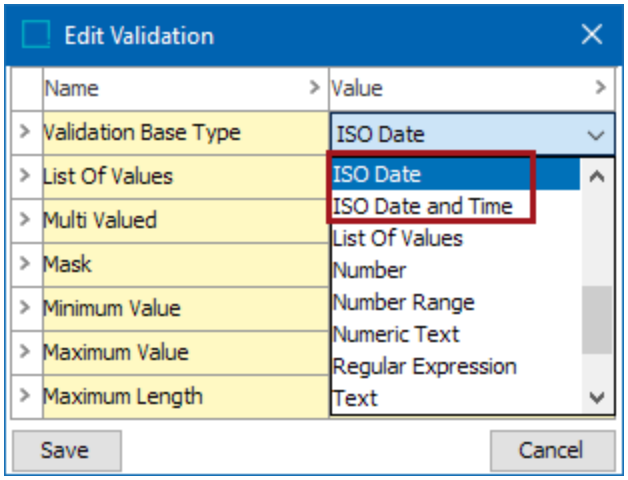
The remaining attribute with the name 'AttributeA', which started as AttributeTemp (as indicated by the original ID in the Name field), now has the values merged from AttributeA, has the ID AttributeA, and has the Externally Maintained parameter = Yes.



Converting Attributes from Date to ISO Date

It is recommended that users store date information in STEP using ISO attributes so that they can fully take advantage of search and compare features in STEP, as well as to maintain consistency in information across multiple regions. There are many benefits to using an 'ISO Date' attribute in STEP. The primary reason is that the lexicographical order of the representation of ISO dates corresponds to chronological order. In simple terms, this means that STEP handles ISO dates better than Date attributes when doing a search, comparing, or other order operations.

For this reason, STEP users who use attributes with a Date Validation Base Type may want to merge or convert the Date attribute into an 'ISO Date' attribute. Using STEP, users can also switch the ID of the attributes making it possible to easily replace an attribute without having to do a lot of changes to the configurations where the attribute is used.



There are two ISO Date formats available as shown above:

- **ISO Date:** When this option is used as a validation, the format in which the date will be entered is 2016-12-16.
- **ISO Date and Time:** When this option is used as a validation, both the date and time will be displayed such as 2016-12-16 17:35:45

Merging Attributes

In STEP Workbench, merging attributes can be done from System Setup, using the right-click menu option 'Merge Attribute Values' for any attribute. This option starts the Bulk Update 'Merge attribute' operation with the selected attribute as the source, and allows you to choose a target attribute. Date types will be converted to honor the target validation base type while merging. Merge can be performed multiple times to make sure data in the target attribute is up to date.

For more information about merging and the steps to merge attribute values, refer to **Merging Attribute Values** in the **Attributes** section of the **System Setup** documentation.

Switching Attribute IDs

After a merge is complete, a user may want to start using the target attribute values in place of the values from the source attribute. This can easily be achieved by switching the ID of the source and target attributes. In any STEP configuration where the source attribute is configured for use, the values from the target attribute will be used after the switch.

This also means that if the target attribute ID is configured for use in any configuration, the source attribute values will be used. Users should verify the impact of the ID switch before starting the process and update any configurations as needed.

For more information about switching attribute IDs, refer to **Changing an Attribute ID** in the **Attributes** section of the **System Setup** documentation.

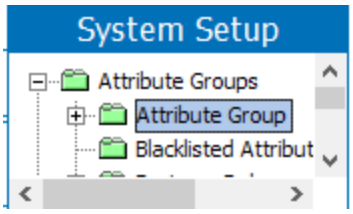
Creating Attributes

Attributes are maintained in System Setup, and are characteristics or detailed pieces of information that relate to a particular object, or show relations between objects (Reference / Link). To create an attribute, follow the directions below.

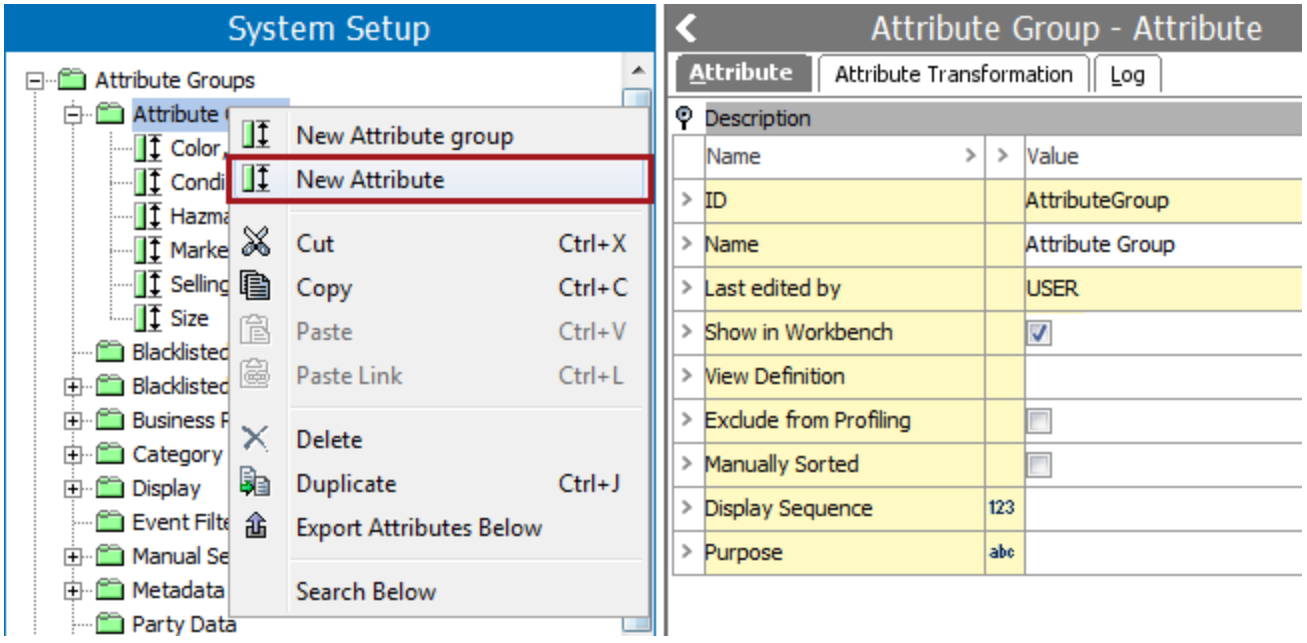
Attributes can also be created in bulk, using the export and import functionality and the Excel format. For details, refer to the **Managing Attribute Parameters with Excel** topic.

Create an Attribute

1. In System Setup, expand **Attribute Groups**, and then select a group for the new attribute to live under.



2. Right-click on the attribute group, and select **New Attribute**.



A **Create Attribute** wizard appears.

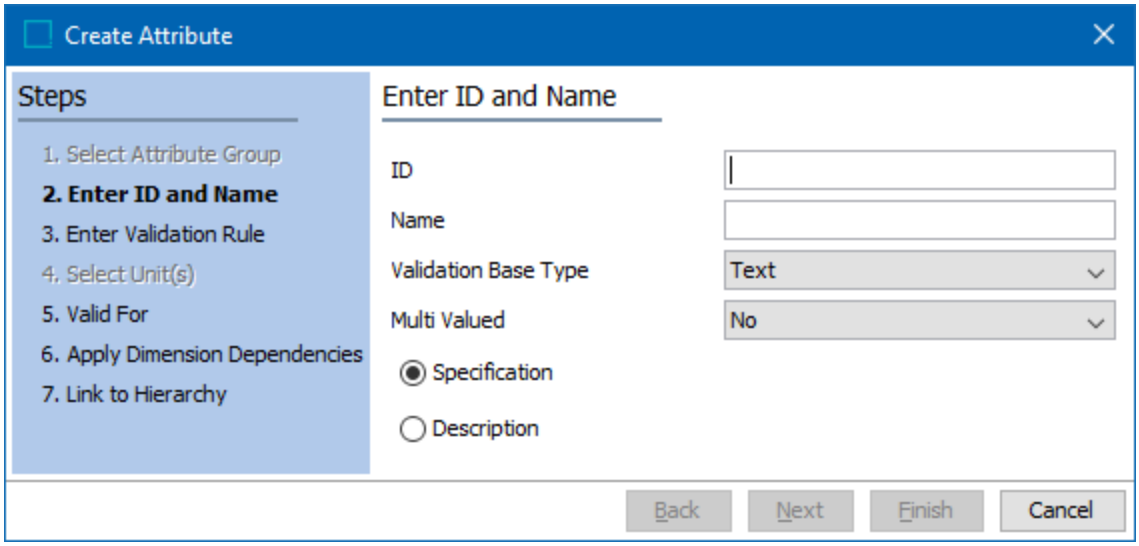
3. Type an ID and Name. Refer to the **Attribute ID Considerations** section in this topic for more information.

Note: Attribute IDs are case sensitive.

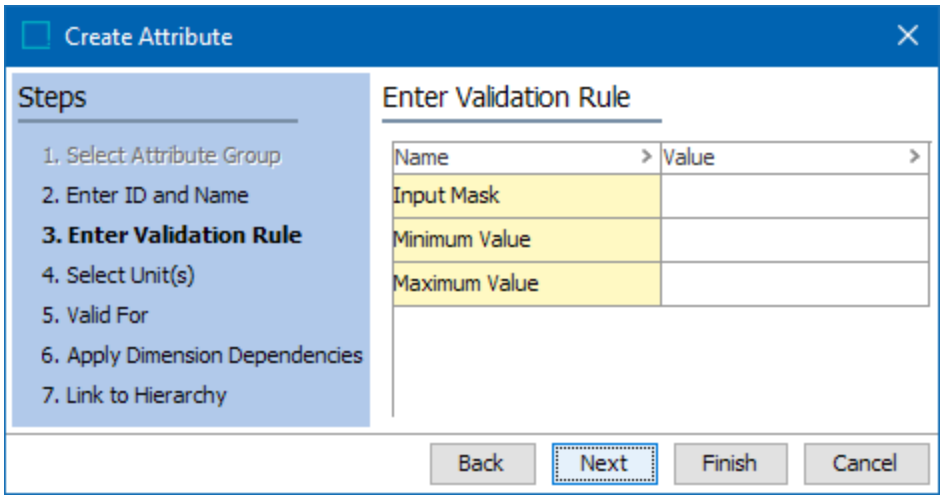
Select the sort of validation that the attribute should be based on from the **Validation Base Type** dropdown list. For a list of available validation base types, refer to the **Validation Rules** topic in this guide.

Select if the attribute should hold multiple values on each product or only one value per product.

Determine whether it is a Specification or Description attribute. Click **Next**.



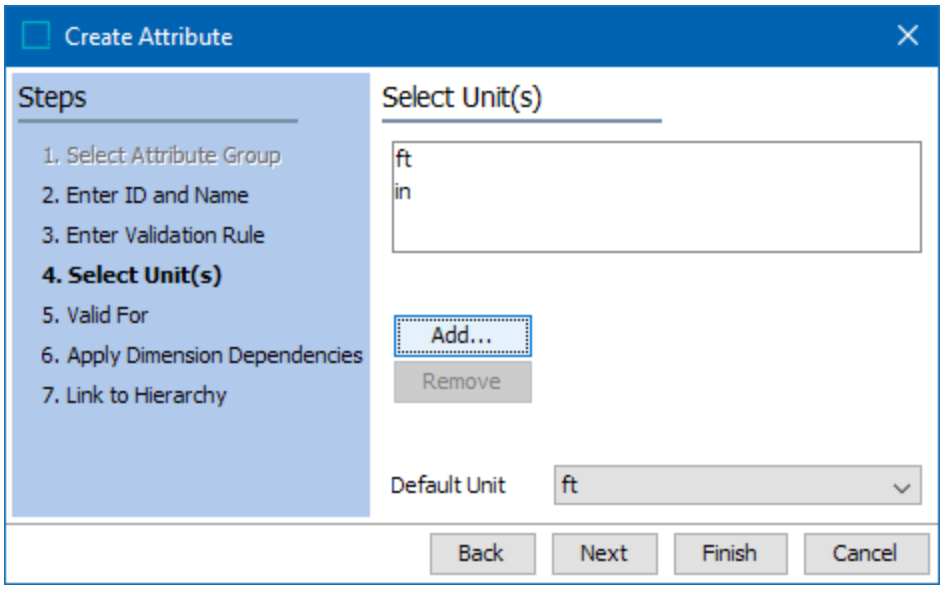
4. Type an Input Mask, Minimum Value and/or Maximum Value. Click **Next**.



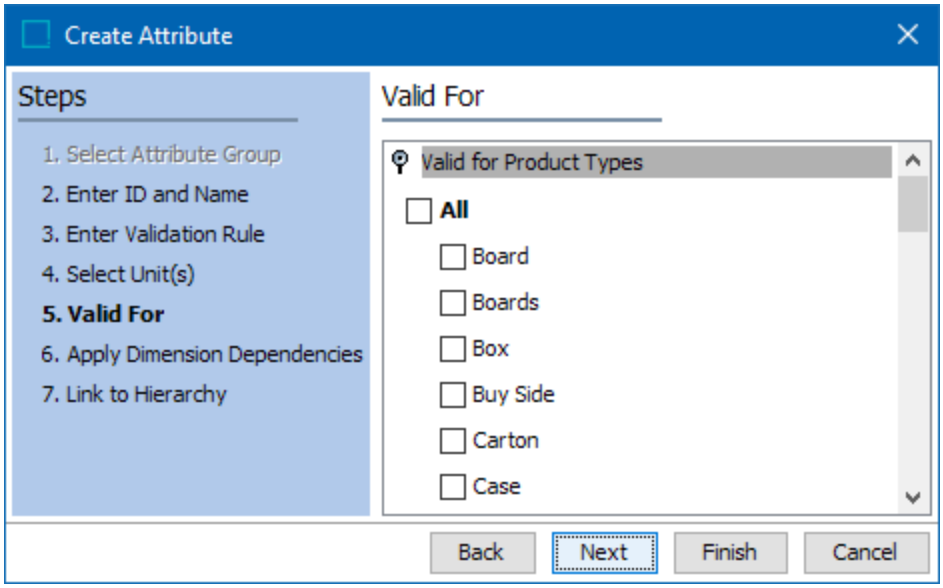
5. The **Select Units** step will only be visible if a validation base type of Embedded Number, Fraction, Integer, Number, Numeric Text, or Numeric Text (exclude tags) numeric validation base type has been selected.

   Search or browse to add one or more relevant Units or Unit Groups.

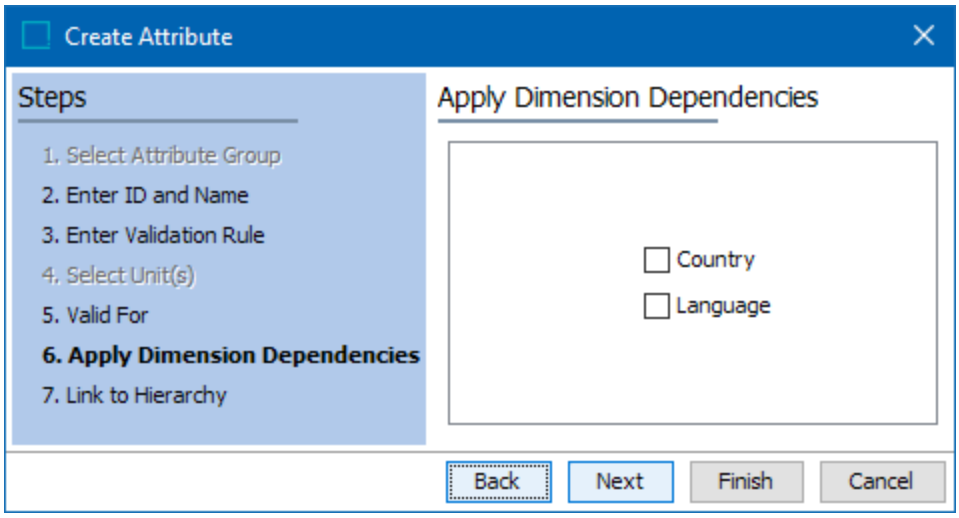
   Select a unit to be selected as default unit. Click **Next**.



6. Select the product types the attribute is associated with. Click **Next**.

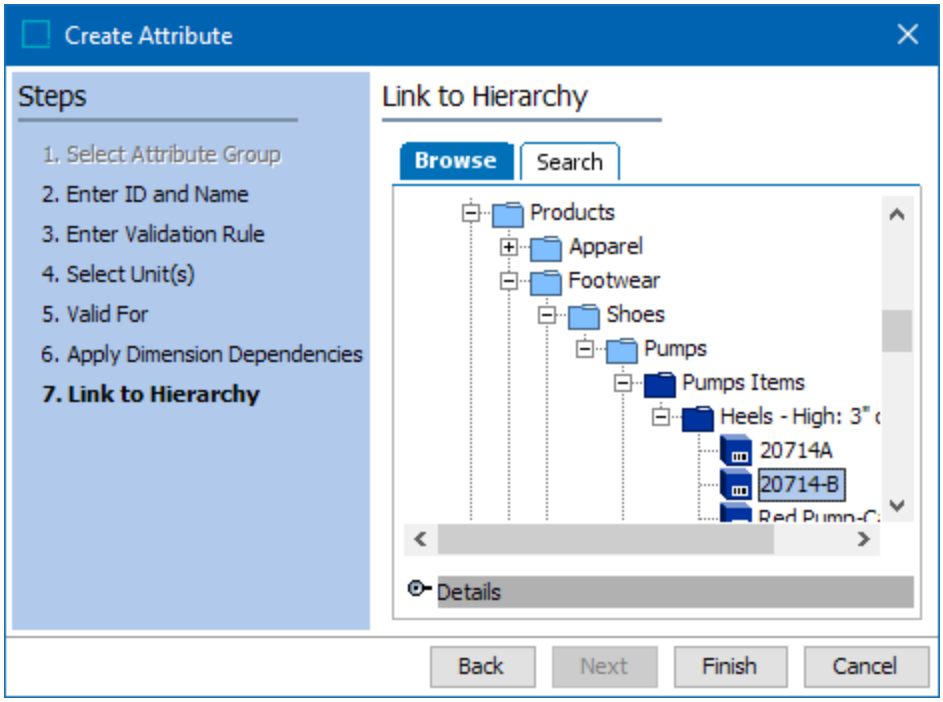


7. Apply Dimension Dependencies. Click **Next**.

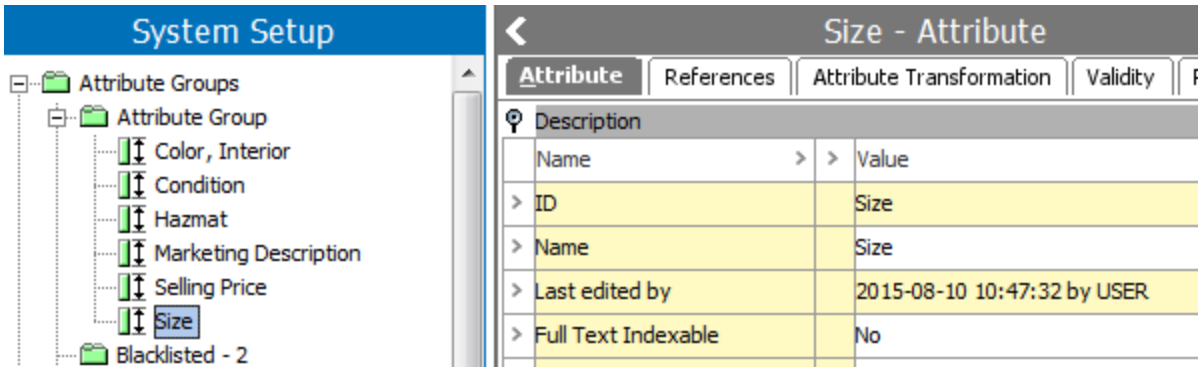


8. Select a tree node where the attribute should be linked.

> **Note:** If the attribute should be a description attribute or a Link Attribute, it is not necessary to link the attribute to a Product or a Classification.



9. Click **Finish** to create the attribute.



Note: Attributes are created as specification attributes by default. Specification attributes are only valid for Product Object Types. If an attribute should be valid for Classification Object Types, for example, it must be changed into a description attribute.

The next steps in attribute creation, as required, are to specify externally maintained, calculated, and/or specify the validity.

Attribute ID Considerations

Take the following information into consideration when creating attribute IDs for attributes that are used for Elasticsearch searches. Refer to the Search Screen topic for information about this functionality.

IDs cannot start and/or end with a period / dot (i.e., '.').

The following words are currently forbidden to be used as part of the ID:

- simpleValue
- lowerCaseValue
- unitId
- numeric
- dateTime

Examples of forbidden attribute IDs:

- [forbidden word], e.g., 'numeric'
- abc.[forbidden word], e.g., 'abc.numeric'
- abc.[forbidden word].abc, e.g., 'abc.numeric.abc'
- end with a dot, e.g., 'abc.'
- start with a dot, e.g., '.abc'
- dot or dots by itself / themselves, e.g., '.', '....'
- etc.

For faceted search, mappings cannot be made for these in Elasticsearch, and the attributes cannot be shown as facets.

Handling Duplicated Attributes in Web UI

It is common for attributes to be linked to multiple attribute groups within STEP. This can lead to redundancy and confusion as attributes may display multiple times when a Web UI screen is configured to display attribute groups that contain overlapping attributes. To manage this, it is possible to indicate groups of attributes that should not be displayed within the Web UI.

Even if duplication is not an issue, a single attribute group or multiple groups may contain sensitive information that should be hidden from view in Web UI. A blacklisted attribute group can be used to hide this sensitive information.

To illustrate this functionality, consider attribute groups 'X', 'Y', and 'Blacklisted'. The 3 groups contain a variety of attributes, but each includes attribute 'A'.

If adding the group 'Blacklisted' to the parameter Blacklisted Attribute Group for group 'Y' but not for group 'X', then attribute 'A' will display with group 'X' attributes on the screen, while being omitted from group 'Y' attributes. This will eliminate duplicates being shown when displaying both groups on the screen.

When group 'Blacklisted' is added to the parameter Blacklisted Attribute Group for both group 'X' and group 'Y', then neither group will show attribute 'A'. Alternatively, if nothing is chosen for the parameter Blacklisted Attribute Group for both group 'X' and group 'Y', then both groups will show attribute 'A'.

Create Attribute Group(s) to Hold Attributes Known to Exist in Multiples Groups

In Workbench, one or more attribute group(s) should be created to specifically hold attributes that should not be displayed within Web UI.

To avoid confusion, it is recommended that any attribute groups created specifically to group blacklisted attributes be named accordingly.

More information about attributes and creating attribute groups can be found in the **Attributes** section of the **System Setup** documentation.

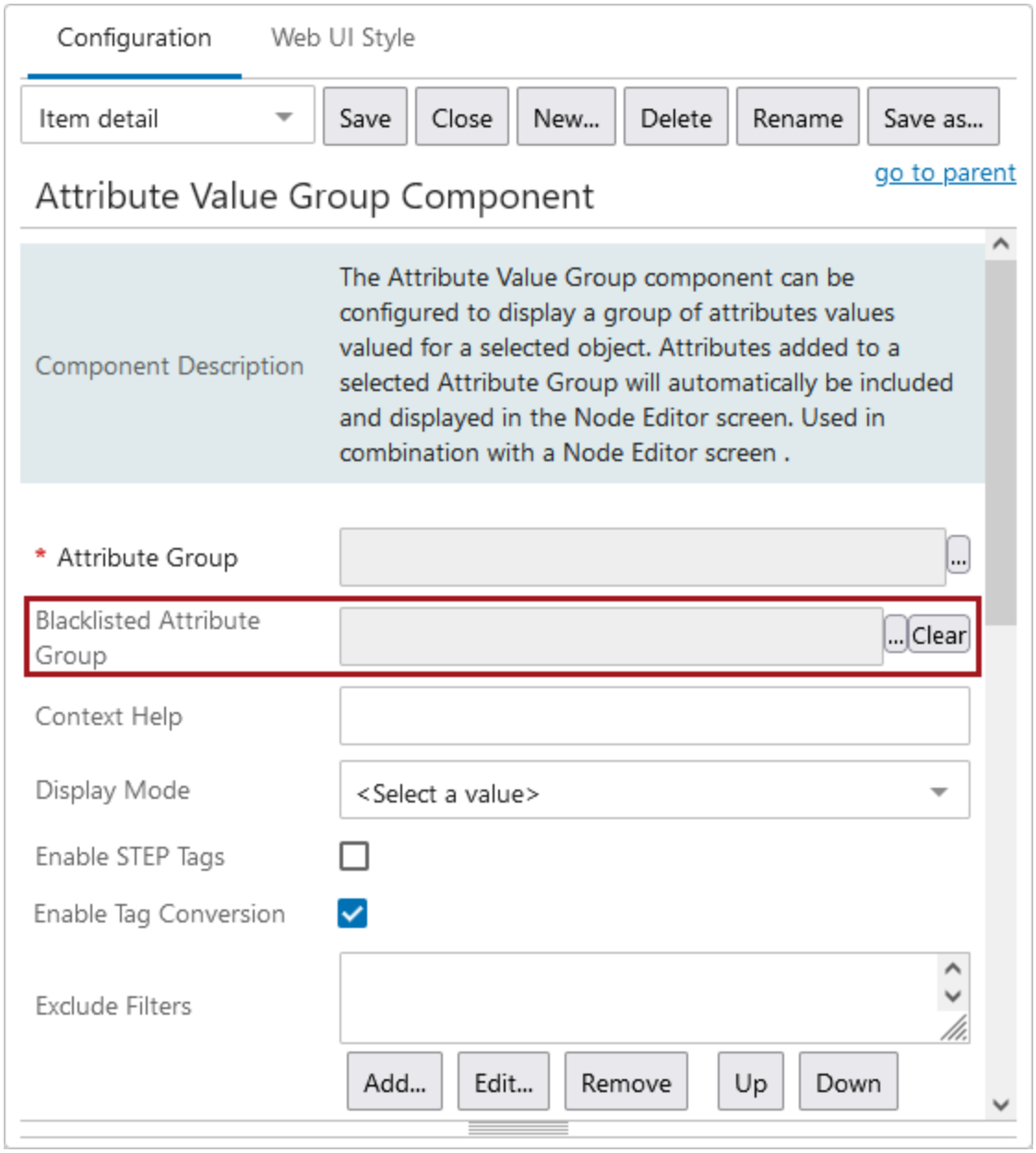
Setting up Blacklisted Attribute Groups in Web UI

Within the designer, the Attribute Value Group component has a Blacklisted Attribute Group field which can be populated with an attribute group. The blacklisted attribute group indicates attributes that should not be displayed within the Web UI. Any attributes in the blacklisted attribute group will not display on the screen. This feature can be used when displaying multiple attribute groups on the screen or even when using a single group.

Note: It is not possible to add multiple attribute group to 'Blacklisted Attribute Group' field in Web UI. It only allows one attribute group to be selected.

1. Log in to the Web UI and go into design mode.
2. On a Node Editor (that is ideally on a screen designed to house object information) click 'Go to Component.'

3. Once there, click on the 'Add' button to add a Child component on the Node Editor Properties screen.
4. On the Add component screen, select the Attribute Value Group Component and then click 'Add.'
5. The 'Attribute Values Group Component Properties' will display. Select the attribute group and the 'blacklisted attribute group' as well as the remaining option, then click on 'Add.' For more information, refer to the Attribute Value Group Component Properties topic in the Web User Interfaces documentation.



Note: Selecting a blacklisted attribute group in Attribute Value Group Component Properties has no impact on other attribute groups shown on a screen within Web UI. Each component operates independently of each other.

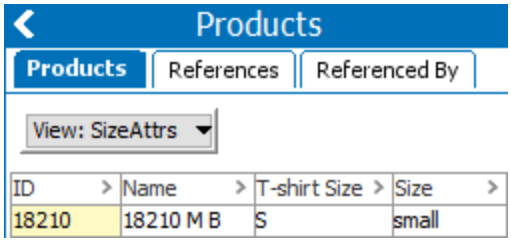
Merging Attribute Values

Redundant attributes have values that may technically be different, but that are logically tracking the same data and are valid for the same set of objects. An example of why this might occur could be due to data loads that happened from different systems and carry the same value in different patterns. Merging redundant attribute values improves data quality by establishing a distinct set of attribute values. The bulk update 'Merge Attribute Values' operation allows you to copy values from one attribute to another, so that ultimately redundant attribute values can be deleted.

The 'Merge Attribute Values' operation works on two attributes:

- The source attribute is the redundant attribute that will be deleted after the merge.
- The target attribute is the preferred attribute and will be retained after the merge.

For example, consider a single object that includes the following two attributes and values to represent a clothing size.



Assume that you want to keep the 'Size' attribute, but want to use the value currently stored in the 'T-shirt Size' attribute. Using the 'Merge Attribute Values' operation with 'T-shirt Size' as the source and 'Size' as the target, the preferred value ('S' for this object) is copied to the preferred attribute ('Size') for this object and for all other identified objects via a background process. Then, after the merge, the redundant attribute ('T-shirt Size') can be deleted manually while retaining all the data it previously held.

For Oracle databases, this action requires single-update mode (SUM), as defined in the Single-Update Mode topic.For Cassandra databases, this action uses Lock-free Schema Change (LFSC) functionality, as defined in the Lock-free Schema Change topic.

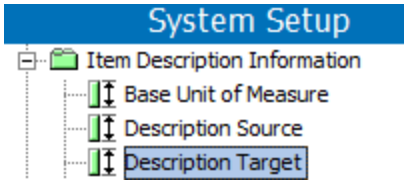
Verify Attributes to be Merged

For a successful merge, before running the bulk update, use the steps below to verify / update the target attribute and the source attribute so that:

- Both have the same classification links to prevent orphaned target attributes after the merge.
- Both have the same product links to prevent orphaned target attributes after the merge.
- Both are valid for the same object types to ensure all source attribute values can be written to the target attribute.

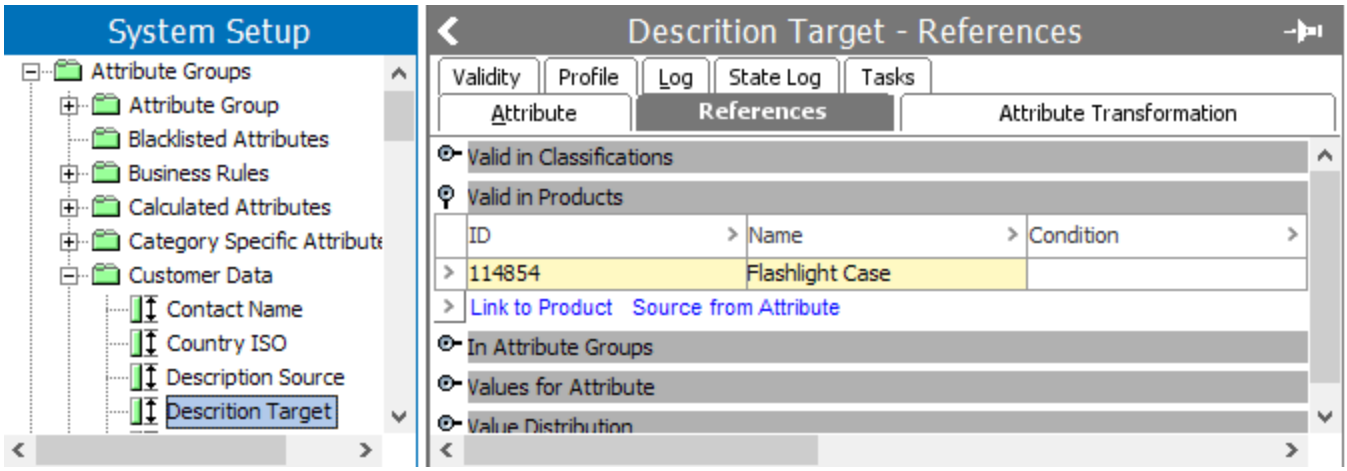
- Both have the same or compatible Validation Base Types to prevent validation errors during the merge. For example, when an LOV attribute is the source, the values can be written to a target Text attribute, however, with a target LOV attribute, depending on the LOV setup, the allowed values may be restricted.
- Ensure that the upstream systems that feed the data to STEP are configured to send the data to the target attribute as the source attribute will be deleted.
- Ensure that if there are any existing import or export configurations using the source attribute, that the configuration modified. This is to avoid errors when trying to run the configuration after the source attribute is deleted form STEP.

1. In System Setup, select the **Target Attribute**.

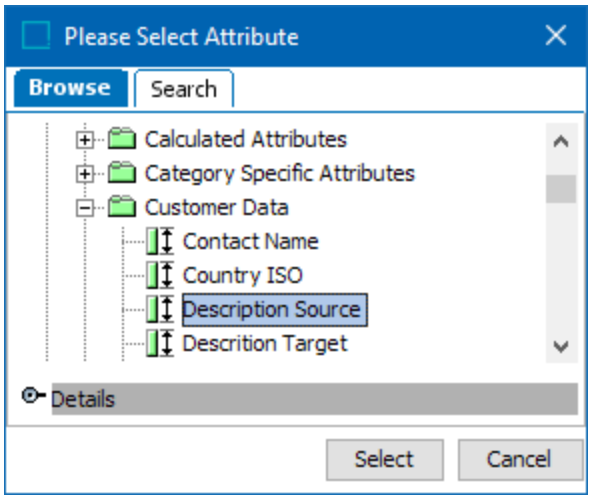


2. On the References tab, if it exists, open the 'Valid in Classifications' flipper, and click the **Source from Attribute** link.

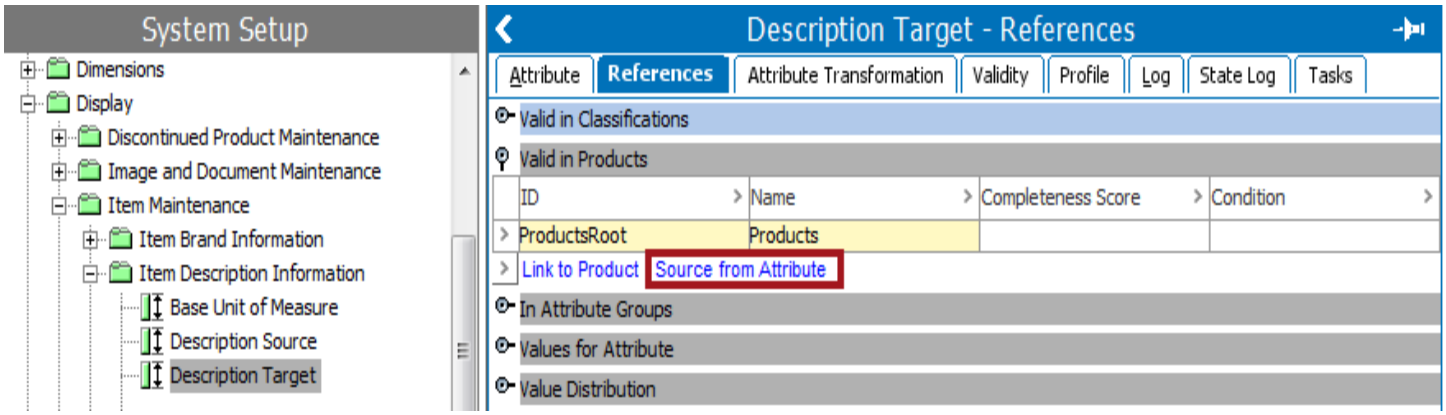
> **Note:** If the attribute is not valid for any classifications, verify that the source attribute is also not valid for classifications.



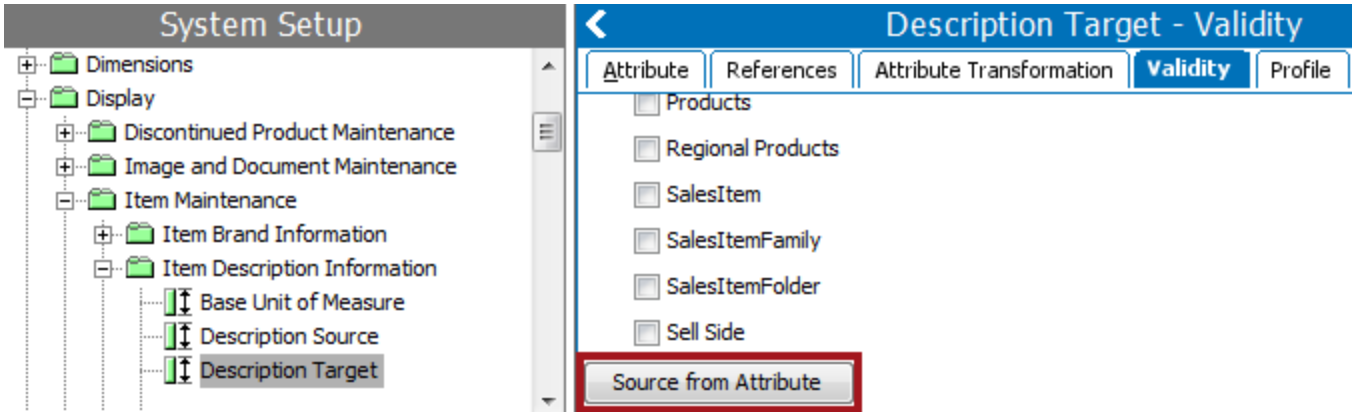
3. Use Browse or Search to find the source attribute and click **Select**. The classification links of the source attribute are copied to the target attribute.



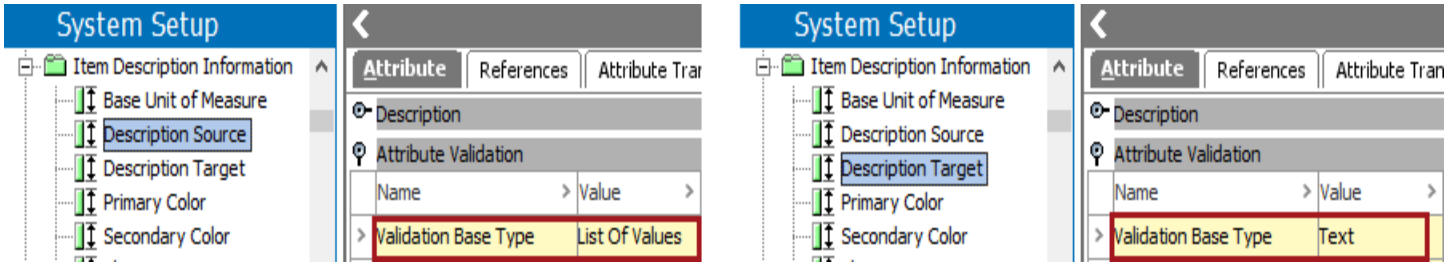
4. On the References tab open the 'Valid in Products' flipper (if it exists), and click the **Source from Attribute** link.



5. Use Browse or Search to find the **Source Attribute** and click **Select**. The product links of the source attribute are copied to the target attribute.
6. On the Validity tab, under the Valid for Product Types flipper, click the **Source from Attribute** button.



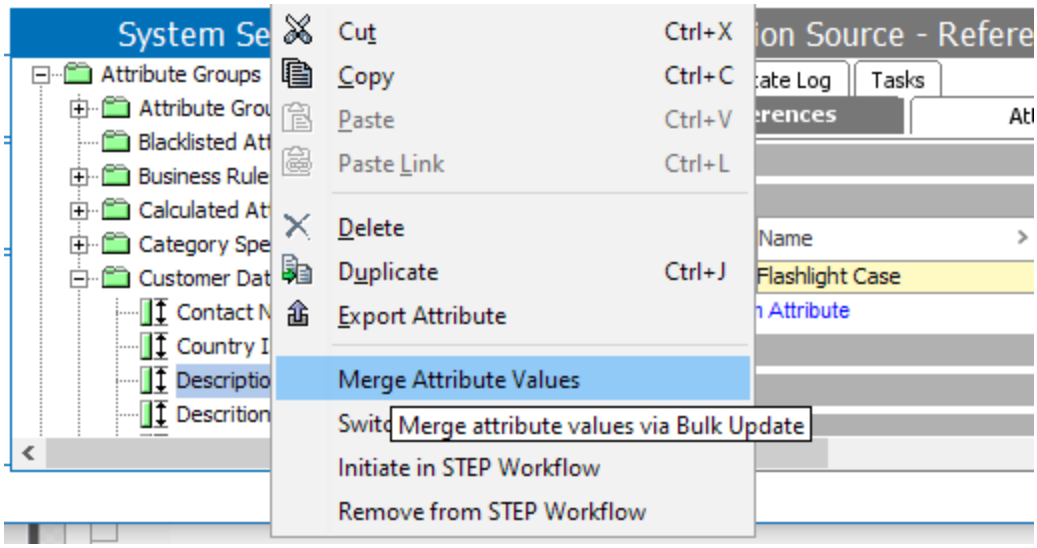
7. Use Browse or Search to find the **Source Attribute** and click Select. The validity of the source attribute is copied to the target attribute.
8. In System Setup, on the Attribute tab under the Attribute Validation flipper, compare the Validation Base Type for the **Target Attribute** and the **Source Attribute**.



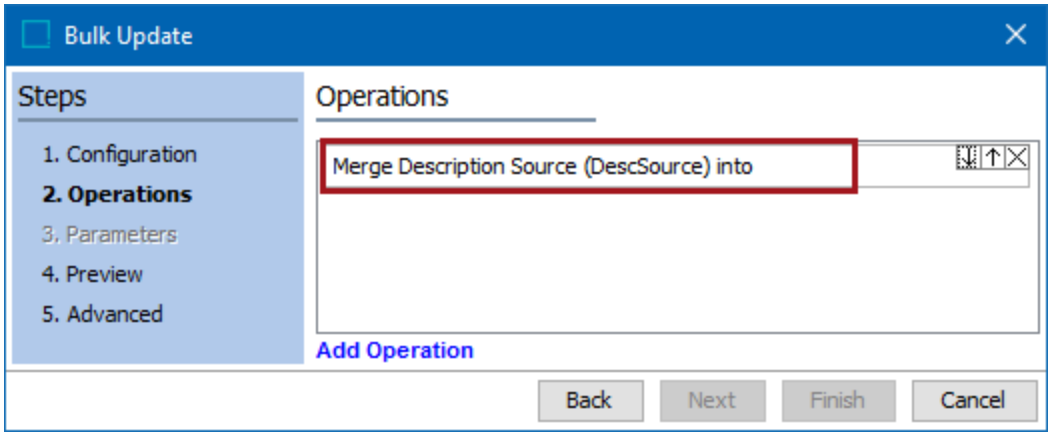
- If the Validation Base Types are the same and are not LOVs, continue to **Merge Values Using Bulk Update**.
- If the Validation Base Types are not the same, determine if they are compatible by manually adding an existing source attribute value to the target attribute successfully. If the manual test works, continue to **Merge Values Using Bulk Update**.
- If the Validation Base Types are not the same and they are not compatible, in the case of an target LOV, setting the 'Allow Users to Add Values' option to 'Yes' allows the new values to be written to the target LOV. Otherwise, refer to **Editing Validation Rules** section and change the validation type if possible, then continue to **Merge Values Using Bulk Update**.
- If the Validation Base Types are not the same, are not compatible, and cannot be changed, validation errors will be displayed in during the Bulk Update process. Values cannot be merged in this scenario.

Merge Values Using Bulk Update

After verifying that the data is ready to be merged, select the **Source Attribute**, right-click and choose **Merge Attribute Values**.



The Bulk Update wizard is displayed with the source attribute already selected for the Merge operation. Click the operation to supply the target attribute and display additional parameters available for the merge.



For details about the bulk update parameters, refer to **Attribute Values: Merge Attribute Values Operation** topic of the **Getting Started** documentation.

Reparenting Attribute Groups

To reorganize attributes under new groups, you will need to reparent the groups. There are two methods of reparenting attribute groups.

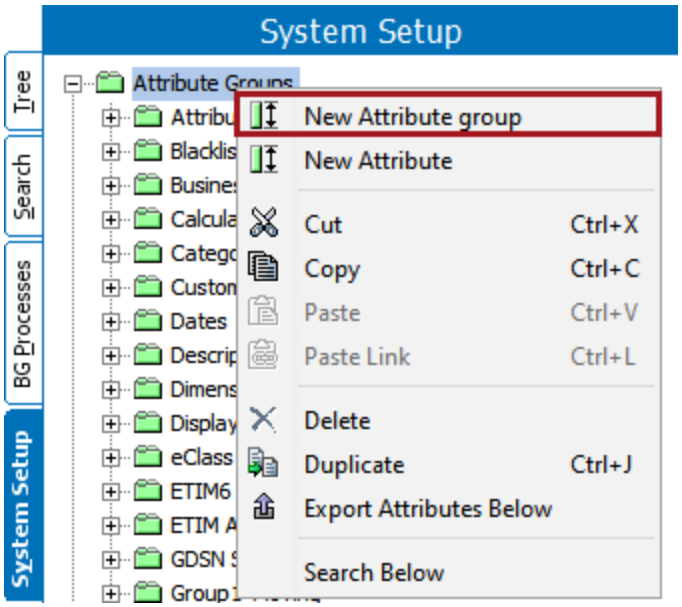
- Manual Reparenting - For smaller attribute groups with only a couple of attributes, users are able to easily drag and drop the attributes under a desired parent.
- STEPXML Reparenting - Using STEPXML, users can reparent an attribute group with numerous attributes inside.

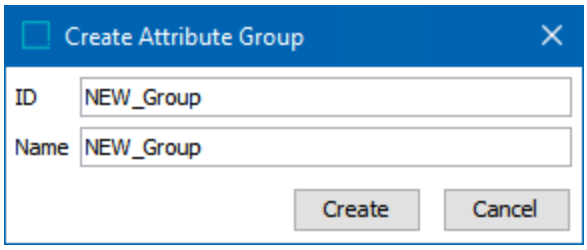
Manual Reparenting

To manually reparent attribute groups with attributes: create a new attribute group, drag the attributes from the existing attribute group into the newly created attribute group, delete the old attribute group, and recreate it inside of the new one.

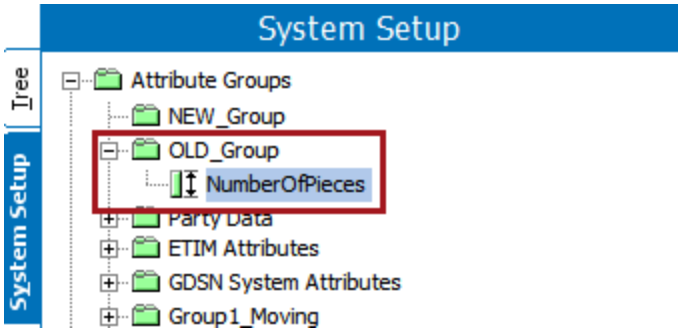
Note: To reuse the name of the existing attribute group inside of the new parent attribute, then that existing group must be deleted first. This is required because STEP auto-generates a name based on the STEP ID, and only one instance of a STEP ID may exist.

1. In System Setup, create a new attribute group that will become the new parent for the attributes in the existing group.

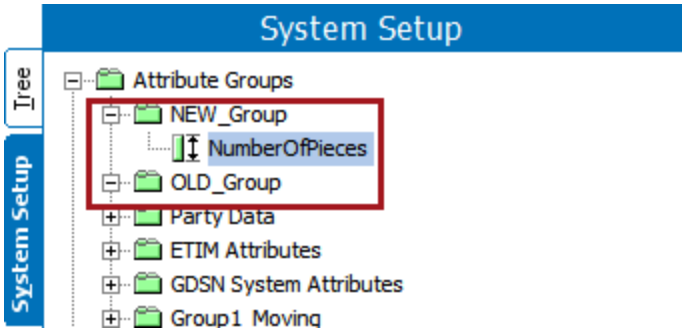




2. Open the attribute group containing the attribute to reparent by pressing the plus (+) icon next to the attribute group name.

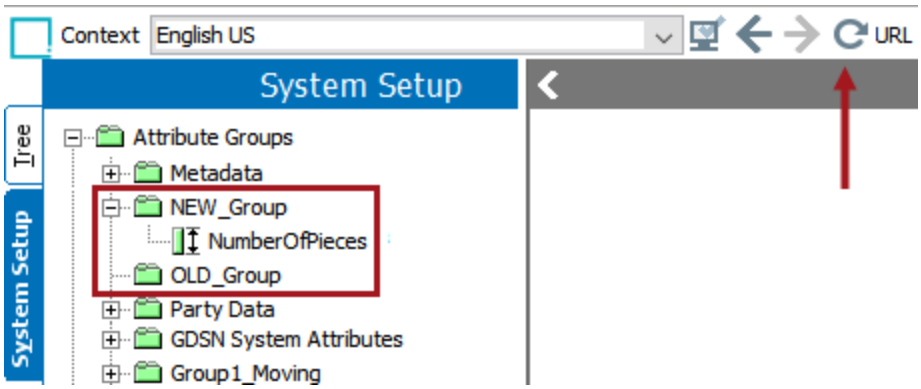


3. Drag the desired attribute(s) into the new attribute group.

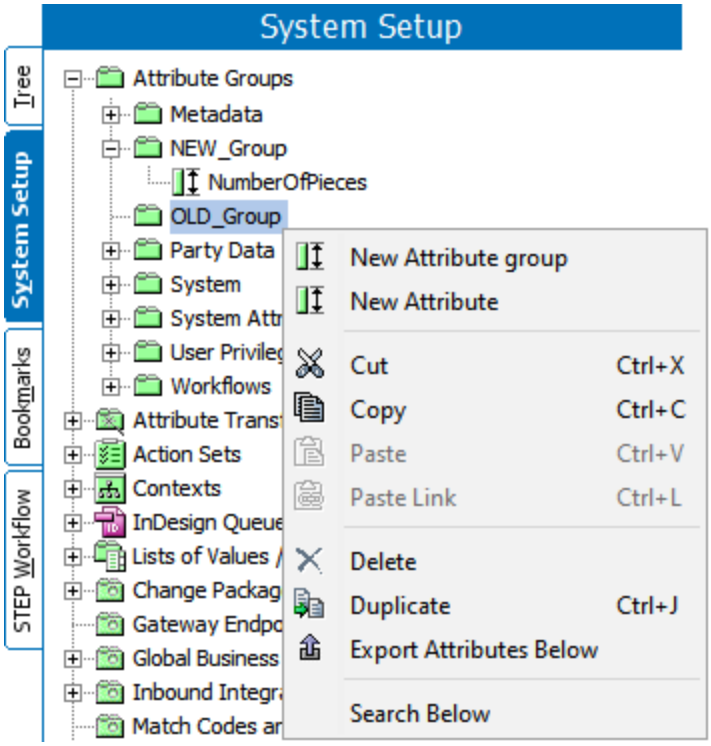


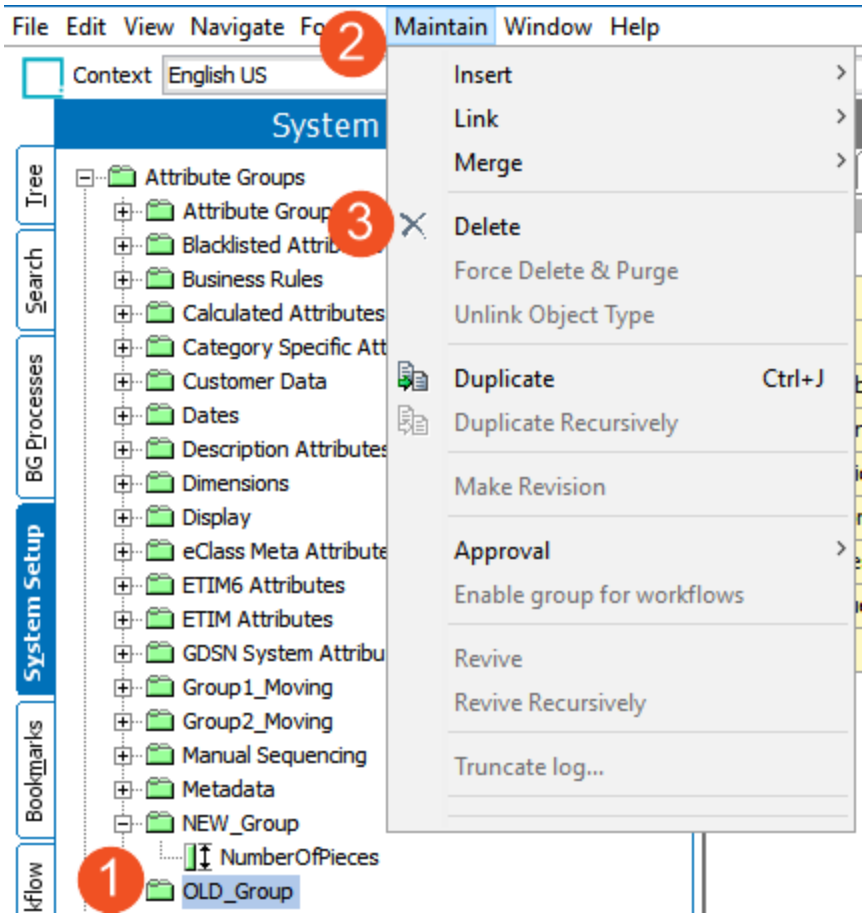
Note: When dragging the attribute, the old attribute group will retain the open icon, which is a minus (-) sign. This is due to the fact that the system has not been updated.

4. Select **Refresh** at the top navigation in STEP. The original attribute group refreshes to show it is empty.

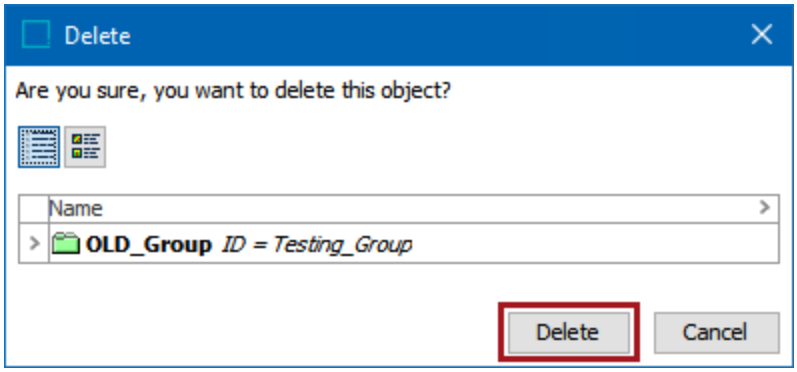


5. Delete your old group from the Tree tab by right-clicking on the attribute group and selecting **Delete**, or by going to the Maintain menu > **Delete**.

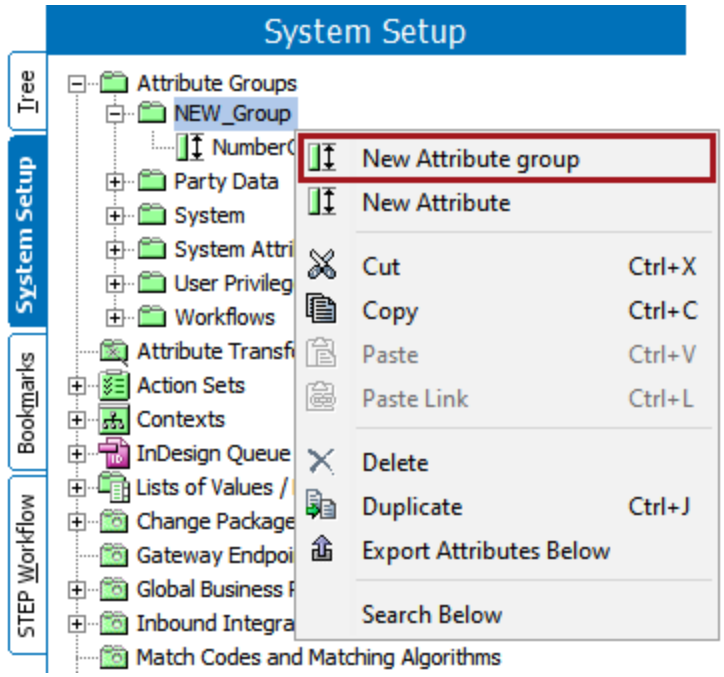


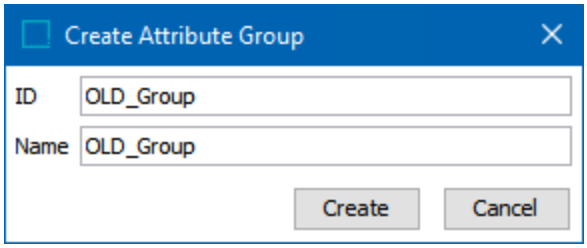


6. Click **Delete** to confirm the deletion on the pop-up prompt.

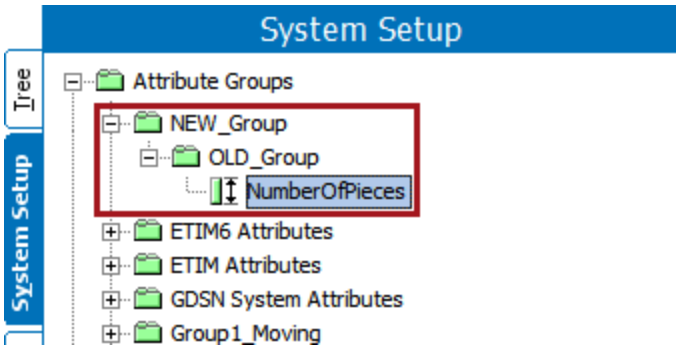


7. Create the old group under the new attribute group that was created in step 1.





8. Drag the attribute from the attribute group created in step 1 and move it to the recreated old attribute group from step 7.

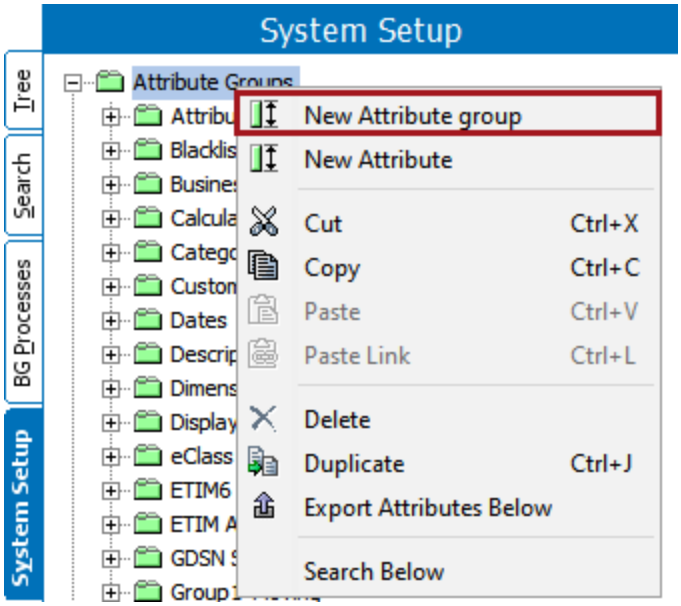


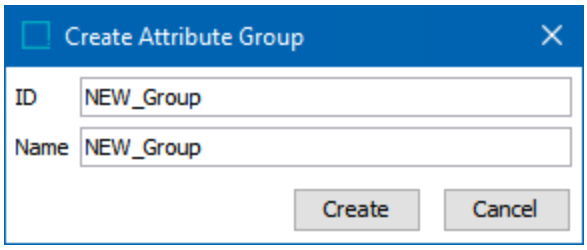
STEPXML Reparenting

An easier method for multiple attribute reparenting is to use STEPXML. In this process, users will export all the attributes to reparent, apply some STEPXML, and then import the updated attributes.

Note: Using the STEPXML method is best when dealing with a larger number of attributes. If only a few are being reparented, the manual method is fine. Using STEPXML a user can link an attribute to new attribute group but cannot unlink an attribute from an old attribute group in which it is already linked.

First, create the new group under which your old attribute group will be reparented.

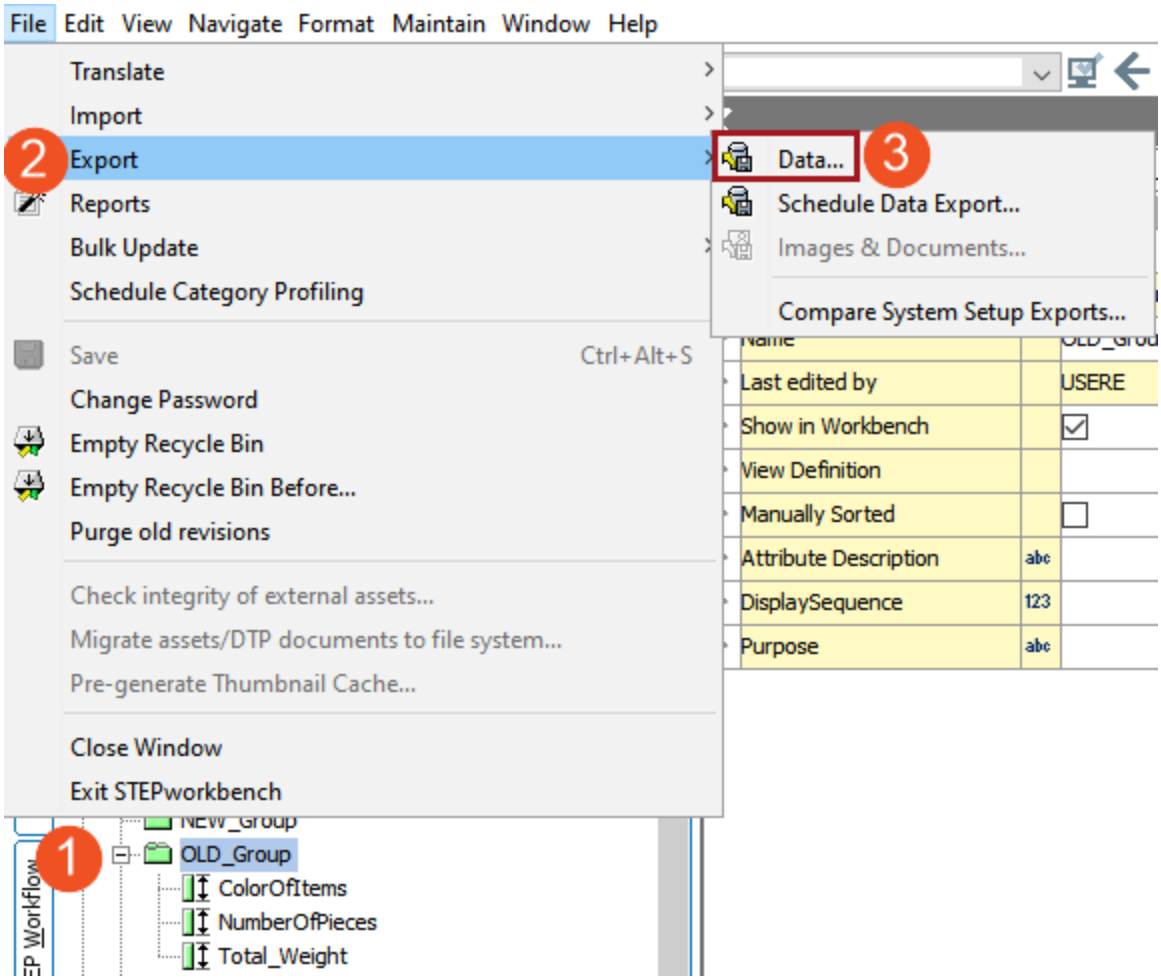




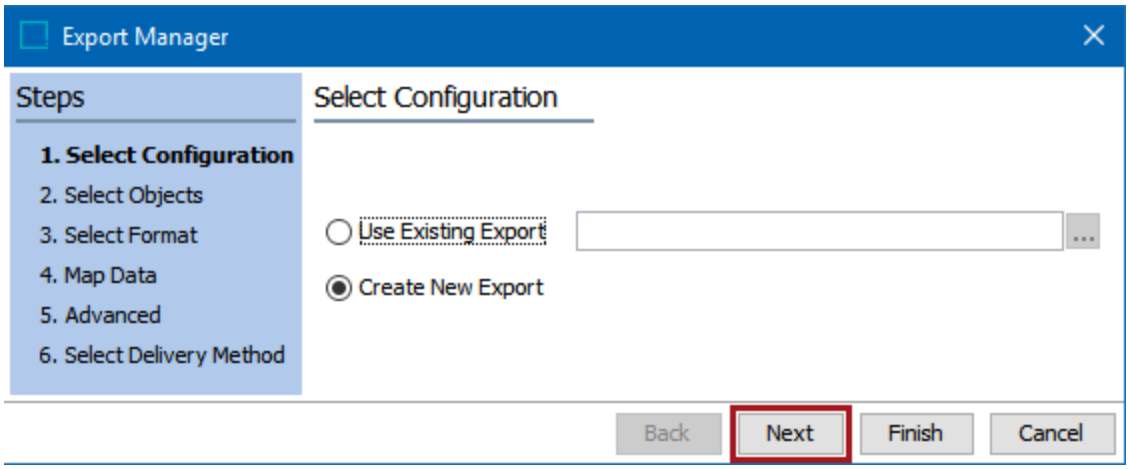
Export the Attribute Group

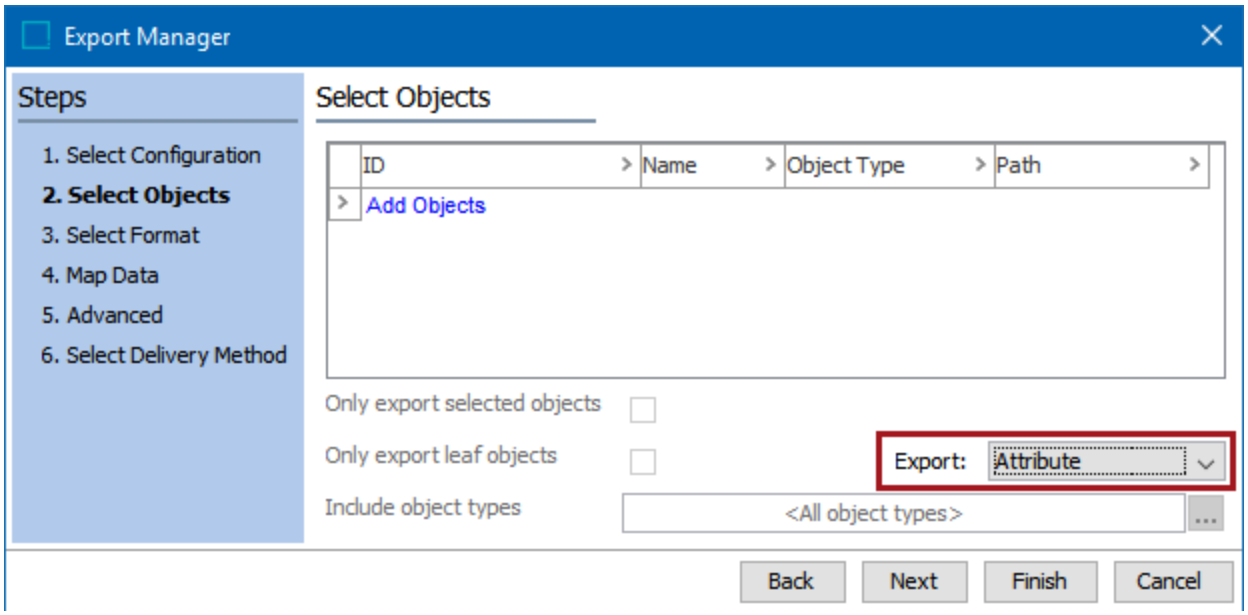
Next, export the attribute group that needs reparenting. To properly export an attribute group for reparenting:

1. Select the old attribute group to reparent from the Tree tab. Then, select File > Export > **Data...**.

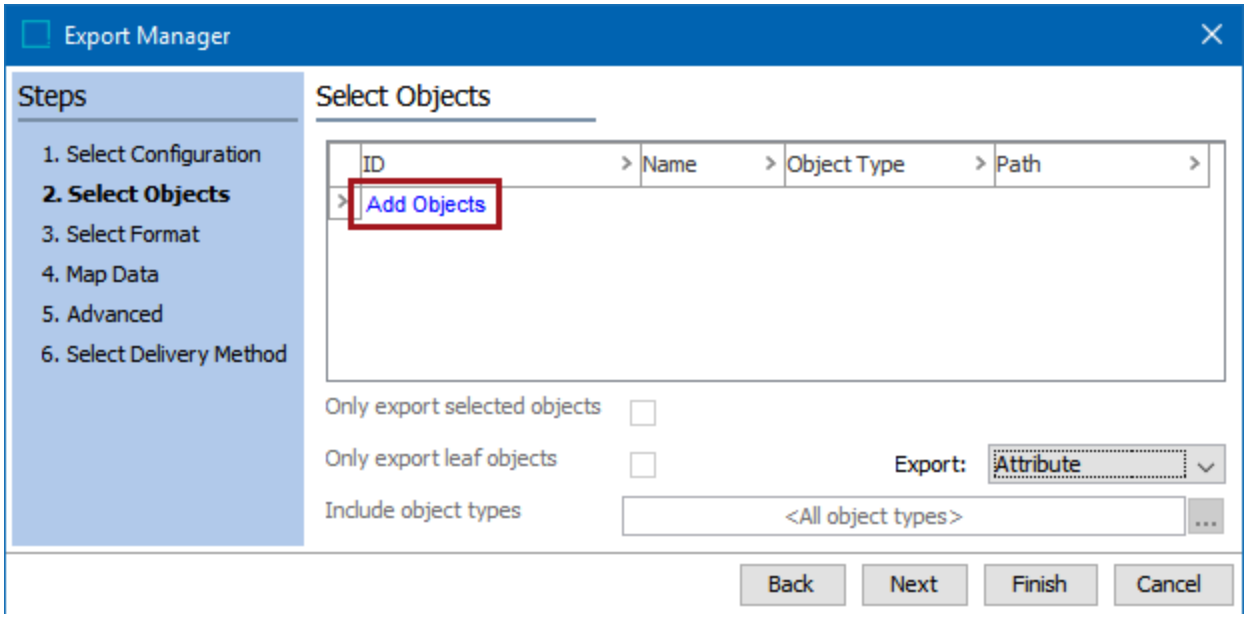


2. The Export Manager will display. Select **Next**, and on step 2 of the Export Manager, Select Objects, select **Attribute** from the Export dropdown menu.

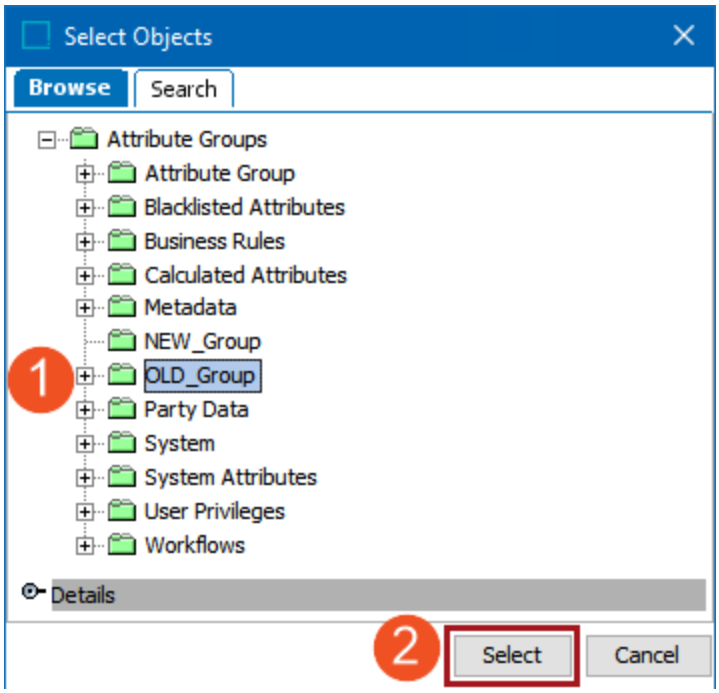




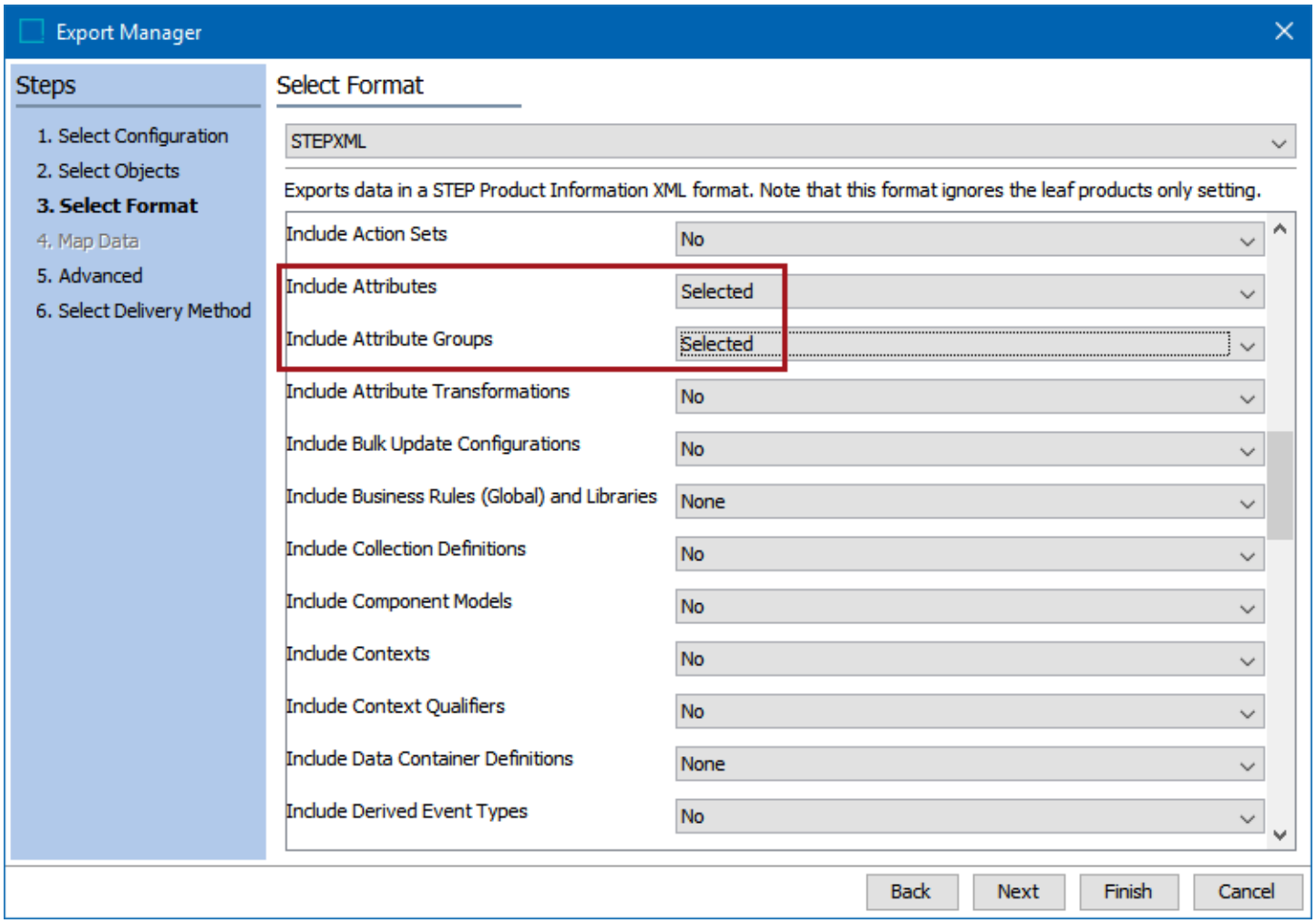
3. Finally, select **Add Objects** from the data field.



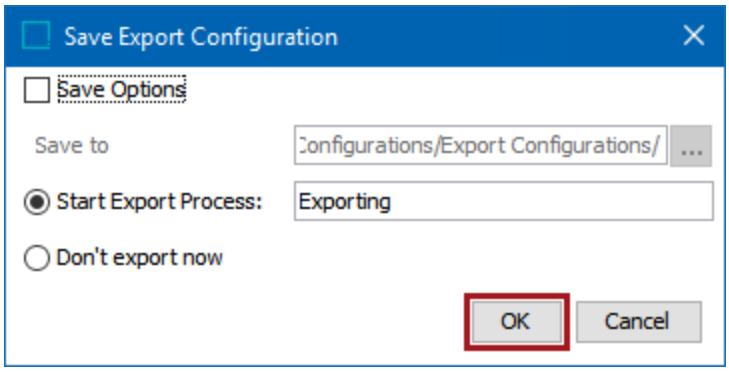
4. Select the desired attribute group to reparent by clicking the group then pressing **Select**. Select **Next** once the attribute group is added to the Select Objects list.



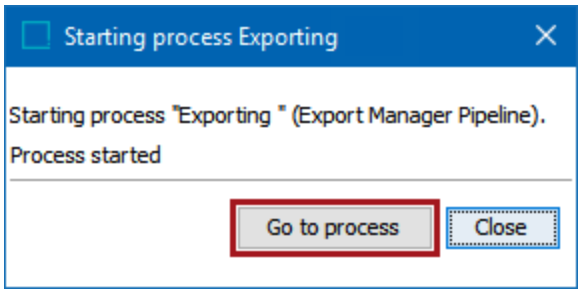
5. On step 3, Select Format, first select STEPXML from the dropdown menu. Then, navigate to **Include Attribute Groups** and **Include Attributes** and set both options to **Selected**. Select **Finish** to export the file.

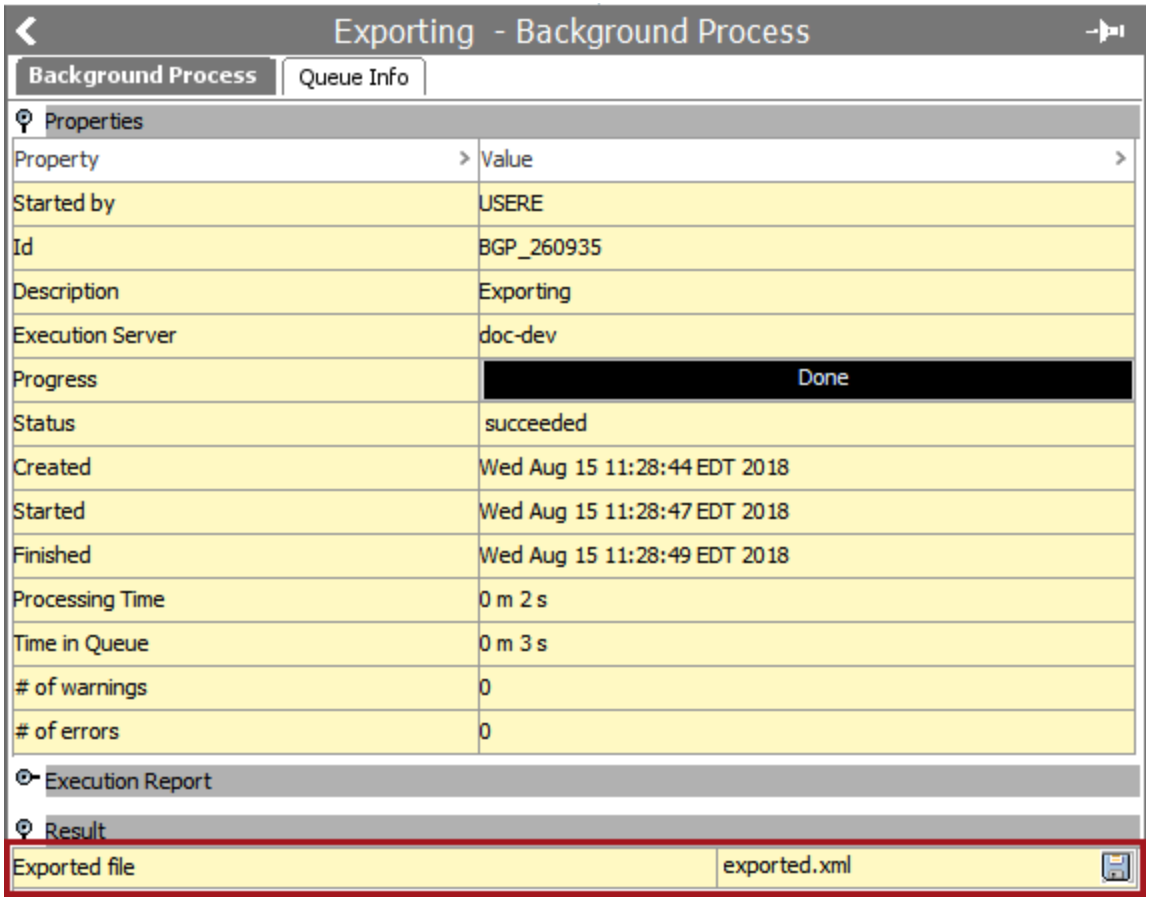


6. Press **OK** on the export configuration pop-up. To save this configuration for future use, select the Save Options box and select a location. Otherwise, the export will begin and give a status update.



7. Select **Go to Process** and scroll down to the exported file. Open the XML file.





Adding STEPXML

Next, STEPXML is added to the exported file. The process for adding STEPXML to reparent an attribute group is as follows:

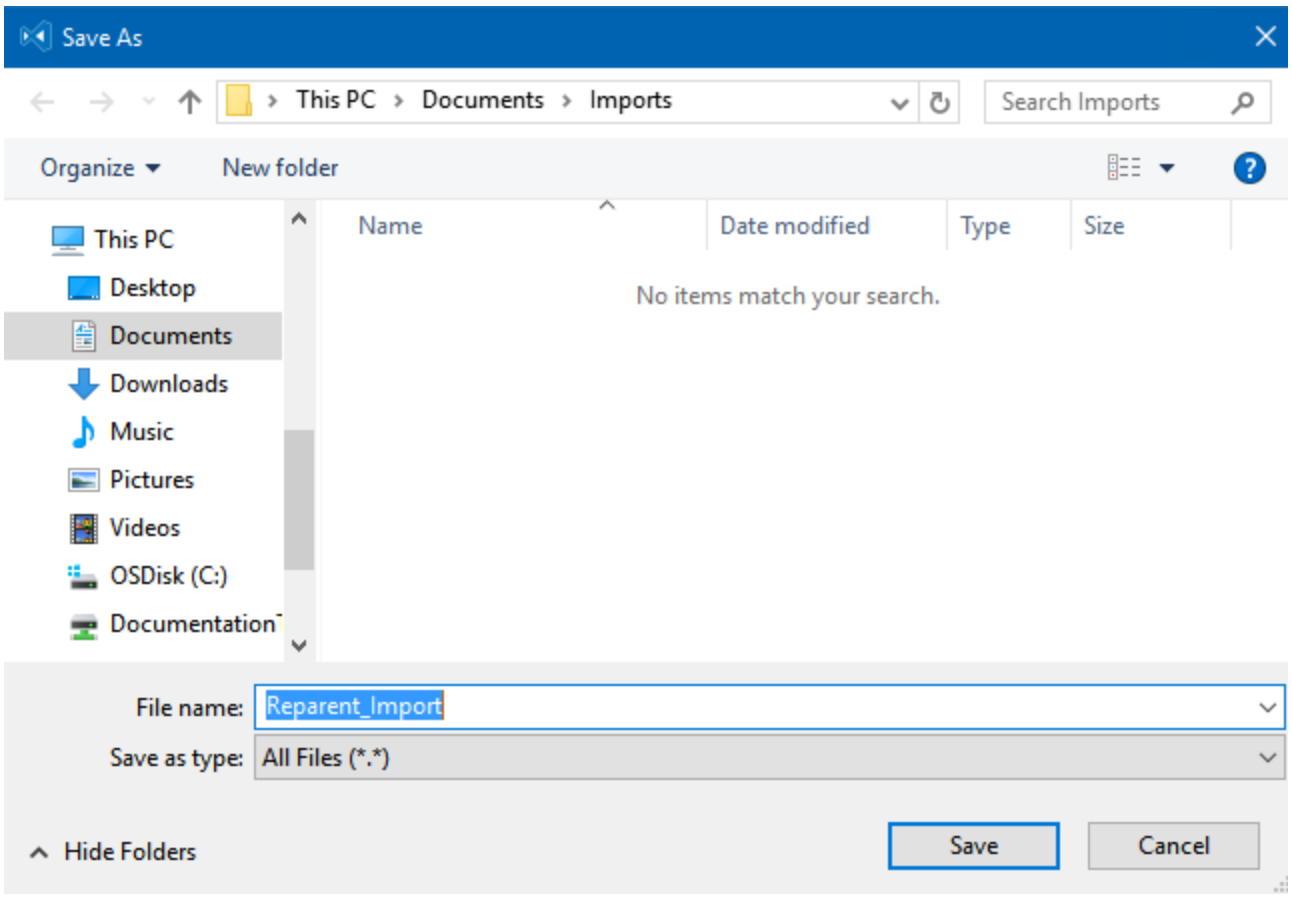
1. After double-clicking the exported file, it will open in the default XML browser. Locate the AttributeGroup ID="[Your old group]" tag.

```
15  <STEP-ProductInformation ExportTime="2018-08-15 11:28:48" ExportContext="C
16
17   <AttributeGroupList>
18
19   <AttributeGroup ID="OLD_Group" ShowInWorkbench="true" Referenced="true">
20     <Name>OLD_Group</Name>
21   </AttributeGroup>
22   </AttributeGroupList>
23   </STEP-ProductInformation>
```

2. Inside the XML brackets for AttributeGroup ID, add ParentID="[Your new group name]". In the braces, use the ID of the parent attribute group where the old attribute group will use as a parent.

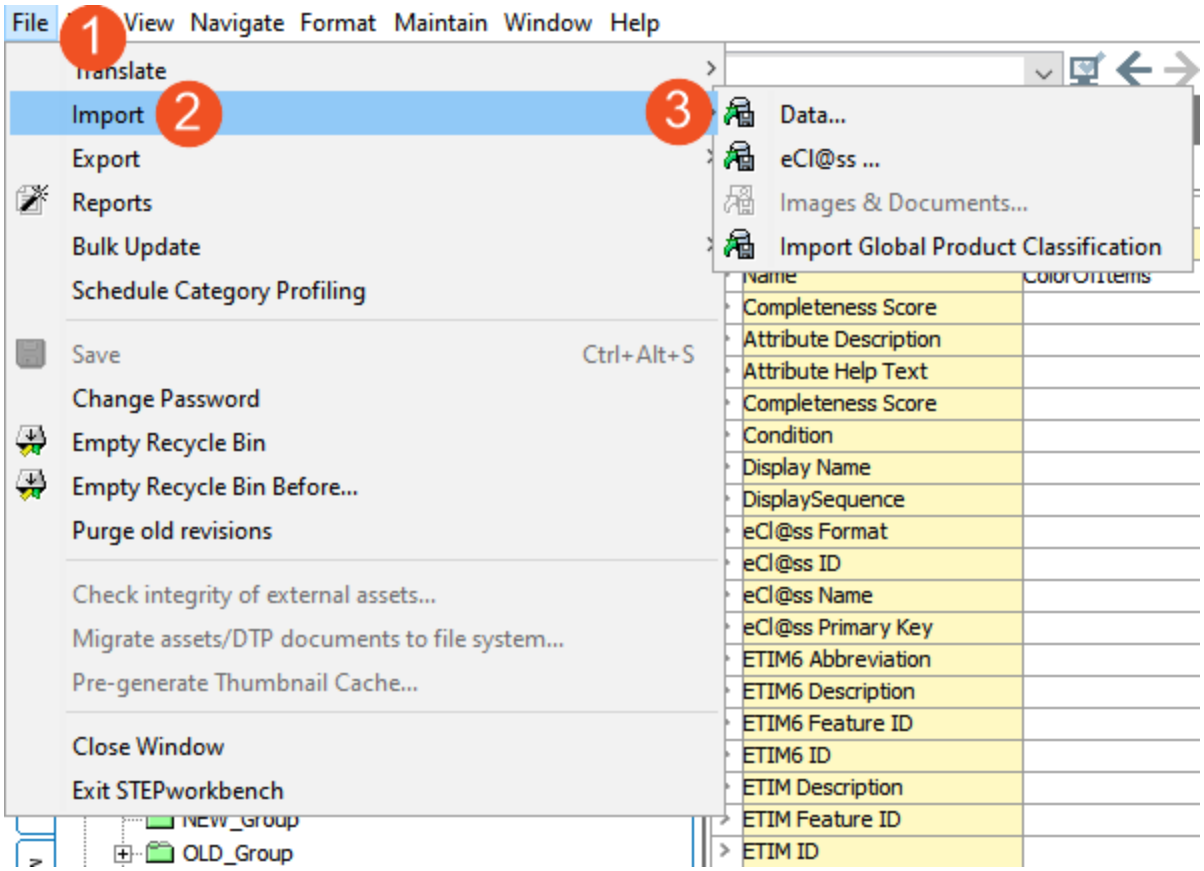
```
15  <STEP-ProductInformation ExportTime="2018-08-15 11:28:48" ExportContext="Context1" ContextID="C
16
17   <AttributeGroupList>
18
19   <AttributeGroup ID="OLD_Group" ShowInWorkbench="true" Referenced="true" ParentID="NEW_Group">
20     <Name>OLD_Group</Name>
21   </AttributeGroup>
22   </AttributeGroupList>
23   </STEP-ProductInformation>
```

3. Select **Save**, and remember where the file is saved for uploading in the STEP Workbench.

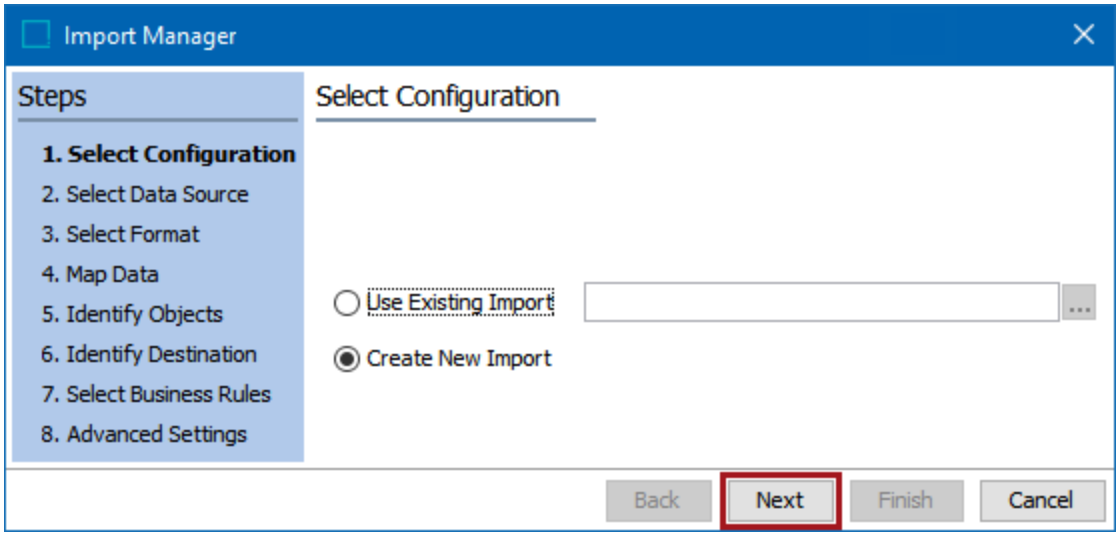


Upload the Modified File

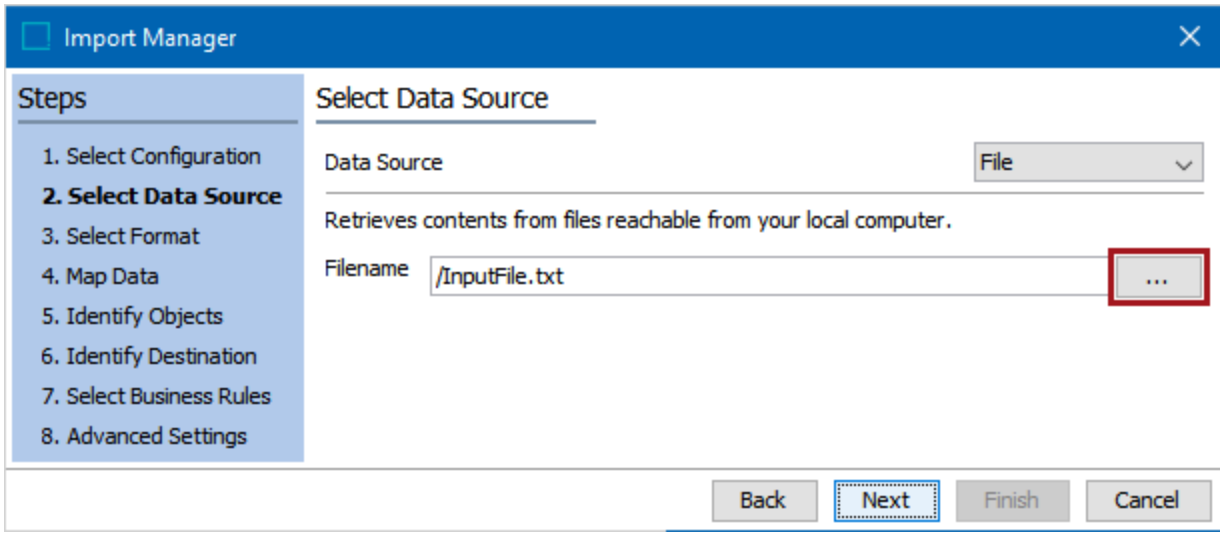
1. In the STEP Workbench, select File > Import > **Data...**.

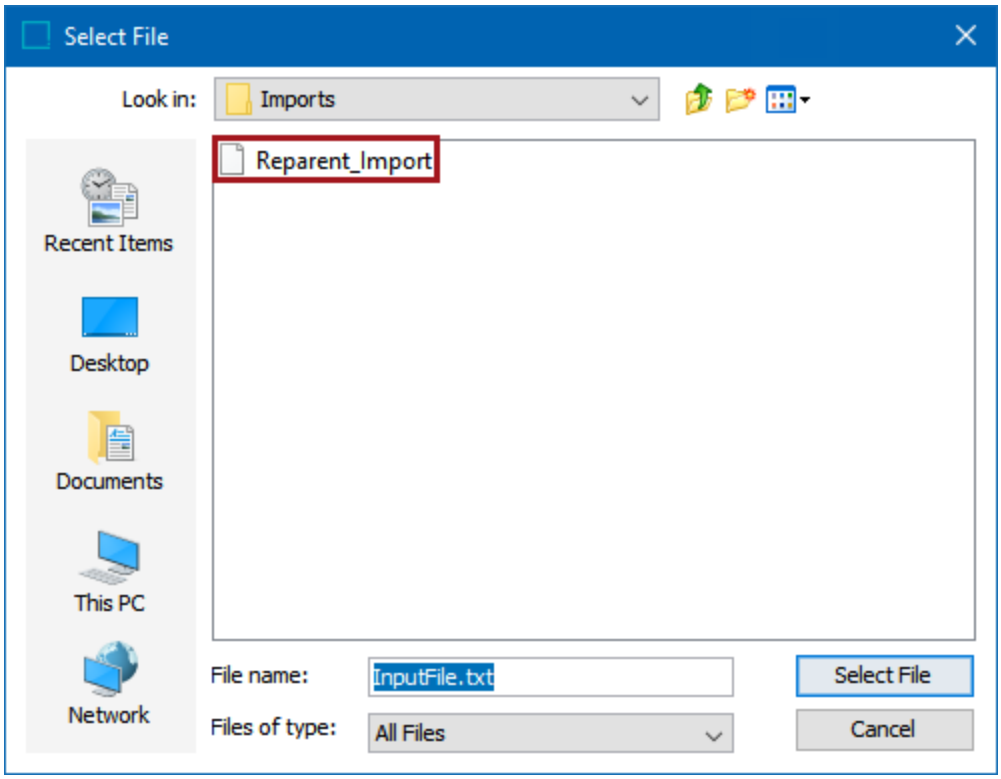


2. The Import Manager will load. Select **Next**.

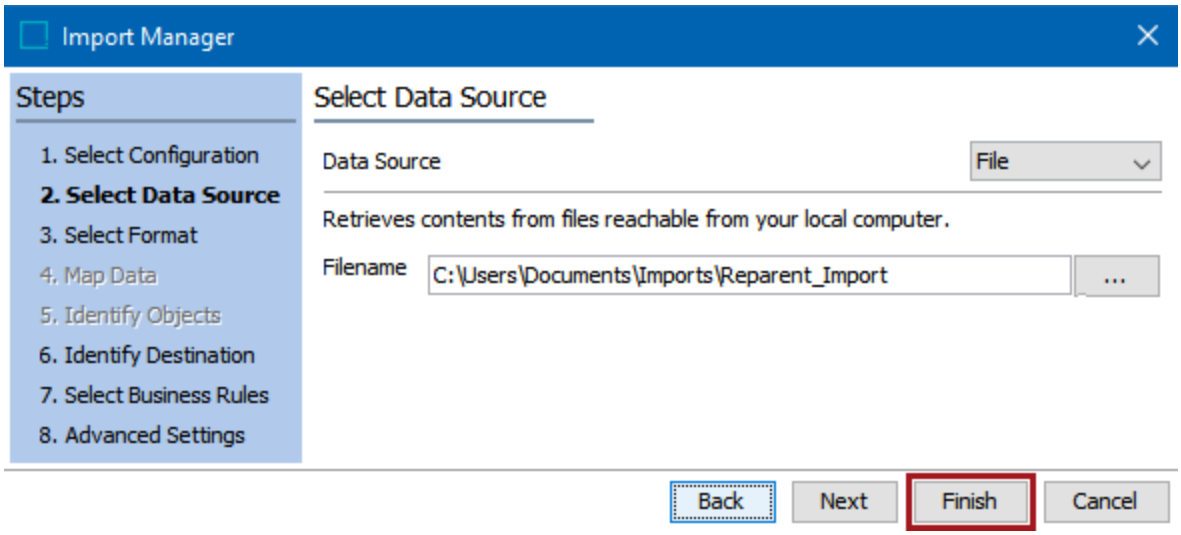


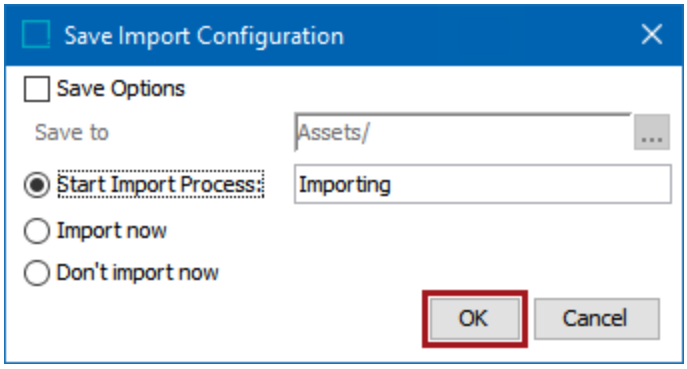
3. On **Step 2. Select Data Source**, select the previously modified STEPXML file from the last step.



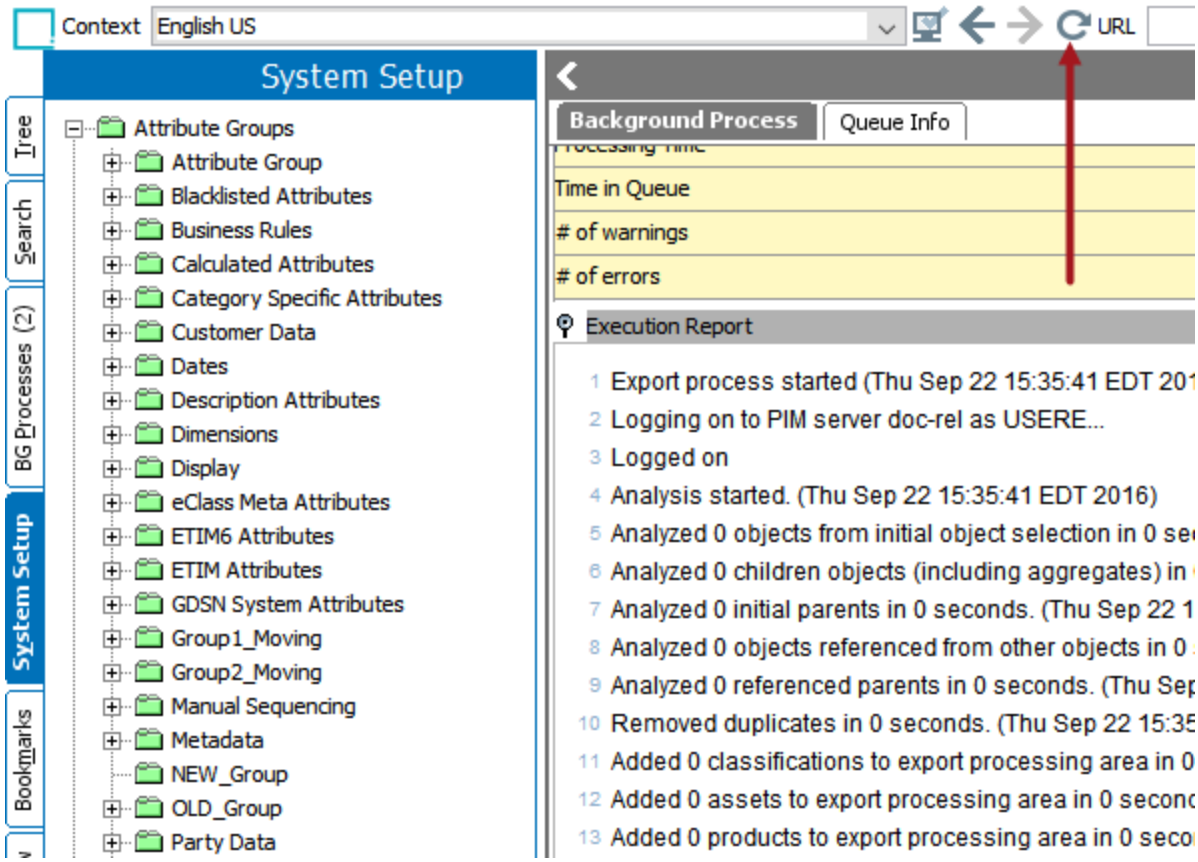


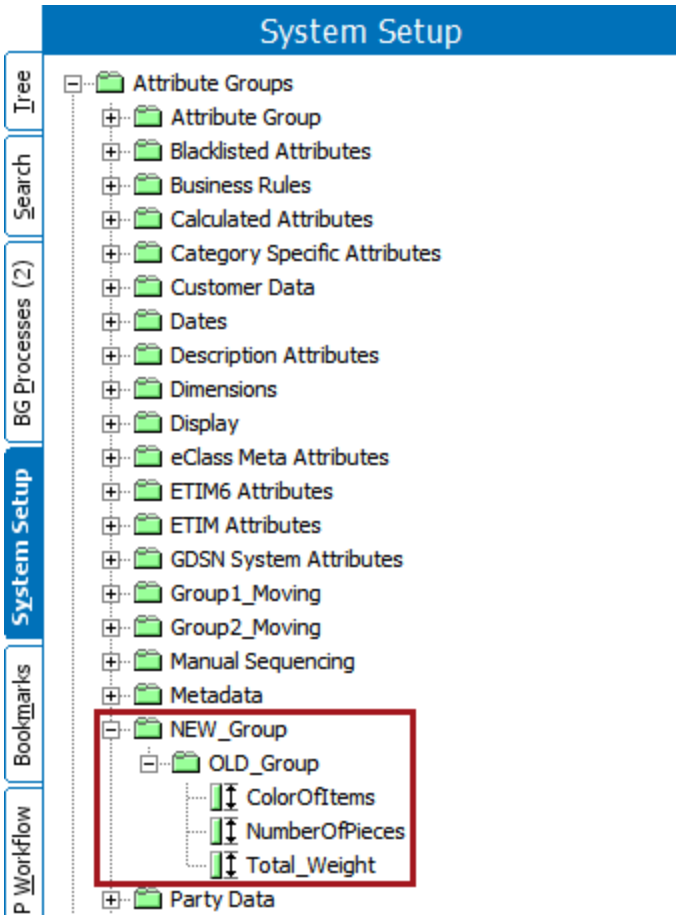
4. Select **Finish**. A Save Import Configuration dialog will pop-up. Select **OK** to import the STEPXML script.





5. Refresh your STEP Workbench. The old attribute group will be a child under the new attribute group.

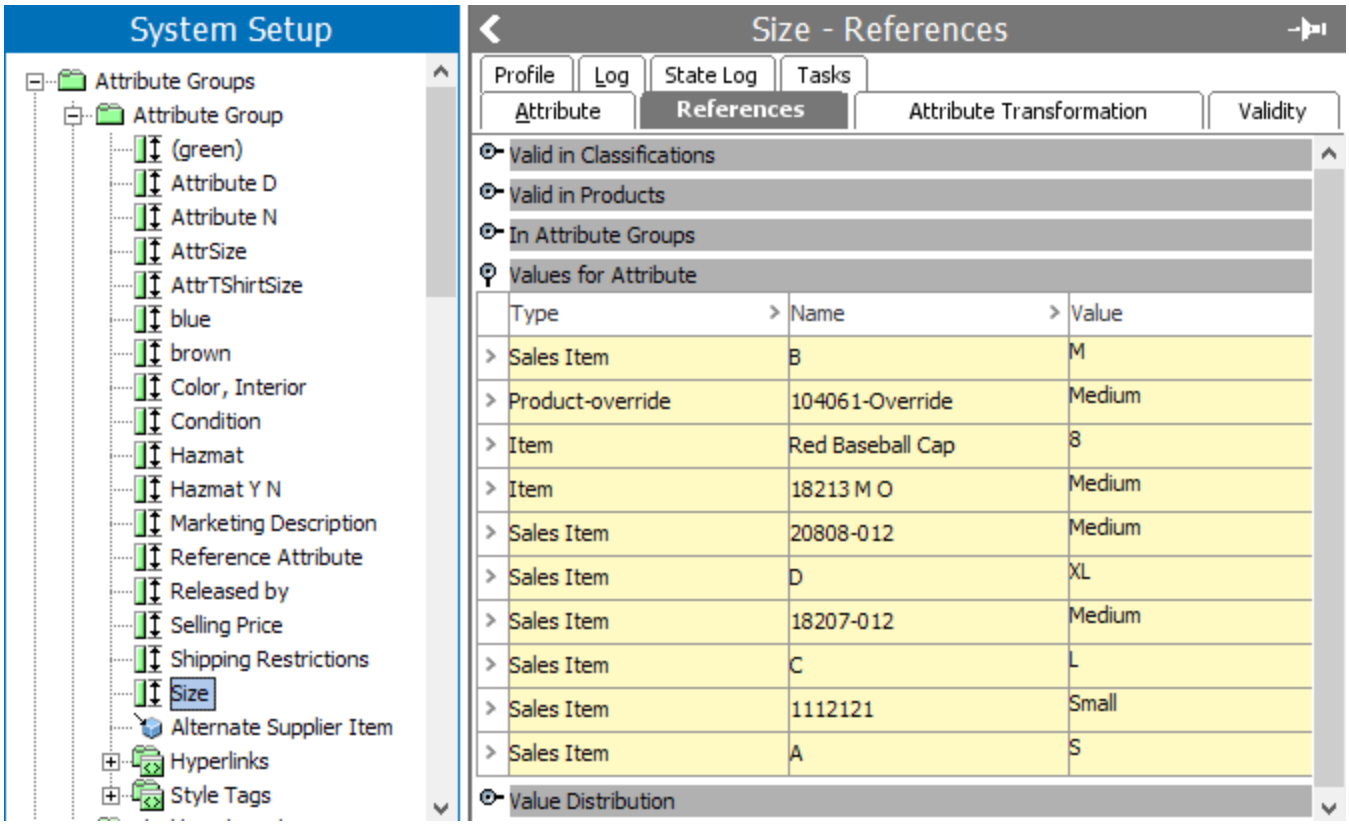

Context
English US
URL
System Setup
Tree
Search
BG Processes (2)
System Setup
Bookmarks
Attribute Groups
Attribute Group
Blacklisted Attributes
Business Rules
Calculated Attributes
Category Specific Attributes
Customer Data
Dates
Description Attributes
Dimensions
Display
eClass Meta Attributes
ETIM6 Attributes
ETIM Attributes
GDSN System Attributes
Group1_Moving
Group2_Moving
Manual Sequencing
Metadata
NEW_Group
OLD_Group
Party Data
Background Process
Queue Info
Time in Queue
# of warnings
# of errors
Execution Report
1 Export process started (Thu Sep 22 15:35:41 EDT 201
2 Logging on to PIM server doc-rel as USERE...
3 Logged on
4 Analysis started. (Thu Sep 22 15:35:41 EDT 2016)
5 Analyzed 0 objects from initial object selection in 0 se
6 Analyzed 0 children objects (including aggregates) in
7 Analyzed 0 initial parents in 0 seconds. (Thu Sep 22 1
8 Analyzed 0 objects referenced from other objects in 0
9 Analyzed 0 referenced parents in 0 seconds. (Thu Sep
10 Removed duplicates in 0 seconds. (Thu Sep 22 15:35
11 Added 0 classifications to export processing area in 0
12 Added 0 assets to export processing area in 0 second
13 Added 0 products to export processing area in 0 seco


System Setup
Tree
Search
BG Processes (2)
System Setup
Bookmarks
P Workflow
Attribute Groups
Attribute Group
Blacklisted Attributes
Business Rules
Calculated Attributes
Category Specific Attributes
Customer Data
Dates
Description Attributes
Dimensions
Display
eClass Meta Attributes
ETIM6 Attributes
ETIM Attributes
GDSN System Attributes
Group1_Moving
Group2_Moving
Manual Sequencing
Metadata
NEW_Group
OLD_Group
ColorOfItems
NumberOfPieces
Total_Weight
Party Data

Viewing Attribute Values

Attribute values for all products can be viewed in System Setup using the attribute editor on the References tab.

Note: If the attribute is valid for a lot of products across hierarchies, it may take some time to populate the values.

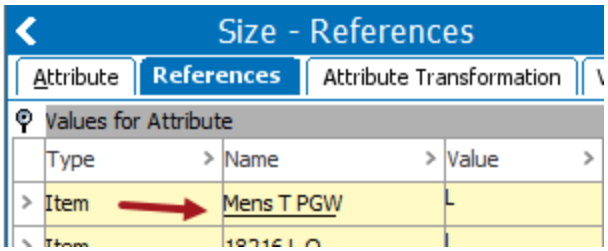


Viewing the values of an attribute means getting a list of the objects' names in which the current attribute has values, and what the value is.

The list is very useful to get an overview of where an attribute is used, e.g., before cleaning up, deleting, or merging attributes.

View Values and Edit Values

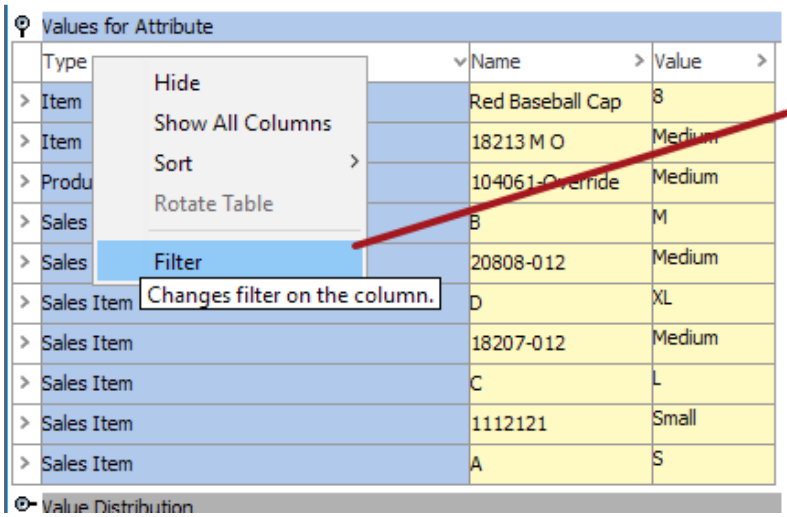
1. In System Setup, select an attribute and click the **References** tab the attribute editor.
2. Open the **Values for Attribute** flipper to display objects and their corresponding values for the attribute.
3. To edit the value, hover over the name of an object in the list to display a link.

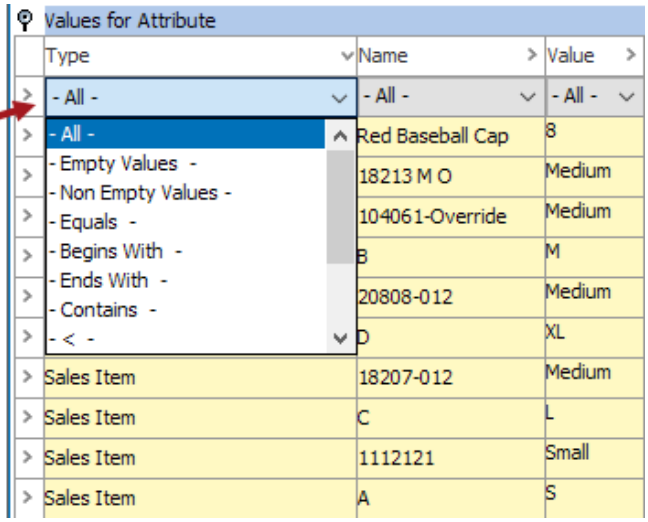


4. Click the link to open the corresponding editor. For example, the product editor is displayed if the value exists on a product.

Filtering Values for Attribute

Filters can be added to the **Value of Attributes** flipper on any column. To filter, right-click on any column header and select **Filter**. Filter will then appear in all column headers.

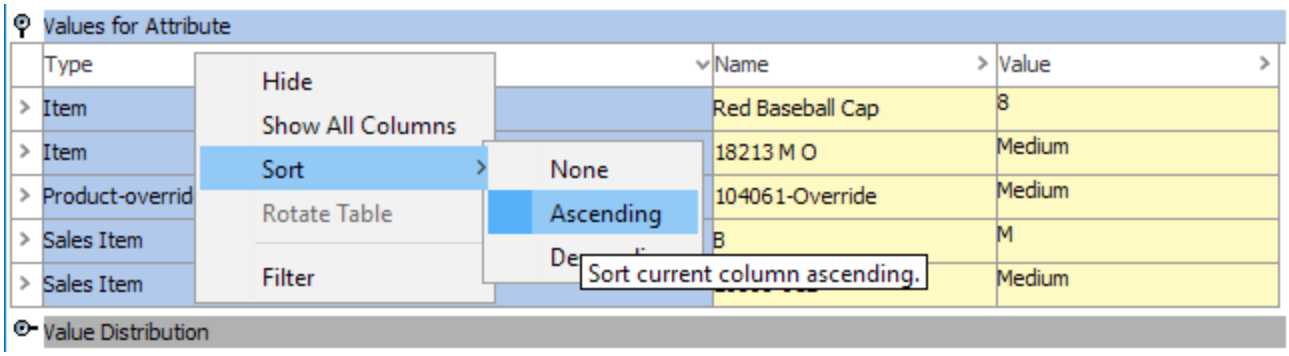




Sorting Values for Attribute

The values can be sorted to help with finding desired attribute values, allowing the user to perform various tasks on those values.

To sort, right-click on any column header and select **Sort** to get options.


Values for Attribute
Type
Name
Value
Item
Red Baseball Cap
8
Item
18213 M O
Medium
Product-overrid
104061-Override
Medium
Sales Item
B
M
Sales Item
Medium
Hide
Show All Columns
Sort
Rotate Table
Filter
None
Ascending
Sort current column ascending.
Value Distribution

Mandatory Attributes

It is often the case that certain attributes are considered critical to all processes, or to a particular process, and therefore there is a desire to make them mandatory (e.g., to enforce that they are populated). There are a variety of methods for doing this, ranging from simple visual cues prompting users to populate a value, or going so far as to prevent approval and/or processing of an object until the required values are populated.

This topic describes:

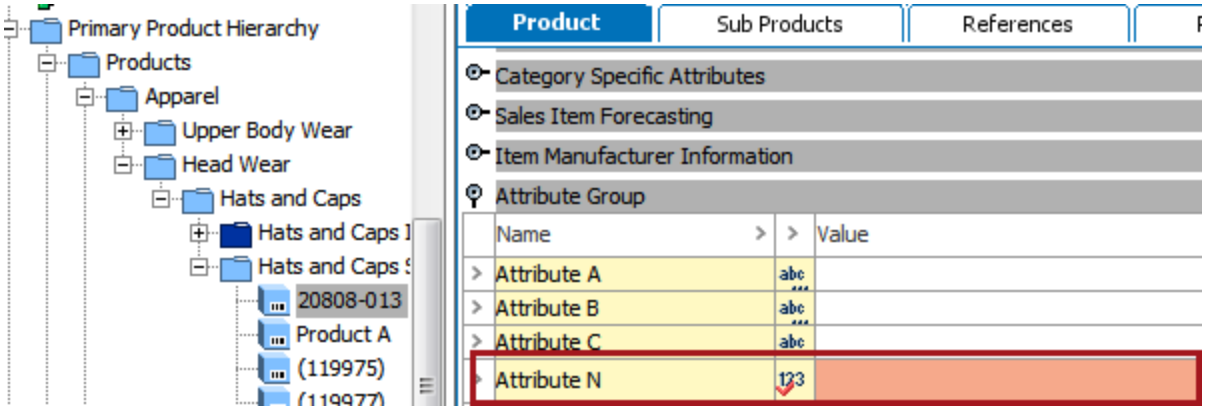
- The standard options for making attributes mandatory
- Detailed configuration and end user information for the various settings, or links to other topics that provide this information
- Considerations for how the different mandatory options behave across the varying interfaces (workbench, Web UI, and Smartsheets)
- Recommendations for how and when to use the various settings

Standard Mandatory Attributes / Visual Indicator in Workbench

An attribute can be set to be mandatory directly on the attribute, which enables a visual indicator in the workbench to prompt users to populate the value. This can optionally be used in conjunction with a system setting to enforce that attributes marked as mandatory are populated prior to approval of any object on which the attribute is valid.

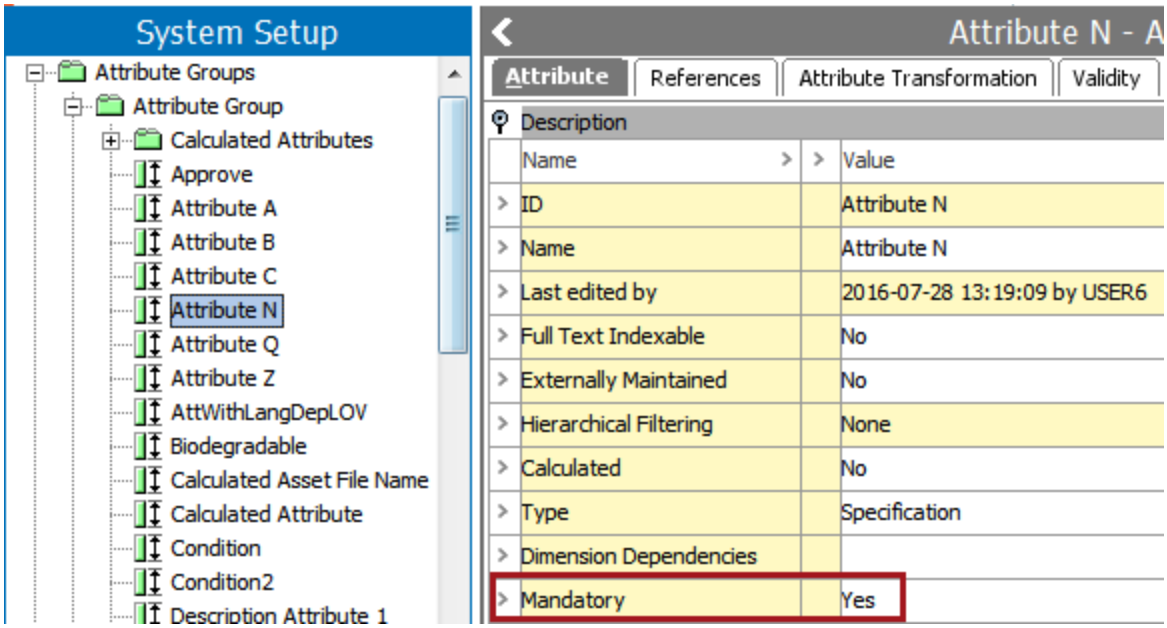
Workbench Visual Indicators

Attributes can be configured to provide a visual indicator within the workbench to prompt users to enter a value.

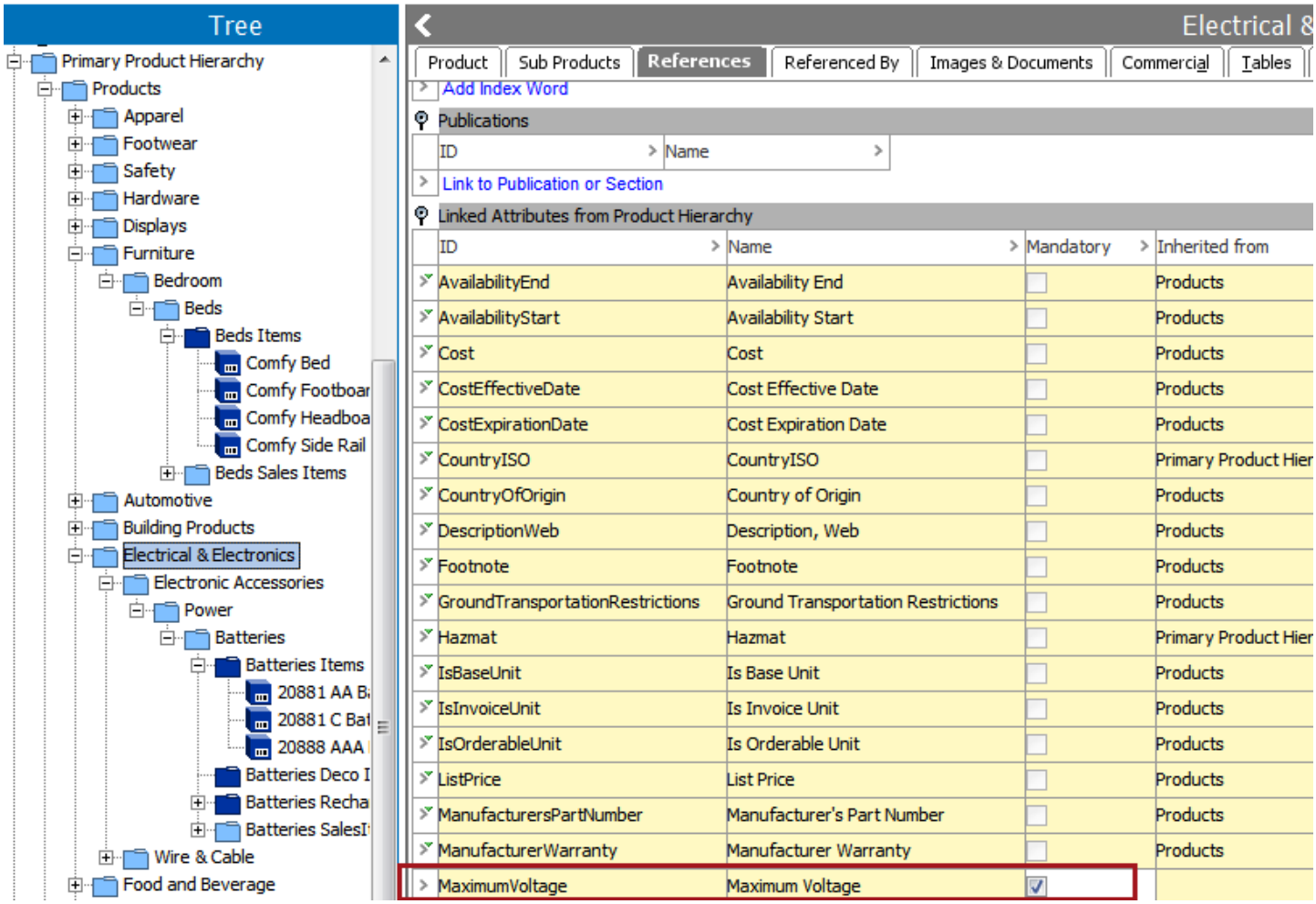


The attribute indicator has a red check mark and the value field is highlighted red for attributes marked as mandatory. Note that the red highlighting is present regardless of the workbench interface (e.g., the standard object editor in Tree navigator, the Tasks tab on an object in Tree, or the STEP Workflow Items tab when using the STEP Workflow navigator). This is effective in calling attention to key attributes that users generally populate within the STEP Workbench.

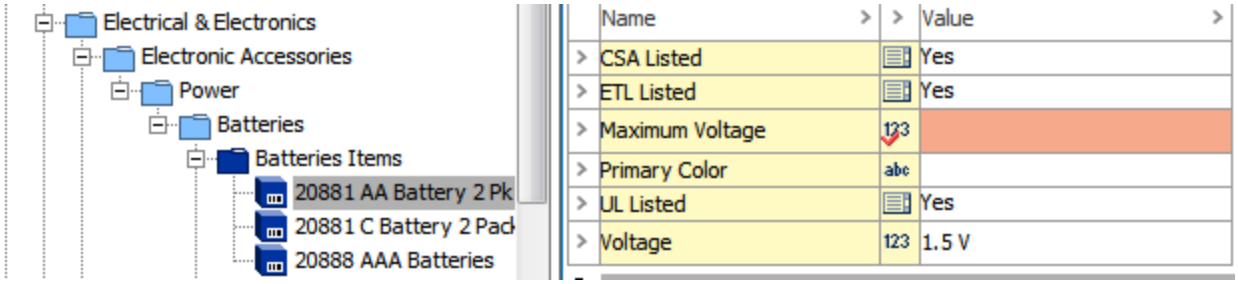
To configure this, update the standard **Mandatory** setting on the attribute to **Yes**.

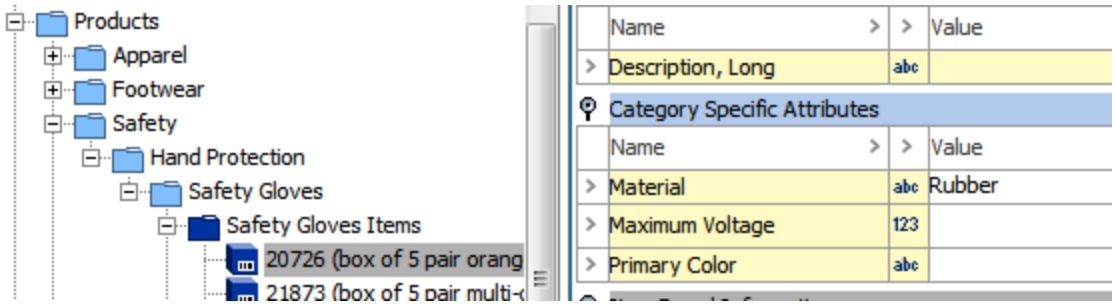


Alternatively, the attribute can be set as mandatory on an attribute link (available on product and classification super types) by clicking the standard **Mandatory** checkbox. Attributes set as mandatory in this way behave in the same manner as described above, though at a more granular level as the indicators are only present on objects or their children where the attribute is linked. For example, a Maximum Voltage attribute is linked to an Electrical & Electronics category, and marked as mandatory on that link.



Child objects of the Electrical & Electronics category have the attribute shown as mandatory, while objects under other categories that also have the attribute linked but do not have it marked mandatory do not display any visual indicator.





It is important to note that attributes set to mandatory using either of the standard methods described above will cause those attributes to also display as mandatory in the Web UI, regardless of how those attributes might be configured for display in the Web UI.

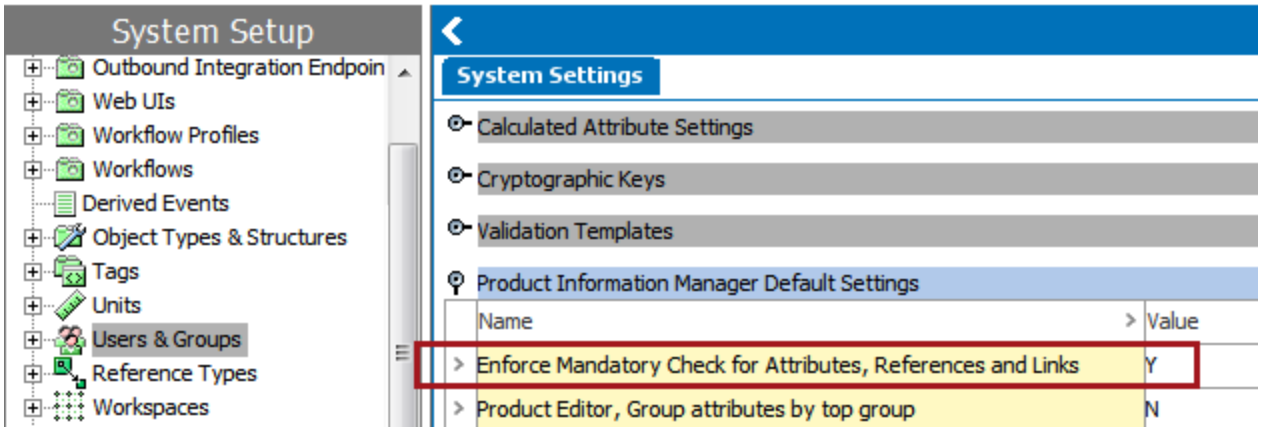
Verify Mandatory Attribute Values Upon Approval

In addition to visual indicators, the system can be configured to *enforce* that the attribute is populated prior to the attribute being approved. This option is most often used only as a final 'safety check' and is applied only to attributes that are required for ALL objects of a particular type or category, with no exceptions. As approval is usually a final step in a larger process, it is more common to enforce that values be present earlier in the process, such as when they are actively populated (e.g., within workflows or imports).

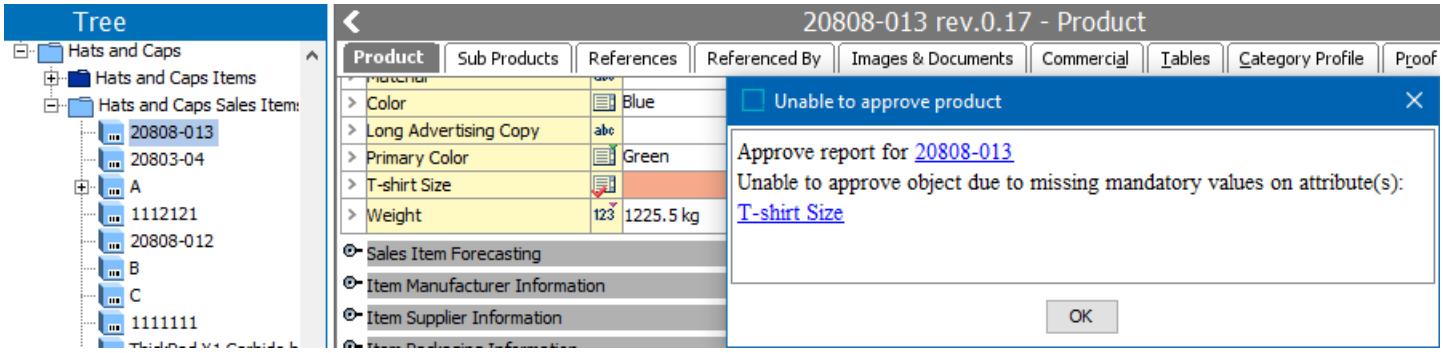
Note: Validity influences the standard mandatory settings, so the mandatory requirement is only enforced for the object types on which the attribute is valid.

For example, if all 'Item' object types require a UPC or GTIN, attributes for those could be made mandatory. Alternatively, consider an 'Address' object type. It might make sense to make an attribute mandatory that holds the street name, but not ZIP Code as not all countries use ZIP Codes.

In this case, the visual indicators must be configured as described above (e.g., relevant attributes must be set to Mandatory = Yes). In addition, a system setting must be configured to enforce the mandatory checks prior to object approval. To do this, navigate to System Settings > Users & Groups > Product Information Manager Default Settings > **Enforce Mandatory Check for Attributes, References and Links** and set the value to **Y**.



With the above setting in place, the system will display an error to any user attempting to approve an object with one or more unpopulated mandatory attributes. The below shows an example of the error in workbench, as encountered when a user attempts to approve an object. A similar error is shown in Web UI upon attempted approval, though the visual indicators are not present unless configured on the screen the user is approving from. Refer to the 'Web UI Screen Mandatory Attributes' section below for more information on configuring visual indicators for mandatory attributes in Web UI.



The above settings have no impact on mandatory attributes in Smartsheets, since Smartsheets do not contain an approval action. In addition, attributes marked as mandatory for approval do not have any visual indicators in Smartsheets. Refer to the 'Smartsheet Mandatory Attributes' section below for more information on this.

Business Rules for Mandatory Attributes

Business rules can be used to enforce complex and/or granular use cases for specifying mandatory attributes. Whenever possible, standard process-based mandatory settings should be used (e.g., workflow mandatory or Web UI screen mandatory, described below). When standard options are insufficient for the requirements, business rules can be used to close the gap. For example, a list price could be required only if the object has a reference to a web classification. The workflow mandatory attribute functionality optionally includes the use of business rules so that attributes are only made mandatory under specific conditions. However, the mandatory enforcement is only applied as part of a workflow, so if it is needed elsewhere (e.g., upon approval, import, or save in Web UI), standard business rule functionality may be necessary.

For more on business rules, refer to the **Business Rules** documentation.

Smartsheet Mandatory Attributes

Attributes can be made mandatory within a Smartsheet, providing both a visual indicator and error reporting on missing values. Attributes marked as mandatory for Smartsheets have their value cells highlighted blue to prompt the user to populate the field. If the user validates the sheet and has not populated the mandatory values, an error is reported.

* <ID>	<Name>	<Object Type Name>	Attribute N	Hazmat
109011	20803-03	Item		
20803	Red Baseball Cap	Item		
20805	20805	Item		

For more information, refer to the **Mandatory Attributes and References in Smartsheets** topic in the **Excel Smartsheet Format** section of the **Data Exchange** documentation.

Web UI Mandatory Attributes

Mandatory attributes can be designated as mandatory either from the standard mandatory settings in workbench or through configuration solely in Web UI. For more information, refer to the **Mandatory Attributes in Web UI** topic in **Web User Interfaces** documentation.

Workflow Mandatory Attributes

It is often necessary that certain attributes or attribute groups be set as mandatory for a state or transition in a workflow. This means that the object can pass further in the workflow only if the indicated attributes have values. To facilitate this, the STEP Workflow Designer includes an option to specify mandatory attributes or attribute groups on both states and transitions, requiring that the indicated attributes are populated prior to the task exiting the state, or taking a particular transition. In addition, attributes and groups can be set to be conditionally mandatory, meaning they are only required if specific conditions are met.

Detailed information on the configuration and use of workflow mandatory attributes is available in the **Mandatory Attributes and References in Workflows** topic in the **Workflows** documentation.

Single and Multi-Valued Attributes

To enter a value for an attribute on an object, navigate to the desired object in **Tree** and select the value field of the relevant attribute.

Note: A value applied to a higher level product, such as a product family, will be shared by its sub products via inheritance.

A Multi-valued attribute is an attribute that can contain more than one value for a specific object.

The Multi Valued parameter is available when creating a new attribute (as defined in the **Creating Attributes** topic) and can also be modified for existing attributes in the Validation Rules flipper (as defined in the **Validation Rules** topic).

The following describes the single and multi-valued attributes:

Value Type	Icons examples	Description	Example
Single-valued attributes		Single-valued Attributes can hold one value for a specific object.	A specific product, such as a 'Battery' with order code 'ABC-123', can only have one value for the attribute 'Casing Style', e.g., 'AAA'.
Multi-valued attributes	Represented by three dots at the bottom	Multi-valued Attributes can hold more than one value for a specific object.	A specific product, such as an 'Anti Virus' software package with order code 'FGH-456' can have one or more values for the attribute 'Platform', e.g., 'Windows NT', 'Windows 2000' and 'Windows XP'. Another example is the description attribute: Keyword. There may be several different keywords to use for a look-up for a classification node. For example, some Keyword values for the node: 'Table Saws' might be 'Table', 'Saw', 'Tablesaw', 'Bench', 'Benchsaw', 'Crosscut', 'Swingarm', etc.

Icons

In the editors, icons are used to indicate the validation rule together with the optionality and the link status for the attribute. For more information, refer to the **Validation Rules** topic.

An attribute with the validation base type number is used as an example below:

Single Valued Attribute	Description
	A single valued integer can be entered.
	A value is inherited from a higher level node. The inherited value can be overwritten.
	Attribute is set as mandatory. An integer must be entered.
	Attribute is set as mandatory. A value is inherited from a higher level in Tree. The inherited integer can be overwritten.

Multi Valued Attribute	Description
	Multiple values can be entered.
	Values are inherited from a higher level node. The inherited values can be overwritten, and new values can be added.
	Attribute is set as mandatory. Integer(s) must be entered.
	Values are inherited from a higher level in Tree. The inherited values can be overwritten, and new values can be added. Attribute is set as mandatory.

Editing Attribute Values

To edit the value of an attribute on an object, navigate to the desired object in **Tree** and select the value field of the relevant attribute.

Specification attributes can be found under their respective attribute group's flipper, and description attributes can be found under the 'Description' flipper at the top of the value editor.

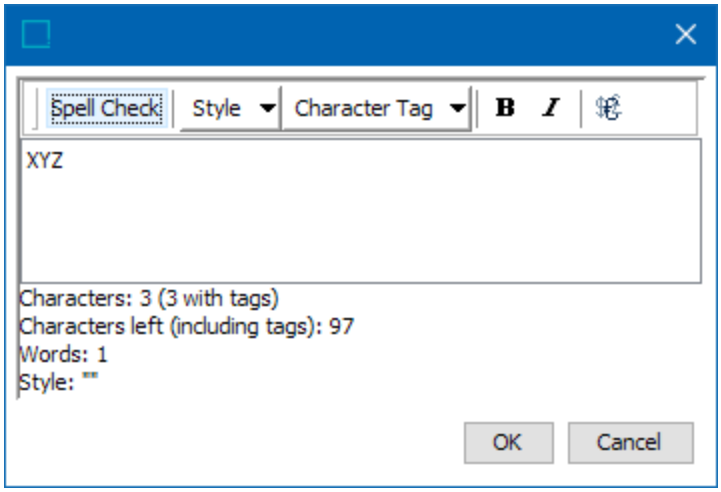
Attribute values can be edited either by selecting from a list, typing a value, or overwriting an existing value.

1. In **Tree**, select the relevant node to open the editor.
2. Depending on the object type, click the **Product** tab, **Classification** tab, or **Images & Documents** tab.
3. Double click the value field of the relevant attribute and enter the new value.

   Note: Only white fields are editable.

4. For additional options when editing a value field, press **Alt + F2** on the keyboard.

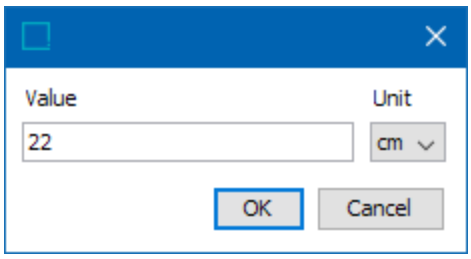
   This opens a value editor related to the validation rule of the selected attribute. The value editor, shown below for a text attribute, will assist you in typing a valid value.



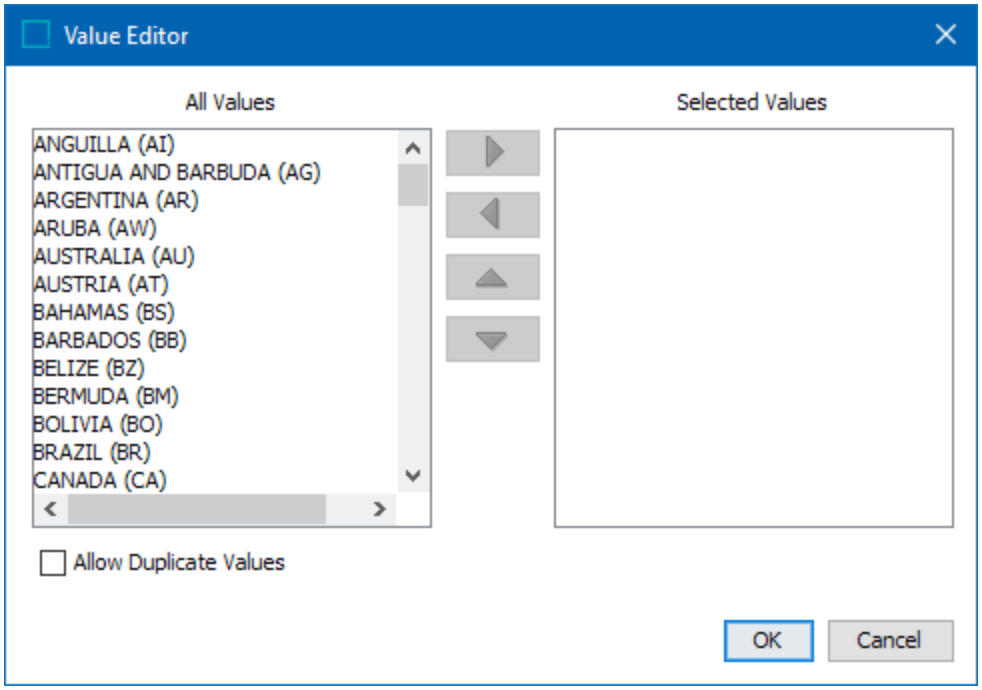
   In addition to adding values to the attribute in the editor, the below operations can also be performed:

   - Perform Spell Check on the values entered.
   - Apply style tags to the text. For more information refer to the **Tags** topic in the **System Setup** documentation.
   - Apply character styles to the text. For more information refer to the **Tags** topic in the **System Setup** documentation.
   - Apply basic formatting to the text.

A 'Number' validation with units attribute editor is displayed below:



This is a multi-valued attribute editor based on an LOV:



Note: Editing large LOVs, those with more than 5,000 values, includes a Filter Values button(Filter Values). For more information, refer to the **Working with Large LOVs** section of the **List of Values (LOVs)** topic.

5. Depending on the attribute, select from a List of Values (LOV) or type the value.
6. Press **F2** on the keyboard to validate the value.

Note: In a multi-valued attribute with LOV validation base type, if you need the same value to be added more than once, click on 'Allow Duplicate Values' checkbox in the Value Editor.

The attribute value has now been edited.

Inherited and Local Values

Values can be:

- Shared by inheritance from a higher product level (e.g., a product family) as defined in the **Inherited Attributes** topic.
- Local and thus added directly on the current level (e.g., a sub product)

Note: When a value is typed, the applied attribute validation rule is enforced. If a typed value does not match the validation rule, an error message will inform you of the problem.

View Filter Options

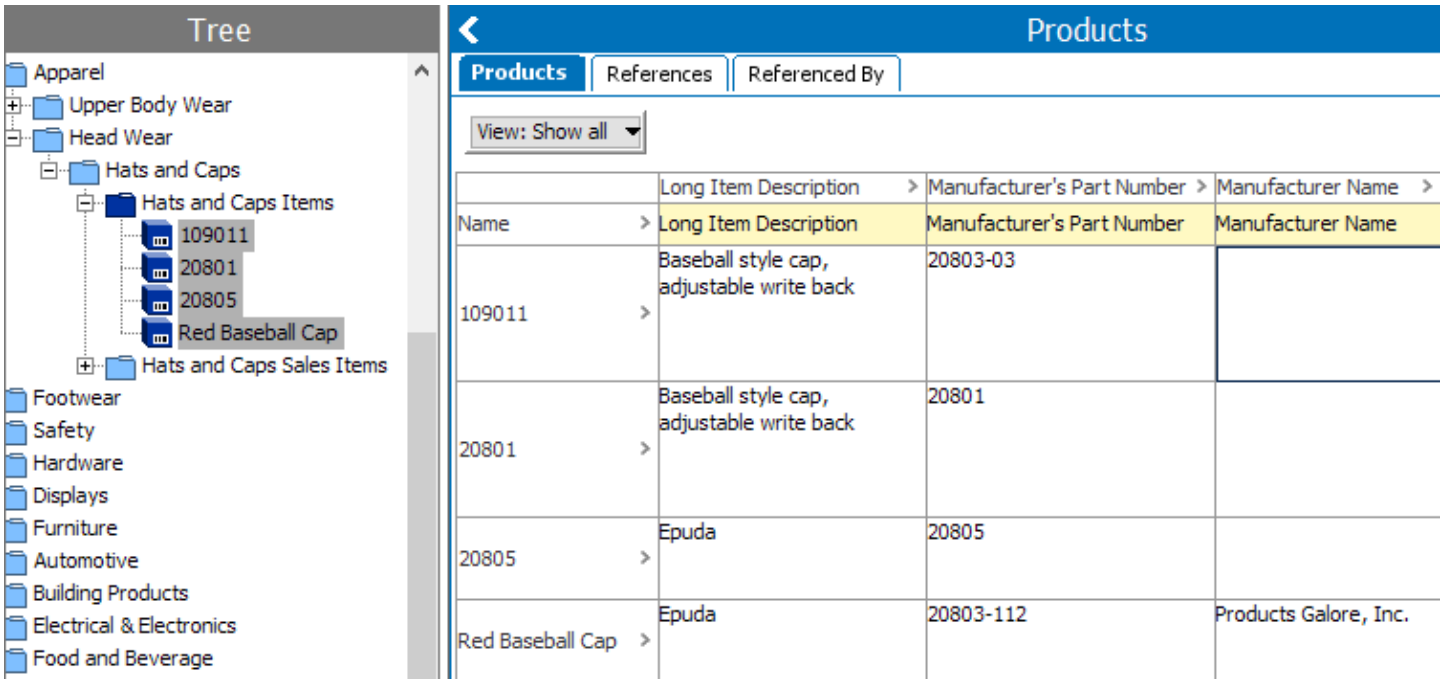
You can set various viewing options such as hiding attributes, rotating tables, and hiding attributes with empty or non-mandatory values. To learn more on how to set filters, refer to the **Editing Objects in the Tree Tab** topic in the **Getting Started** documentation.

Attributes with Units

Below is a description of attributes with units:

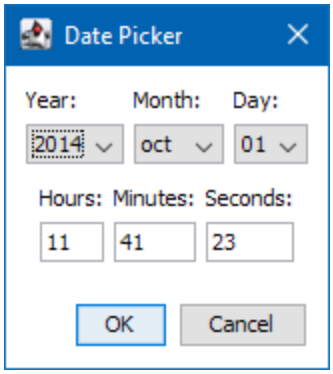
Attribute	Description
Attribute with default Unit	If the attribute has a default unit, it will appear automatically in the field after pressing <F2>.
Attribute with Units	If the attribute has units applied, you can either key in the relevant unit, or press <Alt> + <F2> to select a unit from the list.
Attribute is Numeric Text or Numeric Text (exclude tags) validated	If the attribute has 'Numeric Text' or 'Numeric Text (exclude tags)' as its validation base type, line breaks are legal. However, these should be avoided if the attribute has units, because the unit will only appear on the last line.

To quickly add values to multiple objects, it is possible to multi select objects using the Ctrl key on the keyboard and then add values to the objects in the editor.



Editing 'ISO Date' and 'ISO Date and Time' validation base type

To edit in the data / time selector, double click on the attribute value to get the data selector to make selections. This applies for both 'ISO Date' and 'ISO Date and Time' validation base types. Below is an example of an 'ISO Date and Time' data selector.



Entering Values

There are different ways of entering values according to the validation base type of the Attribute:

1. Values *must* be in a list of values (LOV). Options include:
   - Selecting the value from the list
   - Typing in a value

The user can only type a value that is in the list. If the user tries to type a value not on the list, it will be rejected, and the list will appear to select from. Otherwise, the list will appear when double-clicking the field.

2. Values *can* be in a list of values (LOV). Options include:
   - Selecting the value from the list
   - Creating a new value

   In this case, the user is allowed to create a value that is not in the list. The new value must abide by the validation rules of the specific LOV. To add the value to the list, the user must select the empty (blank) field in the list and then key in the new value.

3. Values are 'free'. Option is:
   - Typing in a value

   The user can type any relevant value in accordance with the validation rules of the specific attribute.

   Refer to the **Validation Rules** section in the **System Setup** documentation for more information.

   Note: The attribute name can be double-clicked to view all settings in the Attribute Editor.

   All value types can be single or multi-valued. Refer to the **Single and Multi-valued Attributes** section in the **Attributes** documentation for more information.

Overwriting Values

- **Specification Attributes:**

  Attribute values that are inherited from a higher level are indicated by a symbol in the icon column. When a value is overwritten, it is no longer inherited, but becomes local. This means that if the original value is edited on a higher level, the local value will not be changed. Also, a global translation will not affect this value.

  For example, the Attribute 'Seat color' has the value 'Blue' for the Product family 'XYZ123'. A sub product 'XYZ123b' has the value overwritten with 'Pale blue'. If the value 'Blue' is changed to 'Light blue' in the corresponding LOV, all Products using this value will have the new value, except the Products (e.g., 'XYZ123b') where the value has been overwritten locally.

- **Description Attributes:**

  Description attribute values do not inherit down to subordinate nodes. However, a calculated attribute can be used to display a value of a description attribute from node(s) above the currently selected node.

Refer to the **Validation Rules** in the **Attributes** documentation for more information.

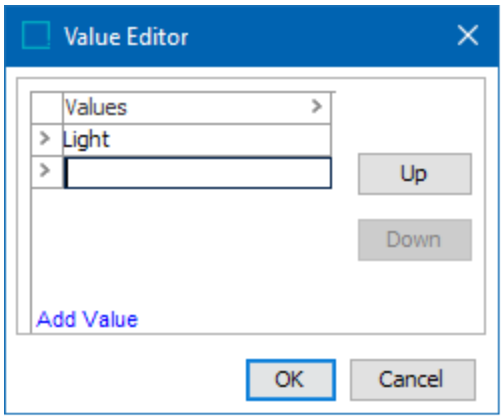
Editing Multi-Valued Attributes

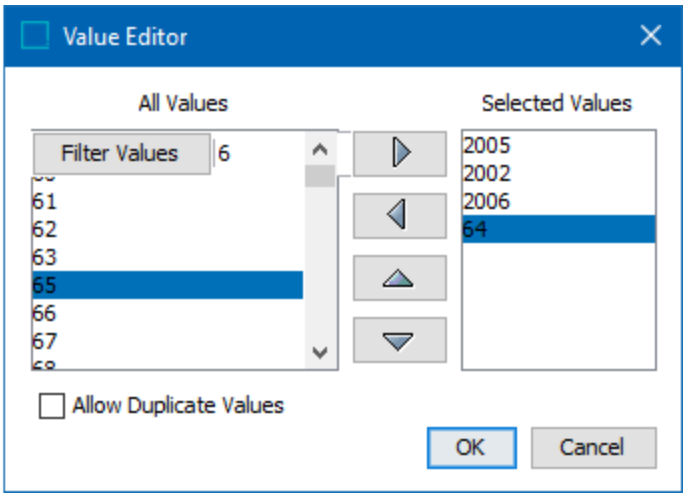
To edit the value of an attribute on an object, navigate to the desired object in **Tree** and select the value field of the relevant attribute.

A multi-valued attribute is an attribute that can contain more than one value for a specific object.

Note: Multi-valued attributes are available for specification and description attributes. Multi-valued attributes are represented by three dots at the bottom of the icon, for example:

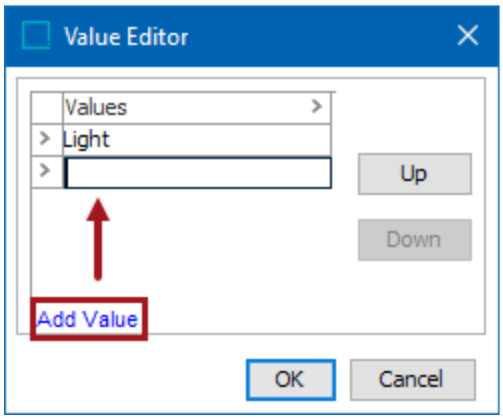
1. In **Tree**, select the relevant node to open an editor.
2. Depending on the editor, click the **Product** tab, **Classification** tab or **Images & Documents** tab.
3. Double-click the value field of the relevant attribute. The **Value Editor** dialog box displays, as shown below for a multi-valued text attribute and a multi-valued large LOV attribute.

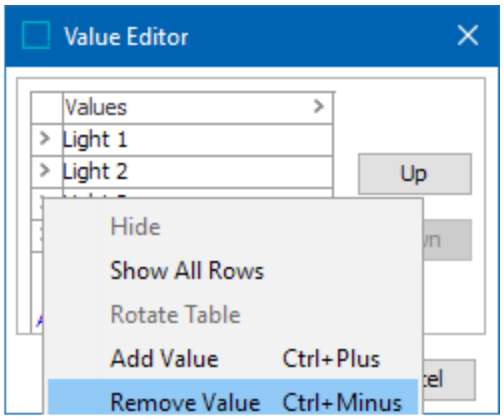




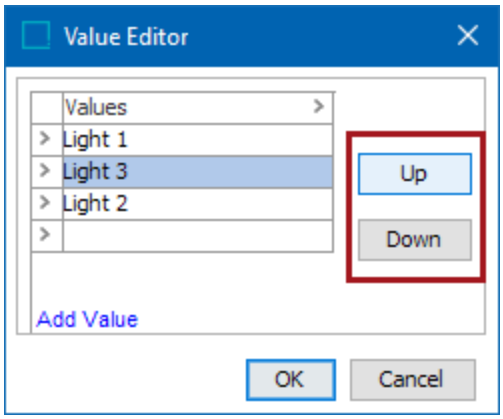
Note: Editing large LOVs, those with more than 5,000 values, includes a Filter Values button(Filter Values). For more information, refer to the **Working with Large LOVs** section of the **List of Values (LOVs)** topic.

4. Click **Add Value** to add a new line, or click into the line to change the value. To delete a value, highlight it right-click on the arrow and press 'Remove Value.'

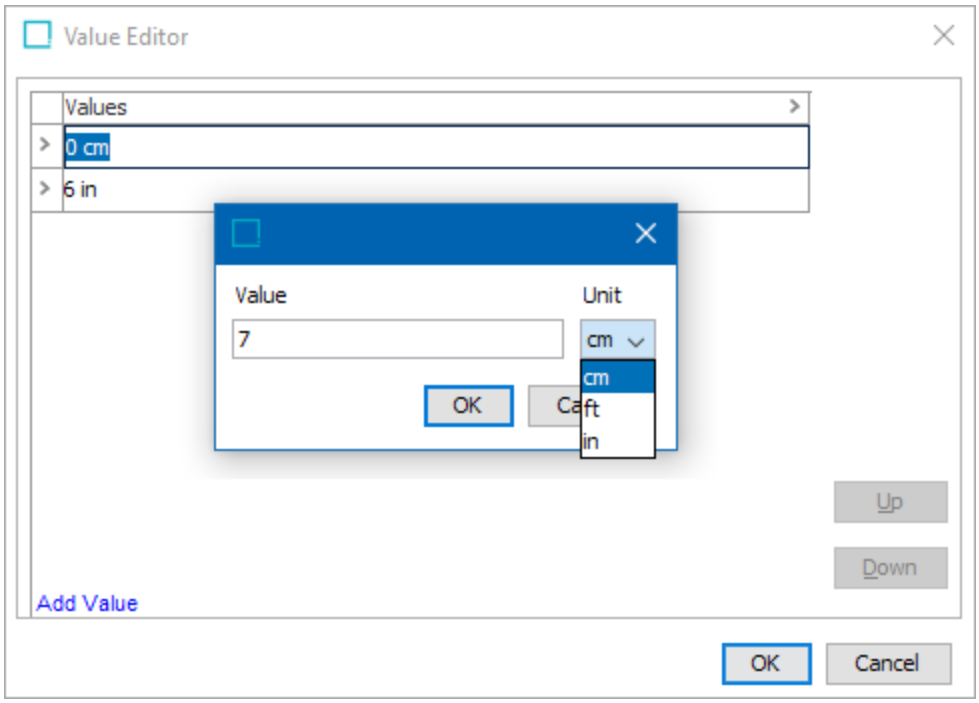




5. It is possible to select in which order the values of the multi-valued attribute should appear. the order can be changed by using the buttons Up and Down.



6. Click **OK** when finished. If the node is a product containing sub products, the new values will be inherited to them. If it is a sub product, the values will be local and only apply to this product. If the attribute has units applied, the user can either key in the relevant units, or press <Alt> + <F2> to select a unit from the list. The example below is with a number validation base type with units applied.


Value Editor
Values
0 cm
6 in
Value
Unit
7
cm
cm
ft
in
OK
Ca
Up
Down
Add Value
OK
Cancel

Unlinking Attributes from Objects

If an attribute is linked to the wrong object or is no longer relevant to the object, the link can be removed.

Note: Globally applied Attributes displayed in the **Description** fields cannot be deleted / unlinked from an Object.

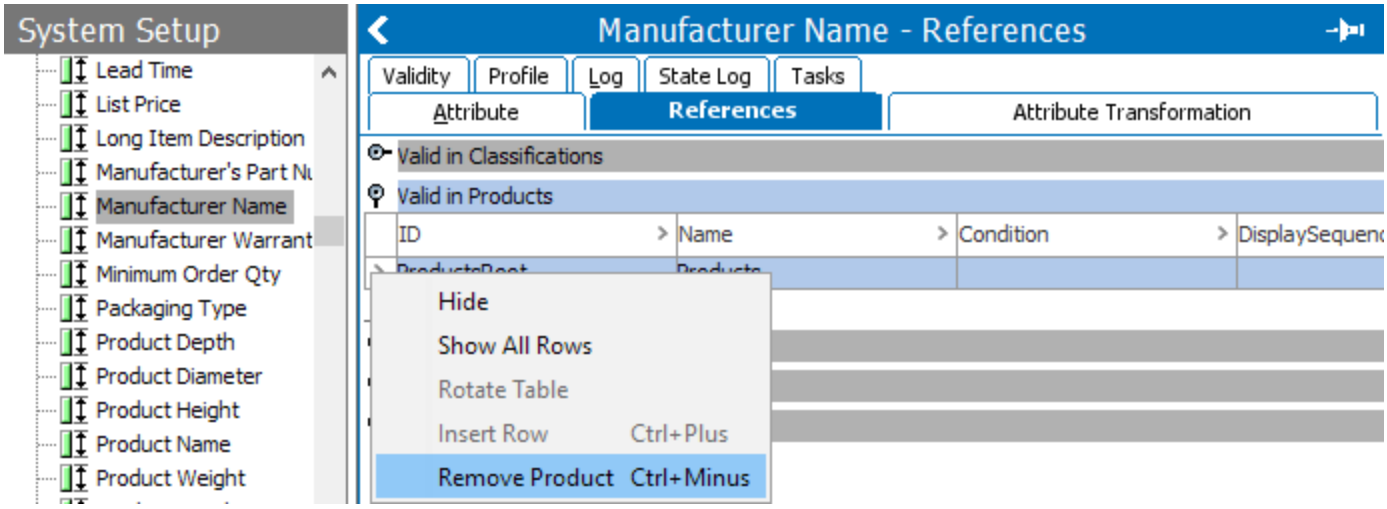
If an attribute with a value is deleted, or unlinked, from a product node, the attribute becomes an 'Orphan Attribute', and will keep values for the attribute. If the attribute is linked to the product again, the value will also appear again.

Attributes can be unlinked from objects in two different locations:

- In **System Setup**, open the relevant attribute. Navigate to the **References** tab and locate the desired object under the **Valid in Classification** field or **Valid in Products** field.
- In **Tree**, open the relevant object. Navigate to the **References** tab and locate the desired attribute from the **Linked Attributes** field.

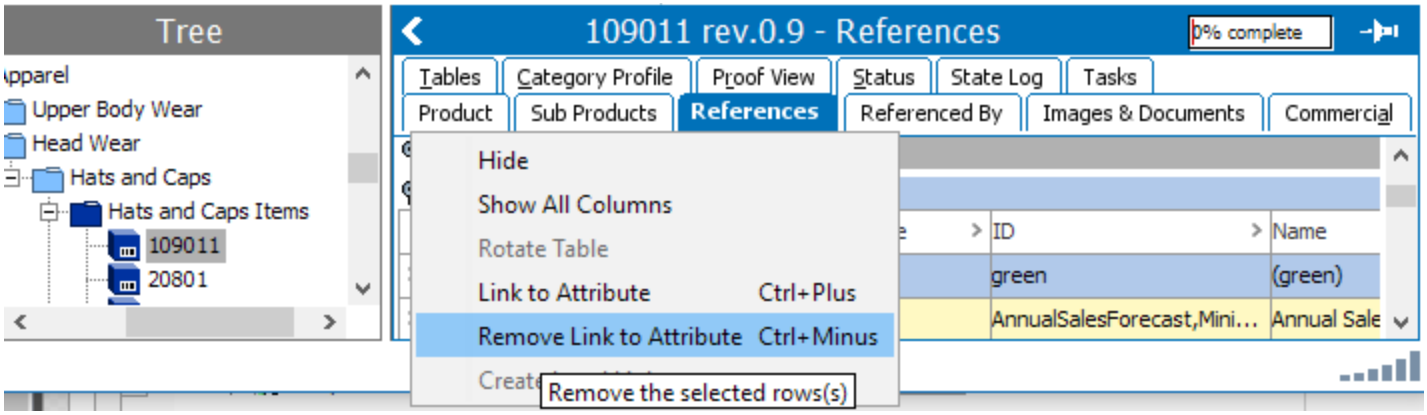
Unlink Object from Attribute References Tab

1. In **System Setup**, select the relevant attribute to open the editor.
2. Open the **References** tab where the linked objects are listed.
3. Click the **[>]** next to the desired object, and then click **Remove**.



Unlink Attribute from Object References Tab

1. In **Tree**, select the relevant object to open the editor.
2. Open the **References** tab where the linked attributes are listed.
3. Click the **[>]** next to the desired attribute, and then click **Remove**.



The attribute has now been unlinked from an object. If the object has any linked products, the attribute will also disappear from those. If the unlinked attribute has a value for the product, the attribute will still be visible as an orphan attribute, which is indicated with the attribute name in italics.

Important: Before unlinking an attribute from an object, the user must make sure that the attribute is no longer needed. When the link to the attribute is removed from a node in the Product or Classification hierarchy, it will also disappear from the nodes below that have inherited the link to the attribute.

Specification Attributes

A specification attribute is a specific characteristic about a product. This could be a physical specification or an immaterial feature.

The total number of specification attributes within the enterprise can be rather large, and not all specification attributes are relevant to all products.

This issue is accommodated by 'linking' the specification attributes to the relevant nodes in the classification or product hierarchies. The specification attributes are then available only to products linked to (or below) these nodes in the hierarchy.

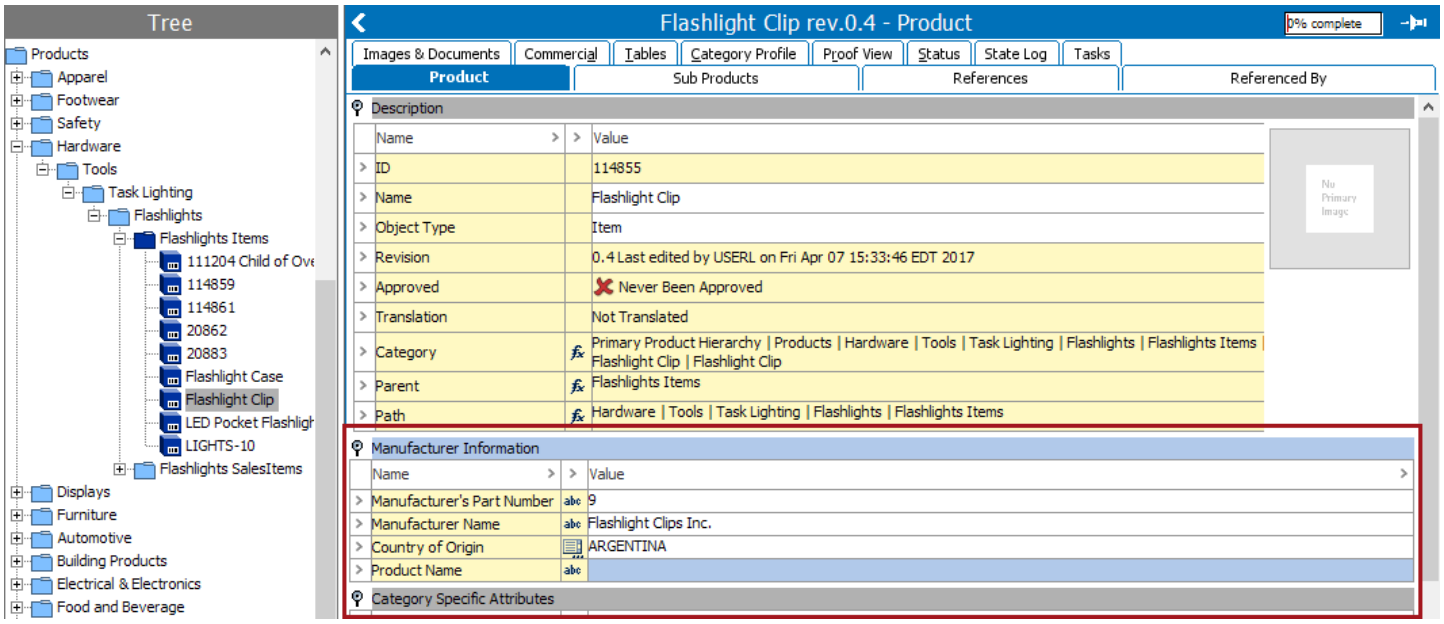
Specification	Example
Physical specification	○ Color ○ Length ○ Weight ○ Type of material ○ Capacity
Feature	○ Price ○ Country of manufacturer

Each of these examples defines a specific characteristic for a relevant set of products.

Specification Attribute Facts

- Specification attributes are only available to products (compared to description attributes, which also are available to classifications, images, documents and link types).
- Specification attributes and their values are always inherited by child objects in the same hierarchy.
- Specification Attributes are always displayed under their 'Attribute Group Flippers' as which appear under the Description.

Note: Specification attributes can become orphaned. More information can be found in the **Linking Orphan Attributes** topic in the **System Setup** documentation.


Tree
Products
Apparel
Footwear
Safety
Hardware
Tools
Task Lighting
Flashlights
Flashlights Items
111204 Child of Ove
114859
114861
20862
20883
Flashlight Case
Flashlight Clip
LED Pocket Flashligh
LIGHTS-10
Flashlights SalesItems
Displays
Furniture
Automotive
Building Products
Electrical & Electronics
Food and Beverage
Flashlight Clip rev.0.4 - Product
0% complete
Images & Documents
Commercial
Tables
Category Profile
Proof View
Status
State Log
Tasks
Product
Sub Products
References
Referenced By
Description
Name
Value
ID
114855
Name
Flashlight Clip
Object Type
Item
Revision
0.4 Last edited by USERL on Fri Apr 07 15:33:46 EDT 2017
Approved
Never Been Approved
Translation
Not Translated
Category
Primary Product Hierarchy | Products | Hardware | Tools | Task Lighting | Flashlights | Flashlights Items | Flashlight Clip | Flashlight Clip
Parent
Flashlights Items
Path
Hardware | Tools | Task Lighting | Flashlights | Flashlights Items
Manufacturer Information
Name
Value
Manufacturer's Part Number
9
Manufacturer Name
Flashlight Clips Inc.
Country of Origin
ARGENTINA
Product Name
Category Specific Attributes

Inherited Attributes

Any specification attributes linked to a node in the product or classification hierarchy are also available by inheritance to the nodes below. If the attribute is also made valid on the child node, inherited values can be localized (e.g., overwritten directly on the child object).

Before linking a specification attribute, the user should consider the level they want to link it to.

- Is the specification attribute relevant only to a single product or product family?
- Is the specification attribute relevant for a whole range of products linked to a classification node?

The availability of specification attributes and the corresponding attribute values are then subject to inheritance according to the following scheme:

Object	Value Inheritance
Product hierarchy	Attributes linked to a product node are available for all sub products linked to (or below) that node. Values applied to these attributes for a specific product are inherited by its sub products.
Classification hierarchies	Attributes linked to a classification node are available for all products linked to (or below) that node.

Validity on Specification Attributes

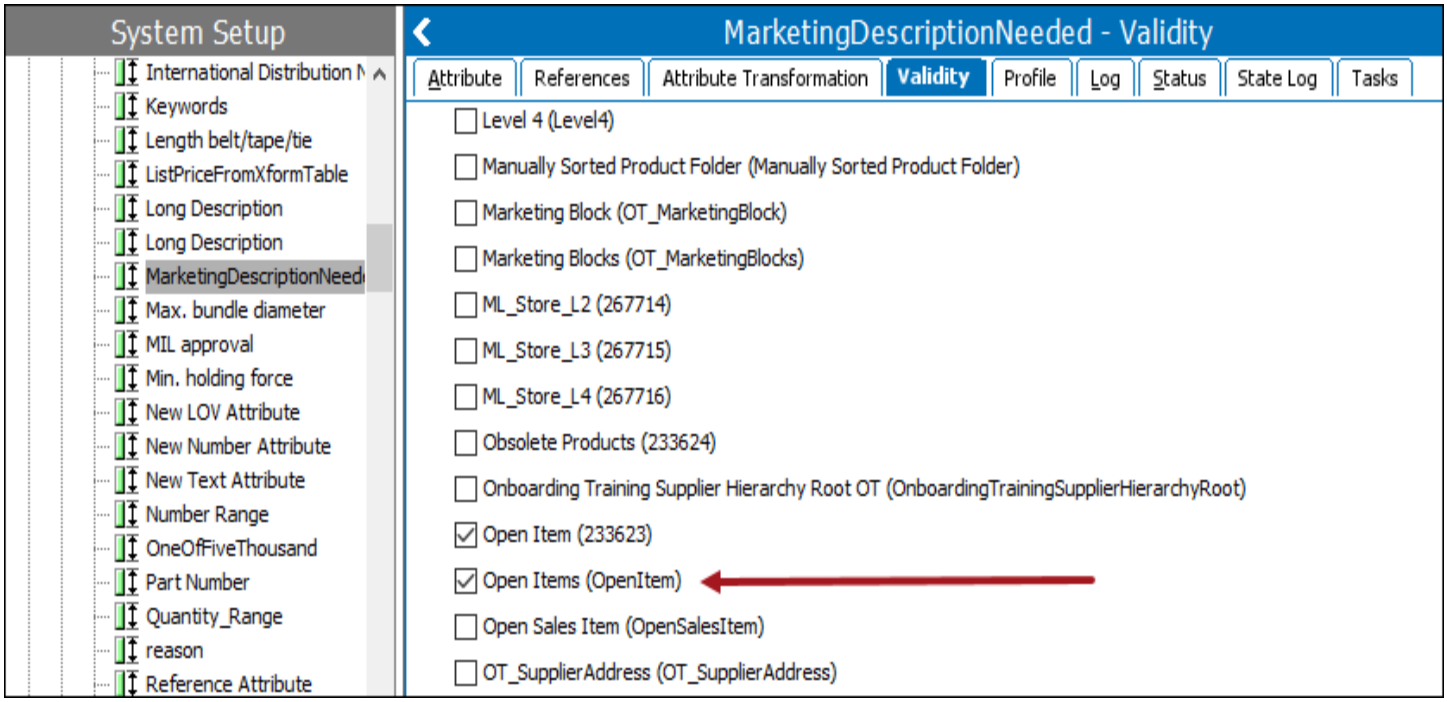
Specification attributes can only be made valid for product object types.

Setting validity for a specification attribute identifies the product object types that can use the attribute.

Note: The STEPXML format identifies selected Validity object types within the UserTypeLink tag using the UserTypeID element.

1. In System Setup, expand **Attribute Groups**, expand the relevant group, and select the relevant attribute. The **Attribute** editor displays.
2. Click the **Validity** tab. The available product object types display.

   Note: The number of available object types depends on whether the attribute is a specification or description attribute.



3. Specify which product object types the attribute should be valid for by clicking the check boxes.

   The attribute will now be available for the selected product object type(s).

   Even if an attribute is not valid for a certain object type, it is possible to link it.

Note: To make a specification attribute available and editable on a product, the attribute must be made valid on the product object type. It should be linked to the product, the product hierarchy, and classification hierarchy where the product resides.

Units

A unit is a representation of measurement. In STEP, a unit is an object that can be associated with attributes or LOVs (List of Values). A measurement stored as an attribute will typically consist of a value and a unit (or unit of measure).

The separation of the unit and the value of a measurement means:

- The value part can be validated according to numeric criteria.
- The value part can be searched and compared according to operators such as '>' and '<.' (Values for numeric searches with no units are assumed supplied in the default unit for the attribute. For example, if kg is the default unit for the Weight attribute, 'Weight = 1' will match '1 kg' and '1000 g'.)
- It is possible to establish automated conversion between values of different units of measure.
- More presentation options, e.g., in 'specifications tables.'
- Consistency can be enforced in the use of units.

Note: Units can be applied to attributes and/or LOVs of all validation base types except: Condition, Text, Date, 'ISO Date', 'ISO Date and Time', URL, and Regular Expression.

A unit is housed in a unit group and can include a unit conversion. Both of these are discussed below, as well as information for maintaining each of these elements.

Unit Groups

A unit group is a grouping of compatible units. It contains units that apply to the same measurement. This makes it possible to establish rules for conversion between units within the group.

Unit groups are available for attributes and List of Values (LOVs). Examples of unit groups and units are included in the following table.

Unit Group	Units
Temperature	• Celsius • Fahrenheit • Kelvin
Dimension	• mm • cm • meters • inches

Unit Group	Units
	• feet • yards
Volume	• cm3 • m3 • inch3

For example, if the unit group 'Dimension' has been linked to the attribute RopeLength, then the units mm, cm, meters, inches, feet, and yards can be applied to the value of RopeLength.

Unit Conversions

A unit conversion specifies the rules for conversion from one unit to another. One of the units must be a base unit. It is possible to define a conversion rule between two compatible units. Unit conversions are used when, for example, exporting data and when searching for Attribute Values. Examples of unit conversions are included in the following table.

Time(s)	ID	Name	Conversion
Second	unece.unit.SEC	s	
Minute	unece.unit.MIN	min	(1 min = 60 s)
Hour	unece.unit.HUR	h	(1 h = 3600 s)
Day	unece.unit.DAY	d	(1 d = 86400 s)

Note: The system will normally include a pre-defined set of units according to UN/ECE standards. New units may be added if this standard does not provide a suitable unit. However, inspect the available units carefully before doing so. The pre-defined units are also provided with standard unit conversions

Conversion Factor and Conversion Offset

A unit conversion is specified in terms of a conversion factor and conversion offset.

Note: A conversion factor and conversion offset must be typed with minimum of one decimal and must never be empty. Type '0.0' to indicate a factor or offset of '0' (zero).

The following example shows the conversion rule for temperature conversion from Celsius into Fahrenheit using the formula: Temperature Fahrenheit = (1.8 * Temperature Celsius) + 32

Unit	Unit Conversion Factor	Conversion Offset
Fahrenheit (base unit)		
Celsius	1.8	32.0

As an explanation of this example, to convert a Celsius temperature of 100 degrees into degrees Fahrenheit:

- Multiply the Celsius temperature reading by 1.8 to get 180.
- Then add 32 to 180 and get 212 degrees Fahrenheit.

Additional Information

For information on creating or deleting the elements included in a unit, refer to the following topics:

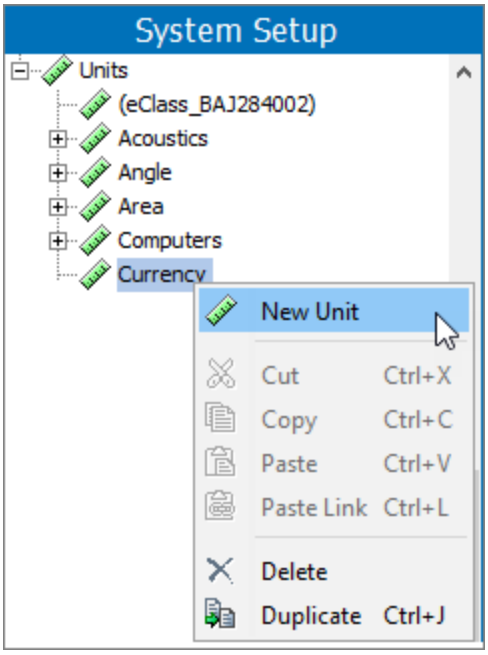
- Maintaining a Unit
- Maintaining a Unit Conversion
- Maintaining a Unit Group

Maintaining a Unit

Units can be created and deleted as necessary. Each maintenance option is defined below.

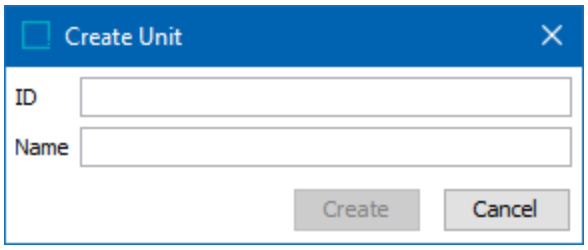
Create a Unit

1. Go to System Setup, open the Units node and click the relevant Unit Group. Right-click the relevant Unit Group and click the **New Unit** option.



Note: To create a new unit group, refer to the **Maintaining a Unit Group** topic in this guide.

2. In the Create Unit dialog:
   - Enter an **ID** for the new unit.
   - Enter a **Name** for the new unit.
   - Click the **Create** button.

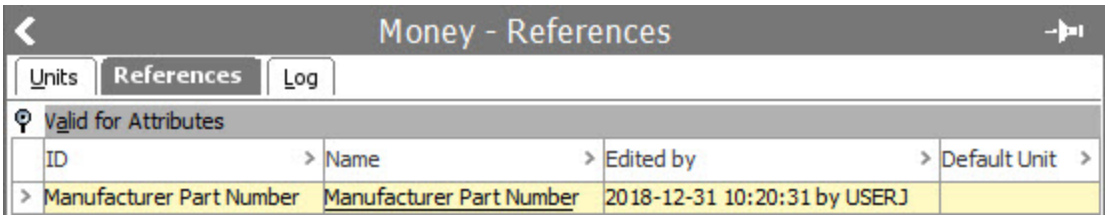


The newly created unit displays within a unit group. The unit can now be selected for attributes.

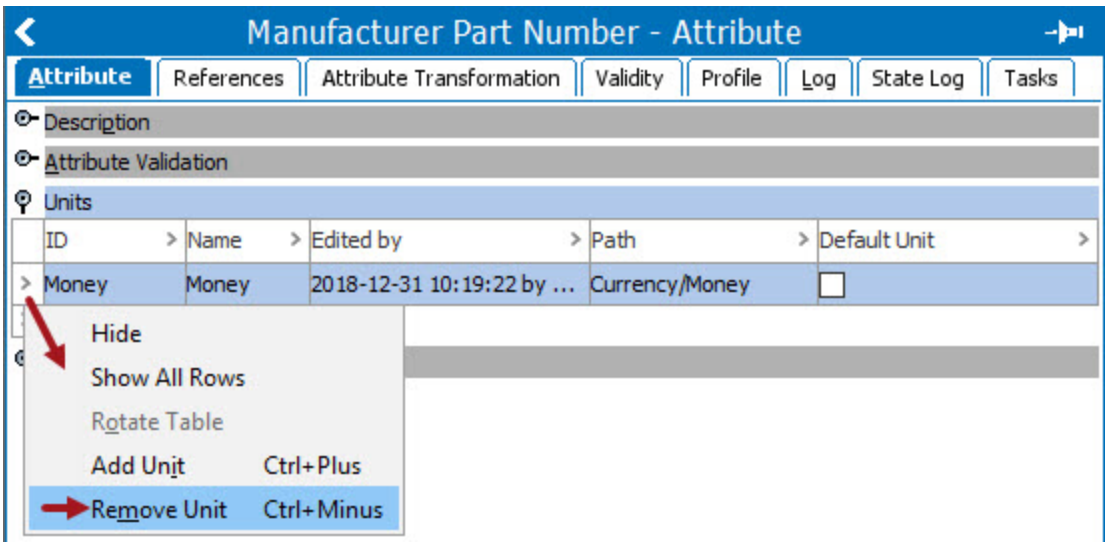
Delete a Unit

A unit group that contains a unit cannot be deleted. All units must be removed from the group before the unit group can be deleted. A unit that is used in an attribute cannot be deleted. The unit must be removed from the attribute before the unit can be deleted.

1. In System Setup, click the Units node, click the units group, and then click the unit to be deleted.
2. On the units editor, click the References tab to display the 'Valid for Attributes' flipper.

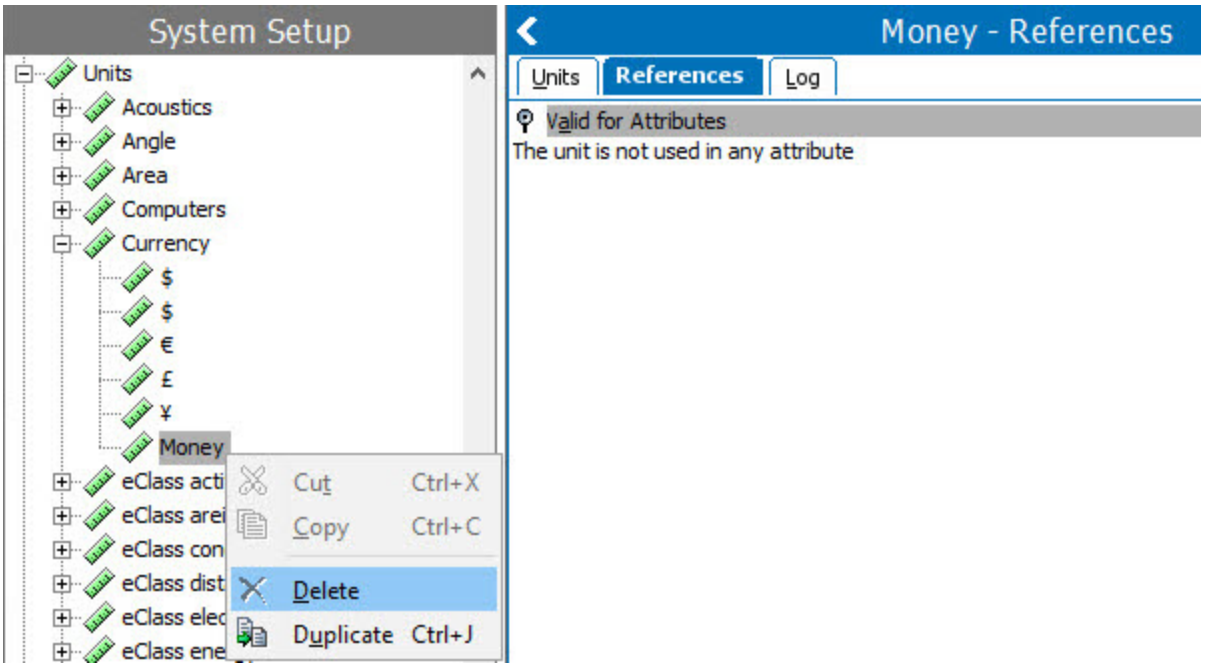


3. For each attribute displayed, use the following steps to remove the unit from the assigned attributes:
    - In the unit editor, click the attribute link in the Name column (as shown above) to display the attribute editor.



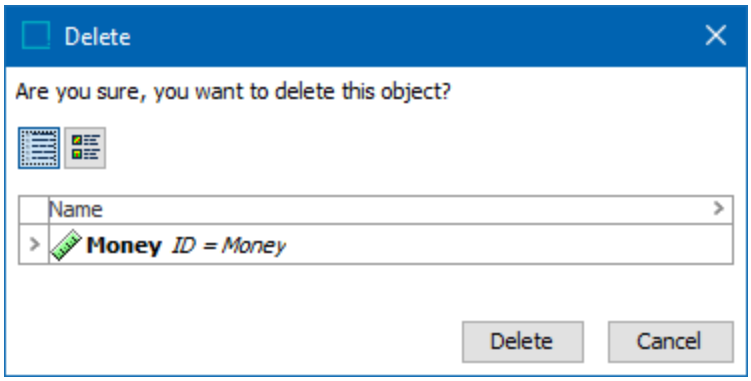
- On the Attribute tab, open the Units flipper.
- Right-click the row of the unit to be deleted and click the 'Remove Unit' option.

4. In the unit editor, when no attributes are displayed on the References tab for the 'Valid for Attributes' flipper, right-click the unit node and click the **Delete** option.

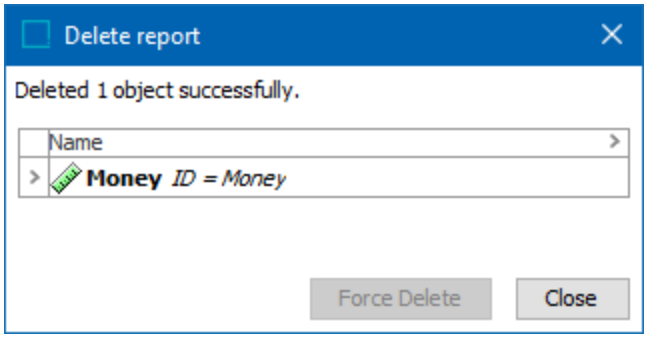


5. On the Delete warning dialog, choose an action:

- Click the Delete button to delete the unit.
- Click the Cancel button to return to the unit editor.



If the unit was deleted, the confirmation dialog is displayed.



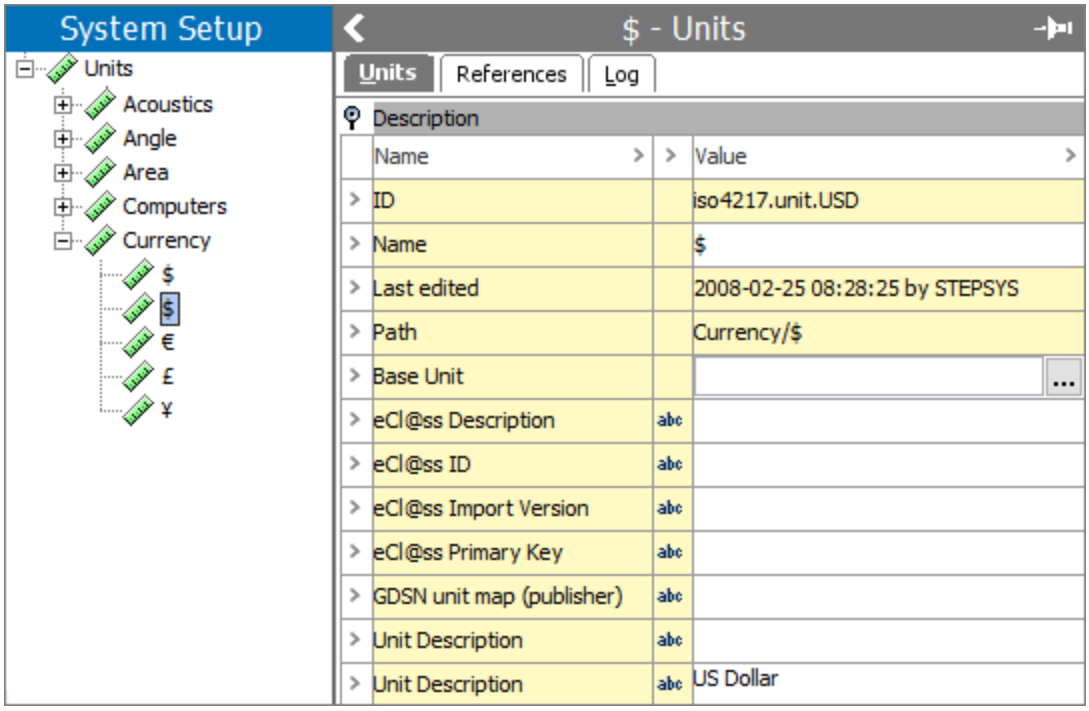
Maintaining a Unit Conversion

A unit conversion provides a way to 'translate' one unit to another. Standard units are defined with standard conversions.

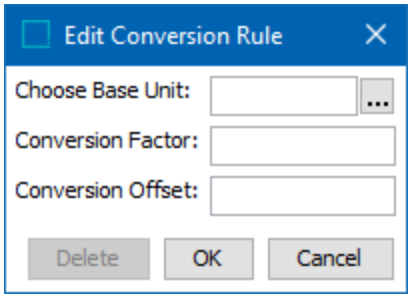
Unit conversions can be created and deleted as necessary. Each maintenance option is defined below.

Creating a Unit Conversion

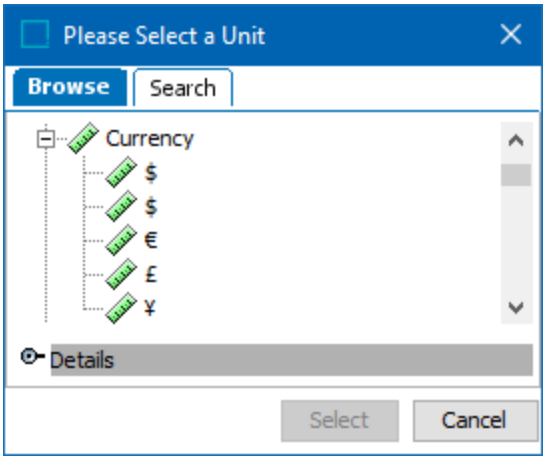
1. Go to System Setup, click the Units node and expand the relevant unit group.
2. Click a unit to display the units editor as shown below.



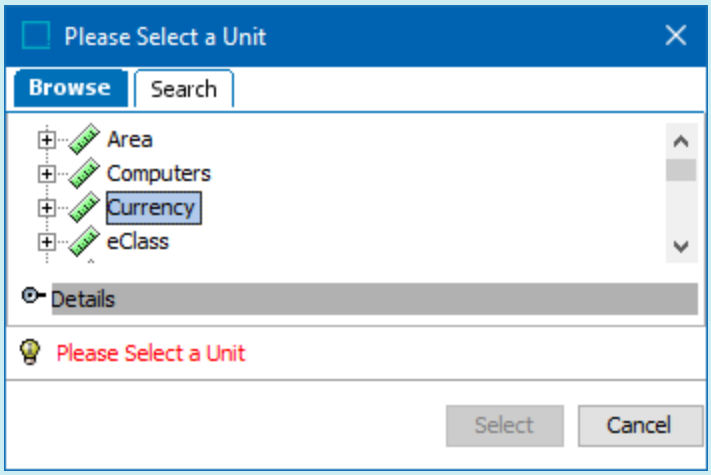
3. On the Units tab in the Base Unit parameter, click the ellipsis button (...), to display the **Edit Conversion Rule** dialog.



- For the **Choose Base Unit** parameter, click the ellipsis button (...), to display a dialog. Use the Browse or Search tabs to find and select the relevant unit, and then click the **Select** button.



Note: If a unit group is selected, a waring is displayed to select a unit (as shown below).



- In the **Conversion Factor** parameter, type the factor.
- In the **Conversion Offset** parameter, type the offset.

For example: 1 Unit = Conversion Factor * Base Unit + Offset

A formula might look like one of the following:

1 week = 7.0 days + 0.0

1 cm = 0.01 m + 0.0

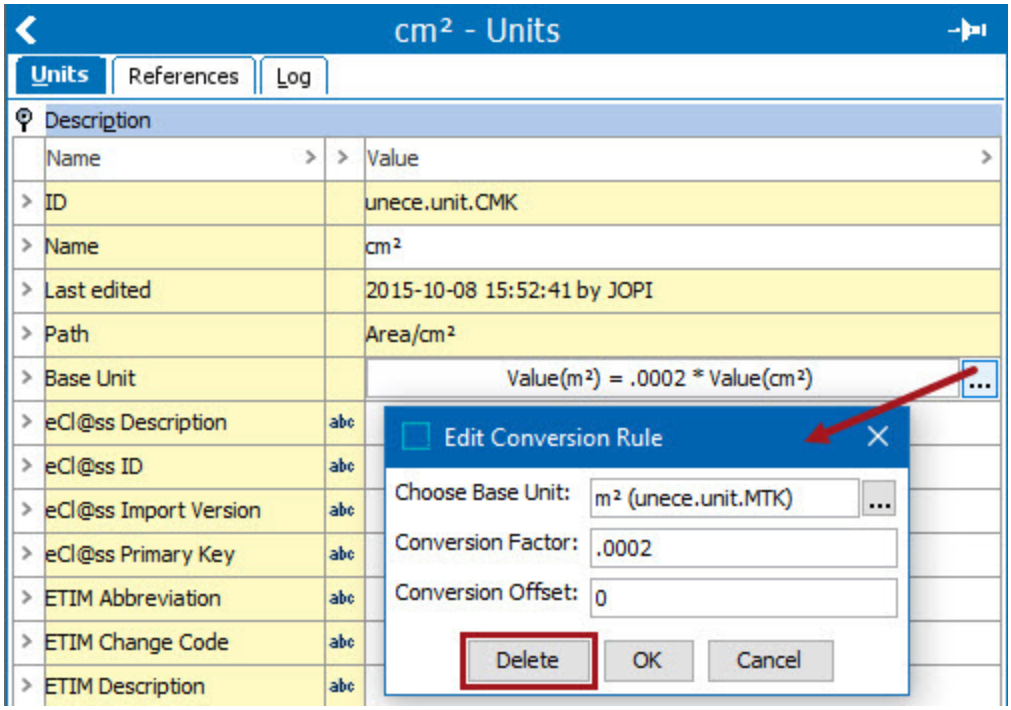
For more information, refer to the **Conversion Factor and Conversion Offset** section of the **Units** topic.

4. Click the **OK** button on the Edit Conversion Rule dialog to create the conversion rule between the two units displayed in the Base Unit field.

> **Important:** There can only be one Base Unit for each group. If one unit uses another unit as Base, it cannot be used as Base itself.

Deleting a Unit Conversion

1. Go to System Setup and click the Units node, expand the relevant unit group and click the relevant Base Unit where the conversion rule is to be removed.
2. On the Units tab of the units editor, click the ellipsis button (...) on the Base Unit parameter to display the Edit Conversion Rule dialog.



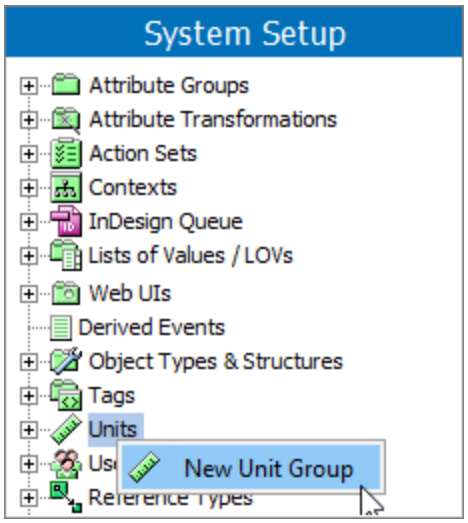
3. Click the **Delete** button. The conversion rule is removed.

Maintaining a Unit Group

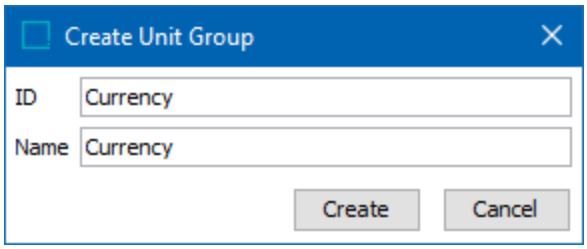
Unit groups can be created and deleted as necessary. Each maintenance option is defined below.

Creating a Unit Group

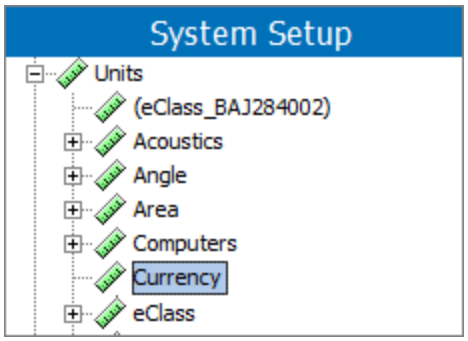
1. In System Setup, click the Units node, right-click the Units node, and then click the **New Unit Group** option.



2. In the Create Unit Group dialog:
   - Enter an **ID** for the new unit group.
   - Enter a **Name** for the new unit group.
   - Click the **Create** button.

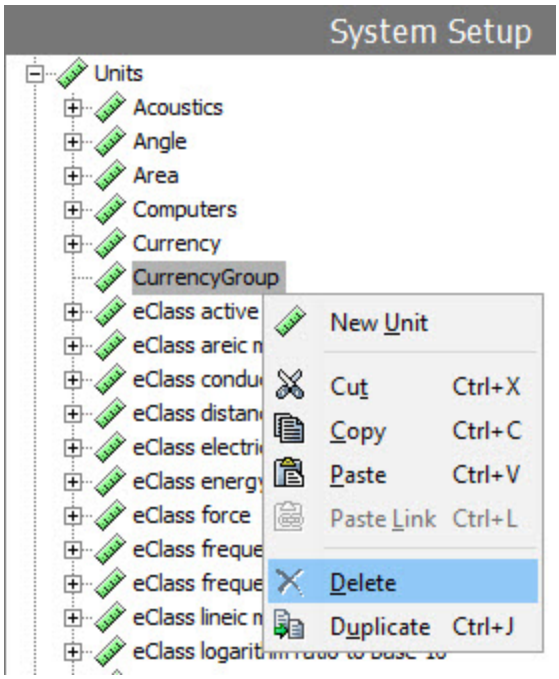


The newly created unit group displays in System Setup as shown below.

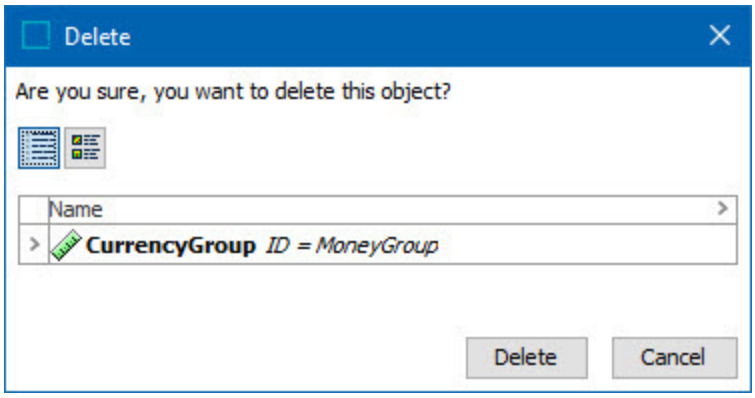


Deleting a Unit Group

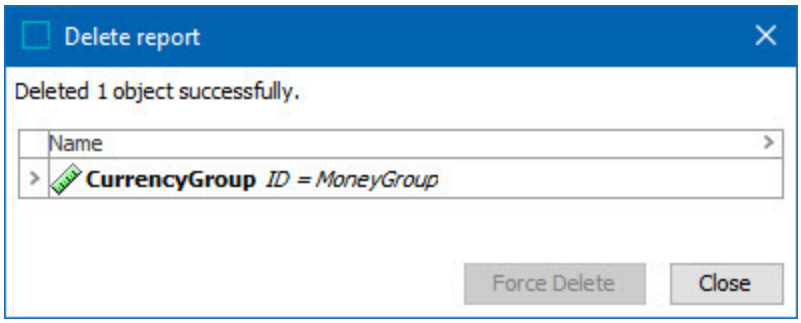
1. In System Setup, click the Units node, and click the units group to be deleted.
2. Verify no units exist within the group. To delete the exiting units, refer to the **Deleting a Unit** section of the **Maintaining a Unit** topic.
3. When no units are displayed for the group, right-click the unit node and click the **Delete** option.



4. On the Delete warning dialog, choose an action:
   - Click the Delete button to delete the unit group.
   - Click the Cancel button to return to the unit group editor.



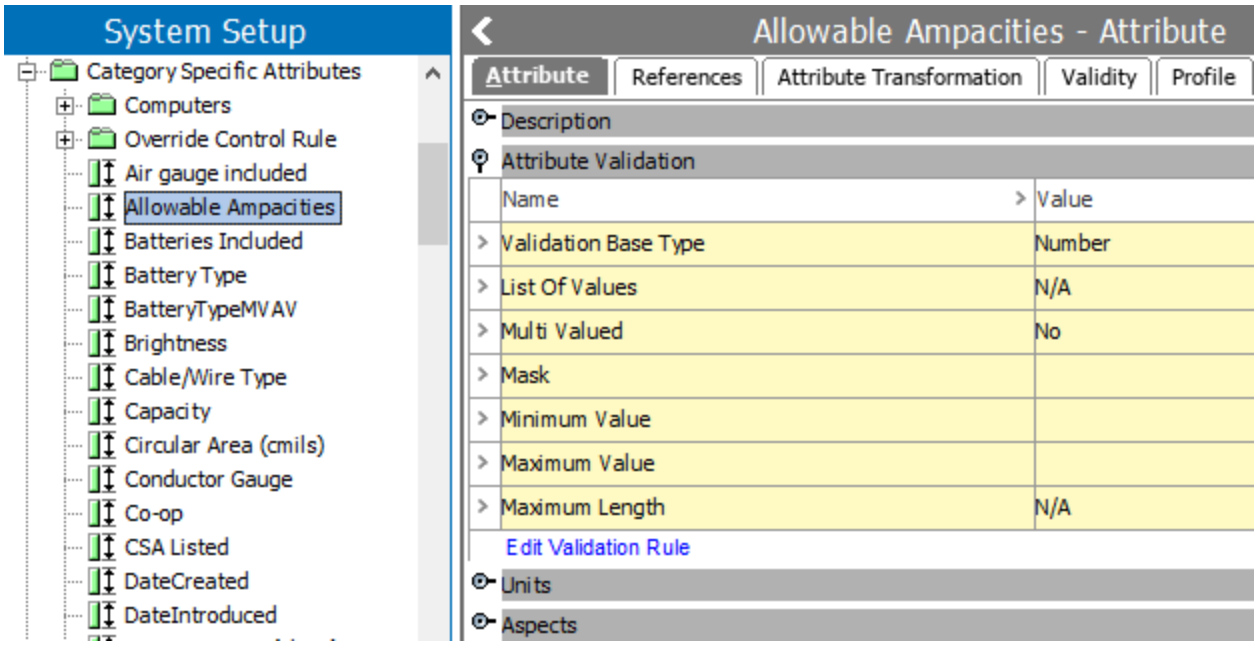
If the unit group was deleted, the confirmation dialog is displayed.



Validation Rules

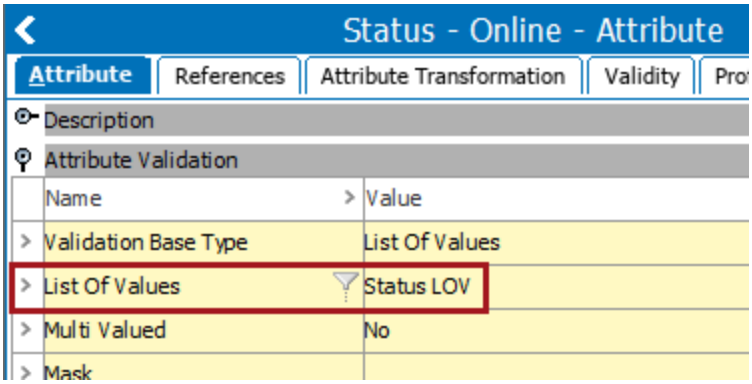
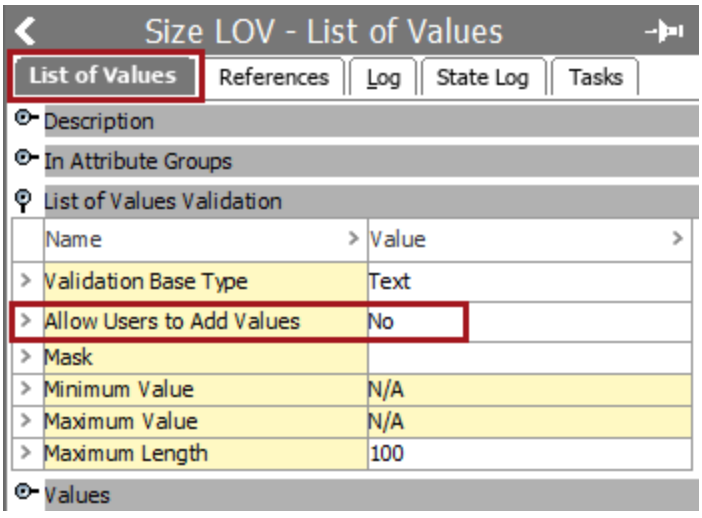
A validation rule defines the allowed content of a specific attribute or list of values and can include the following rule options.

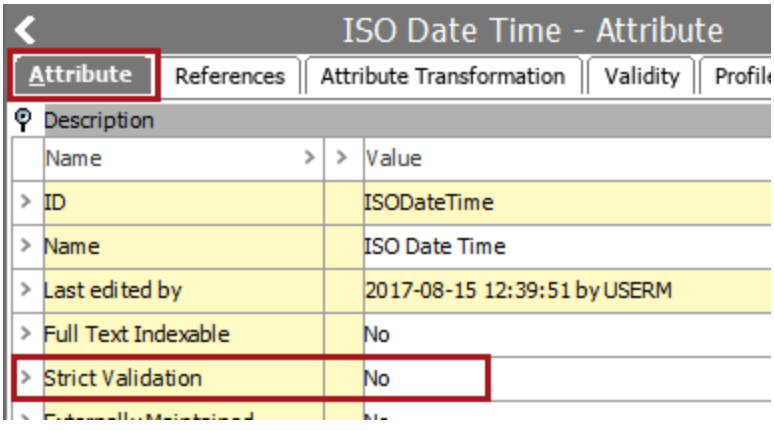
In System Setup, most validation rules are set for attributes under the Attribute Validation flipper and the available is based on the Validation Base Type selected.



Other rules are found under the Description flipper.

Validation Rule	Description
Validation Base Type	The basic data type, such as text, integer, number, date or List of Values (LOV). For more information, refer to the **Validation Base Type** topic. **Note:** Validation rule options change according to the selected Validation Base Type.
List of Values	If Validation Base Type is LOV, a reference to the actual LOV is shown. For more information, refer to the **List of Value (LOVs)** topic.

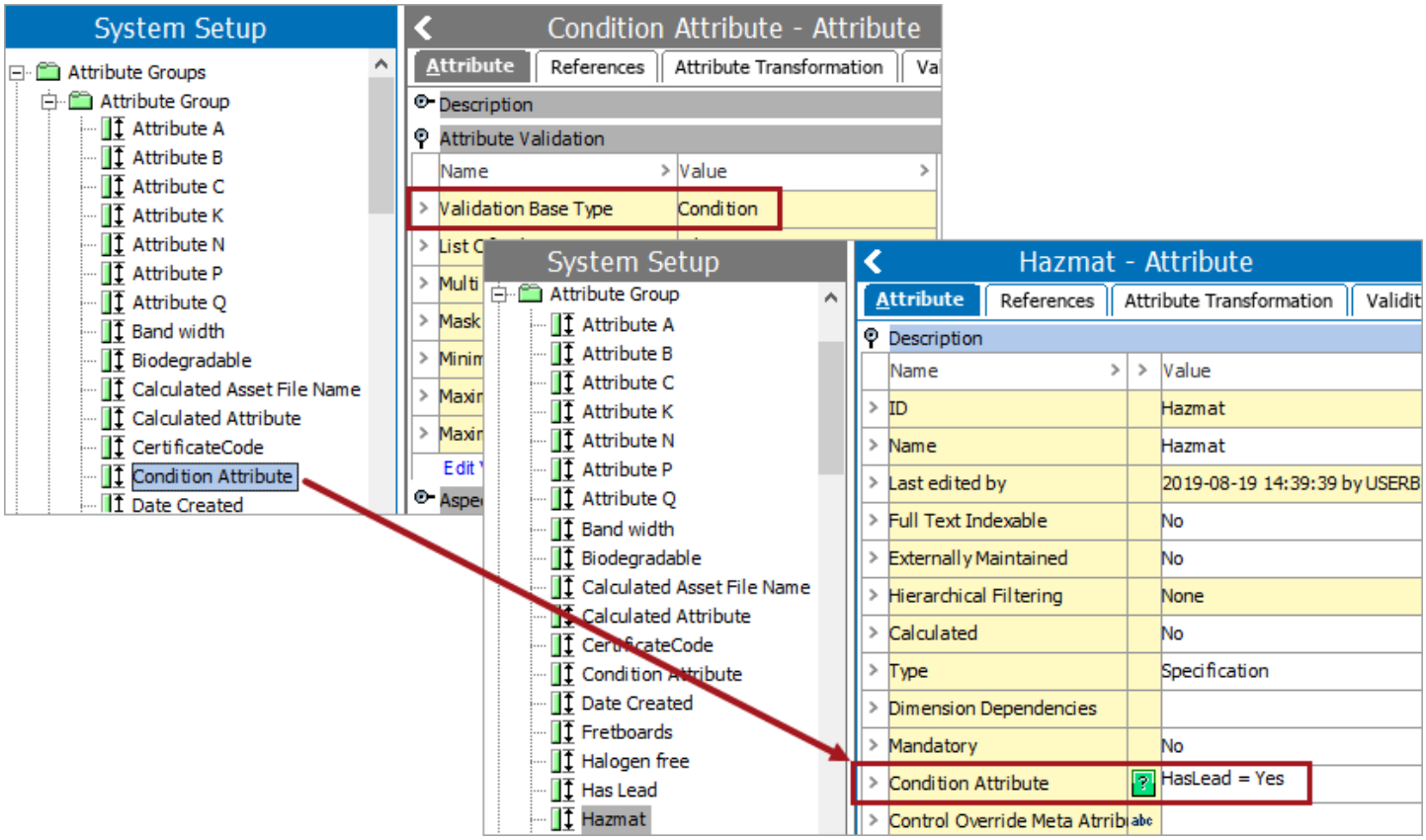
Validation Rule	Description
	
Multi Valued	For attributes only, multiple values on a single attribute are allowed / not allowed based on this parameter. While changing this setting is allowed on an existing attribute, it does require special handling: • For Oracle databases, this action requires single-update mode (SUM), as defined in the Single-Update Mode topic. • For Cassandra databases, this action uses Lock-free Schema Change (LFSC) functionality, as defined in the Lock-free Schema Change topic. For more information, refer to the **Single and Multi-valued Attributes** topic.
Allow Users to Add Values	For LOV object types only, values can be added by users outside of System Setup. 

Validation Rule	Description
Mask	An input mask defines the pattern of characters allowed when entering a value. **Note:** Do not make any entry for the Mask for attributes with the Base Validity of ISODATE or ISODATETIME. Those attributes have their own predefined internal Mask. Any Mask entry that you make will not only be redundant it will cause an error to be displayed when attempting to enter a date.
Minimum Value	E.g.; '5' means that the minimum numeric value is 5.
Maximum Value	E.g.; '7' means that the maximum numeric value is 7. Used with the Minimum example above, the value must be between 5 and 7.
Maximum Length	Only for text-based data. E.g., '20' means that a maximum of 20 characters is allowed. **Note:** The maximum length is validated including use of tags and inline reference tags. For example, if you style a text bold, then the characters in the style tags <bold> and </bold> are also counted toward the maximum length. For more information, refer to the **Tags** topic. **Note:** In Web UI, the text box and rich text editor on a Node Editor, as well as the inline editor and multi-value text attribute on a Node List, will display with a text editor count display to reflect the number of characters added to the field.
Strict Validation	For 'ISO Date' or 'ISO Date and Time' attributes and LOVs only, the Strict Validation setting is located on the Attribute tab under the Description flipper. 

Validation Rule	Description
	Setting this field to **Yes** ensures that only the industry standard formats of 'ISO Date' and 'ISO Date and Time' are accepted: YYYY-MM-DD for 'ISO Date' and YYYY-MM-DD HH:MM:SS for 'ISO Date and Time.' These are predefined internal Masks and do NOT require any entry in the Mask field. In fact it is important that the Mask entry is left blank. If Strict Validation is set to **No**, then the system will accept dates and times in non-standard ISO formats. This was only implemented for backward compatibility in older STEP systems and is not recommended for systems using STEP 6.0 and later. For these non-standard formats, searching is problematic and not consistent. Therefore, recommended practice is to *always* set Strict Validation to **Yes**. **Note:** In the workbench, if the user has a locale applied and the 'Localize dates' option (located on the User object in System Setup under System Settings > **PIM GUI Localization**) is set to 'Y,' then that user may *also* enter 'ISO Date' and 'ISO Date and Time' date values using the locale's format. Example: if an attribute has a validation of 'ISO Date' and the user's locale is set to 'English (United States) - en_US,' then a date may be entered either as '2025-06-13' or 'Jun 13, 2025', and an attribute with a validation of 'ISO Date and Time' may have an entry of '2025-03-27 18:30:30' or 'Mar 27, 2025 6:30:30 PM.' Both types of entry will be accepted in the workbench, and for either type of entry, the workbench display will show the value in the locale's format. But, the value stored in STEP will always be the ISO format. In addition, searching on dates using > or < or = will be consistent and accurate. If you have been using the Strict setting of **No** and you have entered dates that are not standard ISO Dates or Times, you can correct your entries to now conform to the ISO standard. By selecting 'Strict = **Yes**' the system checks if you have any non standard date / time entries and allows them to be auto-corrected. If you answer **Yes** the system launches a Background Process to remedy any and all non-ISO standard dates and times.

Validation Base Type

In the object editors, the validation base types are indicated by icons as shown below. For example, the description attribute 'Condition Attribute' has the 'Condition' validation base type. 'Condition Attribute' is valid on the 'Hazmat' attribute, and displaying that editor shows the condition icon ( ).



Validation Base Type	Icon	Description	Example
Condition		Allows applying conditions.	[AttributeID] = [Value1];[Value2]
Date		Allows a date to be entered according to a predefined input mask, indicating the valid pattern of the value. Since the mask is predefined, a Mask value is *not* entered within the Attribute	The mask is: DD-MON-YYYY.

Validation Base Type	Icon	Description	Example
		Validation settings. Units cannot be applied to 'Date' attributes. **Note:** This validation type has been superseded by the two validations of 'ISO Date' and 'ISO Date and Time'. Recommended practice is to use one of these newer validations and to *not* use the 'Date' validation. If you *do* use this validation, you cannot apply a locale to the value on data exports, and, in many cases, searching for objects by date values will be inconsistent and inaccurate.	A valid date is e.g., 15-JAN-2025
Embedded Number	12	Prefix, number, unit, and suffix are stored as separate entities. • **Required:** number Numbers can be searched on without regard for the surrounding text. • **Optional:** prefix, unit, and suffix (shown as '*none*' in the following list) In the examples: • Prefixes are '±', '≈', and '≤'. • Numbers are '2', '35', and '0.2'. • Units are 'g', '°C', *none*. • Suffixes are 'of protein', *none*, and '% THD'. The following calculated attribute functions can extract different pieces of the Embedded Number entry: • GETEMBEDDEDPREFIX(value) • GETEMBEDDEDVALUE(value) • GETEMBEDDEDSUFFIX(value) For more information, refer to the Calculated Attributes topic.	±2g of protein ≈35°C ≤0.2% THD
Fraction	3/4	Allows numbers including dash (-), slash (/), and decimal.	Valid values: 1/2, 1-1/2, 1.5

Validation Base Type	Icon	Description	Example
			Invalid value: 1 1/2
Fraction (No Decimal)	3/4	Allows numbers including dash (-) and slash (/) only.	Valid values: 1/2, 1-1/2 Invalid value: 1 1/2, 1.5
GLN	GLN	Validates the length and check digit of the thirteen digit GLN.	1111111111116
GTIN		Validates the lengths check digits for multiple GTIN types. For instance, if an attribute is valid for either an EAN-8 or an EAN-13, this attribute can be configured to validate against either of them. By default, the GTIN Validation Base Type will validate the GTIN-8, 12, 13 and 14 digit numbers. If the requirement is to validate only the GTIN-8 and 13 digit numbers and not the GTIN-12 and 14 digit numbers, an input mask will have to be set so that 12 and 14 digit number are not accepted. For more information refer to the Input Masks section.	22222220 or 4444444444444
GTIN-8	G8	Validates the length and check digit of the eight digit GTIN.	22222220
GTIN-12	G12	Validates the length and check digit of the twelve digit GTIN.	333333333331
GTIN-13	G13	Validates the length and check digit of the thirteen digit GTIN.	4444444444444
GTIN-14	G14	Validates the length and check digit of the fourteen digit GTIN.	55555555555555
Integer	123	Allows only whole numbers.	Valid values: 5, 26, 199, and -23. Invalid values: .250, 67.34, and 50 1/2
ISO Date	31	Allows a date to be entered according to an internally predefined input mask, indicating the valid pattern of the value. Since the	The mask is:

Validation Base Type	Icon	Description	Example
		mask is predefined, a Mask value must *not* be entered within the Attribute Validation settings. Units cannot be applied to 'ISO Date' attributes. **Note:** It is strongly recommended to set Strict Validation to **Y** on any attribute that is 'ISO Date' validated. For more information, refer to the explanation of 'Strict Setting' in the Validation Rules topic. For workbench users with an assigned locale and a setting of 'Y' for 'Localize dates,' values may be entered not only in the ISO format but also by the locale's format. Both types of entry will be accepted, and for either type of entry, the workbench display will show the value in the locale's format, but the value stored in STEP will always be the ISO format.	YYYY-MM-DD A valid date is e.g., 2025-01-15
ISO Date and Time		Allows a date and time to be entered according to the internally predefined input mask, indicating the valid pattern of the value. Since the mask is predefined, a Mask value must not entered within the Attribute Validation settings. Units cannot be applied to 'ISO Date and Time' attributes. **Note:** It is strongly recommended to set Strict Validation to **Y** on any attribute that is 'ISO Date and Time' validated. For more information, refer to the explanation of 'Strict Setting' in the Validation Rules topic.	The mask is: YYYY-MM-DD HH24:MI:SS A valid date is e.g., 2025-01-15 12:15:40
LOV		LOV must be selected containing the valid values. Units cannot be applied to 'LOV' attributes.	An LOV (List Of Values) will contain the valid values of an attribute, e.g., • Red • Green • Blue
Number		Allows any numeric characters.	Valid values: -15, -

Validation Base Type	Icon	Description	Example
			24, 78, 1, .34, and 384.5. Invalid values: Fractions such as 50 1/2
Number Range	1-23	Allows a range of numbers, separated by a dash (-). First value must be less than or equal to second value.	Valid values: 1.2-3.6, 100-100, 5-7 Invalid values: 7-5, 76
Numeric Text	12a	All characters (numeric and alpha) are valid. It is also possible to link a Unit. The numeric text validation base type should be used for numerical data that may at times have non-numerical values. Refer to the cell to the right for examples. **Web UI users and those using the setSimpleValue() method in the business rules API:** If using units and a user types a value in the field that matches a unit, but the user omits typing an explicit unit, then the text in the field becomes the value and the unit becomes null. If the attribute has a default unit, that unit is appended even if it matches the value string. The only exception to this behavior is if the text ends with a digit followed by a matching unit, e.g., '5m.' Examples to explain the concept described above are shown below (with 'm' being a valid unit and 'cm' being the default unit): • '5' becomes '5 cm' (value: '5', unit: 'cm') • '5m' becomes '5 m' (value: '5', unit: 'm') • '5 m' becomes '5 m' (value: '5', unit: 'm') • 'medium' becomes 'medium cm' (value: 'medium', unit: 'cm') • 'medium m' becomes 'medium m' (value: 'medium', unit: 'm') • 'm' becomes 'm cm' (value: 'm', unit: 'cm') • 'cm' becomes 'cm cm' (value: 'cm', unit: 'cm')	Valid values: • 14 mm • 269 • N/A

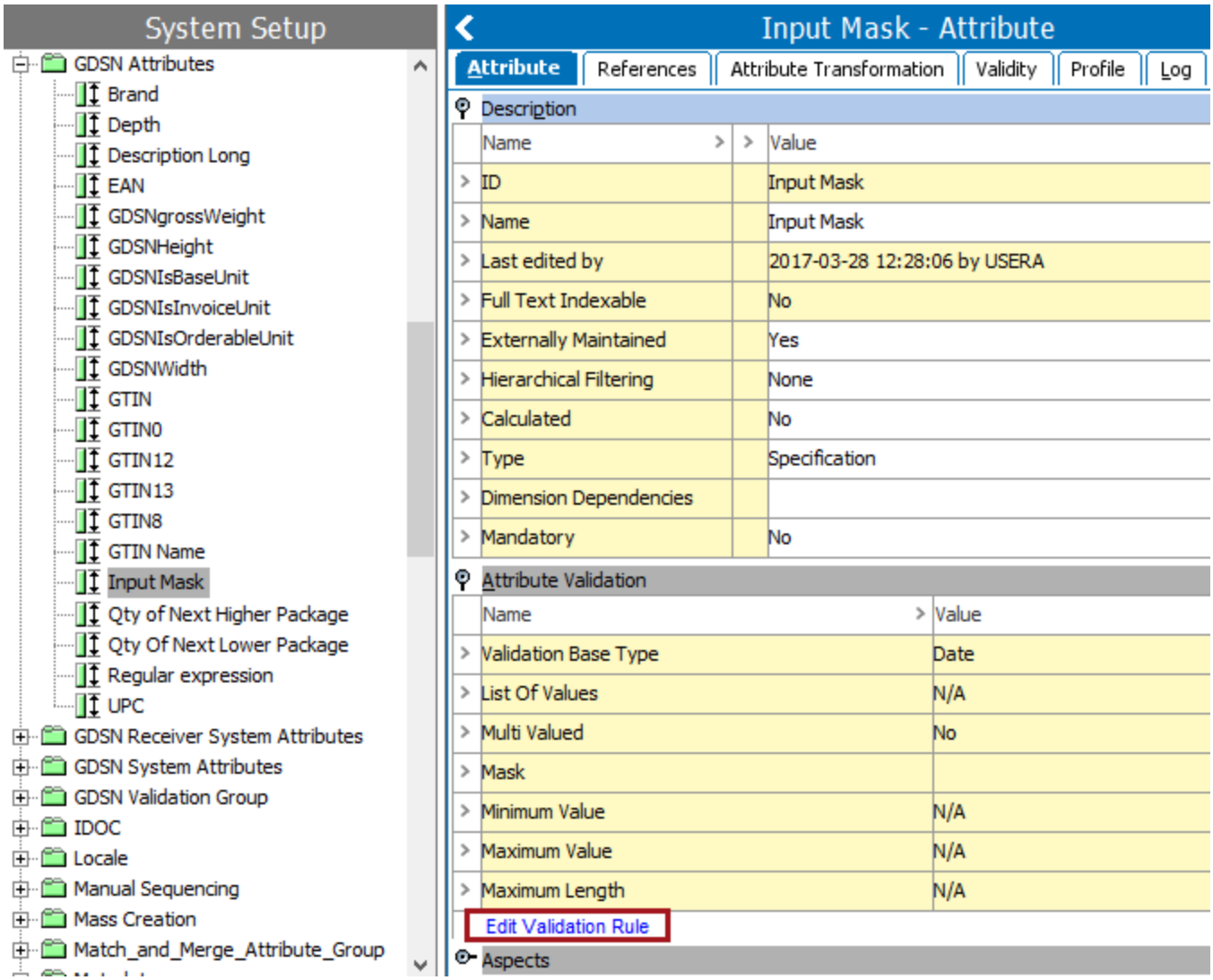
Validation Base Type	Icon	Description	Example
Numeric Text (exclude tags)	12a	This functions like the Numeric Text validation base type, except style tags are excluded from character counts. Additional tag exclusions are as follows: • Character tags, such as less than (<lt/>) or greater than (<gt/>), are counted as 1 character. • Footnote tags and footnote content are counted as 1 character. • Inline references are counted as 0. • Hyperlink tags are counted as 0, but hyperlink text is included in the character count. For example, the phrase 'This is **important** information' contains 29 characters on output, which is acceptable for an attribute with a maximum length of 30 that uses the Numeric Text (exclude tags) validation base type. However, if using the Numeric Text validation base type (refer to the row directly above), the character count would be 42, since the value is stored in STEP as 'This is <bold>important</bold> information', with the bold style tags expanding the character count to 42. This example applies to character tags as well.	
Regular Expression	RE	Allows for the applying of regular expressions as a validation base type. For more information, refer to the Regular Expression topic in Resource Materials online help documentation. Regular expressions used as validation base type can be stored as a Validation Template, allowing you to create an expression once and then apply it to multiple attributes by selecting the template from the Validation Base Type dropdown. For more information, refer to the Validation Templates topic.	[a-z]{3} ([0-9]{3})
Text	abc	All characters (numeric and alpha) are valid. Units cannot be applied to 'Text' attributes.	
Text (exclude tags)	abc	This functions like the Text validation base type except style tags are excluded from character counts. Additional tag exclusions are as follows:	

Validation Base Type	Icon	Description	Example
		• Character tags, such as less than (<lt/>) or greater than (<gt/>), are counted as 1 character. • Footnote tags and footnote content are counted as 1 character. • Inline references are counted as 0. • Hyperlink tags are counted as 0, but hyperlink text is included in the character count. For example, the phrase 'This is **important** information' contains 29 characters on output, which is acceptable for an attribute with a maximum length of 30 that uses the Text (exclude tags) validation base type. However, if using the Text validation base type (refer to the row directly above), the character count would be 42, since the value is stored in STEP as 'This is <bold>important</bold> information', with the bold style tags expanding the character count to 42. This example applies to character tags as well.	
URL	URL	Allows applying a URL.	**Valid** http://www.stibo.com https://www.stibo.com http://stibo.com **Invalid** www.stibo.com stibo.com
Validation Templates	RE	The standard validations that are available when creating a new attribute (Text, Number, Integer, etc.) may be augmented by adding new validations based on Regular Expressions. For more information about creating Validation Templates, refer to the Validation Templates topic.	

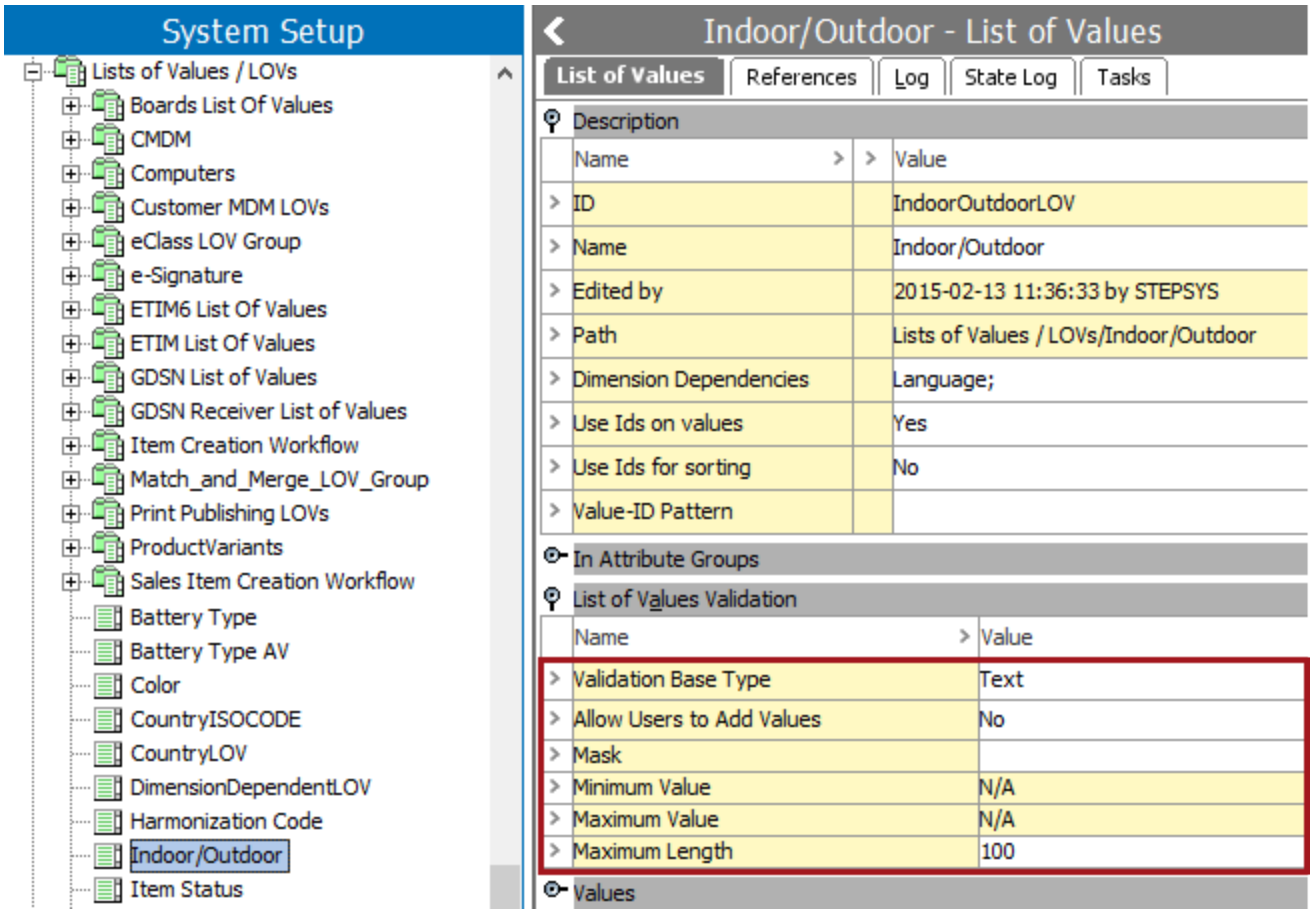
Editing Validation Rules

Validation rules for Attributes and List of Values (LOVs) are changed in System Setup.

For an attribute, open the Attribute Editor and use the 'Edit Validation Rule' link on the Attribute tab.



For a List of Values / LOVs, edit directly on the List of Values tab.



Sometimes it is necessary to edit the validation rule for an Attribute or List of Values. For instance, a change of validation rules may be necessary when two or more Attributes or Lists of Values are merged into one. Prior to merging, it would be necessary for the Attribute or Lists of Values to share the same validation rules. The validation rules are explained in the **Validation Rules** section. This section is used to describe some of the limitations encountered when changing validation rules; specifically the 'Validation Base Type'.

Attributes and LOVs with Values

If the attribute being changed has values, it can only be changed to a validation rule. For instance, it may be possible to change the Validation Base Type from 'Date' to 'ISO Date' but you would not be able to change 'Text' to 'Date' if text values were being used.

For a non-LOV attribute, the following changes are allowed, although some restrictions apply as noted below:

- Text can be changed to Numeric Text or Numeric Text (exclude tags)
- Text (exclude tags) can be changed to Numeric Text or Numeric Text (exclude tags)
- Text and Text (exclude tags) can be changed to 'ISO Date' or 'ISO Date and Time' only if all current values conform to the 'ISO Date' or 'ISO Date and Time' format
- 'ISO Date' or 'ISO Date and Time' can be changed to Text or Text (exclude tags)

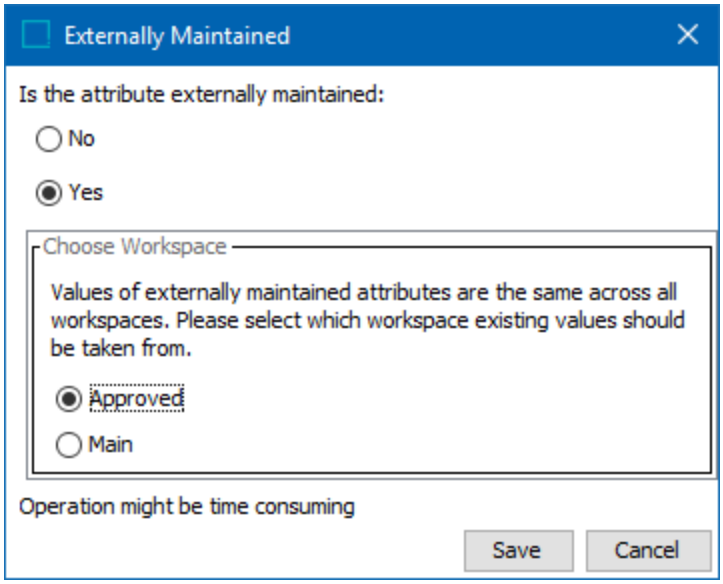
- Number or Integer can be changed to Text or Text (exclude tags) only if no units are involved
- Number or Integer can be changed to Numeric Text or Numeric Text (exclude tags)
- Fraction can be changed to Text or Text (exclude tags) only if no units are involved
- Fraction can be changed to Numeric Text or Numeric Text (exclude tags)
- Integer can be changed to Number

For a non-LOV attribute, the following changes are not allowed if the attribute already has values:

- 'ISO Date' cannot be changed to 'ISO Date and Time' when values already exist
- 'ISO Date and Time' cannot be changed to 'ISO Date' when values already exist
- Any validation base type with units cannot be changed to Text or Text (exclude tags) if the attribute already has values
- Fraction cannot be changed to Number if any fractional value has a hyphen (-) or slash (/)

Workspace Values

Sometimes the Validation Base Type cannot be changed on an attribute that is not Externally Maintained due to values being different across multiple workspaces. This can be overcome by changing the attribute to **Externally Maintained** and choosing which workspace the existing values should be taken from as shown in the image below. It can even be changed back to not Externally Maintained but it is important to note that in doing so, all of the revision history will be lost.



Custom Validation Error Messages

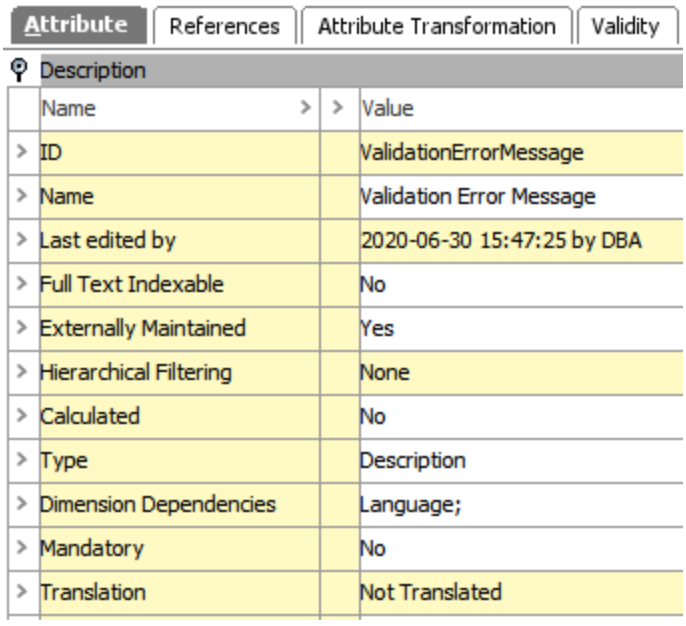
You can write your own error messaging for attribute validation errors. Creating clear error messaging provides a way for data stewards and various managers (e.g., brand, product, channel) to understand their errors and correct them immediately.

For example, writing a custom message for a Regular Expression (RegEx) validation that says 'Values must be a capital letter followed by a number, e.g., A7.,' is clear and concise compared to a system-generated message that says '[Blue] does not fit the regular expression "[A-Z]\d".'

Note: User-defined messages are optional. If a custom error message is not supplied, the existing system messages will still be shown. These error messages will display if there are errors when validating attributes in Web UI (shown above), workbench, Smartsheets, and upon import.

An attribute named 'Validation Error Message' exists on your system upon installation and is housed within your systems' Metadata attribute group in System Setup and is added to all attributes by default.

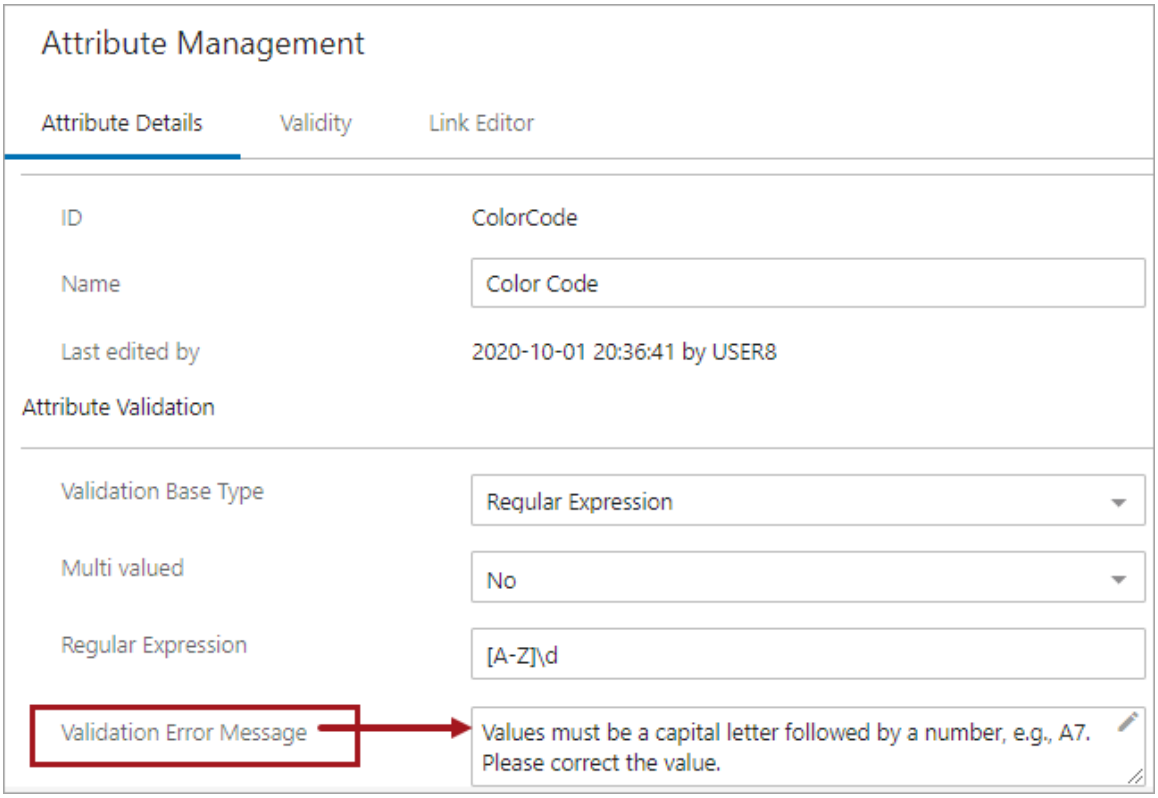
- If an attribute with the same ID (ValidationErrorMessage) already exists on a system before upgrading to 10.1 (and higher) versions, the existing attribute will not be changed nor will further configuration take place.
- If a Metadata attribute group already exists within another group, it will appear in that group even if within another higher-level group.
- If the Validation Error Message attribute is ever removed, it can be added back and set up as a metadata attribute again by following the directions that are found in the **Attribute Metadata on Attributes** topic.



Setting Up a Custom Validation Error Message

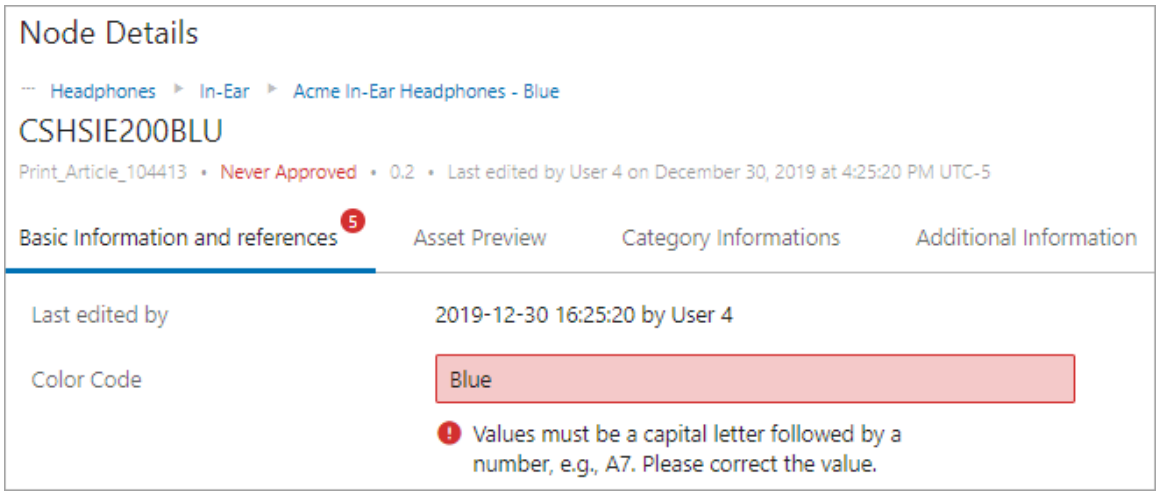
Define your custom error message within the metadata attribute field for the designated attribute.

- If using workbench, use the Attribute Editor.
- If using Web UI, define the message within the Attribute Management screen for the specific attribute (shown below). Save changes.



Using the Custom Validation Error Message

When you enter an attribute value and click out of the value field, if the attribute validation fails, then the custom error will display. Continuing with the example from above, refer to the error for an invalid Color Code below.



Considerations and Limitations

- As described above in the 'Setting Up the Validation Error Message' section, the validation errors are context specific and have nothing to do with locale.
- User-defined error messages are not present in the Map Data step of the Import Manager. Validation is done upon import and reported in the execution report.
- An execution report will always present the validation error messages from an XML-pointed import context and in cases where importing multi-context values.

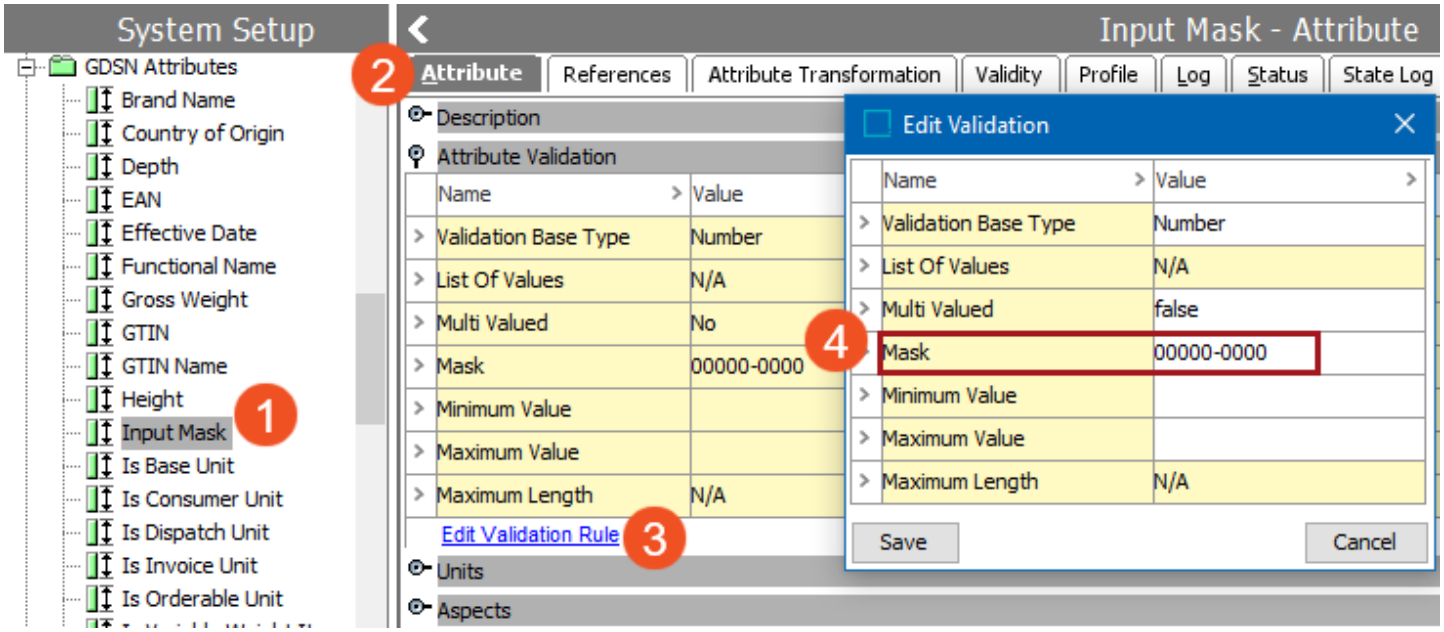
Input Masks

Input masks provide a set format for data entry in an attribute or list of values by using characters and symbols. When you apply an input mask to a field, anyone who inputs data in that field must follow the specific pattern defined by the input mask.

Input masks are a part of the Validation rules that are set in **Attributes** and **List of Values** in the System Setup.

Note that for attributes or LOVs with the Base Validity of ISO date and ISO Date and Time you should not enter any Input Mask at all. In fact you will encounter errors if you do enter a Mask and subsequently attempt to enter a Date or Date / Time value for an attribute.

1. Create attribute or LOV.
2. Select the Attribute or List of Values tab.
3. Click on the **Edit Validation Rule** link.
4. Edit the **Mask**.



Example Input Mask Use Cases

Example	Description
An attribute contains values for the 5+4 U.S. zip codes.	A pattern could be set that would require entering: • 00000-0000

Example	Description
	The valid value for this attribute would have to be patterned as 12345-1234. Any other pattern, such as 123-1234 or 12345 would result in an error message appearing and the entry would not be accepted.
A LOV for an attribute contains values for a unique color code. Examples: BK (01) RD (02) Y (03) GR (04)	The requirement for this LOV input mask are: • The first character must contain an alpha character. • There may or may not be a second alpha character. • A space must exist between the letters and the numbers. • There must be two corresponding numerical characters and they must be enclosed in parenthesis. Thus the input mask would look something like this: L? (00)
A GTIN attribute needs to be configured to allow for more than one type of GTIN.	An example might be to allow for the EAN-8 or the EAN-13 to be entered. An example for this would be: 00000000|0000000000000 This mask would allow for an eight digit or a 13 digit number to be entered. The PIPE symbol (|) is added after the eighth character to indicate the 'OR' operator for the mask.

Definitions of Input Mask Characters

The following table lists the different restrictions that may be imposed on a value through the use of an input mask. Remember, this list focuses on each of the values for an input mask. They can be combined to create a combination of patterns for an attribute or LOV.

Mask	Description	Input Mask Example
9	The corresponding character must be numeric, (0-9), a space, or an empty value.	Input Mask: 99999 Valid values: 1, 12345, 12 45 Invalid values: 12-45, A45, +23
#	The corresponding character must be one from the following set: {0, 1, 2, 3, 4, 5, 6, 7, 8, 9, <space>, -, +}	Input Mask: ##### Valid values: 12345, -23 5, 1234+

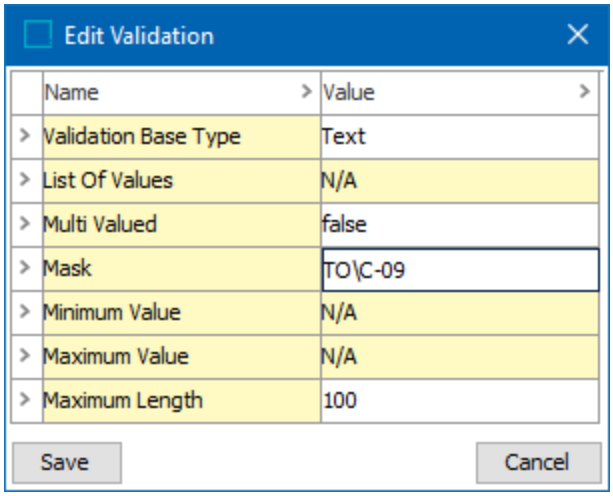
Mask	Description	Input Mask Example
		Invalid values: AA 45, 123#5
?	The corresponding character must be an alphabetic letter up to the length of the mask. Empty values are OK at the end of the entry but no spaces otherwise.	Input Mask: ????? Valid values: ABCDE, AbCd, a Invalid values: AB12, A+, AB DE
a	The corresponding character may be either alpha or numeric but no special characters. Empty values are OK at the end of the entry but no spaces otherwise.	Input Mask: aaaaa Valid values: aB123, 1234, ab1 Invalid values: AB 12, +GT
C	This will allow any character in the corresponding position, including spaces and empty values at the end of the entry.	Input mask: CCCCC Valid values: ABC, ab 12, 1, +45, 23% Invalid values: 123456 as the last digit exceeds the limit of the mask.
&	This will allow any character in the corresponding position, including spaces but no empty values at the end of the entry.	Input mask: &&&&& Valid values: 123ab, 12 AB, -1Xy% Invalid values: 123, abcd
L	The corresponding character must be an alphabetic letter up to the length of the mask. No spaces or empty values at the end of the entry are permitted.	Input mask: LLLLL Valid values: ABcDE, ABCDE, abcde Invalid values: ABC, AB123, +abcd
A	The corresponding character may be either alpha or numeric but no special characters or spaces and no empty values at the end of the entry.	Input mask: AAAAA Valid values: abcde, a1b2c, 12345 Invalid values: B1, ab de, 45%
0	The corresponding character must be numeric, (0-9), with no spaces or empty values.	Input mask: 00000 Valid values: 12345 Invalid values: 12, 12 34, 12abc

Static Mask Characters

If other characters are typed into the mask besides the ones mentioned above, then the value must match that character exactly and it cannot be omitted.

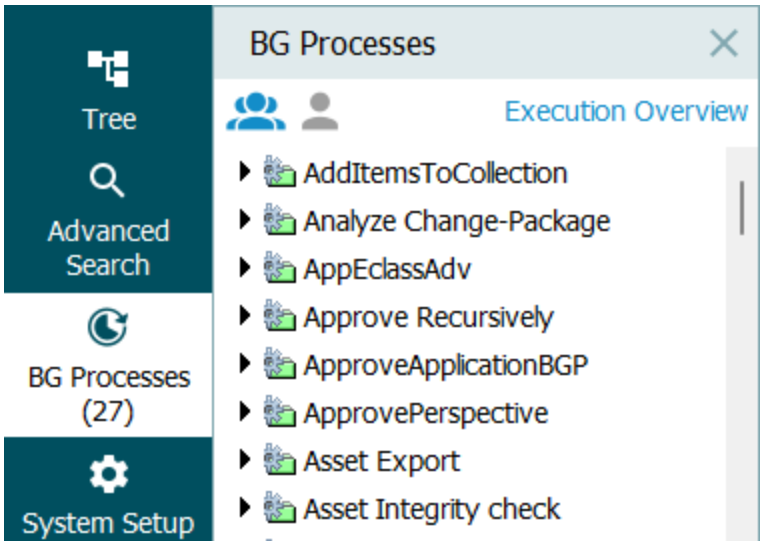
For example, in reference to the mask 'T-99', the 'T' and the '-' are always required to be entered but the '99' are masks for optional number per the definition in the table above. This means that the values T-1 and T-12 would be valid values but the values R-12 or T=1 would not be valid values.

If the static mask requires the usage of one of the mask characters mentioned in the mask character table above, it is possible to release or 'escape' the character rules by typing a '\' in front of the character. For example, if you wanted a static mask like 'TOC-09' meaning a static prefix of 'TOC-' followed by a required number '0' followed by an optional number '9', the 'C' would allow any character to be entered under the mask rules for 'C'. However, by entering the'\' in front of the 'C' as shown in the image below, the 'C' no longer follows the mask rules and would require the 'C' be entered as a valid value.



Background Processes and Queues

Background processes (BGPs) use one or more queues to run system actions in the ‘background’ while allowing users to continue working in the user interface. Background processes are executed based on the selected BGP execution mechanism.



BGP Execution Management

The available BGP execution management mechanisms are defined in the BGP Execution Management topic.

Tracking BGPs

All BGP execution mechanisms allow most standard background processes to be tracked on the BG Processes tab in workbench, as defined in the BG Processes Tab topic in the Getting Started documentation.

For information on initiating and monitoring BGPs in Web UI, refer to the Background Process List Screen topic in the Web User Interfaces documentation.

BGPs for inbound integration endpoints (IIEPs), outbound integration endpoints (OIEPs), and event processors (EPs) are tracked on a Background Processes tab within the specific endpoint or processor. For more information, refer to the appropriate section of the Data Exchange topic in the Data Exchange documentation or the Event Processors topic in the System Setup documentation.

Scheduling BGPs

All BGP execution mechanisms allow a BGP to be scheduled, as defined in the Scheduling a Background Process topic.

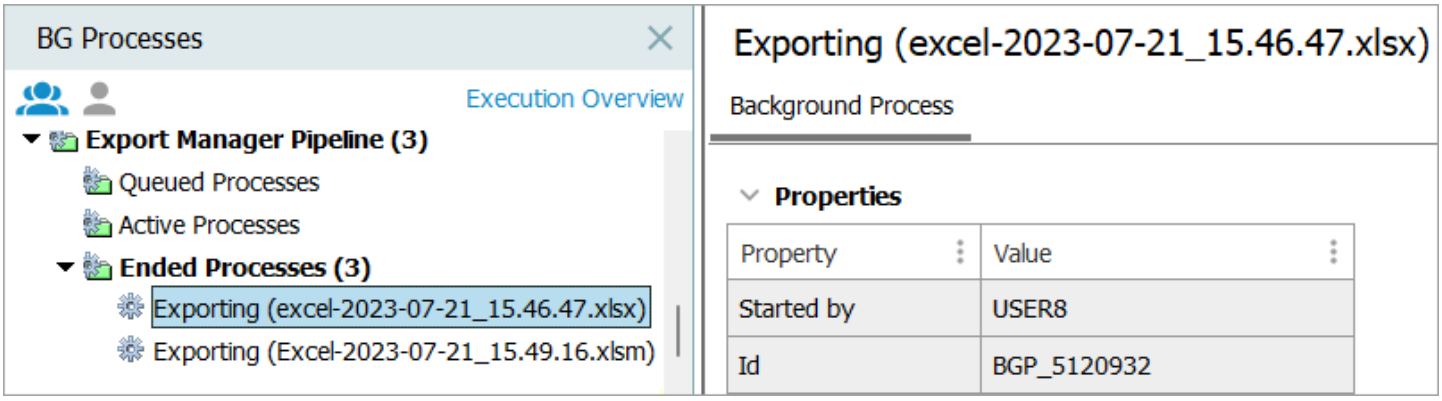
Managing BGP Data

All BGP execution mechanisms benefit from reducing the amount of unnecessary BGP data, as defined in the Managing BGP Data topic.

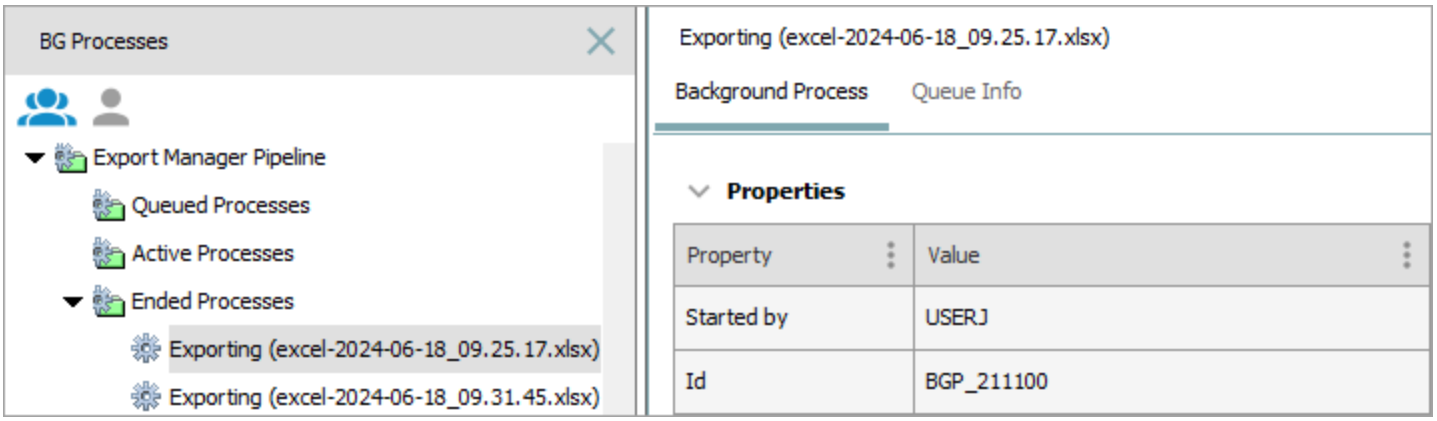
BGP Execution Management

The available BGP execution mechanisms are:

- 'One Queue' is the recommended mechanism which implements a priority parameter for BGPs and prioritizes the order in which background processes are handled. Waiting BGPs are prioritized for execution based on creation time and the priority setting. For details, refer to the BGP One Queue topic.



- 'Multiple Queues' is the default legacy mechanism which uses specified queues for background processes. For details, refer to the BGP Multiple Queues topic.



Note: Deleting a user who is responsible for a BGP will result in errors. For more information, refer to the Working with Users topic.

BGP One Queue

The recommended BGP execution mechanism is 'One Queue' and implements a priority parameter for BGPs and prioritizes the order in which background processes are handled. Waiting BGPs are prioritized for execution based on creation time and a priority setting. 'One Queue' is used when the `BackgroundProcess.Scheduler.PluginID` configuration property is set as `OneQueueBGPScheduler`.

Important: Before applying 'One Queue' to a production environment, first apply and thoroughly test the background process execution mechanism on lower-level environments.

The following sections define the functionality available when using 'One Queue':

- Priority Mechanism
- Background Process Execution Overview
- Priority Parameter Setting
- Parallel Processes

Priority Mechanism

When using the 'One Queue' background process execution mechanism, priority is set for event processors (EPs), outbound integration endpoints (OIEPs), and inbound integration endpoints (IIEPs). The number of workers on a STEP environment determines how many BGPs can run in parallel, and if a newly created BGP is allowed to start. This mechanism selects BGPs to start across all BGPs waiting to be executed. For integration endpoints (IEPs), the configurable priority is for the 'worker' BGPs started by the endpoints.

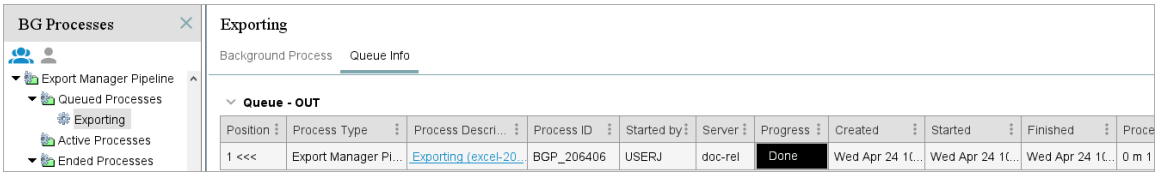
Each application server / node has a fixed number of 'BGP workers' available for processing BGPs. The number of available BGP workers is set automatically, depending on the environment size. Individual application servers / nodes poll the list of waiting BGPs with regular intervals and start as many processes as capacity allows (via available BGP workers, and if sufficient heap memory is available). The waiting BGPs are prioritized for execution first based on priority and then on creation time ('Start at' for scheduled EP BGPs).

Poller processes for IEPs and BGP scheduler processes (BGP type 'Schedule') bypass the prioritization and are always allowed to run.

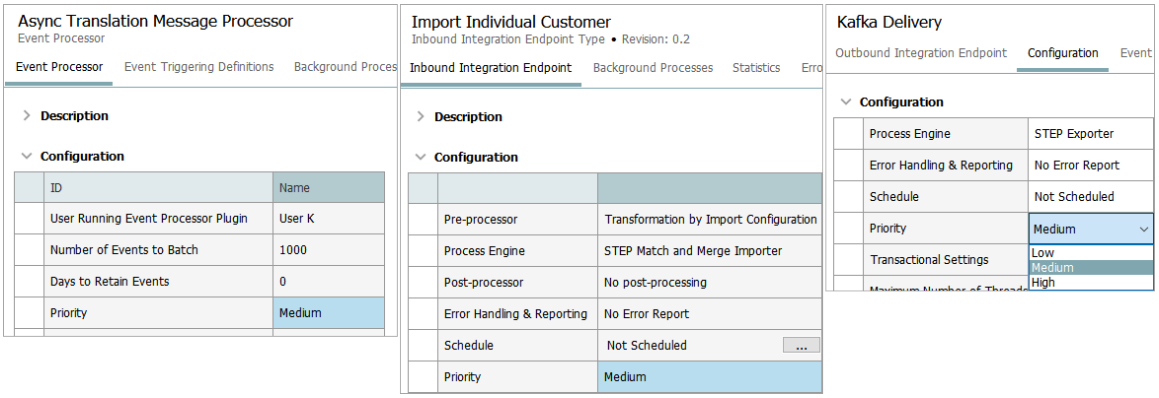
Note: New 'One Queue' background processes can only start when there is adequate heap memory. By default, at least 10 percent of the total amount of heap memory on an environment must be available to start a new background process. When 20 percent of the total amount of heap memory is free, new BGPs are started without restraint.

When the 'One Queue' mechanism is enabled:

- BGPs assigned to queues and the degree of parallelism for the queues on existing configurations are ignored. Refer to the Parallel Processes section below for more information.
- Queues cannot be specified for IEPs and EPs.
- The 'Queue Info' BGP editor tab is not displayed. It is only available on systems using the legacy setting.

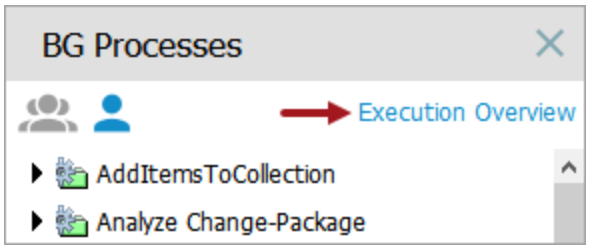


- Background process priority is displayed on the Configuration section of EPs and IEPs. Priority can be set via the 'Edit Configuration' link (which opens the wizard) for EPs and IIEPs and for OIEPs set the priority directly in the editor via a dropdown.

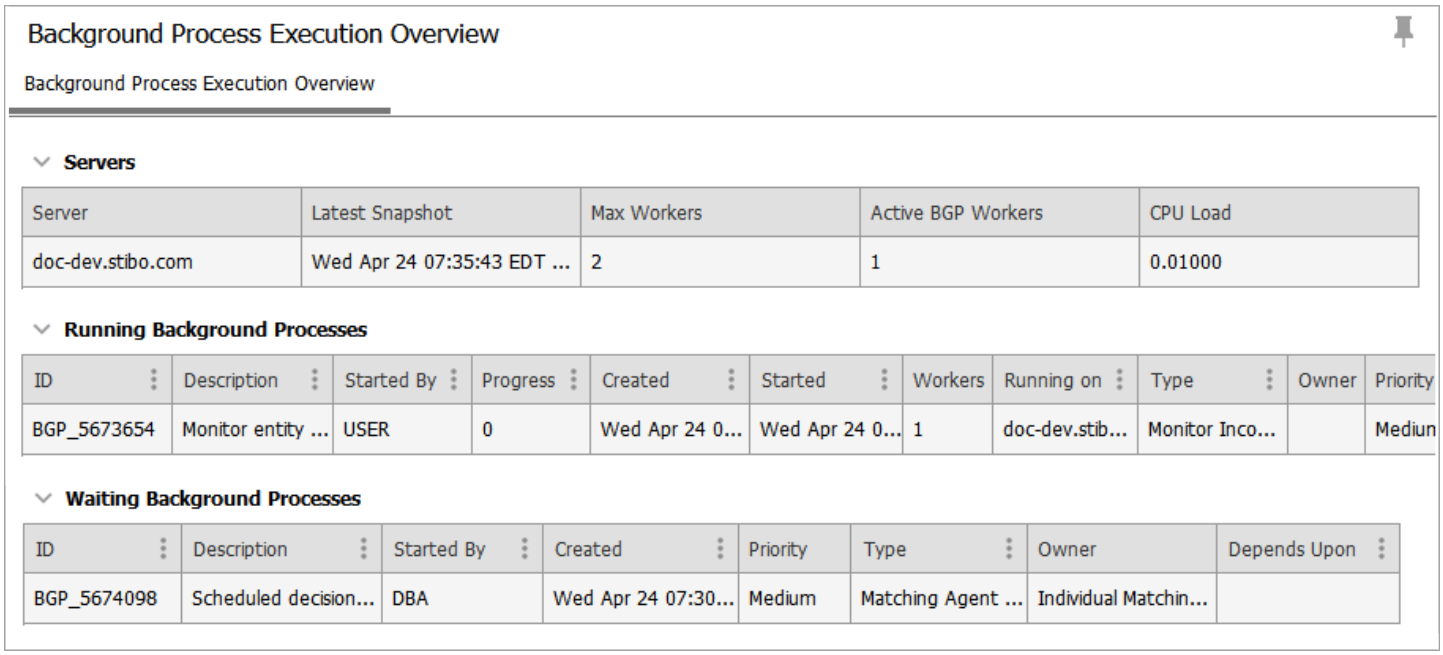


Background Process Execution Overview

Admin users with the 'View Background Processes of Other Users' setup action can monitor the execution of background processes via the 'Execution Overview' link available on the BG Processes tab in workbench.



The 'Background Process Execution Overview' includes sections for Servers, Running Background Processes, and Waiting Background Processes.



Note: The overview is not automatically updated. To refresh the data, click the general workbench 'Force Reload' button ( ) or click the 'Execution Overview' link again.

Servers

The Servers section of the Background Process Execution Overview includes the application servers / nodes that are available (which can be multiple in a clustered setup) with details about the total number of BGP workers ('Max Workers'), the number of active BGP workers, and the CPU load. Application server / node details are not refreshed when the execution overview is refreshed, instead, the timestamp in the Latest Snapshot column indicates when the data was collected.

Running Background Processes

The Running Background Processes section shows the BGPs currently being executed by STEP. The following is a list of the columns associated with Running Background Processes:

- ID – The ID of the BGP with a link displayed when hovering.
- Description – The BGP Description with a link displayed when hovering.
- Started By – ID of the STEP user who started the BGP.
- Progress – BGP Progress.
- Created – Time that the BGP was created. For scheduled EP BGPs, this shows the 'Start at' time.
- Started – Time that the BGP was started.

- Workers – The number of BGP workers used for executing the BGP. This can be more than one for BGPs using the parallel execution / multithreading framework. Refer to the Parallel Processes section below for more information.
- Running on – The application server executing the BGP.
- Type – The background process type.
- Owner – The IIEP, OIEP, EP, or setup entity that created the BGP.
- Priority – The priority of the BGP.

Waiting Background Processes

The Waiting Background Processes section shows the BGPs waiting to be executed. The columns shown are:

- ID – The ID of the BGP with a link displayed when hovering.
- Description – The BGP Description with a link displayed when hovering.
- Started By – ID of the STEP user who started the BGP.
- Created – Time that the BGP was created. For scheduled EP BGPs, this shows the 'Start at' time.
- Priority – The priority of the BGP.
- Type – The background process type.
- Owner – The IIEP, OIEP, EP, or setup entity that created the BGP.
- Depends Upon – IDs of BGPs that potentially block the execution when the BGP depends on other BGPs to complete before they can start.

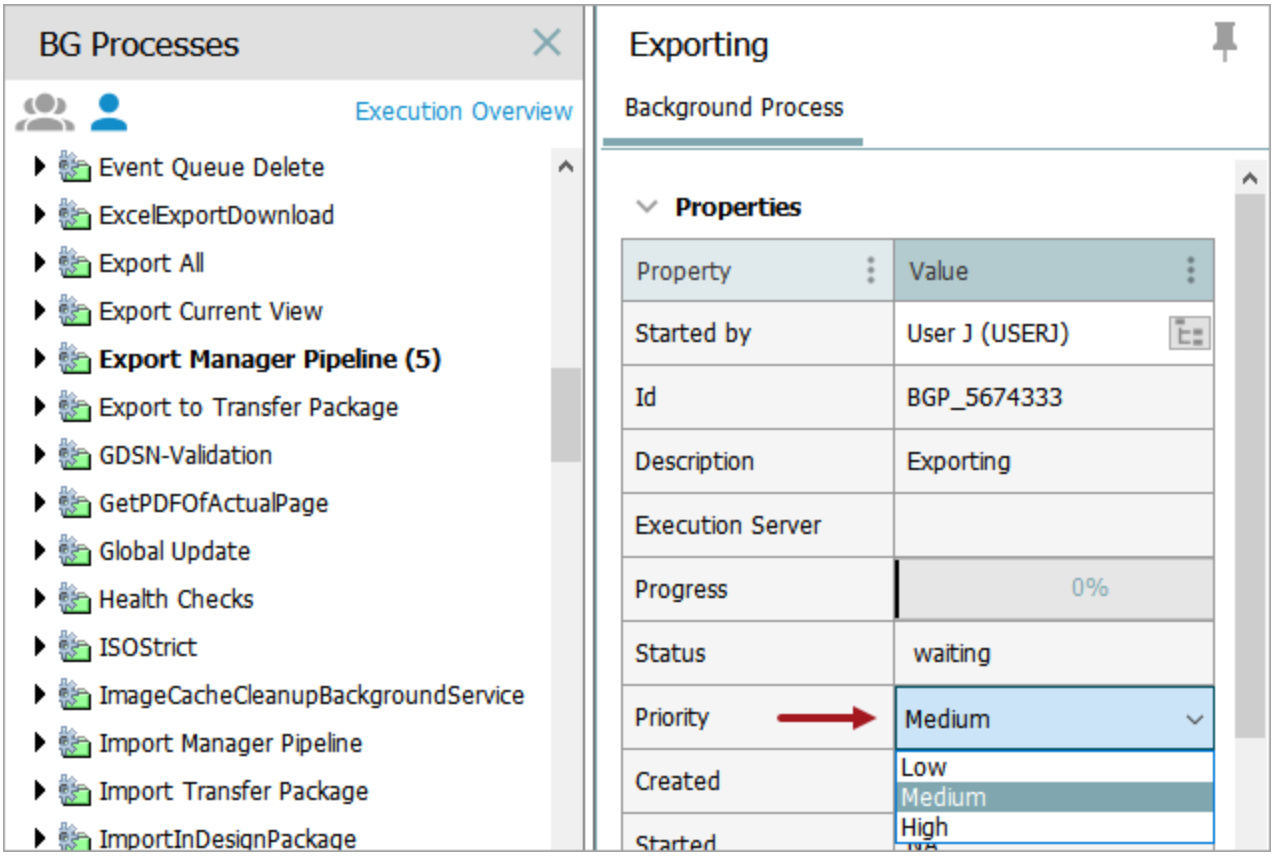
Priority Parameter Setting

Waiting BGPs are prioritized for execution based on the priority of the BGP and the created time.

Choose a method to set BGP priority:

1. When configuring EPs, IIEPs, and OIEPs, users with maintain permissions can set a Low, Medium, or High priority in the applicable wizard. The default value is 'Medium.'
    - For IIEPs and OIEPs, this is the priority of BGP Workers created by the endpoints.
    - For EPs, this is the priority of the BGP associated with the event processor.
2. Users with the 'Manage Background Process Execution' setup action can set the priority of waiting BGPs directly in the workbench Background Process editor. This allows admin users to make ad hoc changes to how waiting processes are prioritized. By default, BGPs other than EPs and IEPs have priority level

'Medium.'



Important: It is recommended to initially leave all EP and IEP priority settings at their default 'Medium' value. This means that BGPs created and/or managed by these configuration types have the same priority as user initiated BGPs (and BGPs created or managed by other EPs or IEPs). A change in priority to 'Low' or 'High' is only recommended when it is verified that a specific integration or background process should always have lower or higher priority than other BGPs being executed on the system.

Parallel Processes

With the priority mechanism enabled, the degree of parallelism / number of threads per queue set via the configuration properties for processes supporting parallel execution (multithreading) are no longer honored. Instead, the number of threads / BGP workers to use for a BGP are automatically determined based on the environment size.

Multi-threaded BGPs can initially be inactive even though they have been claimed by an application server / node and appear in the 'Running Background Processes' section (with a status of 'running'). This occurs when the application server / node does not have the desired number of BGP workers available. In this case, no new BGPs start until the desired number of workers is available and the multi-threaded process can start.

For OIEPs only, the user can specify the maximum number of threads / workers to use for processes started by the endpoint. This option limits the number of threads / workers only and cannot be used to increase the amount beyond what the environment allows.

BGP Legacy Multiple Queues

The default legacy BGP execution mechanism is 'Multiple Queues' and uses specified queues for background processes. The recommended BGP execution mechanism is 'One Queue' and is defined in the BGP One Queue topic.

Multiple queues are used when the `BackgroundProcess.Scheduler.PluginID` configuration property is set as `MultipleQueuesBGPScheduler`.

A background process queue is a way of handling system processes that ensures high-level system performance. BGP queues can be named and configured to control which processes run on which server and how many may run at the same time on each server. Background processes that share a queue also share the number of simultaneous processes that can be run for a given application server.

For more information about using multiple queues, refer to the following topics:

- Default Configuration for Legacy BGP Queues
- Parallel and Multithreading for Legacy BGP Queues
- Modifying Configuration for Legacy BGP Queues

Default Configuration for Legacy BGP Queues

Legacy BGP functionality uses specified queues, while the recommended 'One Queue' BGP execution mechanism prioritizes BGPs based on the priority setting of the BGP and the created time. Refer to the Background Processes and Queues topic.

In the default legacy configuration, the following queues are used:

- Elasticsearch Indexing processes have their own queue named ElasticsearchPublisher
- Import processes have their own queue named IN.
- Export and web publisher processes share a queue named OUT.
- Scheduled processes have their own queue named SCHEDULE.
- All other background processes share a queue named MISC.

The legacy IN, OUT, and SCHEDULE queues are set up to execute one process at a time, while the MISC queue is set up to execute two processes simultaneously. For more information on these settings, refer to the Parallel and Multithreading for Legacy BGP Queues topic.

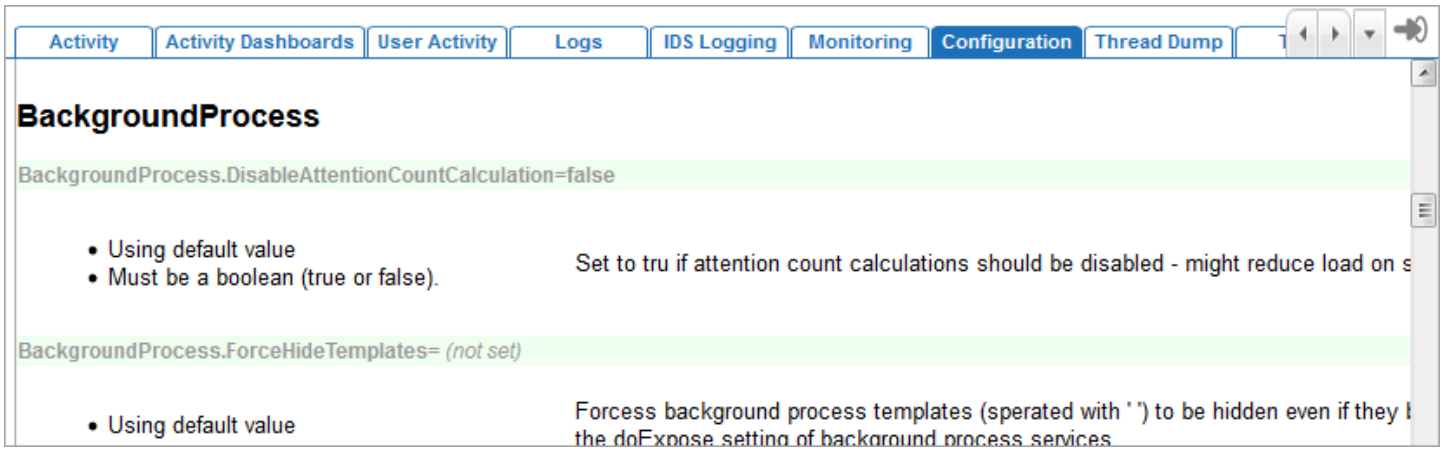
The following legacy background process properties define the type of data being processed:

- BackgroundProcess.ProcessType.**Elasticsearch**.Queue=ElasticsearchPublisher
- BackgroundProcess.ProcessType.**Exporter**.Queue=OUT
- BackgroundProcess.ProcessType.**Importer**.Queue=IN
- BackgroundProcess.ProcessType.**Schedule**.Queue=SCHEDULE
- BackgroundProcess.ProcessType.**WebPublisher**.Queue=OUT

The following legacy background process properties define the default queue sizes:

- BackgroundProcess.Queue.ElasticsearchPublisher.Size=1
- BackgroundProcess.Queue.IN.Size=1
- BackgroundProcess.Queue.MISC.Size=2
- BackgroundProcess.Queue.OUT.Size=1
- BackgroundProcess.Queue.SCHEDULE.Size=1

All of the legacy background process settings can be viewed in the System Administration portal, on the Configuration tab under the Background Process section.



For more information, refer to the Configuration topic in the Administration Portal documentation.

Parallel and Multithreading for Legacy BGP Queues

For only the legacy BGP Legacy Multiple Queues execution mechanism, in addition to integration endpoint transactional settings (refer to the Integration Endpoint Transactional Settings topic in the Data Exchange documentation), parallel and multithreading properties can be used to manage efficient processing.

Note: The recommended 'One Queue' priority based BGP execution mechanism does not require parallel and multithreading properties since the waiting BGPs are prioritized for execution based on the priority of the BGP and the created time. Refer to the BGP One Queue topic.

Configuration properties allow admin users to manage system behavior for a wide range of functionality, for example, the management of background processes and web services.

Note: Ensure changes in the settings are applied with care and properly tested before promoting to production. Parallel setting and multithreading can easily result in optimistic locking issues, which can have a negative impact on performance, rather than the desired performance gain.

For SaaS systems, properties are set within the Self-Service UI by going to the Configuration Properties tab for your system. If the properties you need are not shown, submit an issue within the Stibo Systems Service Portal to complete the configuration. For on-prem systems, properties shown in this topic should be added to the sharedconfig.properties (or config.properties, if only using a single server) file.

Size: The number of BGPs that can run at the same time in the same queue. As an example, for data profiling setting the size = 0 on one server and setting size = 1 on another server forces all data profiling to be handled by a specific server. Recommended practice is to use one server to handle background processes and another to handle ad hoc user requests, which can give users improved system responsiveness.

- **Parallel**: The following BGP types support the parallel option, which makes the same BGP use multiple CPUs on the server (multithreading) to finish faster:
  - Data Profiling
  - Experian Email Validation
  - List Processing
  - Match Code Generation
  - Matching and Linking
  - Match and Merge Import

- Match and Merge Match Tuning
- Policy Evaluation

Use the **BackgroundProcess.Queue.*[name of queue]*.Parallel=*[number of CPUs]*** property where the *[name of queue]* designation is replaced with the name of the queue for which the setting applies and the *[number of CPUs]* designation determines how many CPUs are used.

A queue parallel of 1 means only one CPU is used for the BGP, while a queue parallel of 2 means two CPUs are used for the BGP.

Cores are the CPUs available to handle parallel processing. The CPU setting must not exceed the number of available cores. To view the number of cores on the application server, refer to the 'No of cores' parameter in the Activity tab 'Details' section of the Admin Portal, as defined in the Activity topic in the Administration Portal documentation.

Note: The parallel queue property's underlying implementation varies significantly based on the background process type. When starting 'X' number of jobs, you use at least 'X' times as many resources, which come from other processes and could impact performance. As such, thorough performance testing with production-level hardware and peak traffic conditions is highly recommended.

- **ProcessType**: This property is used to rename the default queue for a specific type of background process which allows the administrator to control the processes that run on each server.

  Use the **BackgroundProcess.ProcessType.*[process type ID]*.Queue=*[name of queue]*** property where the *[process type ID]* and the *[name of queue]* designations are replaced with the actual type ID and the actual name of the queue for which the setting applies.

For steps to change your configuration, refer to the Modifying Configuration for Legacy BGP Queues topic.

Single Application Server and Single Queue Example

This example includes inbound integration endpoints (IIEPs) but can also be applied to any feature that uses background processes.

Consider the following config.properties settings for a single server called appserver1:

```
BackgroundProcess.Queue.DataProfilerParallel.Parallel=4
BackgroundProcess.Queue.DataProfilerParallel.Size=4
BackgroundProcess.Queue.In.Parallel=8
BackgroundProcess.Queue.In.Size=1
```

Combined with these workbench parameter settings:

- The match and merge IIEP has 'Queue for endpoint processes=IN'
- The bulk update IIEP has 'Queue for endpoint processes=IN'

Result

A configuration with these settings results in the following activity on the single server:

- A 'Match and Merge IIEP' background process will not run simultaneously with a 'Bulk Update' background process. Both use the IN queue, which has size 1, limiting it to only one (1) background process at a time.
- A 'Match and Merge IIEP' background process will use up to 8 cores due to the parallel setting of 8 for the IN queue.

Two Application Servers Example

This example includes inbound integration endpoints (IIEPs) but can also be applied to any feature that uses background processes.

In addition to appserver1 described above, add a second application server (called appserver2) with the following sharedconfig.properties settings:

```
BackgroundProcess.Queue.DataProfilerParallel.Size=0
BackgroundProcess.Queue.In.Size=0
```

Result

A configuration with these settings results in the following activity on the two servers:

- appserver1 runs up to four (4) data profiling processes in parallel. Data profiling process number five (5) remains in queue until one of the first four is complete.
- appserver2 never runs 'Match and Merge IIEP' background processes nor 'Bulk Update IIEP' background processes because this server has a size of 0 for IN queue, and both of these background processes use the IN queue.
- Since all BGPs run on appserver1, high BGP load does not adversely impact users because appserver2 is reserved for actions in the user interface.

Single Application Server and Two Queues Example

This example includes inbound integration endpoints (IIEPs) but can also be applied to any feature that uses background processes.

Consider the following config.properties settings for a single server called appserver3:

```
BackgroundProcess.Queue.InIIEP1.Size=10
BackgroundProcess.Queue.InIIEP2.Size=20
```

Combined with these workbench parameter settings:

- The match and merge IIEP has 'Queue for endpoint processes=InIIEP1' with 'Transactional settings = None'
- The bulk update IIEP has 'Queue for endpoint processes=InIIEP2' with 'Transactional settings = None'

Result

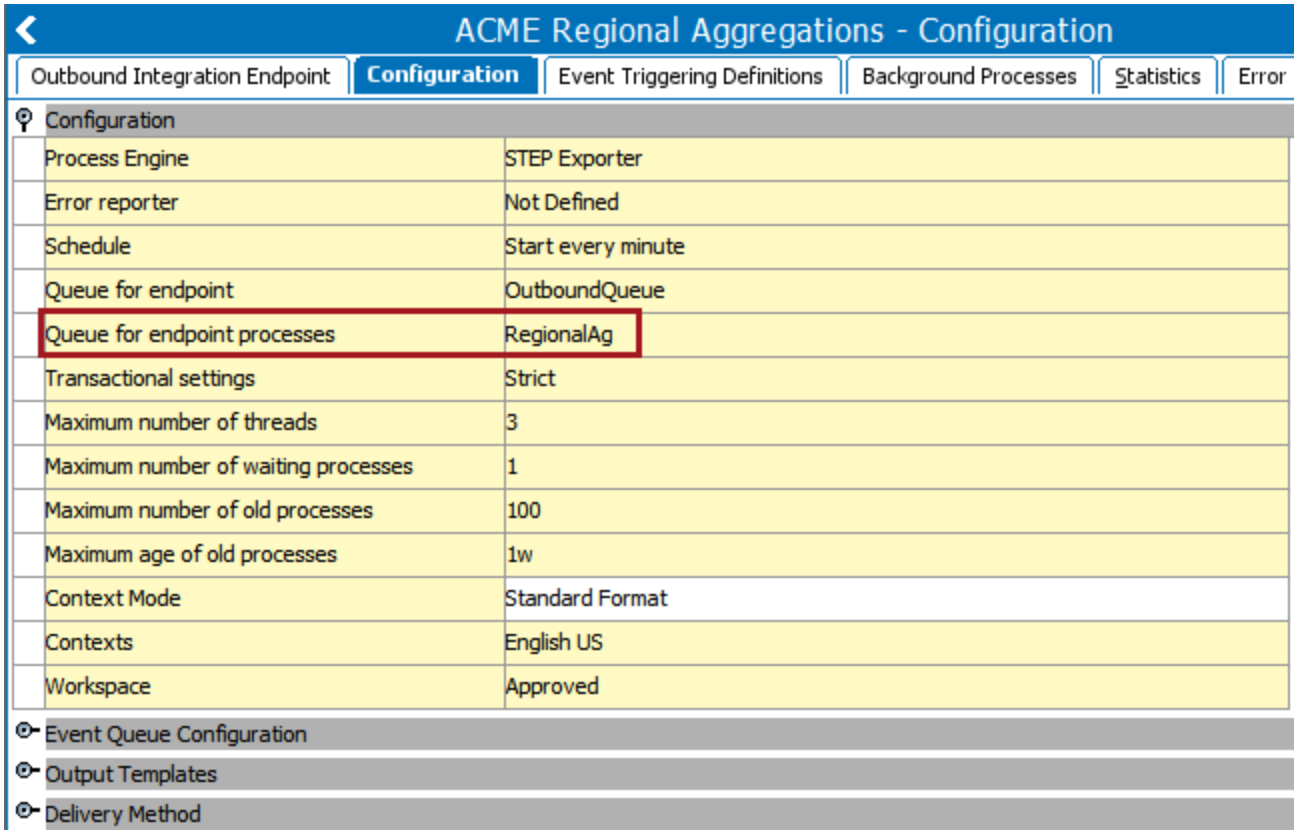
A configuration with these settings results in the following activity on the server:

- appserver3 runs up to 10 match and merge processes simultaneously. Match and merge process number 11 remains in queue until one of the first 10 is complete. These are the only processes that run on the InIIEP1 queue.

- appserver3 runs up to 20 bulk update background processes simultaneously. Bulk Update process number 21 remains in queue until one of the first 20 is complete. These are the only processes that run on the InIIEP2 queue.

Single OIEP in Parallel Example

In the previous examples, the techniques involved configuring several BGPs (using a standard queue, for example, 'OUT') to use parallel processing and/or to change the number of processes that can run concurrently. In some situations, however, the requirement may be to configure a single OIEP to run in parallel to process the related data faster. In this case, define a dedicated queue specifically for the OIEP using the 'Queue for endpoint processes' parameter on the Configuration tab as shown in the image below.

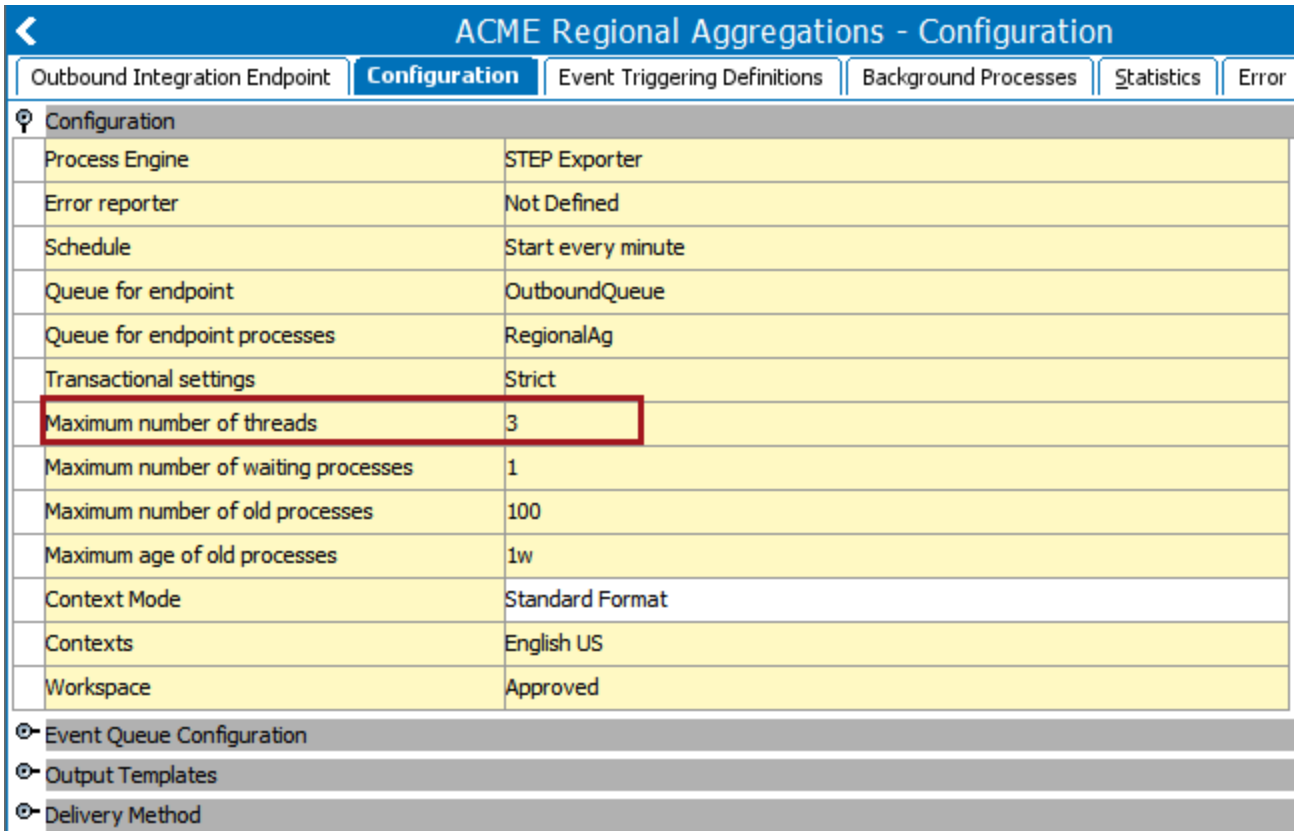


Note: SaaS environments with STEP 11.1 or later with a Cassandra database cannot set up OIEPs in parallel if the 'One Queue' feature is enabled. 'One Queue' replaces the Queue for Endpoint and Queue for Endpoint Processes parameters with a single 'Priority' parameter. For more information, refer to the BGP One Queue topic.

For example, the Acme company has a requirement to generate a weekly report of its total sales. Acme has locations in both the eastern and western parts of the country; however, because there are fewer locations in the west, less data processing is required for the west. The bulk of the data processing is generated by the locations in the east.

For this setup, the STEP system has a total of 24 cores and the 'RegionalAg' dedicated queue is defined to aggregate the regional sales figures via the following OIEPs:

- 'OIEP-east' is an OIEP that only processes data from the eastern locations. It is configured to run in parallel and the 'Maximum number of threads' parameter sets the number of CPU cores to three (3) to handle the larger data load.
- 'OIEP-west' is an OIEP that only processes data from the western locations. The 'Maximum number of threads' parameter uses the default setting of one (1) CPU core since there is less data to process. This OIEP does not run in parallel since it only uses one (1) core.



Although this STEP system has a total of 24 cores, the entry for the config.properties or sharedconfig.properties file (depending on the specific setup) is:

```
BackgroundProcess.Queue.RegionalAg.Parallel=3
```

With this setting, the OIEP's defined queue (RegionalAg) can have up to a maximum of three (3) parallel threads. This allows an end user to adjust this queue to use 1 thread (default), 2, or 3, but any larger value is ignored, even though the system has a total of 24 cores.

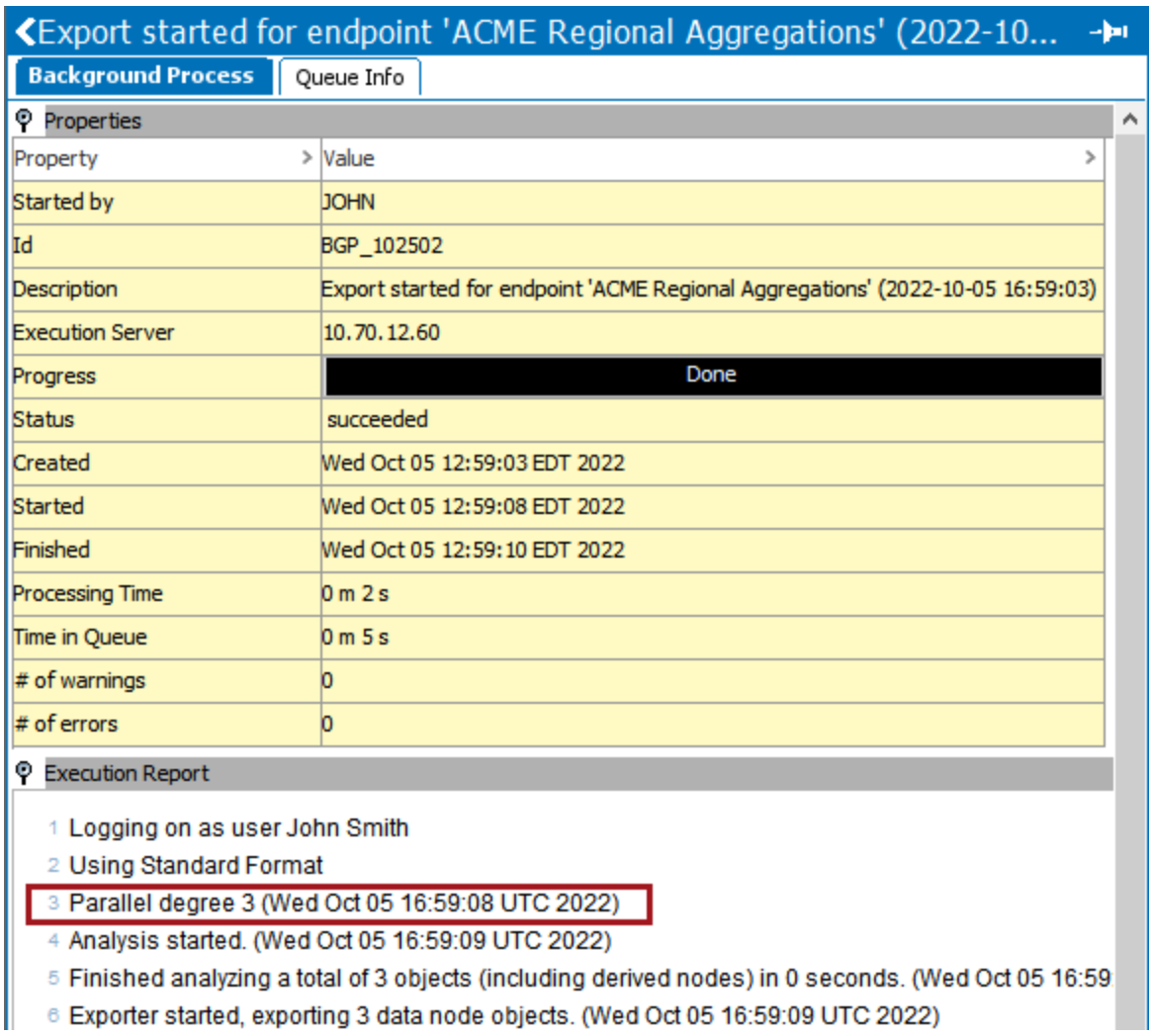
Although this property is not strictly required to enable parallel threads for a given OIEP, it allows a STEP administrator to set sensible boundaries and maintain optimal performance of the overall system.

Important: The example above is for a system with 24 cores, but some systems have fewer cores. Consider the impact that running in parallel will have on your system. Generally, the number of threads should not exceed a maximum of 25 - 30 percent of the total number of cores on the system. This allows both the STEP application and the underlying operating system to have the resources to function properly.

For example, if a system has a total of 4 cores, it is not recommended to define 3 threads for a queue as this would most likely result in degraded performance of the overall system since 75 percent of the resources are being consumed by a single OIEP.

To ensure that a production (or production-like) environment is not negatively impacted by a specific parallel setup, it is always recommended to first test the setup on a development or sandbox environment.

Once an OIEP is configured to run in parallel, the Execution Report (as shown below) contains an additional line item to indicate that the process is running in parallel.



Result

A configuration with these settings results in the following activity on the server:

- The 'OIEP-east' OIEP runs one (1) BGP for the RegionalAg queue but runs in parallel using three (3) cores to process the data faster.
- The 'OIEP-west' OIEP runs one (1) BGP for the RegionalAg queue and uses only one (1) core to process data in the same manner as a standard (default) BGP. This OIEP does not run in parallel since it only uses one (1) core.

Understanding config.properties Settings in On-prem Systems

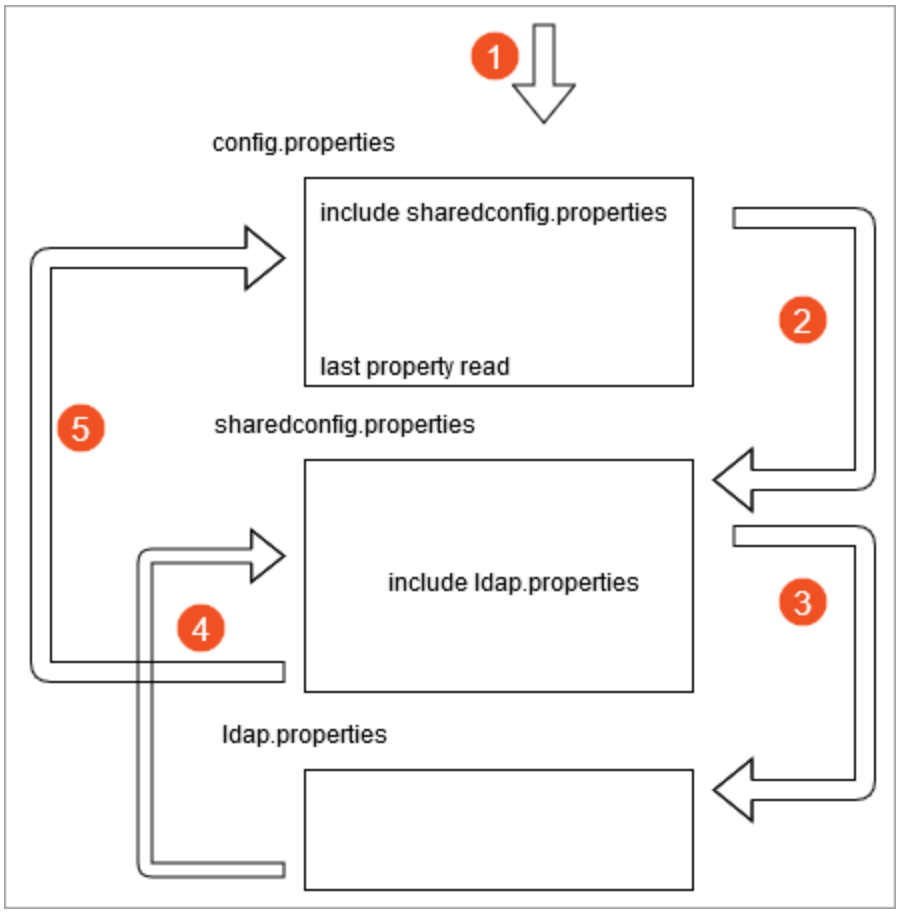
Configuration properties provide on-premises system administrators with options for controlling system behavior, logging, processing, storage of information on the application server(s), and many other things. Configuration properties are specified in the config.properties or sharedconfig.properties files on the application server(s). There is one config.properties file per application server so a clustered environment may have multiple config.properties files, with each containing settings local to a particular application server.

Conversely, the sharedconfig.properties file is global so there will be only one file per setup, with all settings being applicable to all application servers. Most properties are set in the sharedconfig.properties file, with the config.properties file being used only for those properties that expressly require it.

The config.properties file is read first, line-by-line, until the first 'include' statement—typically the sharedconfig.properties file as shown below.

```
#================================================================================#
# Include other config files
#================================================================================#
@include /workarea/sharedconfig.properties

#================================================================================#
# StandAlone Settings (Application Server)
# NOTE: Only used if ApplicationServer.Type = standalone
#================================================================================#
ApplicationServer.Type = standalone
```

When an 'include' statement is found, the included file is read line-by-line (and any 'include' statements in those files are also read) before reading is continued in the config.properties file. A property can exist more than once in the properties files and the last value read is the only active value. This allows properties in the config.properties that come after an 'include' statement to overwrite the same properties in the sharedconfig.properties file.



For more information on config.properties settings, refer to the Configuration topic in the Administration Portal documentation.

Use the **BackgroundProcess.Queue.*[name of queue]*.Size=*[number of allowed concurrent processes]*** property where the *[name of queue]* designation is replaced with the name of the queue for which the setting applies and the *[number of allowed concurrent processes]* designation determines how many concurrent background processes can run.

A queue size of 1 means only one process can run at a time, while a queue size of 2 means two processes can run concurrently.

For more information, refer to the Default Configuration for Legacy BGP Queues topic, and the Monitoring an IIEP via Background Process topic or the Monitoring an OIEP via Background Process topic in the Data Exchange documentation.

Modifying Configuration for Legacy BGP Queues

Legacy BGP functionality uses specified queues, while the recommended BGP execution mechanism prioritizes BGPs based on the priority setting of the BGP and the created time. Refer to the Background Processes and Queues topic.

For SaaS environments, create a Stibo Systems Service Portal ticket to modify these properties.

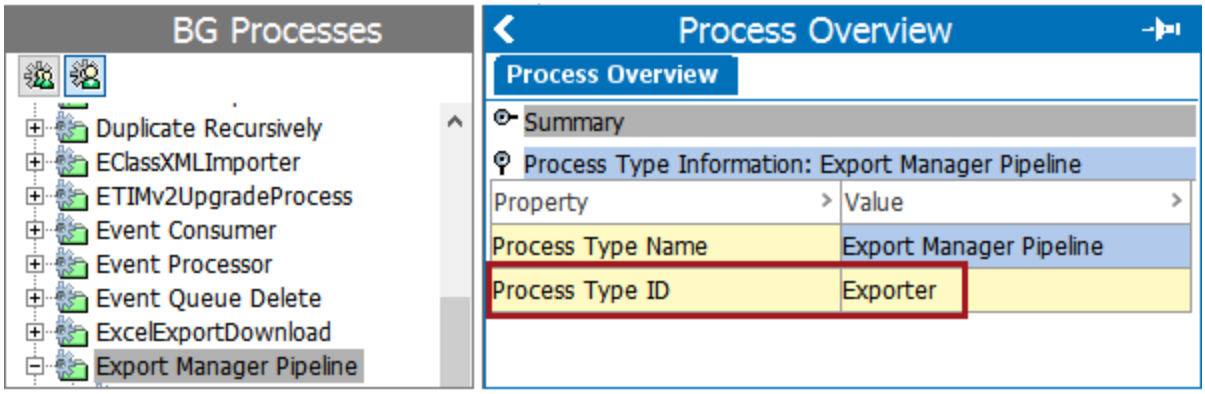
In the steps below, the legacy default configuration is changed to allow for the export and web publisher processes to be run on separate queues.

Note: If you run a clustered setup and you make the following changes in the sharedconfig.properties file, the settings regarding the size will be applicable for each application server. When you edit the shared configuration file as described in the example on a cluster with two application servers, you would be able to run four exports and four web publisher processes simultaneously on the cluster, i.e., two exports and two web publisher processes on each application server.

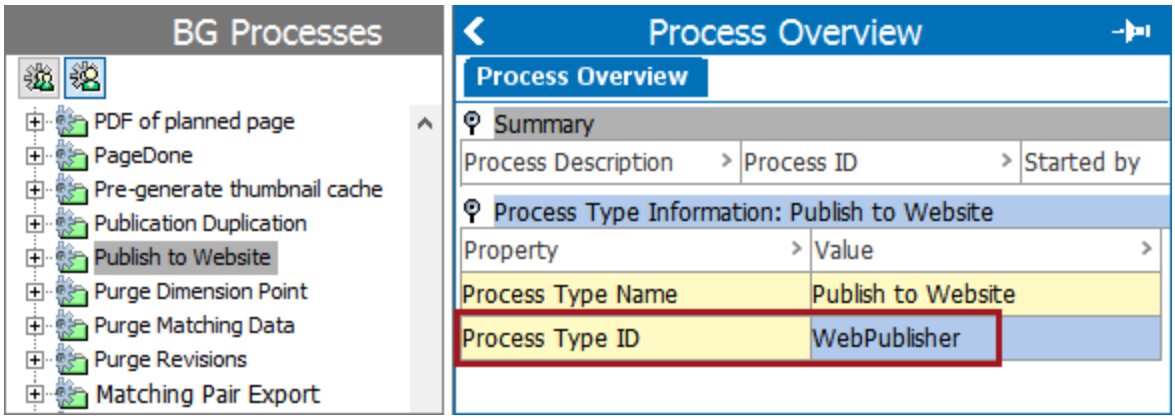
Update Legacy Queue Configuration

Use the following steps to modify the export and web publisher processes to run two processes simultaneously.

1. In the workbench, click the **BG Processes** tab.
2. Click **Export Manager Pipeline** node to display the Process Overview.



3. Expand the **Process Type Information: Export Manager Pipeline** flipper.
4. Right-click the value of the **Process Type ID**, copy and paste the value in a temporary text file. In this example 'Exporter' is copied and pasted. This value will be used to set the configuration property below.
5. Click the **BG Processes** tab then click **Publish to Website**. A Process Overview dialog displays.



6. Expand the **Process Type Information: Publish to Website** flipper.
7. Right-click the value of the **Process Type ID**, copy and paste the value to a temporary text file. In this example 'WebPublisher' is copied and pasted. This value will be used to set the configuration property below.
8. Open the sharedconfig.properties file on the STEP application server.
9. Add the case-sensitive **BackgroundProcess.ProcessType.***[Process Type ID]***.Queue=***[Queue]* property to create the new queues. Replace the text in square brackets with the required data and use the following required format of the property:

   ```
   BackgroundProcess.ProcessType.[Process Type ID].Queue=[Queue]
   ```

   Continuing with the above example, the entry in the properties file would include the values pasted to the temporary file above:

   ```
   BackgroundProcess.ProcessType.Exporter.Queue=EXPO
   BackgroundProcess.ProcessType.WebPublisher.Queue=WEBP
   ```

   In this example, [Process Type ID] is replaced with 'Exporter' and 'WebPublisher' to identify the new types of queues.

   [Queue] is replaced with the new Export process queue named EXPO, and the new Web Publisher queue named WEBP.

10. Add the case-sensitive **BackgroundProcess.Queue.*[Name]*.Size** property to set the size on the new queues. Replace the text in square brackets with the required data and use the following required format of the property:

    ```
    BackgroundProcess.Queue.[Name].Size=[Size]
    ```

    Continuing with the above example, the entry in the properties file would be:

    ```
    BackgroundProcess.Queue.EXPO.Size=2
    BackgroundProcess.Queue.WEBP.Size=2
    ```

    In this example, the new queue EXPO and the new queue WEBP can each run two concurrent processes.

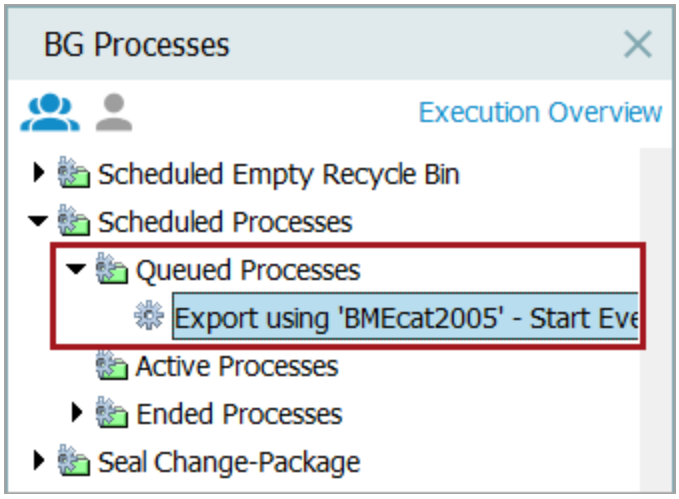
11. Restart the application server to apply the changes to the properties file.

BGP States and Quarantine Status

For all BGP execution mechanisms, states are indicated by the folders below each node on the BG Processes tab. The status of a BGP is displayed on the Background Process tab.

Queued Processes State

The queued processes list includes processes which are in queue but have not yet been started. When the queued process is started it moves to the active process node.



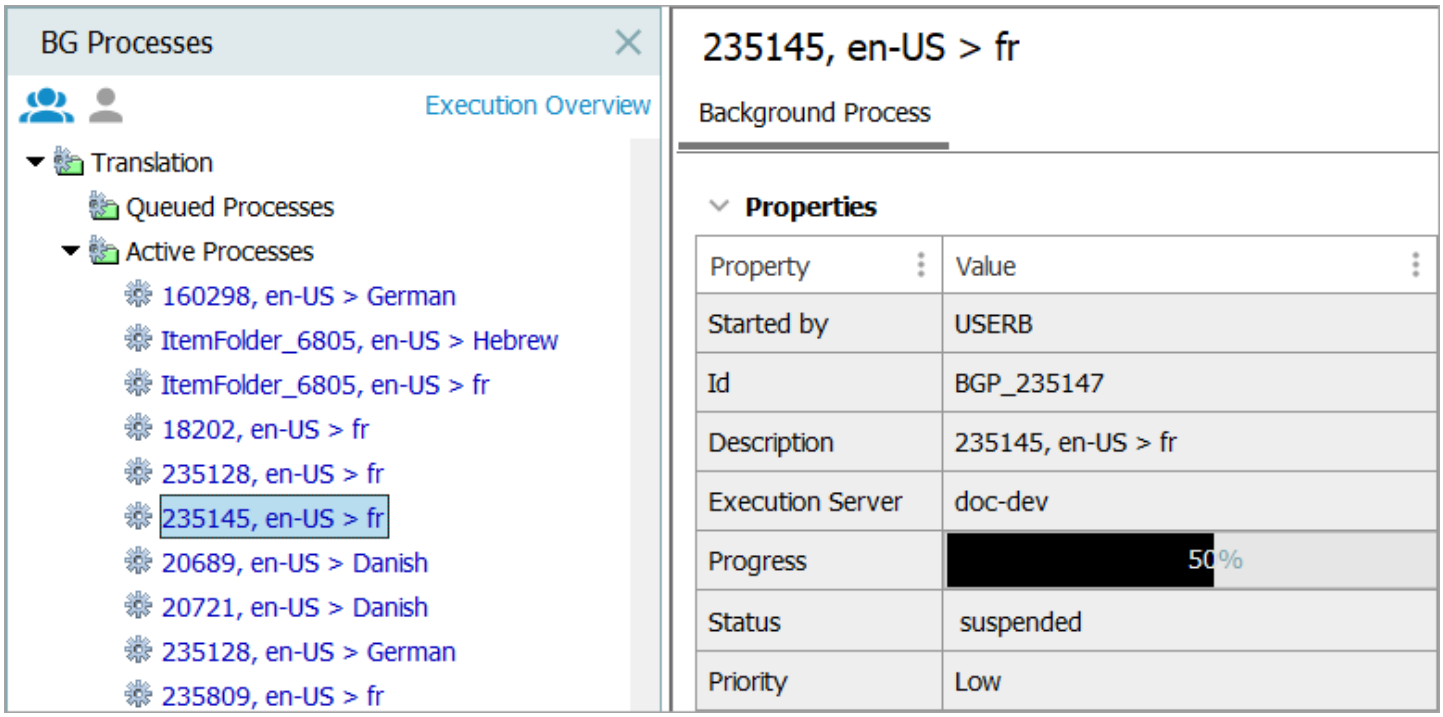
Active Processes State

The active processes list includes processes which are currently being executed.

Active processes that have failed remain in the active process node but are highlighted with red colored text.

- For failed IIEP processes, refer to the Handling Failed IIEP Background Processes topic in the Data Exchange documentation.
- For failed OIEP processes, refer to the Handling Failed OIEP Background Processes topic in the Data Exchange documentation.

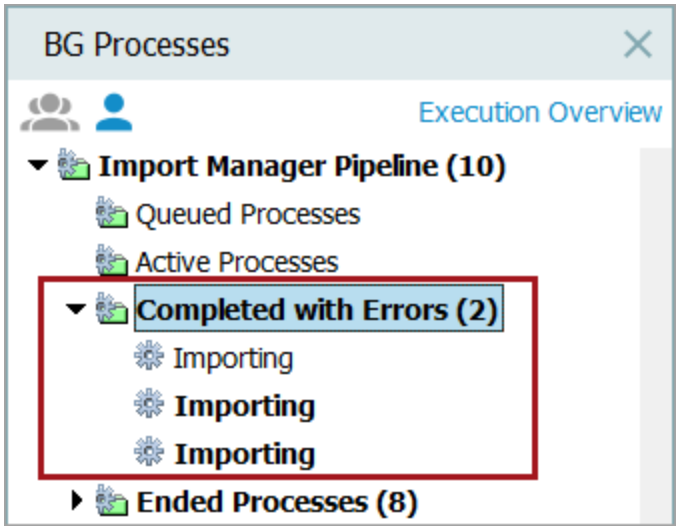
To abort an active BGP, select it, open the Maintain menu, and click Delete. The process is moved to the Ended Processes folder.



Completed with Errors Processes State

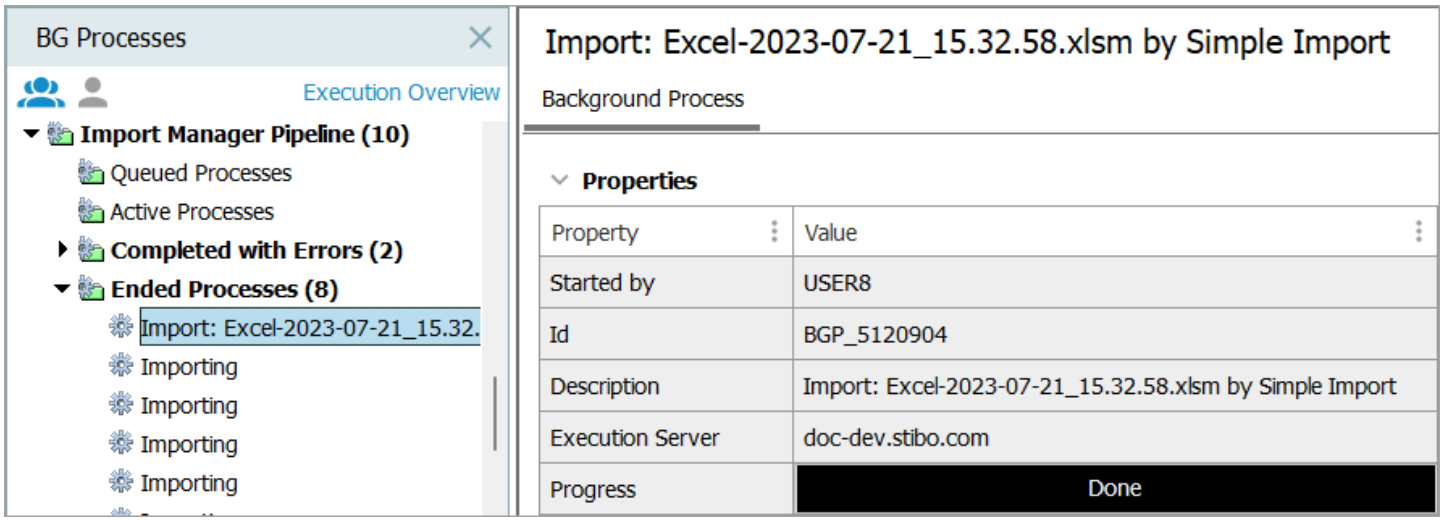
The completed with errors processes list includes processes that partially completed but also had errors. The minor errors are displayed with the details, but the events that can be processed will eventually complete.

Note: The 'Completed with Errors' option is only available for some processes including Asset importer process, Import Manager Pipeline, Match Code Processes, Smartsheet Import, and StateflowDeadline.



Ended Processes State

The ended processes list includes processes which have been completed without any errors, or in the case of Scheduled Processes, those that have been aborted.



Quarantined Status

For all BGP execution mechanisms, STEP prevents repeated restarts of background processes (BGPs) that were running on an application server / node that crashed. The quarantine fail-safe mechanism prevents continuous loops of server / node crashes caused by BGPs.

If a BGP seems to be a potential cause of an application server / node crash, STEP moves the background process into a 'failed' state and does not restart it automatically. Additionally, the BGP goes into a 'quarantined' status which requires user intervention.

Note: When the system administrator is shutting down an application server, it is important to do so with the proper tools, as simply killing the application server JVM for STEP or cutting power will be interpreted as a crash and may cause this mechanism to be triggered. Shutting down a STEP application server with the proper tools will not have this effect.

Analyze the reason for quarantine to determine the next action to take. Not all quarantined background processes cause a crash. In some cases, timing makes it difficult to automatically detect the reason.

Sometimes, an application server / node crash is not caused by the specific background process that was quarantined. If the issue can be found and fixed, the quarantined background process can be restarted from the workbench. Alternatively, if you determine that the quarantined background process should not be started again, it can be deleted.

Integration Endpoints

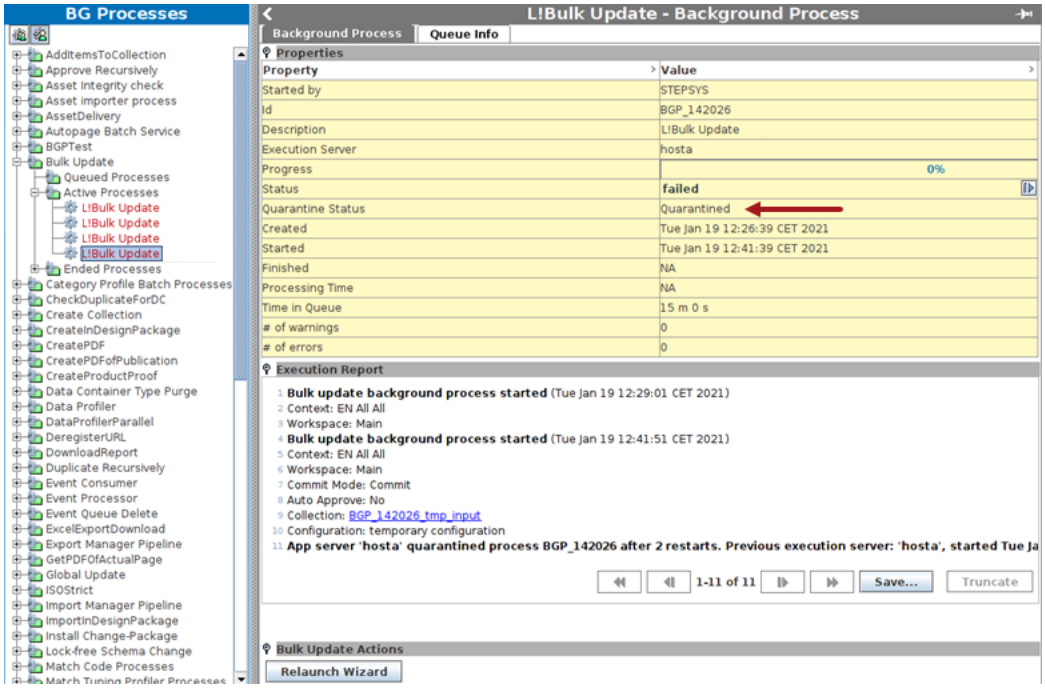
Integration endpoints will halt if any of their associated background processes are quarantined to avoid starting background processes which could cause the same problem repeatedly. The execution reports of both the integration endpoint and the background process will indicate the connection between the two processes. It is strongly recommended to first address any other quarantined background processes of the integration endpoint, then manually restart the integration endpoint in the workbench. Resuming an integration endpoint will not resume any associated quarantined background processes.

Important: It is vital to monitor integration endpoints so they can be restarted after such an incident. Sensors for integration endpoints are available for this purpose, defined in the Sensors for External Monitoring topic in the Administration Portal documentation.

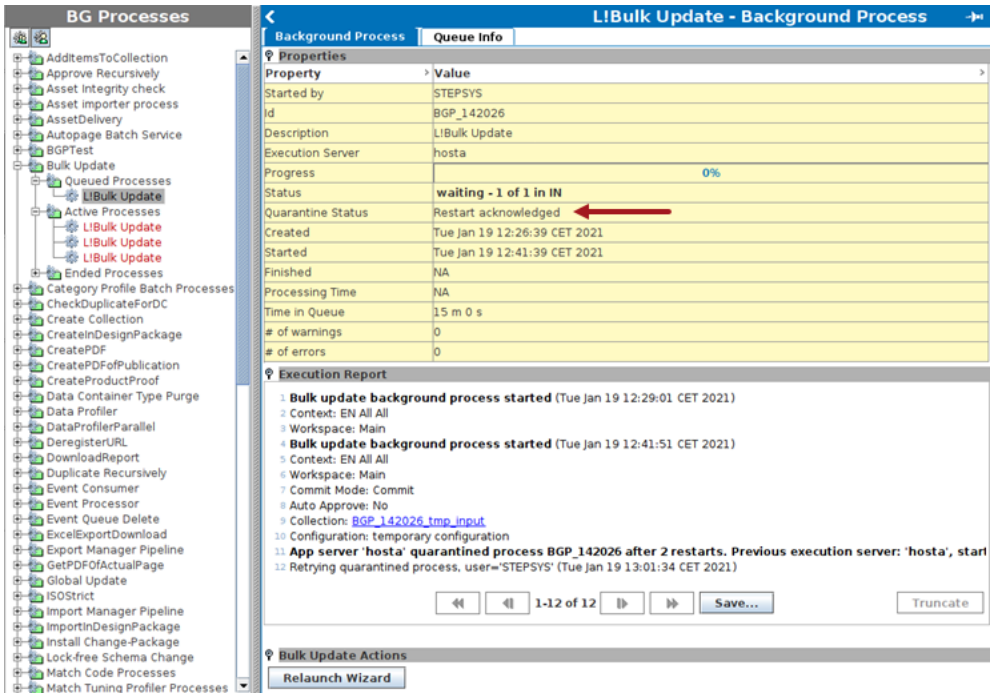
Quarantined Status Values

The Quarantine Status property only displays if a background process is or has ever been quarantined. Otherwise, the property line does not show on the BGP tab. If a background process has been quarantined, one of the following values is displayed:

Quarantined - When the background process is currently in quarantine and in most cases, the background process is in a 'failed' state.



Restart acknowledged - A quarantined background process has restarted, but is not yet being executed, e.g., because it just happened or it is waiting on its execution queue. Typically, the process is in 'waiting' state.



Previously Quarantined - A background process that is no longer quarantined and can now be in any of the possible BGP states.

Searching for Quarantined BGPs

To find quarantined background processes:

1. On the **Advanced Search** tab, select the **Background Process Search** from the criterion dropdown.
2. In the Quarantined parameter, select **Quarantined**, **Previously Quarantined**, or **Restart Acknowledged**.
3. Click the **Search** button to view the results.

Managing BGP Data

For all BGP execution mechanisms, the longer you use STEP, the more background processes are generated. Over time, this creates a large amount of data that has no long-term value. Managing this data involves deleting completed processes to reduce the amount of unnecessary data.

Automatic Deletions

By default, all ended background processes auto-delete after 168 hours (one week). When a process is older than the number of hours specified, it is deleted.

Important: Auto-delete removes the process from the application server and also from the file server.

The AutoDeleteBackgroundProcesses configuration properties control when processes are deleted.

- For SaaS systems, properties are set within the Self-Service UI by going to the Configuration Properties tab for your system. If the properties you need are not shown, submit an issue within the Stibo Systems Service Portal to complete the configuration.
- For on-prem systems, properties are case-sensitive and can be written to the sharedconfig.properties file on the application server.

The admin portal includes information on reviewing system properties. Refer to the Accessing the Admin Portal and the Configuration topics, both in the Administration Portal documentation.

AutoDeleteBackgroundProcesses.AgeInHours.[Process Type ID]

This property determines how old the ended background processes must be before being deleted. This applies to processes that have ended in the 'Aborted', 'CompletedWithErrors', 'Succeeded', or 'Failed' states.

The default number of hours can be modified for the export, import, and web publishing processes using these properties:

```
AutoDeleteBackgroundProcesses.AgeInHours.Exporter = 168
AutoDeleteBackgroundProcesses.AgeInHours.Importer = 168
AutoDeleteBackgroundProcesses.AgeInHours.WebPublisher = 168
```

Note: For SaaS environments, the AutoDeleteBackgroundProcesses.AgeInHours property is automatically set to 168 hours.

AutoDeleteBackgroundProcesses.DelayInHours.[Process Type ID]

Using this property, users can dictate the frequency at which STEP runs a check to assess which ended background processes are newly subject to auto-deletion. The value must be an integer and defaults to one [1] if no property is set.

```
AutoDeleteBackgroundProcesses.DelayInHours=1
```

AutoDeleteBackgroundProcesses.OperatingHours.[Process Type ID]

This property can be used to set the interval(s) during a 24-hour period in which the auto-delete function should be run against ended background processes. This property is often set for users who want the auto-delete functionality to only run during business hours. Using the 24-hour clock, the value for this property should be set in this format: "[XX]-[YY]", with [XX] being the starting hour and [YY] the ending hour. Multiple intervals can be configured using the same format, separating the hour pairs with a semi-colon instead of a dash, e.g., 10-16;22-02. If this property is not set, the auto-delete functionality is set to the default, which is to run at all hours.

```
AutoDeleteBackgroundProcesses.OperatingHours
```

AutoDeleteBackgroundProcesses.OperatingHoursTimeZone.[Process Type ID]

If the time zone during which the auto-delete functionality runs should be different than the default time zone set on the app server, then users can configure the appropriate time zone using this property. Using the 24-hour clock, the value for this property should be set in this format: "GMT[+/-][XXYY]", with [XX] being the hour and [YY] being the minutes following (+) or preceding (-) Greenwich Mean Time (GMT), e.g., GMT+0200. For example, if the time zone to be configured using this property is Eastern Standard Time (EST), then the value for this property should be GMT-0400. For Pacific Standard Time (PST), the value would be GMT-0700. If this property is not set, the auto-delete functionality is set to the default, which is to run according to the time zone set on the app sever.

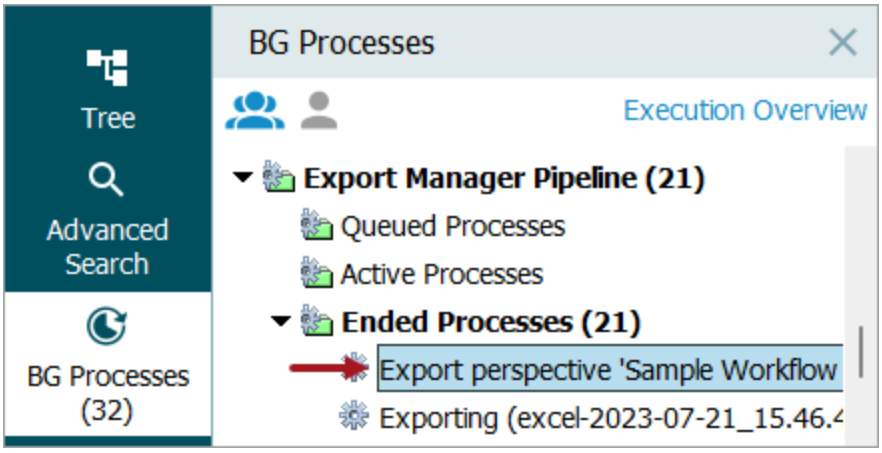
```
AutoDeleteBackgroundProcesses.OperatingHoursTimeZone
```

Important: This property should not be set unless the AutoDeleteBackgroundProcesses.OperatingHours property has also been set.

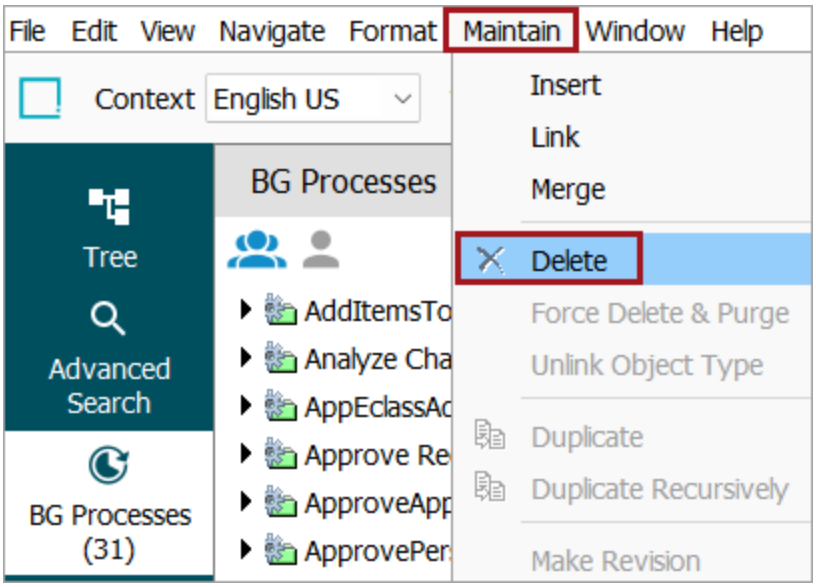
Manual Deletions

Background processes may be deleted manually as follows.

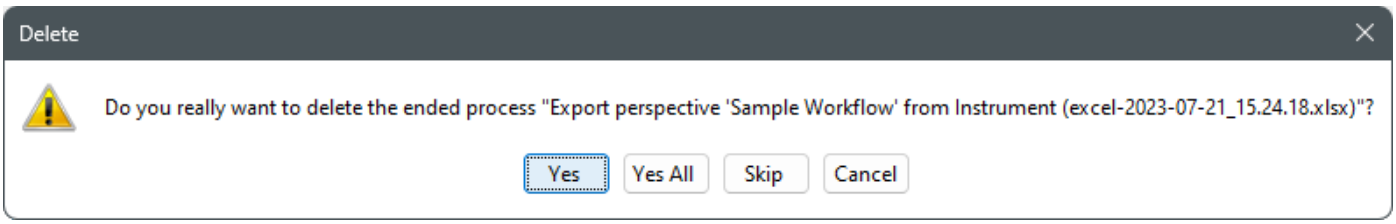
1. In workbench, click the **BG Processes** tab, and select the background process to be deleted.



2. From the toolbar, click the **Maintain** menu, and select **Delete** to remove the background process.



3. Confirm the deletion.



Scheduling a BGP

For all background process execution mechanisms, the steps to create a schedule for a BGP vary based on the process. Refer to the following topics for details:

- Generating, Updating, and Scheduling a Data Profile
- Scheduling Bulk Updates for Collections
- Scheduling a Data Export
- Scheduling a Collection of Objects for Translation
- Scheduling a Data Translation

Alternatively, inbound and outbound integration endpoints and event processors can be scheduled to run background processes that are not available on the BG Processes tab. Instead, in workbench on the System Setup tab, view these related BGPs on the Background Processes tab of the integration or event processor editor. Some endpoints, such as gateway and web service, do not run on a schedule.

- IIEP - Schedule Endpoint
- OIEP - Configuration Section
- EP - Schedule Event Processor

Scheduled BGP Properties

Once created, a scheduled background process displays on the BG Processes tab under the 'Scheduled Processes' folder, and within a folder that indicates the state:

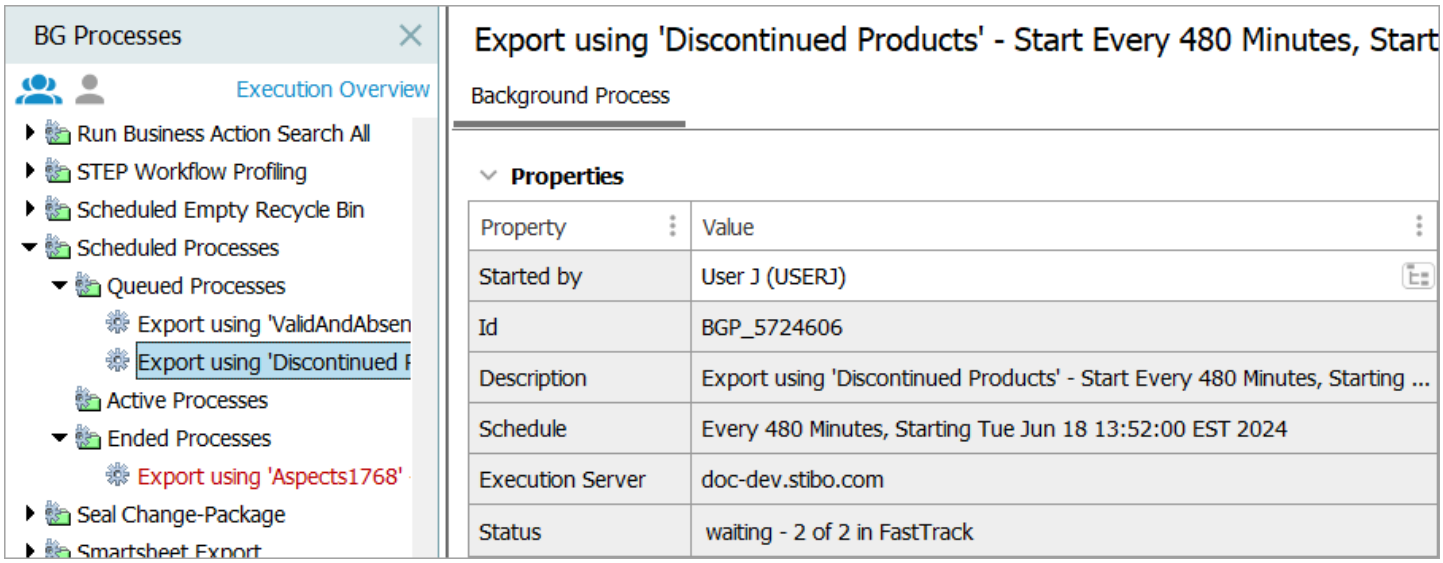
- **Queued Processes** are waiting for the next scheduled run.
- **Active Processes** are currently running.
- **Completed with Errors Processes** are ended and at least some of the process succeeded. This state is available for a limited number of processes.
- **Ended Processes** have been aborted or the schedule is completed.

For details on the states of a background process, refer to the BG Processes States topic.

For details on creating a scheduled background process, refer to the Scheduling a Background Process topic.

A scheduled process begins in the Queues Processes folder until the scheduled time arrives. Then the process displays in the Active Processes folder until it is completed. The same process again goes into the Queued Processes folder until the next scheduled time. The process is moved to Ended Processes folder after successful completion of the schedule or if it is aborted while not running. If a user aborts the process before the schedule is complete, or if there is an error in the BGP, the process moves to the Active Processes folder with red text indicating an execution error.

Important: Consider the time zone of the application server compared to that of the workbench (the client) where the schedule is created or viewed. When scheduling a job, the local time zone is displayed in the workbench, but the time zone of the server is used to run the background process. Although displayed, the time zone of the client is not included in the instruction to the server to run the job. This can cause confusion about when the job will run since the scheduled time is not automatically converted to accommodate potential differences in time zones.



The Background Process editor tab displays the following data about the selected export:

- **Started by** shows the user who scheduled the export process.
- **ID** shows the background process ID.
- **Description** is the text added in the 'Scheduled Process Name' field when the scheduled export was created.
- **Schedule** defines the frequency that the export is scheduled to run.
- **Execution Server** shows the name of the database server running the export.
- **Status** can be waiting, active, or aborted, depending on the current situation.
- **Created** shows the day, date, and time that the scheduled export was created.
- **Started** is the day, date, and time that the scheduled export first ran.
- **# of warnings** is the number of warning messages included in the execution report.
- **# of errors** is the number of error messages included in the execution report.
- **Next Run** is the day, date, and time that the export will run again.

Note: Administrators can edit the 'Started by' field. This helps to update users that no longer exist for existing scheduled processes instead of manually recreating them or deleting them.

Deleting a Scheduled BGP

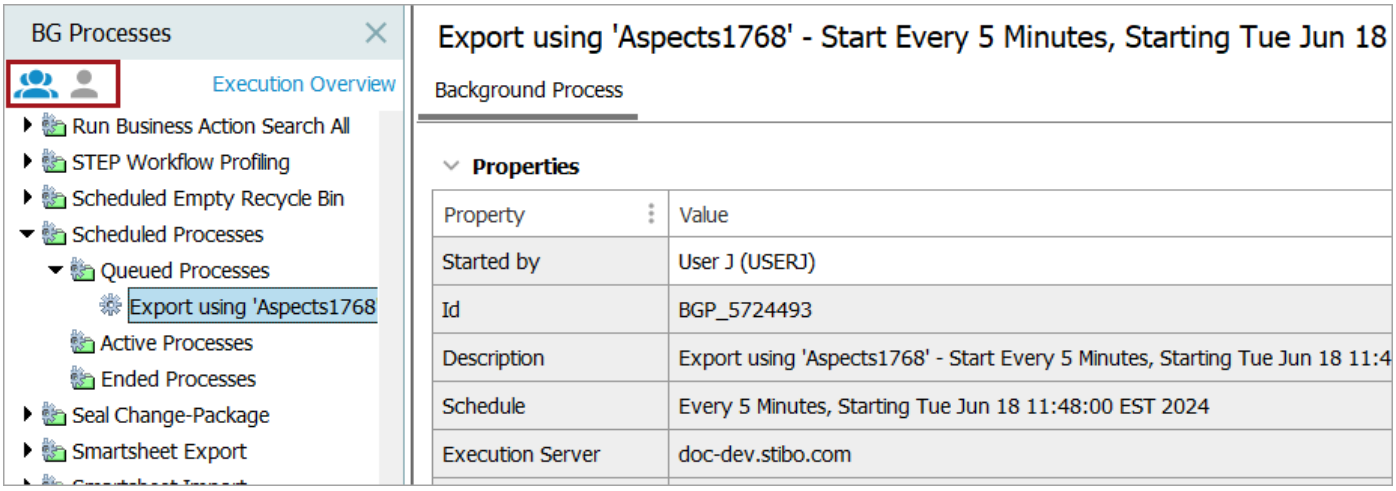
A scheduled background process continues to use the configuration it was started on. Therefore, if you change the parameters of the configuration, you should delete the relevant scheduled processes and create a new scheduled BGP.

Once a process is shown in the Queued Processes node, the schedule details cannot be changed. Instead, it must be deleted and rescheduled as needed.

Note: The images below show an export process, but the steps are the same for all scheduled processes.

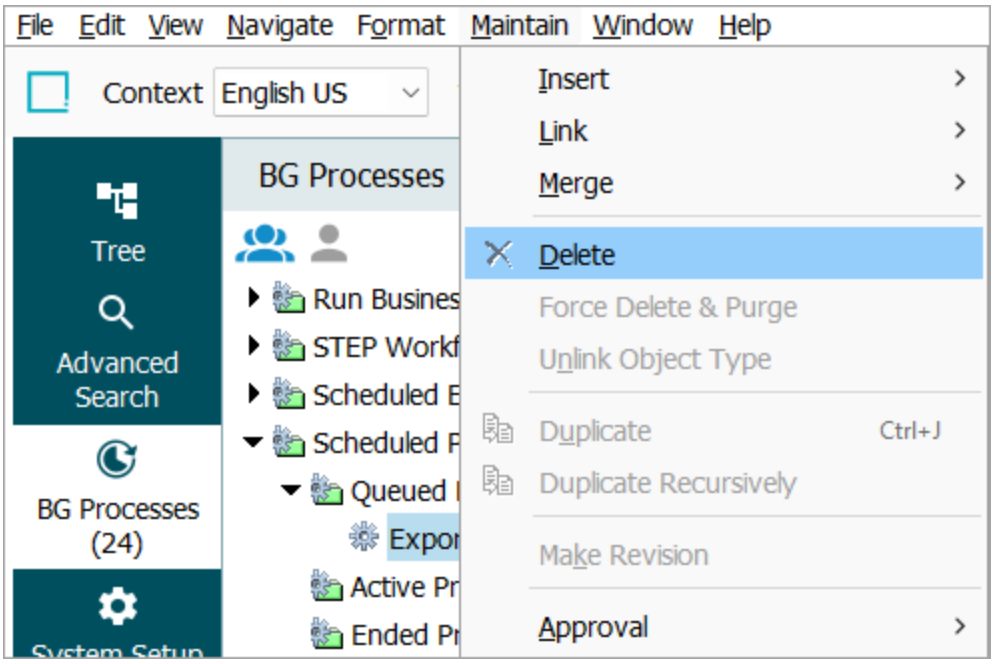
To delete a scheduled process:

1. On the BG Processes tab, expand Scheduled Processes node and open **Queued Processes**. If needed, use the filter buttons at the top of the BG Processes tab to display processes started by other users.



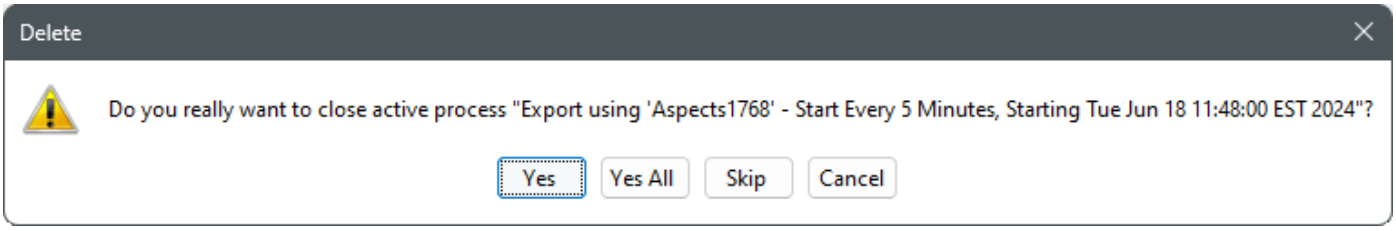
   For details on the states of a background process, refer to the BG Processes States topic.

2. Select the one or more processes to delete, and from the **Maintain** menu, click **Delete**.



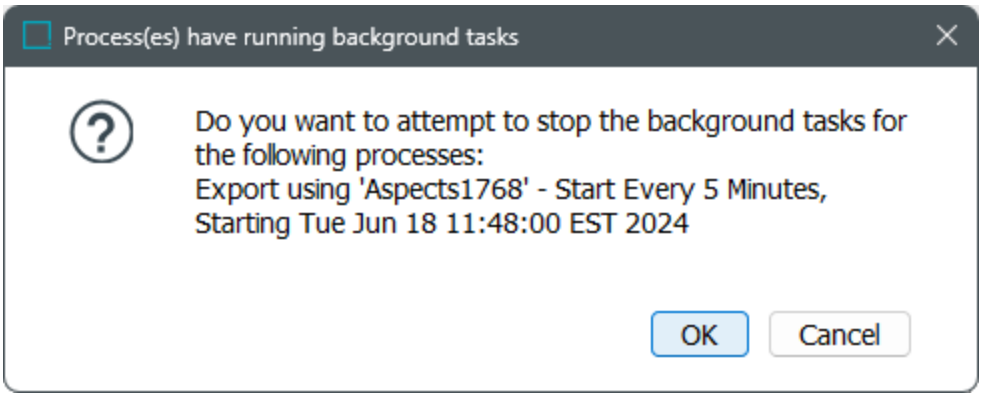
Important: This step moves the scheduled process to an aborted status and displays it in red text as an Ended Process. The details of the process continue to display; however, an aborted scheduled process cannot be started again. To run it again, use the details to create a new scheduled process.

3. On the Delete dialog, confirm or deny deletion using the following options:



- **Yes** deletes only the single selected process shown in the message.
- **Yes All** deletes all selected processes.
- **Skip** does not delete the single selected process shown in the message.
- **Cancel** does not delete any of the selected processes.

Since deleting a queued process attempts to move it to Ended Processes, you must confirm that you want to stop the background tasks.

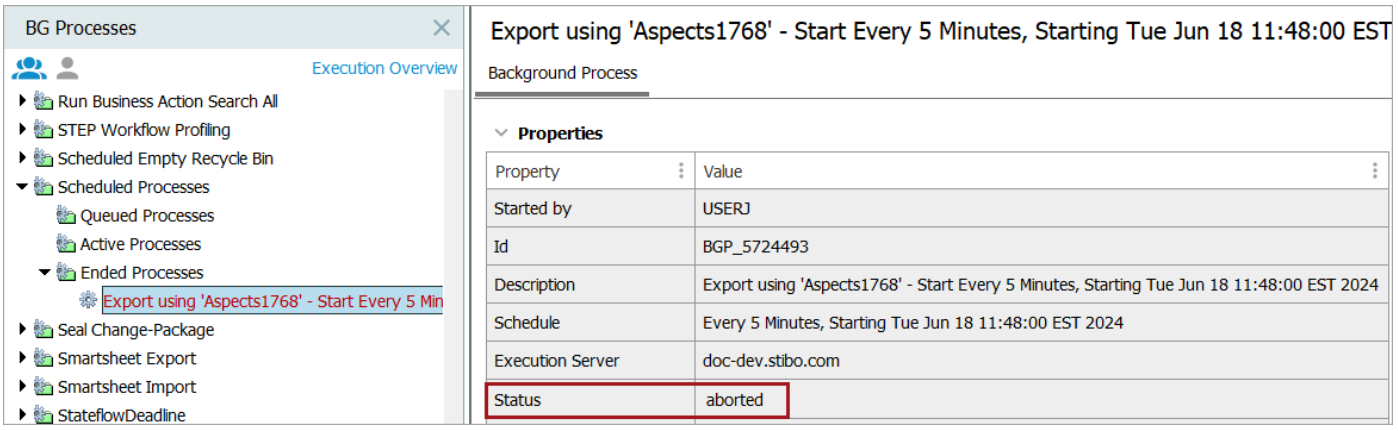


4. Select an aborted process in Ended Processes.

Important: Once deleted, an aborted scheduled process is removed from STEP and cannot be restored.

5. From the Maintain menu, click **Delete** to display the Delete dialog again. Confirm or deny deletion using the following options:

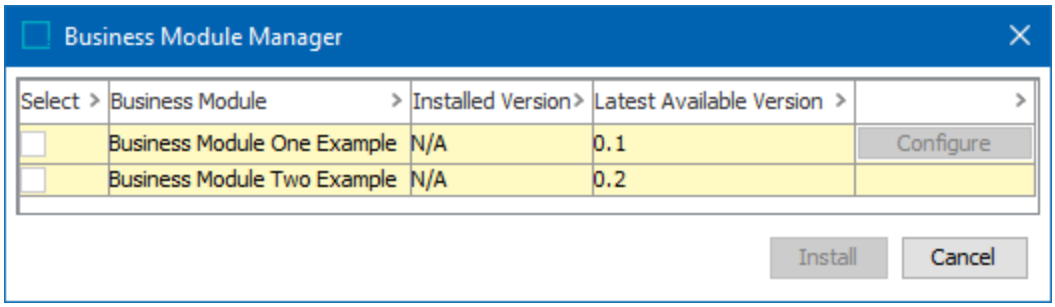
   - **Yes** deletes only the single selected process shown in the message. The scheduled process is removed from STEP.
   - **Yes All** deletes all selected processes. The scheduled processes are removed from STEP.
   - **Skip** does not delete the single selected process shown in the message. The scheduled process remains in aborted status.
   - **Cancel** does not delete any of the selected processes. The scheduled process remains in aborted status.



Business Module Manager

A business module is a functional configuration which handles use cases based on common practices observed in the industry. The Business Module Manager allows an administrator to install a pre-configured data model for a business purpose, such as the 'sell side' of the product enrichment process, or the 'buy side' for the vendor data onboarding process. Business module installation can include the creation of product objects types, classification objects, lists of values types, etc.

The 'Business Module Manager' option displays on the File menu for all users. The install functionality is available for users who are assigned the 'Install Business Modules' setup action privilege. For more information, refer to the **Setup Actions and Error Descriptions** topic.



When a business module is activated by Stibo Systems, it displays in the Business Module Manager dialog. The dialog includes:

- Select - checkbox to indicate a module should be installed.
- Business Module - names of the activated modules. Hovering over the business module name displays a tooltip with a description of the module.
- Installed Version - the version of the module currently on your system.
- Latest Available Version - the current available activated version.
- Configuration - when additional parameters required to install the module, the 'Configure' button is enabled.

Installing a Business Module

1. Activate the 'Install' button by meeting the requirements for the selected modules, as follows:
   - If multiple modules are selected for install, safeguards ensure any required order is followed.
   - If the 'Configure' button is enabled, click to display an additional dialog with required parameters.
2. Click the Install button to start the installation background process.
3. Review the BG Processes progress under the 'Install Business Modules' node.

   If an error occurs during install, the BGP Execution Report shows the problem and actions are rolled back. The Installed Version column is not modified.

Available Business Modules

- **Accelerator for Retail**: refer to the **Solution Enablement** documentation.

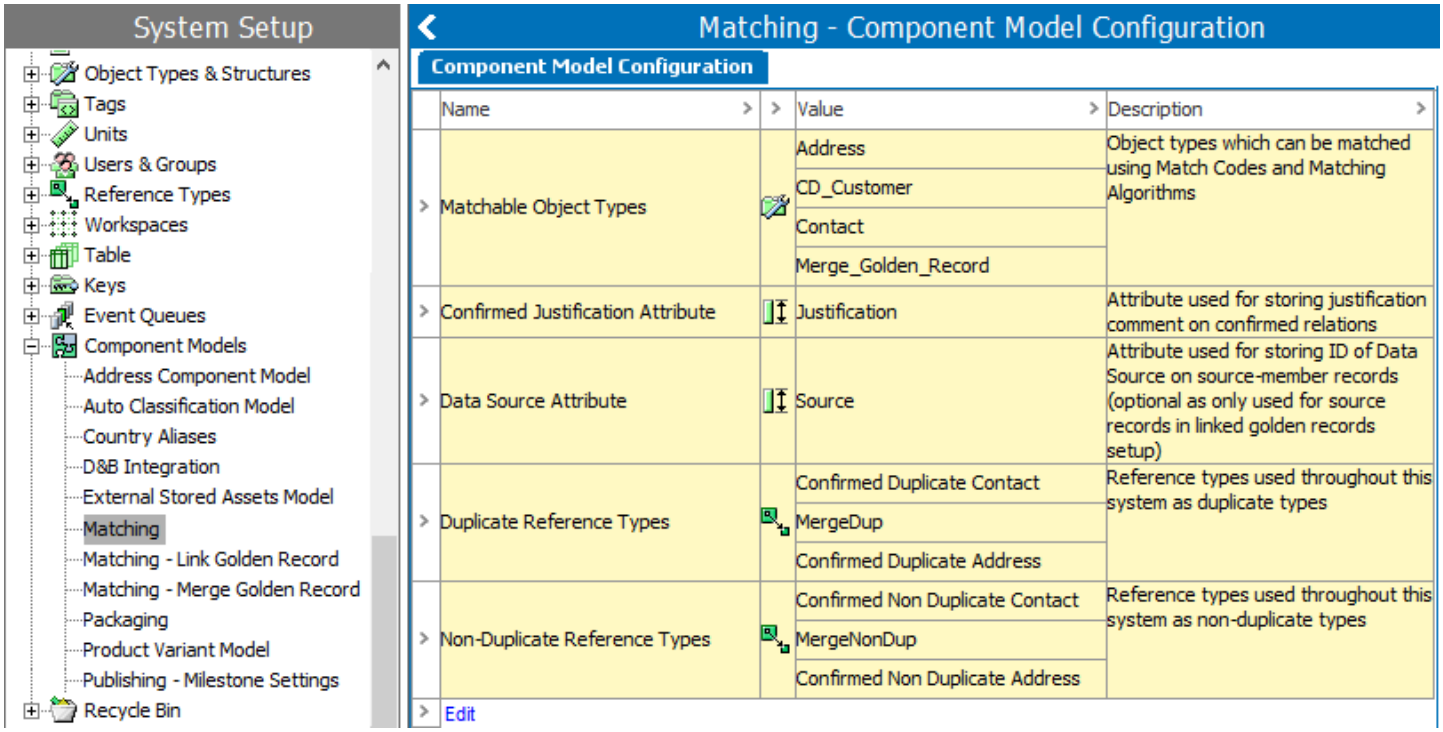
Component Models

Component Models provide configuration instructions for functionalities that require multiple objects, references, or other elements to perform a specified operation. For example, to use Matching functionality (as shown below) the component model identifies the object types used for matching, the attributes used to hold justification and source information, as well as the reference types used to identify duplicates and non-duplicates.

Exporting component models with STEPXML contains references to the applicable reference types, object types, and attributes objects. Alternatively, exporting the definition of referenced objects is possible with the 'V1' setting on the 'Export.ComponentModel.Version' property. To export definitions, in the STEP application server sharedconfig.properties file, add the case-sensitive property as shown below:

```
Export.ComponentModel.Version=V1
```

By default, the value for this property is 'V2' and indicates that actual references are included in the export.



Generally, the available component models are explained within the applicable section of documentation. For information on the component models, refer to the following topics.

Address Component

- Address Component Model - in the Data Integration documentation

Automatic Classifications

- Auto Classification Model - in the Automatic Classification documentation

Automotive

The following component models are defined in the Automotive Quick Start Guide.

- Automotive – Application Model
- Automotive – AutoCare Model
- Automotive – Import Flow Process
- Automotive – NAPA Model
- Automotive – TecDoc Model

The following component model is defined in the Automotive Reference Guide.

- Automotive – Country Model

Data Integrations

- Address Component Model - in the Loqate Integration section of the Data Integration documentation
- CASS Address Component Model - in the Loqate Integration section of Data Integration documentation
- D&B Integration - in the Dun & Bradstreet Integration section of the Data Integration documentation
- Email Component Model - in the Experian Email Validation Integration section of the Data Integration documentation

Digital Assets

- Asset Analyzer Component Model - in the Asset Analyzer section of the Digital Assets documentation
- Asset Download Component Model - in the Asset Download section of the Digital Assets documentation
- External Stored Assets Model - in the Storing Assets Externally documentation

Matching, Linking, and Merging

The following component models are defined in the Matching, Linking, and Merging documentation.

- Matching
- Matching - Link Golden Record
- Matching - Merge Golden Record

Packaging

- Packaging - in the Packaging Hierarchy Editor topic within the Web User Interfaces

Product Variants

- Product Variant Model - in the Product Variants section of the System Setup documentation

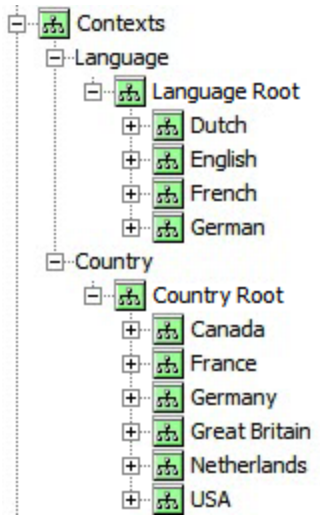
Publishing

- Publishing – Milestone Settings - in the Print Flatplanner section of the Publisher (Adobe InDesign Integration) documentation

Dimensions, Dimension Points, and Contexts

One of the core features of STEP is the ability to store multidimensional data. Dimension-dependent data is presented differently based on the dimension in which it is stored, such as language or country. Most often, data is dimension-dependent for purposes of translation when content needs to be stored in multiple languages, though sometimes data is made dimension-dependent if it must vary in different countries, markets, or business units.

Dimensions, dimension points, and contexts are maintained in the STEP Workbench on the System Setup tab under the Contexts node.



This documentation section includes the following topics:

- Dimensions and Dimension Points
- Maintaining Dimensions and Dimension Points
- Dimension and Dimension Points Recommended Practices
- Adding Dimension Dependency After Loading Data
- Contexts
- Maintaining Contexts
- Context Recommended Practices
- Context Locales

Dimensions and Dimension Points

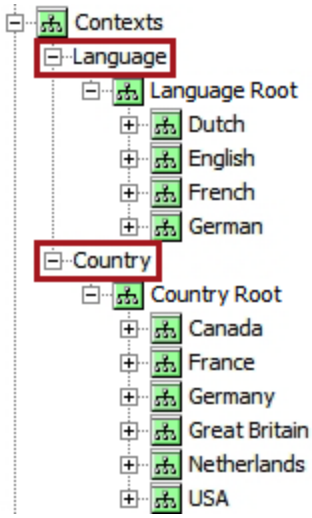
Dimensions and dimension points are maintained in the STEP Workbench on the System Setup tab within the Contexts node.

Important: 'Dimensions' are general, while 'dimension points' are specific.

Dimensions

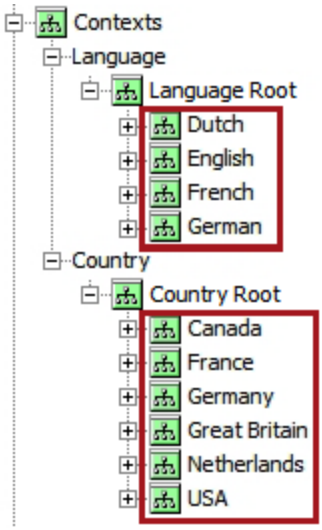
A 'dimension' is a definition of a context-sensitive element in STEP, such as language or country, which allows for different layers of information to vary. A dimension is presented in STEP as a hierarchy of dimension points. Each system must have at least one dimension.

Common examples of dimensions are 'Language' and 'Country,' as shown in the screenshot below:



Dimension Points

'Dimension points' are contained within dimensions. For example, a specific language or a specific country. Data is stored in STEP in dimension points.



Note: Although 'Language Root' and 'Country Root' are dimension points, they should never be used when creating a context. For more information, refer to the Dimension and Dimension Points Recommended Practices topic.

Dimension Dependent Data

Data is stored in STEP in dimension points, not in contexts. In order to place data into different dimensions, the object type, attribute, and/or reference type that will either contain or link the data together must be made dimension dependent.

- **Object types** are made dimension dependent if they should have different STEP **names** in different contexts. In most cases, this is because the names are translated into different languages, though they may also have different names in different markets, for example.

  For information on making object types dimension dependent, refer to the Maintaining Dimension Dependent Object Types topic.

- **Attributes** are made dimension dependent when their **values** should be different in different contexts. This also includes lists of values (LOVs).

  For information on making attributes dimension dependent, refer to the Dimension Dependent Attributes topic in the Getting Started documentation.

- **Reference types** are made dimension dependent when different linked objects (typically assets) should be visible in different contexts.

  For information on making reference types dimension dependent, refer to the Dimension Dependent Reference and Link Types topic.

- **Assets** can be made dimension dependent but this is a global setting applied from System Setup, Users & Groups, within the Image & Document Settings node.

  For more information, refer to the Image and Document Settings topic.

Note: In most circumstances, assets can be 'swapped out' in different dimensions by use of dimension-dependent reference types.

Dimension and Dimension Points Recommended Practices

While STEP is highly configurable for creating and maintaining dimension and dimension points, certain implementation standards apply. This topic outlines considerations to your system to handle dimension-dependent data.

Review the Dimension Recommendations and Dimension Warnings sections the bottom of this topic for points of interest and alternatives to additional dimensions.

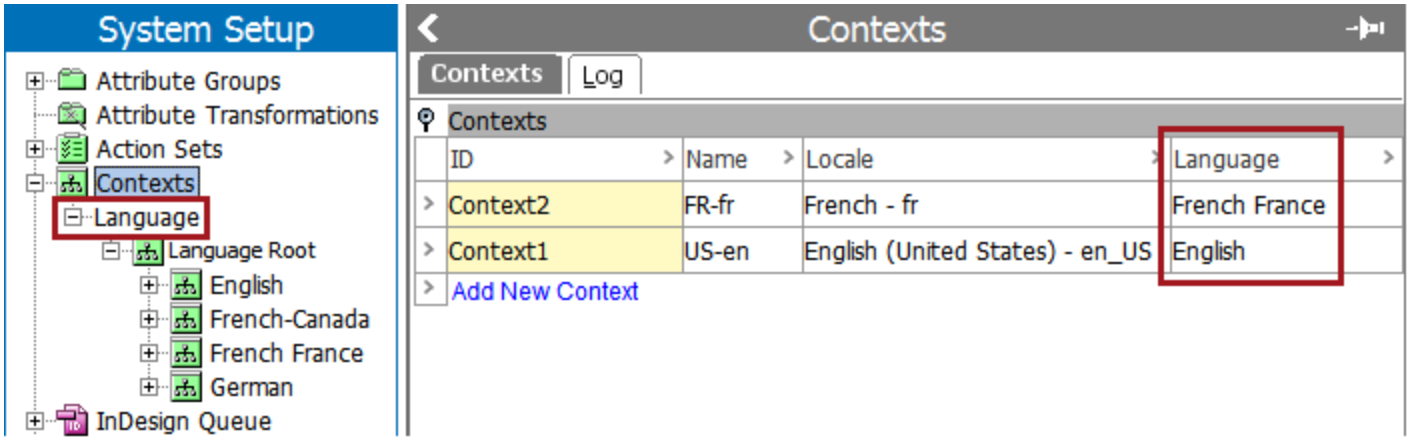
Note: Never use more than three dimensions. Typically, only two should be used, though it is possible to even use only one—language.

Language Dimension

There **must** be a language dimension. This is the only dimension that is supported by the STEP translation tracking and translation workflow features. For more information on the translation functionality of STEP, refer to the Translations documentation.

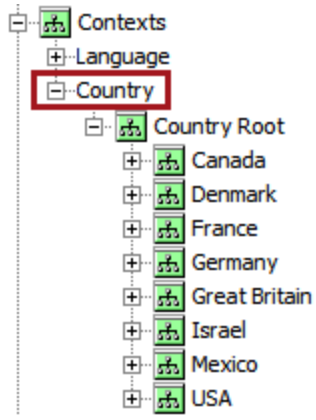
Even if you do not use multiple languages, you must have a language dimension for the language in which you are maintaining your data. Choose a real language so that it is very clear what belongs there. The language dimension is special in STEP because it tracks changes between a source language and its translations. This means that there are no STEP tools to help users find instances where content in a country-dependent attribute value has changed and may need to be updated for other countries.

In many installations, *only* the language dimension point is required. Additional dimensions, such as country, are not needed if there is no country-specific data, such as warranty information that varies depending on which country a product is sold. The screenshot below shows a dimension hierarchy in System Setup and two contexts that only use the Language dimension.



Country Dimension

The Country dimension comes standard with STEP, but if you do not need it, remove it until you do.



You should only use a country dimension if the following conditions apply:

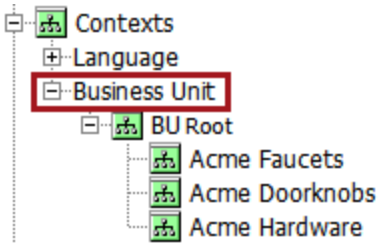
- You have products that are sold in more than one country and there are a lot of **attributes** with different values because of the country they are sold in.
- You have products that are sold in more than one country and there are a lot of **references** that are different because of the country they are sold in.
- You are using the Stibo Systems GDSN solution, which requires that each target market references a context containing a language and country dimension.

If there are only a handful of attributes on products that are only sold in a few countries, use separate attributes to hold this information. For example, 'Description, English,' 'Description, German,' and so forth.

Additional references might also be used if they relate to information that varies by country. For example, a product could reference a PDF document and the document contains different information in some countries. Instead of making the reference dimension-dependent, you could make separate reference types ('Warranty, United States' and 'Warranty, Canada'). For information on dimension-dependent references, refer to the Dimension Dependent Reference and Link Types topic.

Business Unit Dimension

Business unit dimensions are sometimes used in larger enterprise implementations, as well as in cases where customers start out with a STEP implementation and then acquire another business.



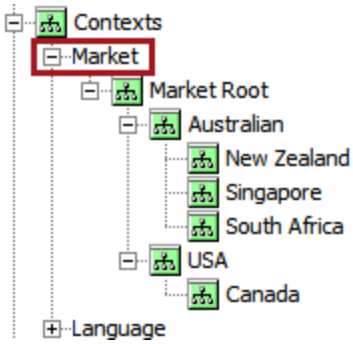
Business unit dimensions may be needed for enterprise-wide implementations if the following conditions apply:

- The exact same products, with the same internal ID, are sold by more than one business unit.
- Each business unit must share the same pool of attributes, and there are no clear 'owners' of the attributes. For example, an attribute like 'Description' is used for products across all business units instead of there being separate attributes for each business unit—'Acme Shoes Description,' 'Acme Electronics Description,' or 'Acme Clothing Description.'

Even if these conditions apply, it should not be an automatic decision to use a business unit dimension. Different customer-facing part numbers, for example, can be stored in separate attributes. If part numbers are different based on the business unit selling the products, you might need a business unit dimension, but this is not enough justification on its own to do so.

Market Dimension

Because market dimensions are not recommended, this section mainly addresses them to provide alternatives to their use.



Any requirements for market-dependent data are typically for a small number of attributes or references, which can be handled by a less-complex approach of additional attributes and/or references.

- Most market-specific attributes are typically separate attributes.
- Market-specific asset references can be handled by separate reference types.
- Whether using dimensions or separate attributes, people who maintain market-specific attributes are only able to partially approve their own content.

Alternatives to market dimensions are to:

- Use separate attributes, for example for web copy, print copy, and so forth.
- Use separate reference types, based on different markets.
- Group the reference types for visual separation.

Dimension Recommendations

The following are recommendations for dimensions:

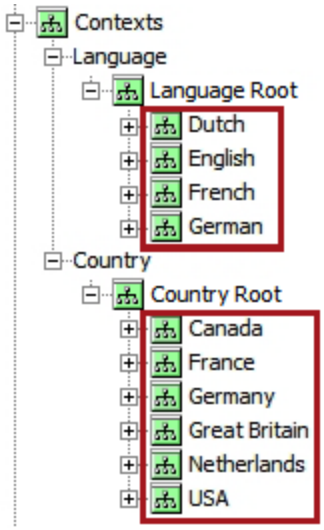
- Use as few dimensions as possible since dimensions affect usability.

  Dimension-dependent data is a good concept but should not be taken too far.

  The more dimensions there are, the more likely it is that users will have to go back and forth between contexts. When users forget to change contexts appropriately and data is added in the wrong dimension, it can potentially be a long time before the mistake is realized. There is no easy way to find the data that should be corrected.

  When using an import, if a lot of data must be entered while working in one context, and then some of that data must also be entered in another context, data ends up in the wrong place if the user forgets to break up the information into separate load files, or if they forget to change context appropriately.

- In most circumstances, dimension points should be created at the same level:



  However, there may be a need to have parent / child relationships between dimensions to maintain many versions of an 'almost the same' language, as pictured below. In this type of setup, parent values from the top-level dimension will be inherited by the child dimensions. If this is implemented, there **must** be clear ownership of the parent language. Otherwise, do not use one.

For more information on use cases and the value inheritance of parent / child dimensions and attribute values, refer to the Dimension Dependent Attributes topic.

- Be consistent across all dimension points and use IDs based on ISO standards. More information about these standards can be found on the web.

  For languages, use IDs based on the **ISO 639**-1 Language Code (2 letter) + **ISO 3166** alpha-2 Country Code. For example, US English: **en-US**.

  For countries, use IDs based on the **ISO 3166** alpha-2 Country Codes. For example, United States: **US**

Dimension Warnings

The following are warnings for dimensions.

- Do not introduce a dimension unless there is strong justification for it.
- Do not use a dimension for any aspect of data that is temporary, such as a website dimension, a print publication dimension, or promotions dimension.
- Do not use an **All** dimension point in a context. Nobody speaks All Languages, nobody lives in All Countries,

and nobody will maintain All.

Note: When content is **not** dimension-dependent it is already stored in the Language Root and Country Root dimension points.

Alternatives to Additional Dimensions

As an alternative to creating more dimensions, consider using additional attributes or additional reference types, which are acceptable if you only have a small amount of information that will vary by language or country.

Arguments for Additional Attributes	Arguments for Additional Dimensions
This is a simple approach for users to understand.	Using the same attributes in layers enables re-use of integrations, saved imports, saved exports, and Web UI screens.
Users can compare values for all versions side-by-side in an Excel file.	Users can compare values for a single attribute across dimensions using the STEP context mode. Refer to the Context Mode View topic.
More dimensions drive more contexts. More contexts mean users have to be aware of which context they should work in, causing a high risk that users make mistakes and put data in the wrong context.	Fewer attributes. Separate attributes for each dimension could mean many hundreds more attributes.
More dimensions drive multidimensional attributes, which are to be avoided.	

Arguments for Additional Attributes	Arguments for Additional Dimensions
To load data via Excel, it is easier to add more attribute columns to Excel than it is to separate Excel files when some of the data has to be loaded to a different context.	

Maintaining Dimensions and Dimension Points

This topic describes how to:

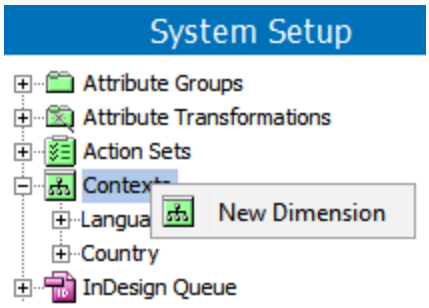
- Create dimensions and dimension points
- Delete dimensions and dimension points
- Select a dictionary for a language dimension point

Creating a Dimension

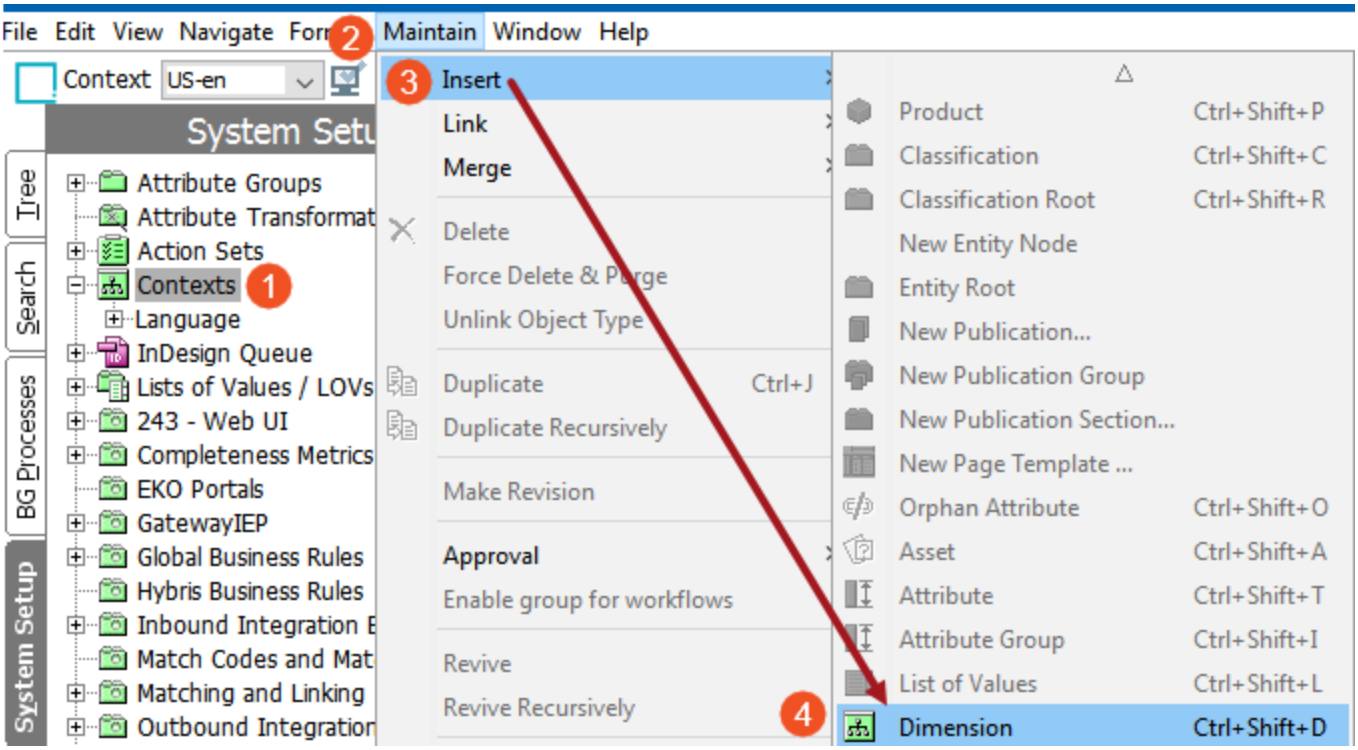
A new dimension may be needed if, for example, content that was once only language dependent also needs to become country dependent.

To create a new dimension:

1. On the System Setup tab, select **Contexts**, and choose one of these options:
   - Right-click and select **New Dimension**.

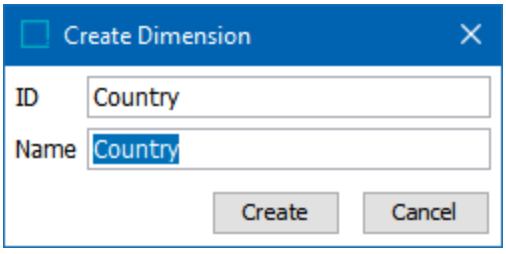


- On the Maintain menu, click Insert and click **Dimension**.

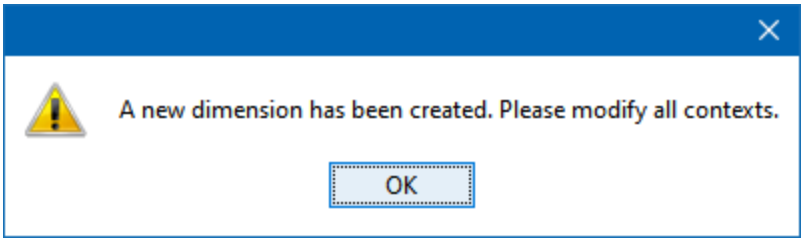


2. In the **Create Dimension** dialog, enter an ID and Name, then click **Create**.

Note: Pressing Enter on the keyboard after adding the ID duplicates the text in the Name field.

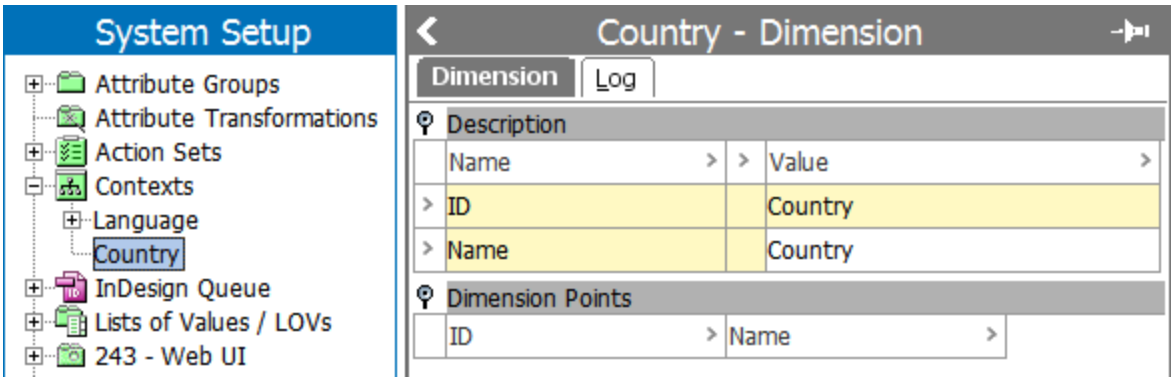


3. Click **OK** to close the confirmation dialog.



The Dimension editor displays.

No additional configuration is allowed until at least one **dimension point** is created for the dimension.



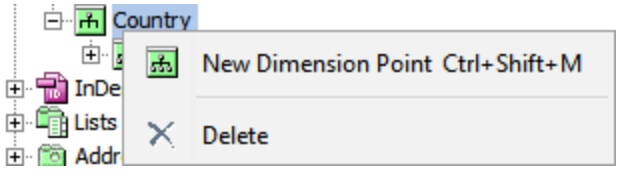
Creating a Dimension Point

After a new dimension has been created, create at least one dimension point below it.

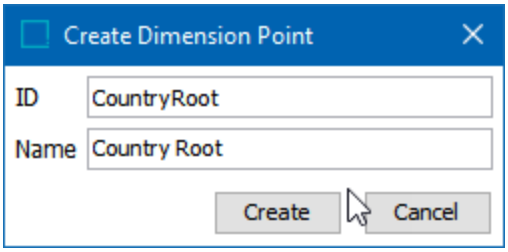
To create a dimension point:

1. On the System Setup tab, select the relevant dimension, in this example, Country.
2. Right-click and click the **New Dimension Point** option.

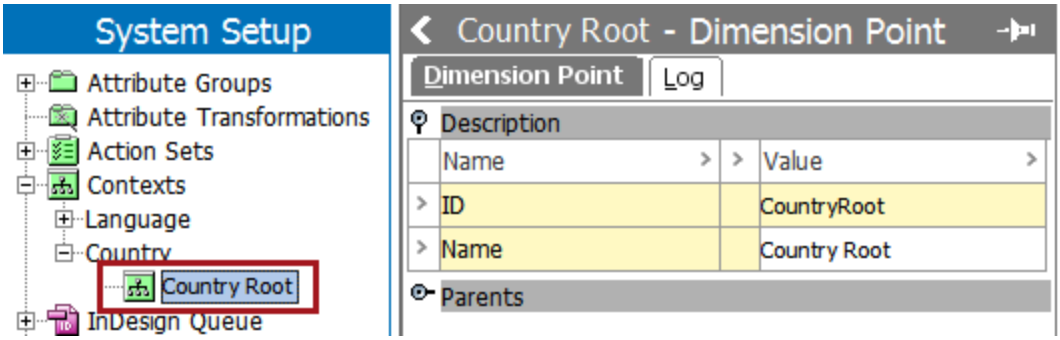
> **Note:** The first dimension point created beneath a dimension must be a root level, which is where *non*–dimension-dependent values are stored. Specific dimension points are created below the root level.



3. In the **Create Dimension Point** dialog, type the ID and Name for the new dimension point, then click **Create**. Pressing Enter on the keyboard after adding the ID duplicates the text in the Name field.



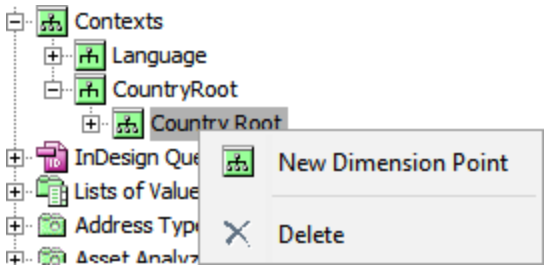
The new dimension point is created.



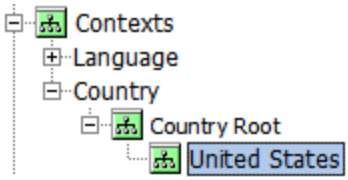
4. Create a dimension point below the root level:

   - Select the root level, right-click, and click the **New Dimension Point** option.

     Note: These specific dimension points (not the root level) are used when creating contexts.

   - Add an ID and Name and click **Create**.

5. Repeat the previous step to create additional dimension point(s) as needed.

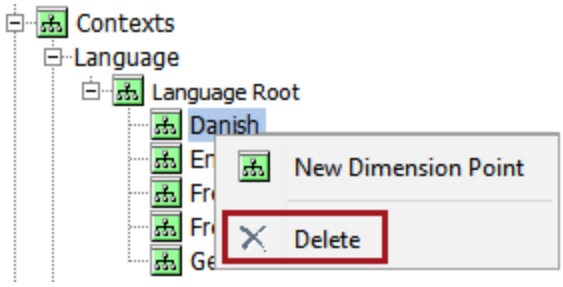
Deleting a Dimension Point

All dimension points that exist below a dimension must be deleted before a dimension can be deleted.

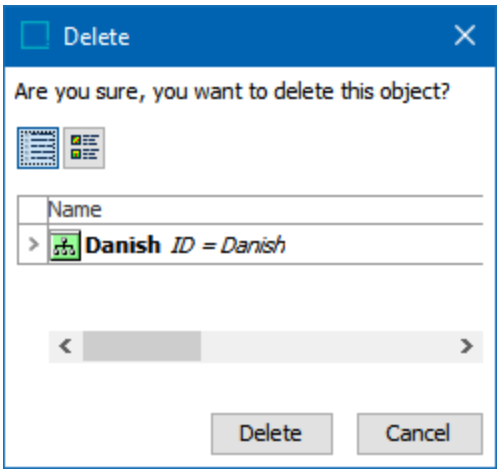
Important: When deleting a dimension or dimension point, all data that is dependent on the dimension or dimension point is permanently removed from the system. The values are not restored if the dimension or dimension point is recreated.

To delete a dimension point:

1. On the System Setup tab, on the Contexts node, select the dimension point to delete.
2. Right-click and select **Delete**, or from the Maintain menu, click the **Delete** option.



3. In the Delete dialog, click **Delete** to confirm deletion.

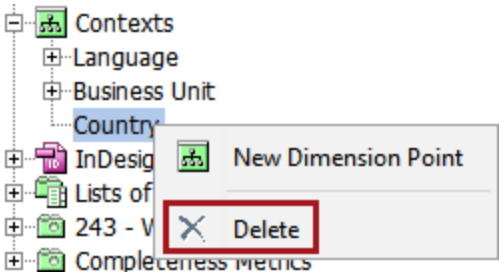


Deleting a Dimension

Once all dimension points have been deleted below a dimension, the dimension can be deleted.

To delete a dimension:

1. On the System Setup tab, on the Contexts node, select the dimension to delete.
2. Right-click and select **Delete**, or from the Maintain menu, click the **Delete** option.



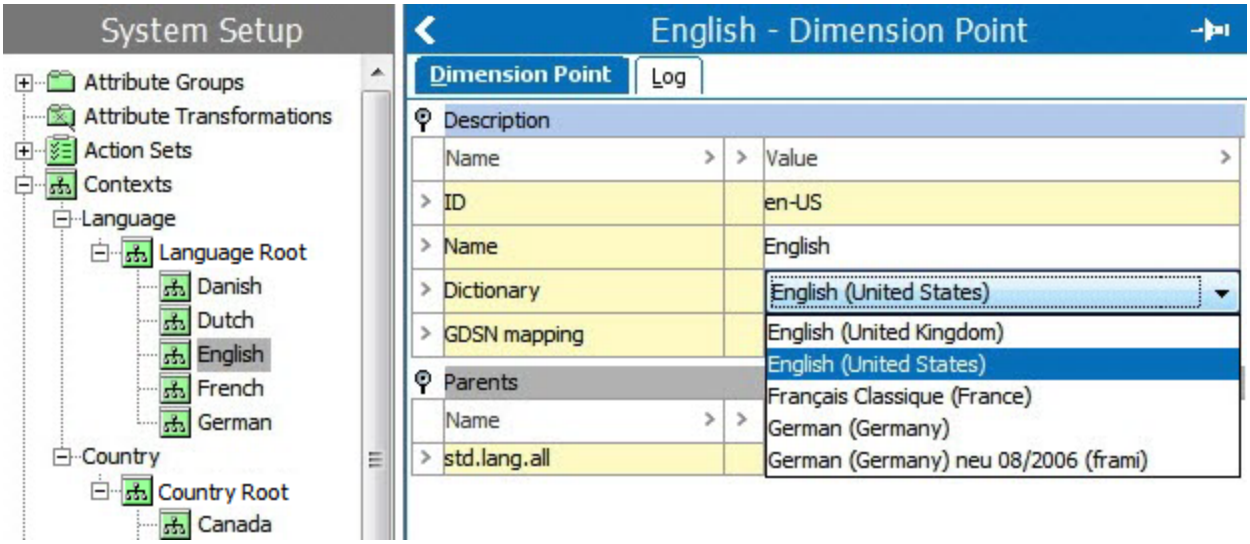
3. On the Delete dialog, click **Delete** to confirm deletion.

Selecting a Dictionary for a Language Dimension Point

A 'dictionary' can be selected for each dimension point in the language dimension. The dictionary is used to check spelling when values are typed. The list of available dictionaries on each STEP system depends on a license. Your list of dictionaries may not correspond to the list in this example.

Note: The list of available dictionaries can be extended and new words can be added to the dictionary. Contact Stibo Systems for more information.

1. On the System Setup tab, navigate to the Contexts node and select **Language**.
2. Navigate to the language dimension point under Language Root where a dictionary should be added.
3. On the Dimension Point tab, click inside the **Dictionary** field to access a dropdown of dictionaries, and click the relevant dictionary from the list.



Adding Dimension Dependency After Loading Data

Though it is always recommended to have your dimension dependencies decided and configured before loading data, sometimes, a dimension dependency to an attribute or reference type must be added after the fact.

Add Dimension Dependency to Attribute

After data has been loaded, use the following steps to add dimension dependency to an attribute.

1. Create a temporary context that has the highest level of the dimension hierarchy necessary to support the change. Refer to the Maintaining Contexts topic.

2. In the Export Manager, select all products in the database and map the attributes that you want to apply the dimension to. For more information, refer to the Creating a Data Export topic in the Data Exchange documentation.
3. Save the export configuration, as defined in the Running a Data Export topic of the Data Exchange documentation.
4. Manually save two copies of the exported Excel file.
5. In STEP, add the dimension dependency to the attribute(s), as defined in the Dimension Dependent Attributes topic.

   If an attribute uses an LOV, refer to the Using Dimension Dependent LOVs With Attributes topic.
6. In one copy of Excel, load the values back to the real working context (not the context that has the 'All' level).
7. In the second copy of Excel, replace all of the values with '[delete]' (no quotes).

   Important: It is recommended to make a small test of steps 7-9 before loading the entire file.
8. To remove the values, load the [delete] values to the temporary context that has the 'All' level of the dimension you applied to the attribute(s).

9. Re-run the export from the temporary context and verify that the values have been removed from the 'All' level.
10. Verify that the values are now in the context with the dimension point you applied to the attribute.
11. Delete the temporary context.

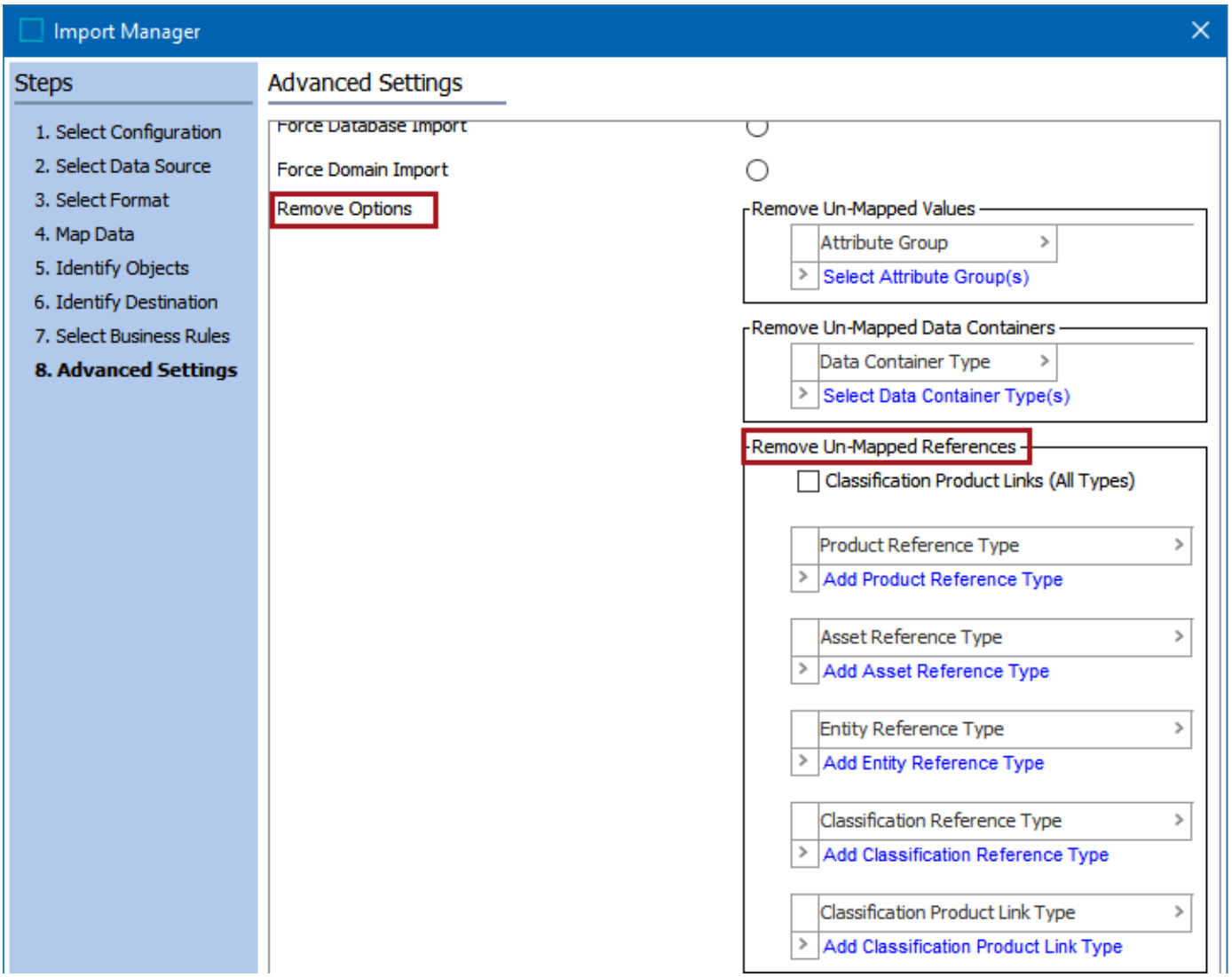
Add Dimension Dependency to Reference Type

After data has been loaded, use the following steps to add dimension dependency to a reference type.

1. Create a temporary context that has the 'All' level of the dimension you want to apply to the reference type.
2. In the Export Manager, select all products in the database and map the reference types that you want to apply the dimension to. For more information, refer to the Creating a Data Export topic in the Data Exchange documentation.
3. Save the export configuration, as defined in the Running a Data Export topic of the Data Exchange documentation.
4. Manually save two copies of the exported Excel file.
5. In one copy of Excel, load the values back to the real working context (not the context that has the 'All' level).
6. In the second copy of Excel, delete all values.
7. Import the file with deleted values to the temporary context that has the 'All' level of the dimension you applied to the reference type(s).

> **Important:** It is recommended to make a small test of steps 7-9 before loading the entire file.

8. In the Advanced Settings step of the Import Manager, in the 'Remove Un-Mapped References' box, add the type of reference. Refer to the Import Manager - Advanced Settings topic of the Data Exchange documentation.



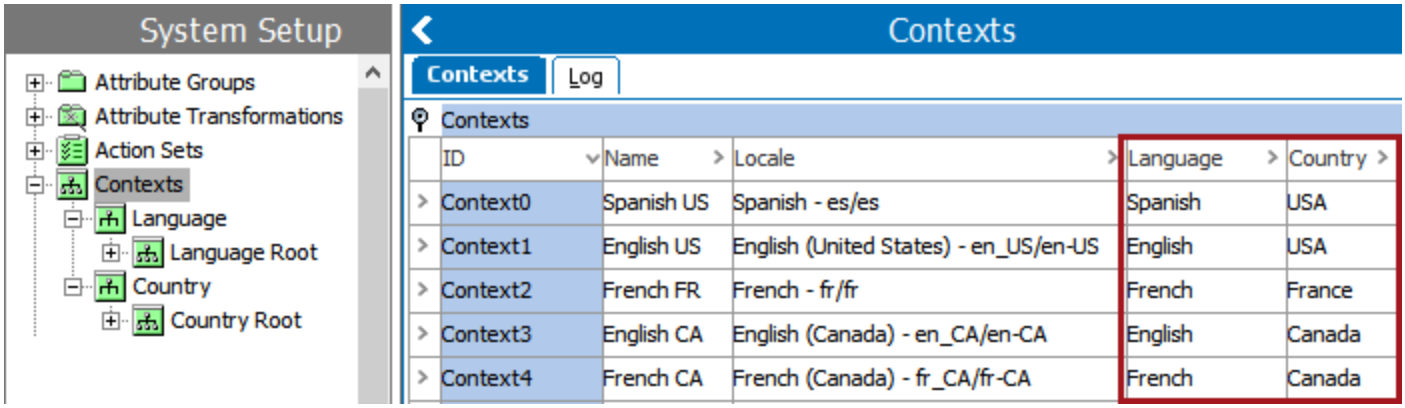
9. Re-run the export from the temporary context and verify that the values have been removed from the 'All' level.
10. Verify that the references are now in the context with the dimension point you applied to the reference type.
11. Delete the temporary context.

Contexts

A 'context' is a specific filter placed on data in STEP which groups a set of dimension points, allowing data to vary based on context. Each context is a combination of different dimensions, such as language and country. One and only one dimension point from each dimension can be associated with a specific context.

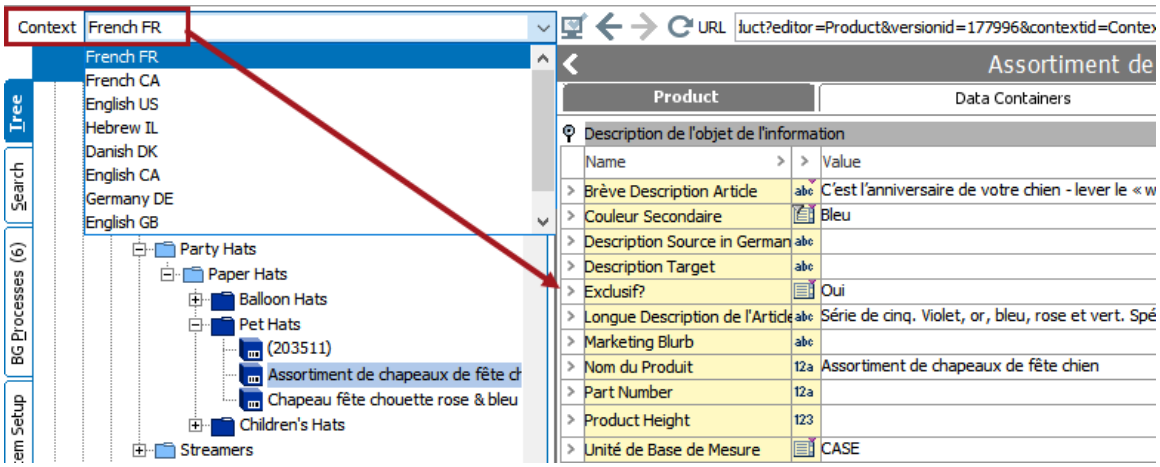
Note: Data is not stored in contexts.

In the below screenshot, the Language and Country columns contain the relevant dimension points.



When selecting a context from the Context dropdown list in the upper left of the STEP Workbench interface, the product data being viewed will change and only data that is valid within the selected context will be displayed. The below screenshot shows a list of contexts available within this specific STEP instance and the view of French data.

If the data being viewed is a dimension-dependent STEP name, and no name value has been provided in the context you are viewing, the ID, in parentheses, displays in the name field instead. For example, the ID 203511 is displayed as the name in the image below.



Dimension Dependent Data

Data is stored in STEP in dimension points, not in contexts. In order to place data into different dimensions, the object type, attribute, and/or reference type that will either contain or link the data together must be made dimension dependent.

- **Object types** are made dimension dependent if they should have different STEP **names** in different contexts. In most cases, this is because the names are translated into different languages, though they may also have different names in different markets, for example.

  For information on making object types dimension dependent, refer to the Maintaining Dimension Dependent Object Types topic.

- **Attributes** are made dimension dependent when their **values** should be different in different contexts. This also includes lists of values (LOVs).

  For information on making attributes dimension dependent, refer to the Dimension Dependent Attributes topic in the Getting Started documentation.

- **Reference types** are made dimension dependent when different linked objects (typically assets) should be visible in different contexts.

  For information on making reference types dimension dependent, refer to the Dimension Dependent Reference and Link Types topic.

- **Assets** can be made dimension dependent but this is a global setting applied from System Setup, Users & Groups, within the Image & Document Settings node.

  For more information, refer to the Image and Document Settings topic.

  > **Note:** In most circumstances, assets can be 'swapped out' in different dimensions by use of dimension-dependent reference types.

For information about contexts and Web UI functionality, refer to the Multi Context Screen topic and the Global Navigation Panel topic, both in the Web User Interfaces documentation.

Context Recommended Practices

While STEP is highly configurable for creating and maintaining contexts, certain implementation standards apply. This topic outlines considerations to your system to handle dimension-dependent data.

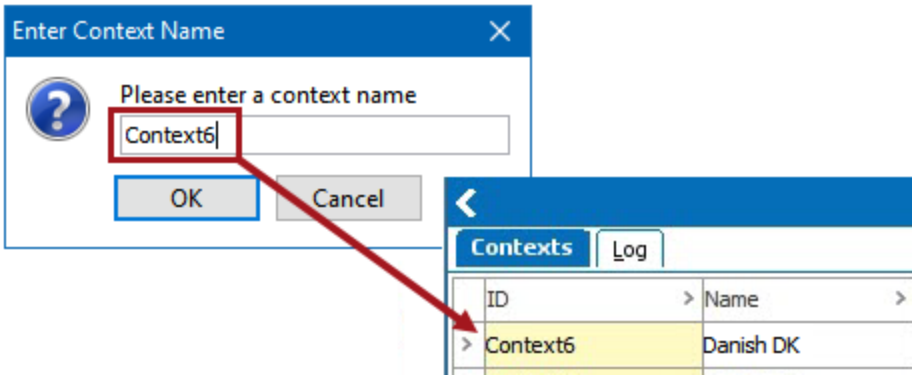
Context Recommendations

- Plan for future change.

  Use IDs that will still make sense when situations change. For example, if you only start with a language and country dimension and assign an ID like 'EN-USA', later, if you add a Market dimension, the original IDs no longer make sense. While you could delete the original context and create a new one, downstream systems that are receiving feeds may need to make adjustments to accept the new files. Also, for print implementations, hundreds or thousands of InDesign pages with the original context ID stored in the page files may have been created.

- Use a generic ID and do not use the ID as the name.

  Make the name readable by users. Unlike most objects in STEP, Context IDs cannot be auto-generated.



Context Warnings

- Create only the combination of *dimensions* that you need; do not create a context that will not be used immediately.
- Do not use an **All** or **Global** level in a context; for example, use a real language and a real country.

  A global context is where the All Languages + All Countries dimensions are used. Since nobody speaks all languages and nobody lives in all countries, no one should maintain data there.

- Avoid asking users to work in multiple contexts.

  Working in multiple contexts involves a high risk that someone will accidentally enter content in the wrong context, and it is difficult to find these situations and correct them.

Using a Global Context

- Do not use a **global** context. Working in a global context results in unnecessarily inherited values. For more information on value inheritance in dimension-dependent attributes, refer to the Dimension Dependent Attributes topic in the System Setup documentation.

  Problems that could be caused by using a global context include:

  - A user logs in to a global context to create some attributes. They also do some sort of data maintenance in STEP. If they forget to switch contexts before entering language-dependent data in English, they have stored that information in the root level instead of the 'English' level. That is not where it belongs, and it should be moved.
  - A user forgets that they are in the global context and exports data to share. This file would not contain any of the language- or country-dependent data, so the file is incomplete.

Deleting a Global Context

Removing a global context from an existing system requires analysis and possibly significant cleanup and rework, for example, re-pushing assets.

Do not delete a global context with data in the following scenarios:

- If the data is inherited from the global context by other contexts, though the data will still exist, it will likely no longer be editable.
- If the context is assigned to a configuration (integration endpoint, export, import, etc.), the configurations will no longer be valid.
- Dimension dependent assets, especially in a print initiative where images are pushed to folder structures corresponding to the dimension, cause functions such as 'Replace Asset Content' to be impossible.

Important: Deleting a global context that contains data will affect ALL data in the context; including attribute values, LOV values, metadata on links, references, assets, etc.

- If a global context already exists on your system—and **it contains no content**—delete it.
- If a global context already exists on your system—and **it contains content**—do not delete it, unless you plan to first move the data into a different context.

Contexts in Web UI

The following impacts Web UI Context ID:

Important: The following characters: '/', '\n', '\r', '\t', '\0', '\f', '`', '?', '*', '\\', '<', '>', '|', '\"', ':', '\u2192'

are not allowed in a Web UI:

- Screen ID
- Context ID
- Workspace ID

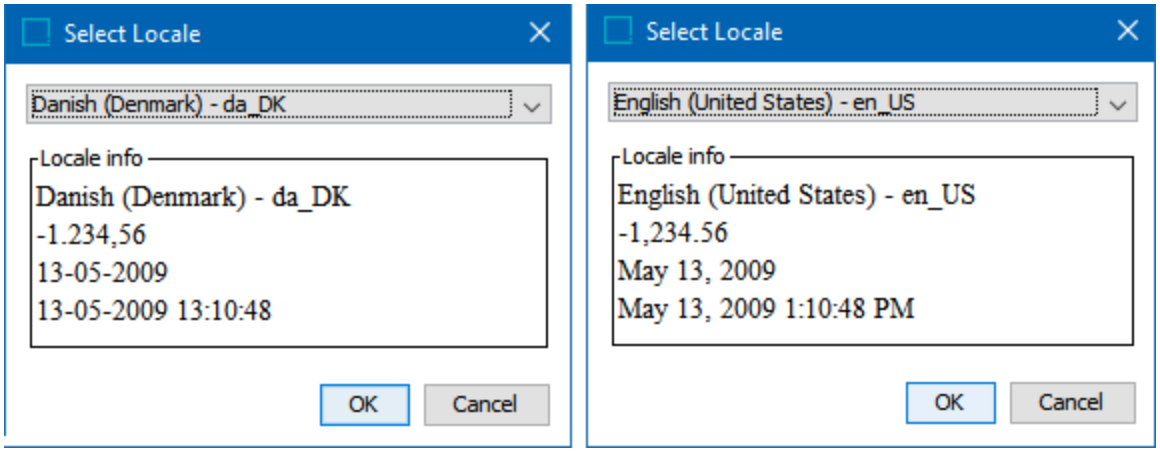
If these characters do exist in an older version of STEP and you update to a newer version, they will be replaced with '_' character.

Context Locales

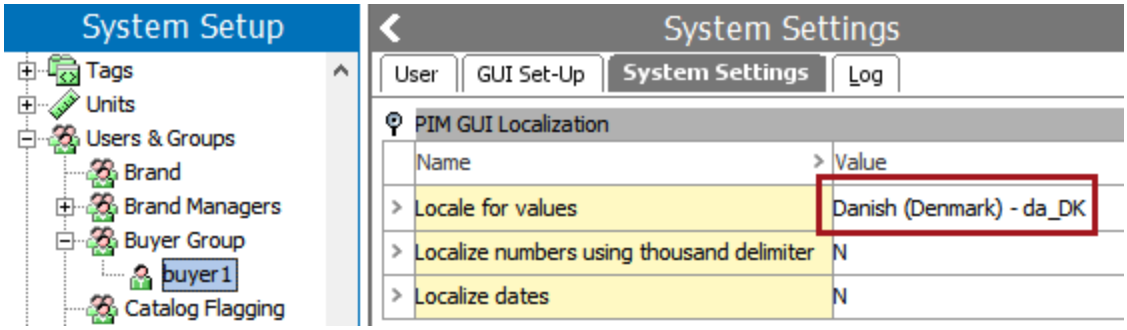
A 'locale' is a part of a context. Locales control the display for users in the workbench, as well as the Web UI buttons, tabs, etc.

Note: Locale settings on the workbench should not be confused with the Web UI locale. In the Web UI, users can select a locale when logging in and, if there is a localized version of a Web UI, the localized screens display. For more information on Web UI locale, refer to the Localization topic in the Administration Portal documentation.

Locales control the decimal separator in attributes that are numbers, fractions, and embedded numbers. Additionally, locales control the appearance of dates. Attributes with the validation of Numeric Text and Numeric Text (exclude tags) are text attributes and are not affected by the locale functionality.



Locales can be set on individual users in the 'Locale for values' field on the System Settings tab, located under System Setup > Users & Groups. Setting a locale for a user controls how the user accesses data in the workbench, regardless of which context they are working in.

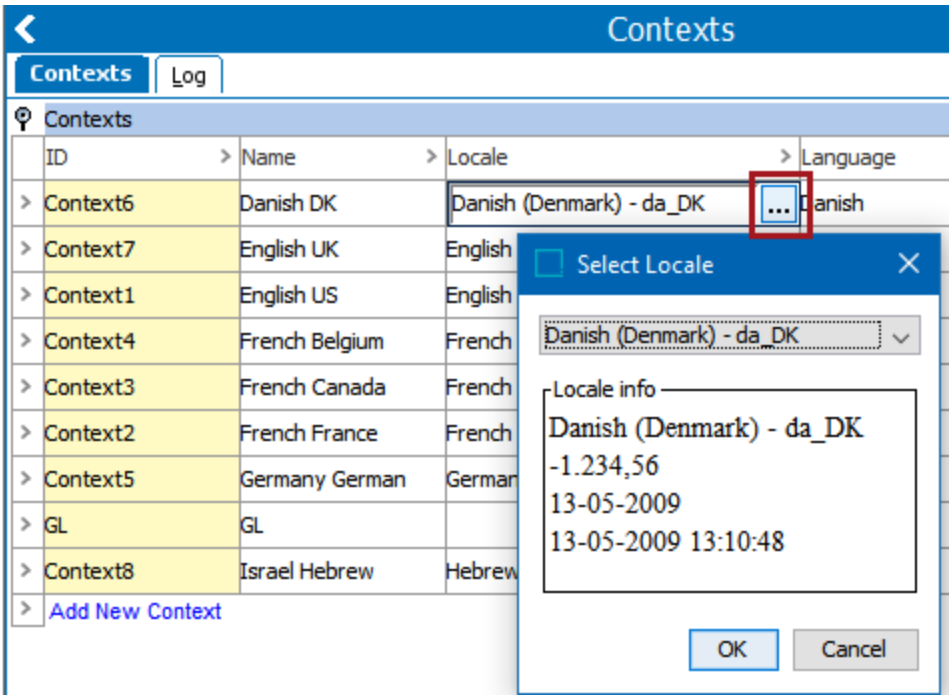


For more information on using locale with users in System Setup > System Settings, refer to the GUI Localization topic in the System Setup documentation.

Locales are also used in attribute transformations, STEP table transformations, and in Print Publisher.

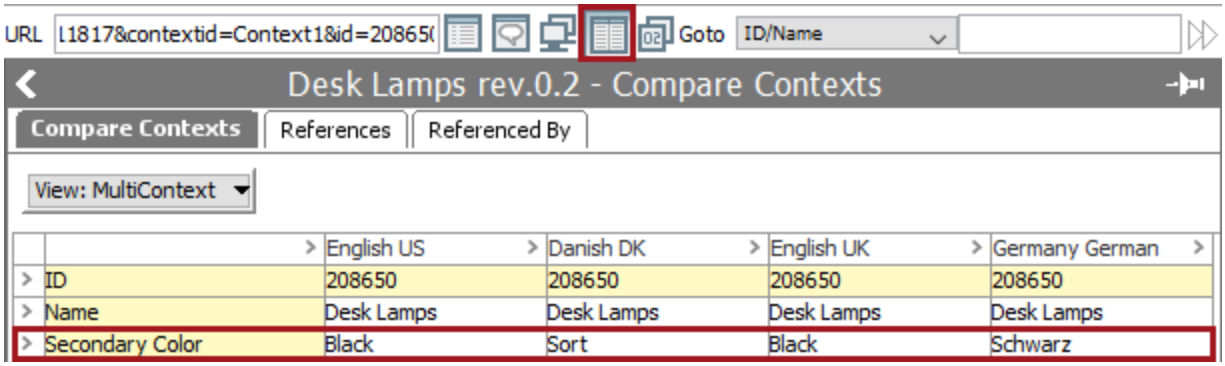
Locale Recommendation

Although the locale can be left blank, it is recommended to set the locale for the country in each context.



Context Mode View

The context mode view allows users to compare values in multiple contexts. For example, selecting contexts that include values in different languages displays the language-dependent attribute values for each context.



When using the Context Mode view:

- To display the Compare Contexts view, click the context mode button ( ) in the toolbar.
- To modify the contexts displayed, on the View menu, click the **Target** option, as described in the View Menu topic of the Getting Started documentation.
- To limit the number of attributes displayed, use a **View**. For more information, refer to the **Multi-Editors** section of the Editing Objects in the Tree Tab topic in the Getting Started documentation.
- To filter, sort, rotate, and hide data, right-click a column header or data row.

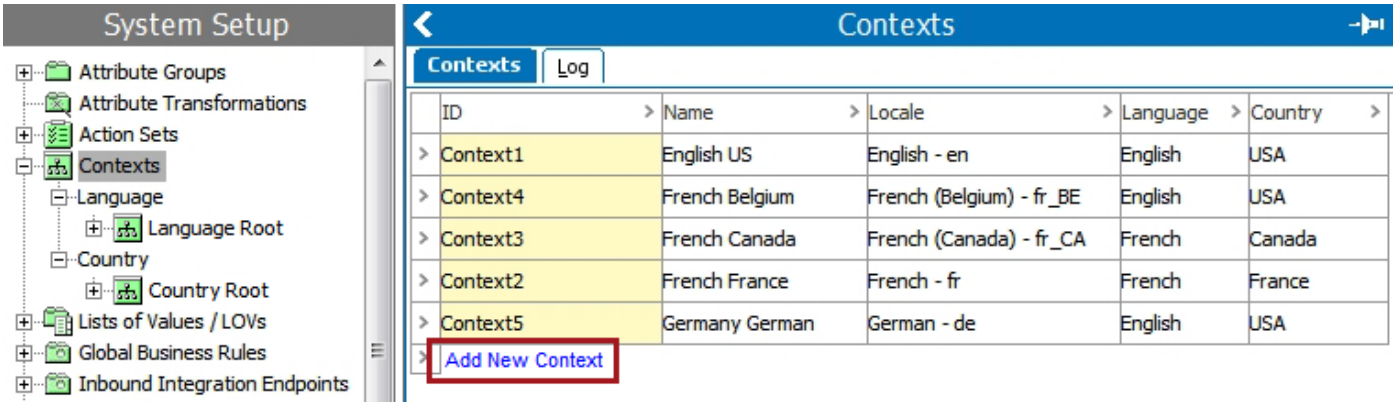
Maintaining Contexts

This section describes how to create, edit, and delete contexts, and how to specify a default context. It also explains 'hidden values', which can be caused when a context is deleted.

Creating a Context

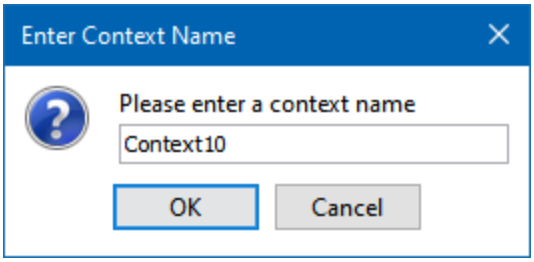
Contexts are maintained on the System Setup tab under the Contexts node. A context must contain, at minimum, one language dimension point; for example, English.

1. Verify that the required dimension and dimension points exist. For more information, refer to the Maintaining Dimensions and Dimension Points topic.
2. On the System Setup tab, click the Contexts node, and click the **Add New Context** link.

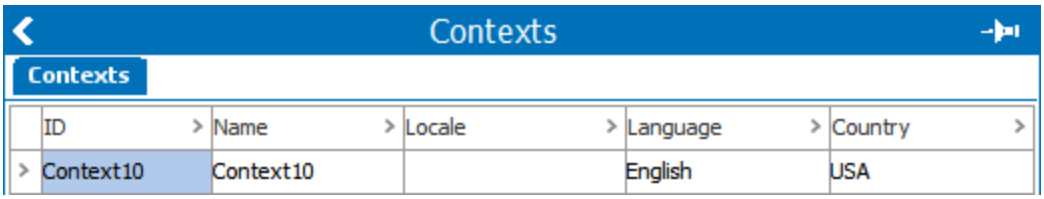


3. In the **Enter Context Name** dialog, enter a name for the context and click **OK**.

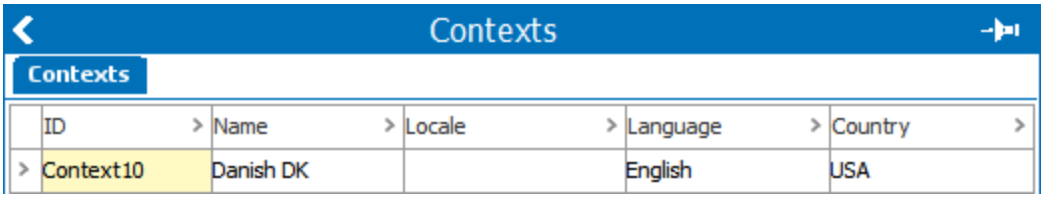
Important: By default, the name entered in this field also becomes the context **ID**. Refer to the Context Recommended Practices topic for suggestions on context ID format.



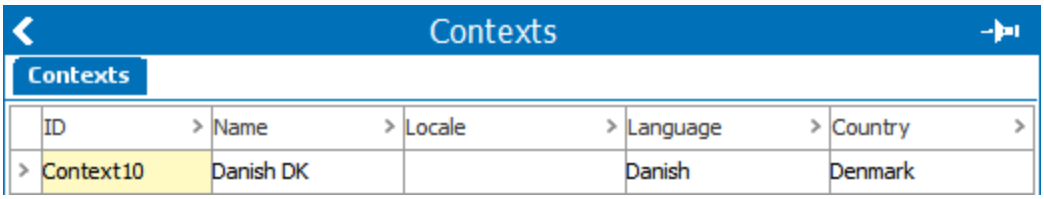
A new context displays with a blank locale and selections for the available dimensions.



4. In the **Name** column, replace the auto-created name with a new, user-friendly name that is different than the ID. Refer to the Context Recommended Practices topic for suggestions on naming contexts.

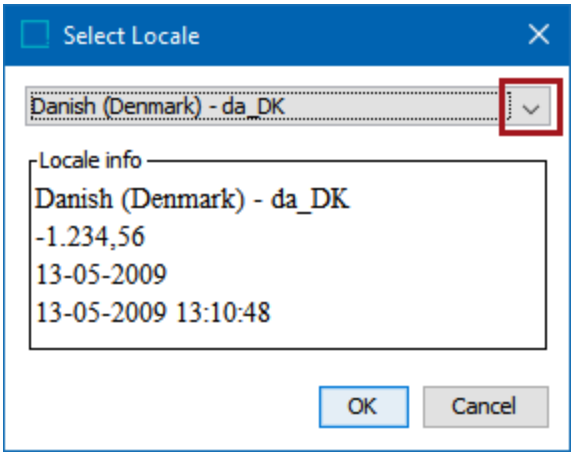


5. Click into the available dimension point column(s) to display a dropdown and make a selection. For example, Language and Country as shown below.

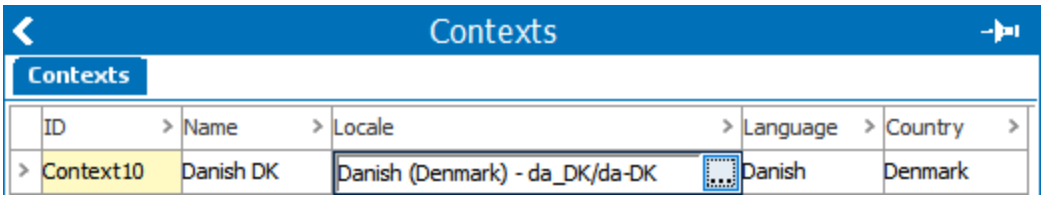


6. Click into the **Locale** field to display an ellipsis, click the ellipsis button (...) to display the Select Locale dialog.

7. In the Select Locale dialog, choose the relevant locale from the dropdown list and click **OK**.



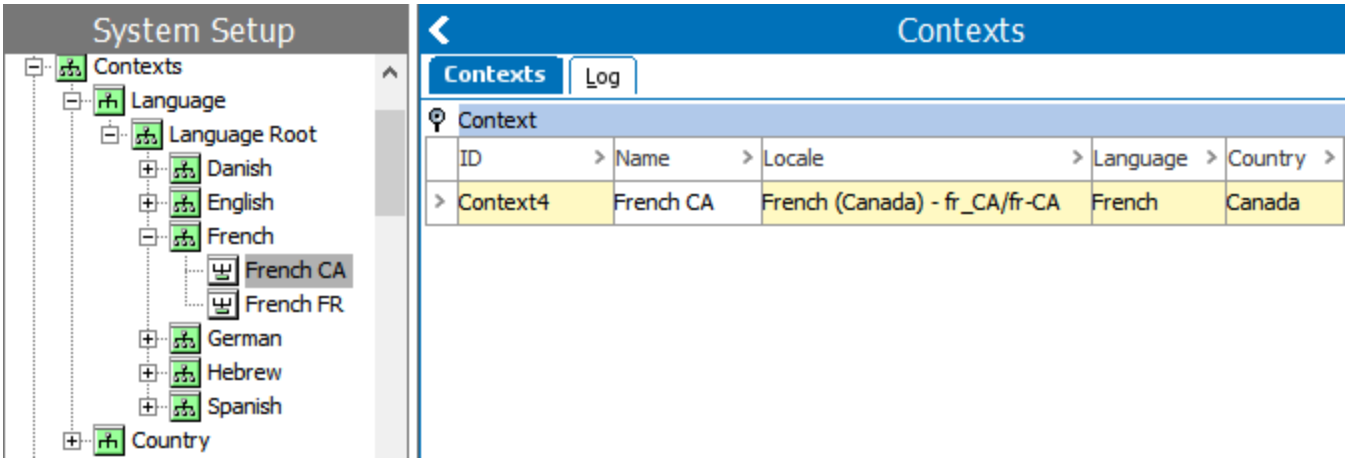
The locale now displays in the Locale column.



For more information on locales and how they are used in contexts, refer to the Context Locales topic.

The context is created and available in the dropdown list of available contexts in the upper left corner of the workbench, as well as in the System Settings menu in the Web UI.

Contexts are displayed on the Contexts node, and are also displayed below the dimension points that are part of the context. Use the editor on the Contexts node to edit more than the name of a context. Expanding the folders of the Dimension hierarchy to view the context icons provides a visual representation of the applicable contexts and can help to validate that the required contexts are configured. On systems where there is more than one dimension, contexts display under each hierarchy where they are configured.



Editing a Context

For existing contexts, the following values can be edited on the Contexts node:

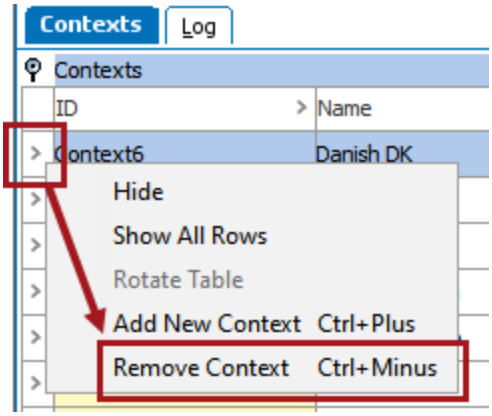
- Name
- Locale
- Dimension point selection

The ID cannot be edited; instead, create a new context to generate a new ID.

Deleting a Context

To delete a context:

1. Identify the context to delete, right-click on the arrow to the left of the context ID to display the context menu.



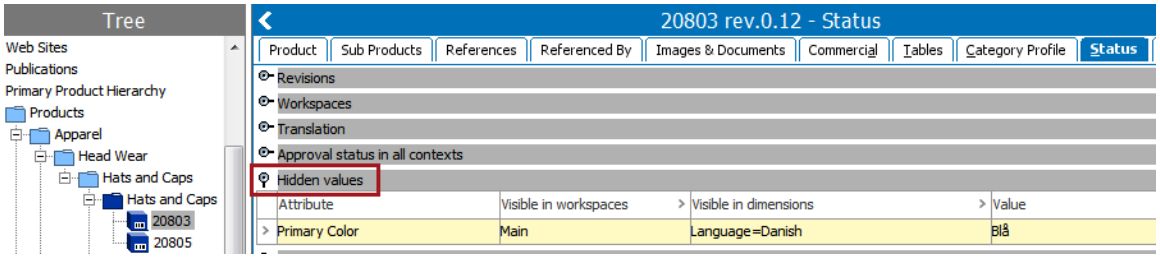
2. Click **Remove Context** (or use the Ctrl + Minus keyboard hot key) to delete the context.

Hidden Values

Values are hidden when a context is deleted:

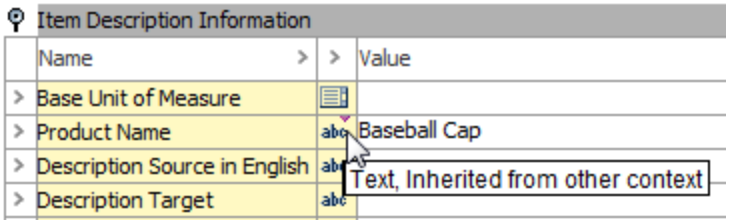
- If attribute values exist in the deleted context
- If no other contexts use the dimension point
- If the attribute(s) are dependent on the dimension point contained within the context (e.g., language or country)

Hidden values are visible on the Status tab within the 'Hidden values' flipper.



The values redisplay if the context is added again, or if another context is created that uses the same dimension point.

In a standard editor, values inherited from another dimension have a purple indicator in the attribute icon, as shown below:



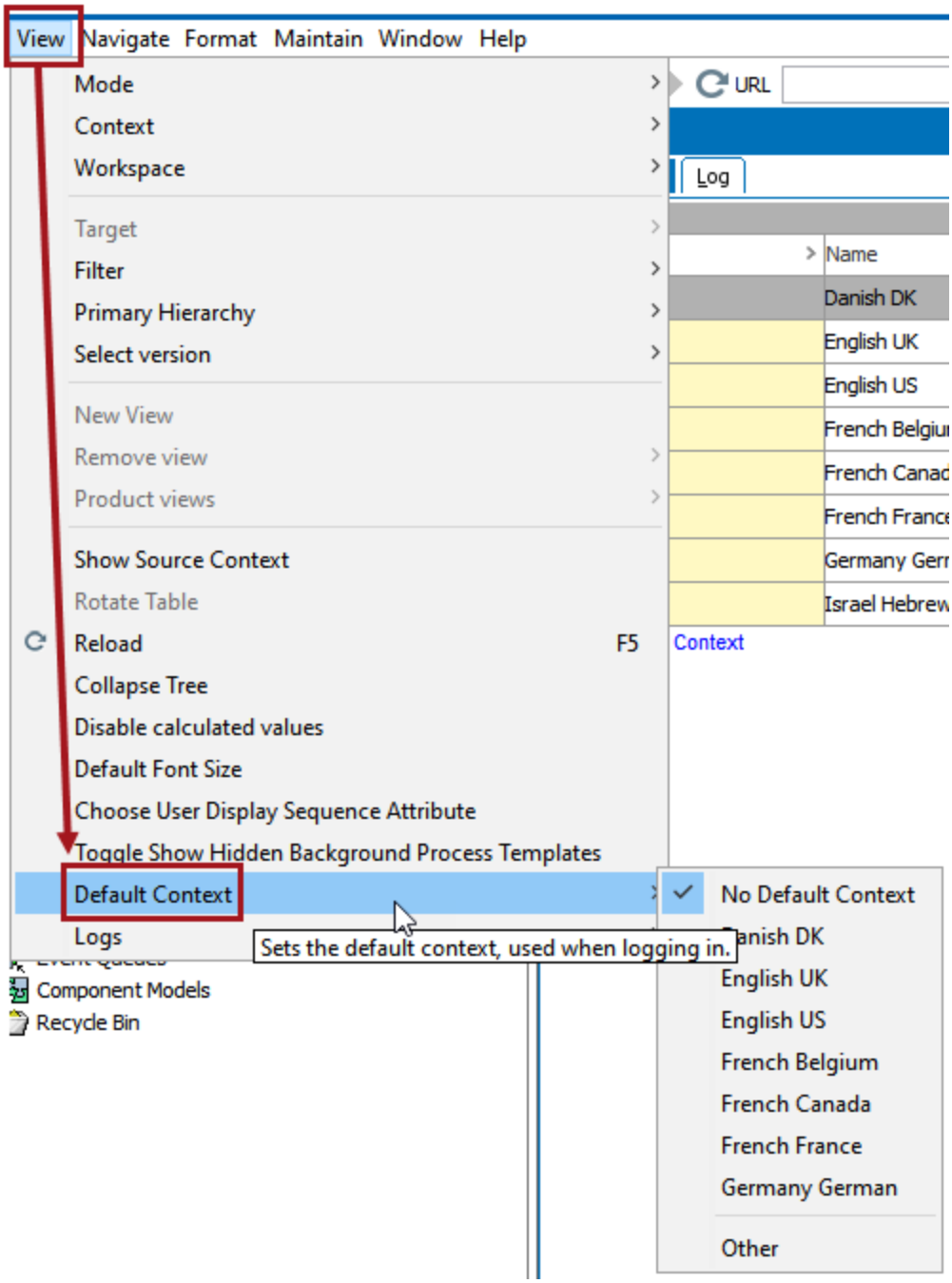
Note: Deleting a context can also cause a product to not be fully approved even if it is approved in all contexts, due to existing values in a deleted context.

Specifying a Default Context

It is recommended that users work in a single context to avoid adding data in the wrong context (for details, refer to the Context Recommended Practices topic). Setting a default context can help alert users when they are not in the preferred context.

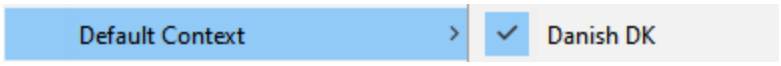
To specify a default context, use the following steps:

1. From the View menu, highlight the **Default Context** option to display the available contexts.

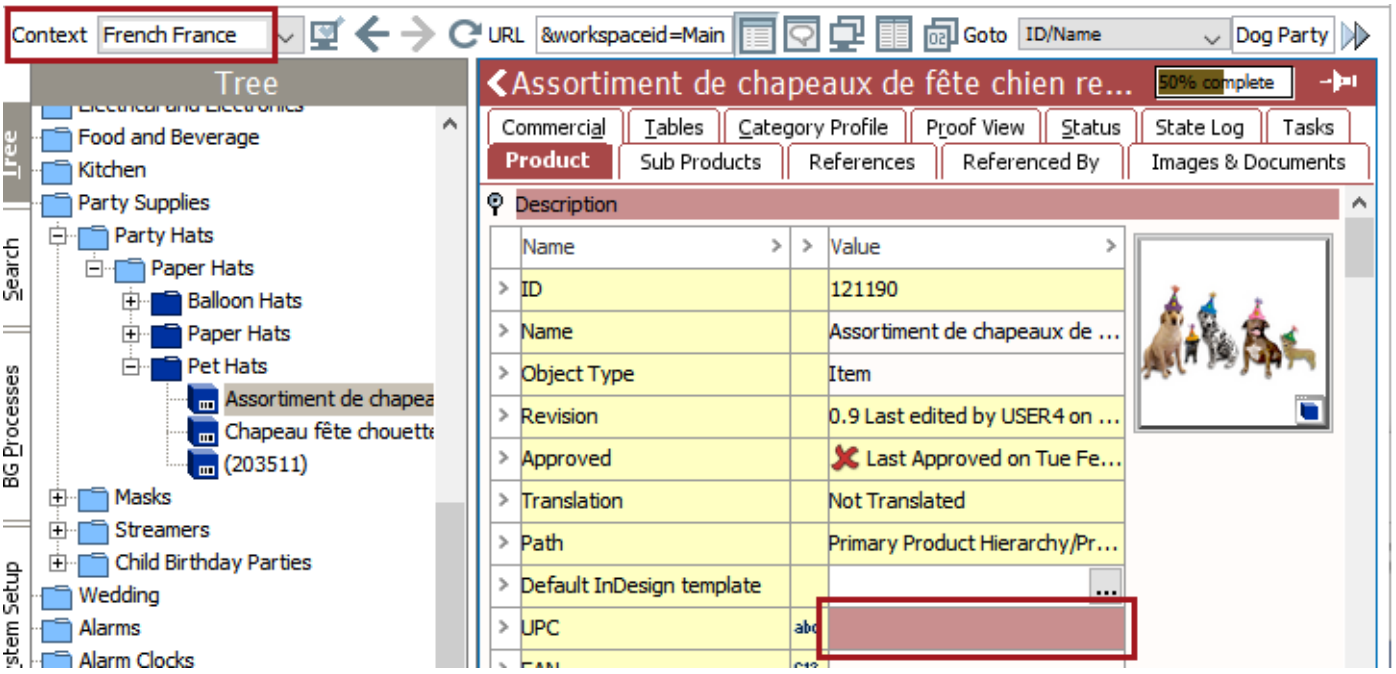


2. Make a selection:
   - Choose 'No Default Context' to remove any default.
   - Select a preferred context from the list.
   - Click **Other** to display more contexts, select from the 'Other Contexts' dialog, and click **OK**.

The selected default is identified with a checkmark on the Default Context menu item.



When a Default Context is selected, a dark pink / light red title displays for the focused area to indicate that the selected context is not the default. Additionally, attribute editor fields will turn pink when selected. In this example, since the default context is Danish DK, the title color changes when French France context is selected.



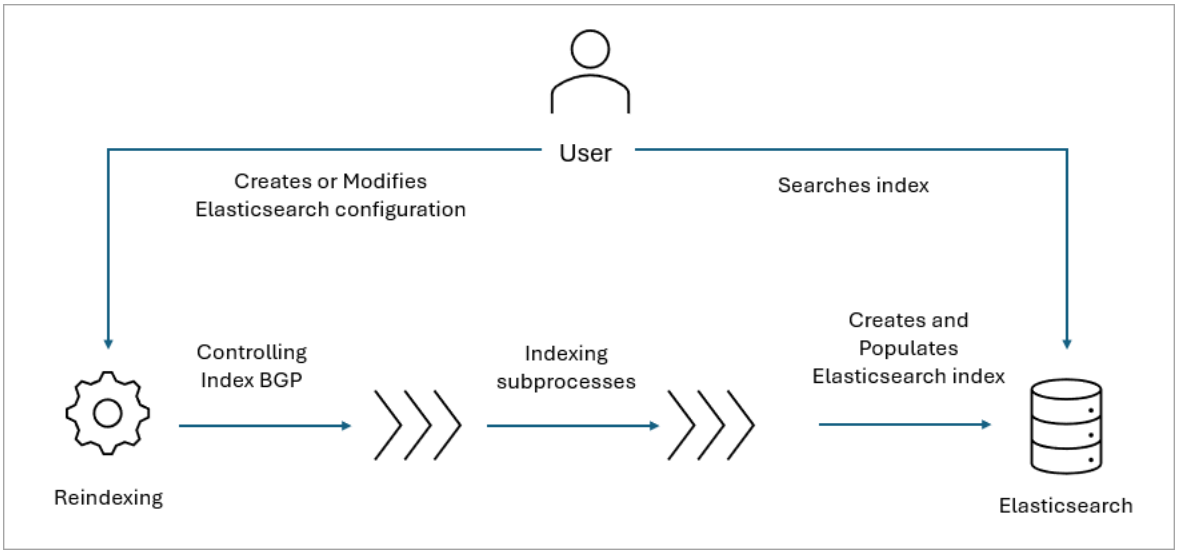
Elasticsearch Setup

Setting up an Elasticsearch configuration determines the STEP data that is provided to the Elasticsearch database to provide a modern faceted search experience. The configuration defines how data can be searched using the Web UI Search Screen.

Note: The enablement of Elasticsearch is a requirement to use Instrument UI. For additional information, refer to the Instrument User Interface topic.

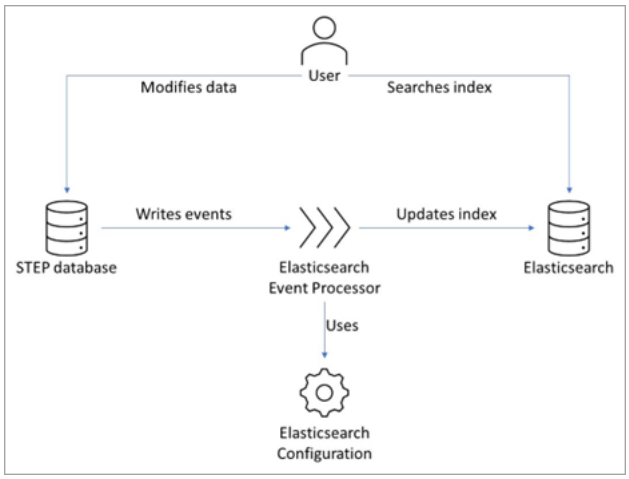
Note: Elasticsearch can display product, entity, classification, and/or asset data only, based on configuration.

Creating an Elasticsearch configuration automatically creates or identifies the related event processor. The Elasticsearch configuration triggers a background process that collects STEP data indicated by the configuration and delegates the indexing to multiple Elasticsearch indexing background processes that run concurrently to push the data to the Elasticsearch database. For more information, refer to the Elasticsearch Index Publishing topic.



The Elasticsearch Configuration wizard adds a number of data specifications automatically, while attributes, attribute groups, link meta / source / target data, and child attributes can be added manually. Each item added manually can be configured for full-text search, ID queries, and can be set to display as a default facet.

Incremental updates are handled by the Elasticsearch event processor. The event processor polls for updates to the data, and if any are found, creates an Elasticsearch indexing background process that pushes the data to the Elasticsearch database.



For illustrations of search results using the faceted Search Screen, refer to the Search Screen Search Result Examples topic.

Important: Ideally, the configuration should include only the data necessary to allow users to easily scope and shape the desired search results. Excessive data in Elasticsearch can negatively impact the response time of searches on the faceted Search Screen. Carefully consider the attributes and references to configure initially and expand the configuration as you determine additional information is required.

To use Elasticsearch, complete the setup steps in the following topics:

1. For on-premises systems, perform the one-time setup as defined in the On-Premises Initial Setup for Elasticsearch topic and the Searchable Object Types in Elasticsearch topic.
2. Create an Elasticsearch object type as defined in the Creating an Elasticsearch Object Type topic.
3. Create and edit an Elasticsearch configuration and the required event processor as defined in the Creating and Maintaining an Elasticsearch Configuration topic.
    - For details on 'data specifications' used in the Elasticsearch configuration, refer to the Elasticsearch Data Specification Type Examples topic.
4. Add STEP data to the Elasticsearch database as defined in the **Reindex the Elasticsearch Database** section of the Elasticsearch Index Publishing topic.

For more information on using Elasticsearch on the Web UI Search Screen, refer to the Search Screen topic.

Elasticsearch Quick Start

After completing the steps in the On-Premises Initial Setup for Elasticsearch topic and the steps in the Creating an Elasticsearch Object Type topic , use these minimum viable configuration steps to understand how Elasticsearch works in Web UI to provide a faceted search experience. Then further configure the 'quick start' configuration to provide the full dataset necessary for end-user searches.

Refer to details and additional information in the Creating and Maintaining an Elasticsearch Configuration topic.

Note: Elasticsearch can display product, entity, classification, and/or asset data only, based on configuration.

Prerequisites

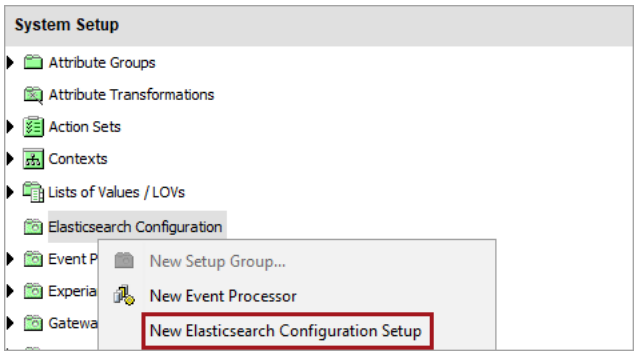
Ensure the STEP data you want to display in the Web UI faceted Search Screen meets the required conditions based on the Searchable Object Types in Elasticsearch topic.

Note: The 'Revert to' a previous revision option on the Status tab of an Elasticsearch Configuration Type object is not allowed. Manual configuration is required to restore previous settings.

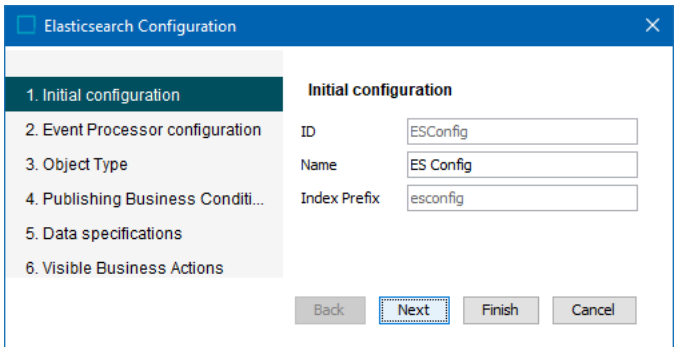
Configuration

Use the following steps to create a 'quick start' version of the Elasticsearch Configuration for faceted search:

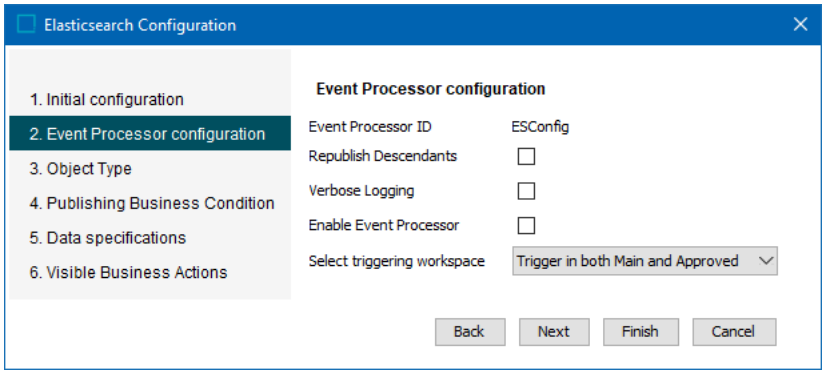
1. In workbench System Setup, right-click the Elasticsearch Configuration node and then click the **New Elasticsearch Configuration Setup** option.



2. On the Elasticsearch Configuration wizard 'Initial configuration' step, add an 'ID' and move to the next parameter to autofill the 'Name' and 'Index Prefix.'

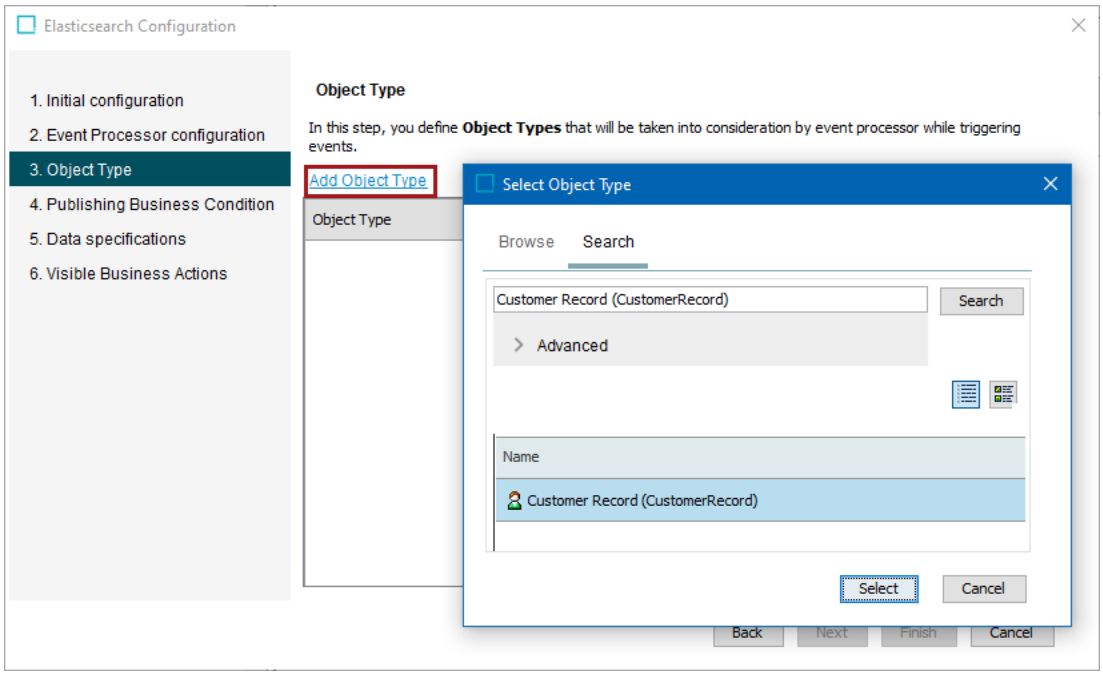


3. Click the **Next** button to display the 'Event Processor configuration' step and set:

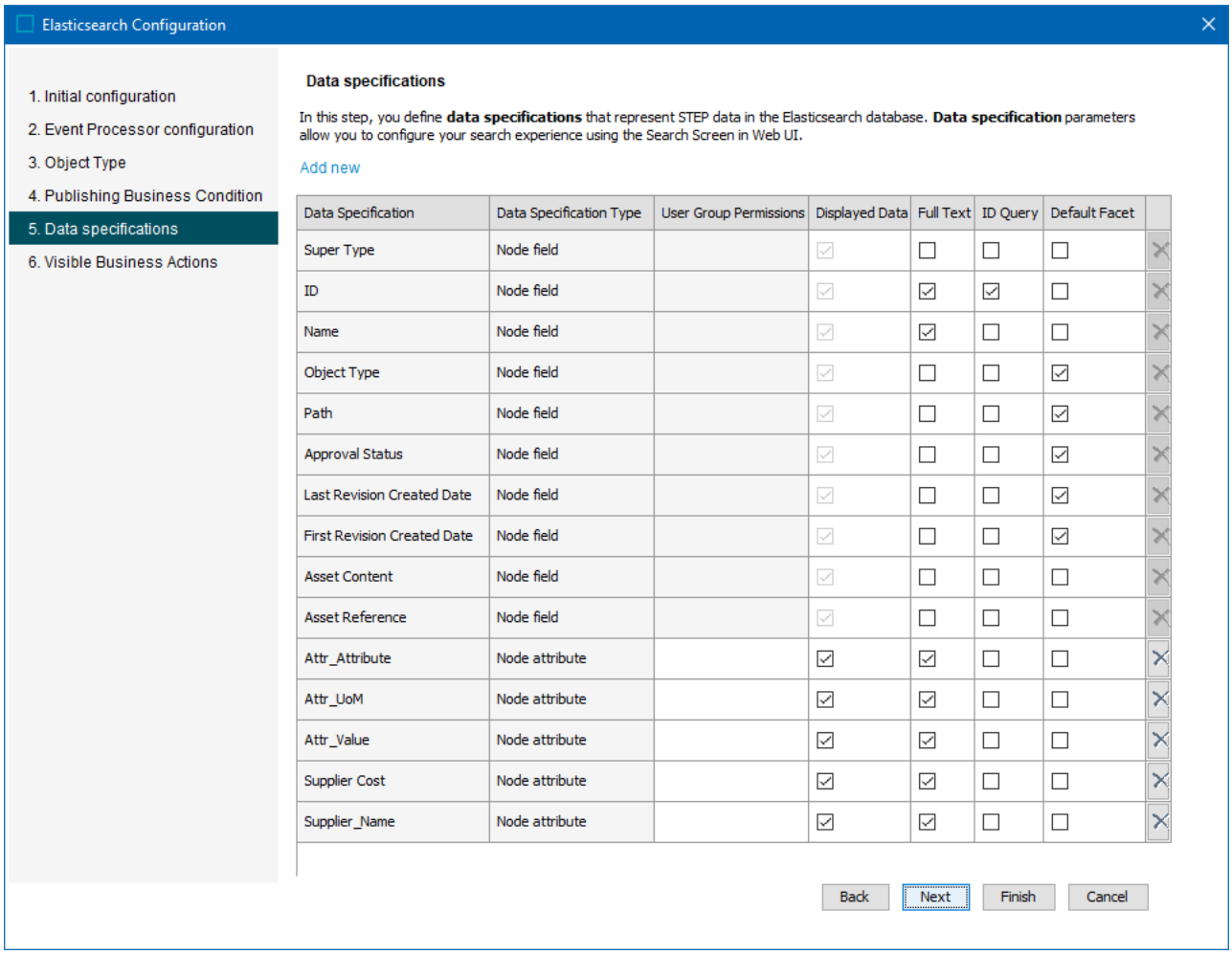


   - **Republish Descendants** - unchecked.
   - **Verbose Logging** - unchecked.
   - **Enable Event Processor** - checked.
   - **Select Triggering Workspace** - Trigger in both Main and Approved.

4. Click the **Next** button to display the 'Object Type' step:
   - Click the **Add Object Type** link
   - Select the object types that should be available for searching in Elasticsearch via the Web UI Search Screen.
   - Click the **Select** button



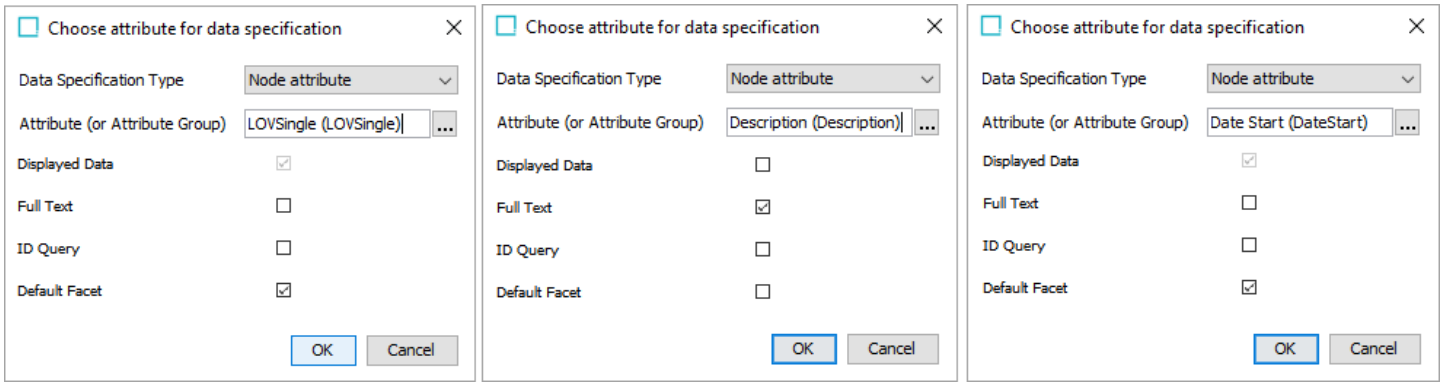
5. Click the **Next** button to display the 'Data specifications' step.



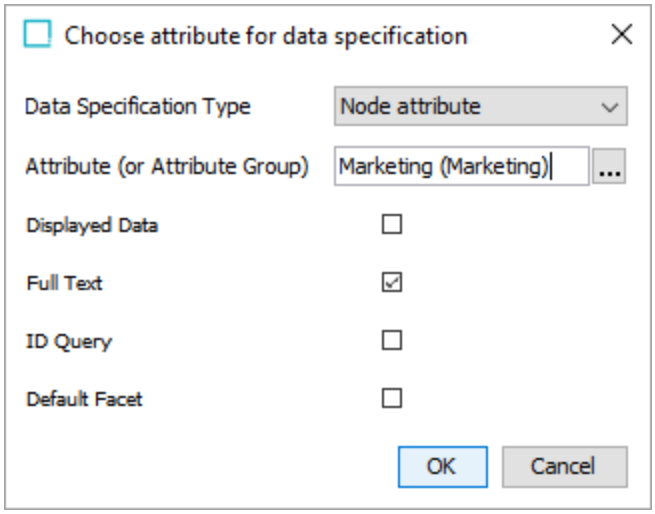
Definitions

- **Displayed Data** includes the data specification to use as facets (either by default or as needed) and can be included in the search results.
- **Full Text** includes the data specification value in full text searches via the search bar and is recommended for text-based attributes.
- **ID Query** includes the data specification value in ID searches via the search bar and is recommended only for attributes that hold values used as identification of an object.
- **Default Facet** includes the data specification as a default facet for filtering and is recommended for attributes with values that are useful for narrowing down search results.

6. Optionally, add individual attributes or add an attribute group to the configuration as follows:
   - For individual attributes: Repeat this step three (3) times to make a selected LOV, Text, and Date attribute available for searching. Click the **Add new** link to display the 'Choose attribute for data specification' dialog. Set the parameters shown below for your LOV, Text, and Date attribute and click the **OK** button.



- For an attribute group: Select a group to have all attributes in the group added as an individual data specification with the selected options, and make them available for searching. Click the **Add new** link to display the 'Choose attribute for data specification' dialog. Set the parameters shown below for an attribute group and click the **OK** button.



7. Update the default entry for the **Name - node field** data specification to be included as an **ID Query** so that text in the search bar returns exact matches for name or ID.

Data Specification	Data Specification Type	User Group Permissions	Displayed Data	Full Text	ID Query	Default Facet	
ID	Node field		☑	☑	☑	☐	✕
Name	Node field		☑	☑	☑	☐	✕
Object Type	Node field		☑	☐	☐	☑	✕

8. **User Group Permissions** is available only when the Elasticsearch Permissions and STEP Privileges searchable data setup option is employed. For details, refer to the Searchable Object Types in Elasticsearch topic.

   If necessary, limit availability to the data specification in the Search Screen based on user group. Permissions cannot be set for 'Node field' data specifications.

- Select the data specification field to be modified (the cell turns blue), right-click, and select the **Edit** option.
- On the 'User Group Selection' dialog, select the groups that require access to the data specification in the Search Screen and click the **Select** button.

Important: If no User Group Permissions are set, all users of the Web UI Search Screen can use the data specification as defined in the Elasticsearch Configuration.

9. Click the **Finish** button to complete the wizard and activate the configuration.
10. Complete the steps to publish STEP data to the Elasticsearch database as defined in the Elasticsearch Index Publishing topic.
11. Add the Search Screen to your Web UI as defined in the **Configuration** section of the Search Screen topic.

Searchable Object Types in Elasticsearch

The following super types are searchable within Elasticsearch using the Search Screen in the Web UI:

- Products
- Attributes
- Classifications
- Entities

Refer to the Creating and Maintaining an Elasticsearch Configuration topic for additional information.

Considerations, Limitations, and Recommendations for STEP Privileges

Elasticsearch Permissions and STEP Privileges includes the following limitations:

- Full-text Search Results Can Include Hidden Values
- Facets Can Include Hidden Attribute Values

Full-text Search Results Can Include Hidden Values

When a Data Specification is configured as ‘Full Text’ or ‘ID Query’ in the Elasticsearch configuration, the search result will not exclude objects where the user is not allowed to view the value being searched on, as long as the user is allowed to view the object. However, the search result will only display the values the user is allowed to view. Because of this, a user may be able to conclude a value without being able to view it.

Example:

- Joe is privileged to view product with ID 123456 and Name of 'Blue Shoe'.
- Product with ID 123456 has an attribute of Description with a value of 'This is a blue shoe with Velcro fastener'.
- Joe is not privileged to view values of the Description attribute for product with ID 123456.

Joe searches for 'Velcro'. The search result contains product with ID 123456 but does not display the value 'This is a blue shoe with Velcro fastener.'

For details on Full-text and ID Query searches, refer to the Creating and Maintaining an Elasticsearch Configuration topic and the Search Screen Search Bar topic.

Note: Use caution when setting both Full Text and User Group Permissions on the Elasticsearch Configuration to avoid unexpected search results.

Facets Can Include Hidden Attribute Values

Data Specification configured as 'Displayed Data' in the Elasticsearch configuration allows users to view the data as a facet. When this is configured, the facet's dropdown will not exclude values the user is not privileged to view when those values originate from objects the user is privileged to view. When the user filters by such a value, the search result will not exclude objects where the user is not allowed to view the value being filtered on; however, the search result will only display the values the user is allowed to view. Because of this, a user may be able to conclude a value without being able to view it.

Example:

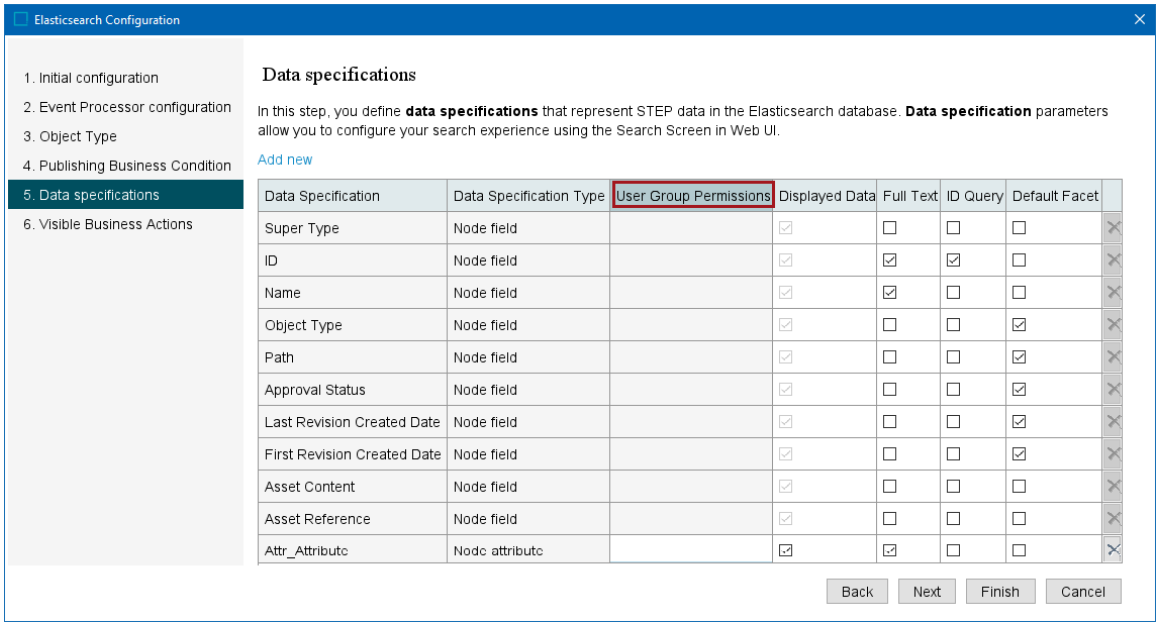
- Joe is privileged to view product with ID 123456 and Name of 'Blue Shoe'.
- Product with ID 123456 has an attribute of Risk Classification with a value of 'High'.
- Joe is not privileged to view values of the Risk Classification attribute for product with ID 123456.

Joe expands the facet of the Risk Classification attribute. The value of 'High' is presented and the count of objects with the value 'High' includes product with ID 123456. If Joe selects the value of 'High' in the facet, the search results will contain product with ID 123456 but will not display the value (High) of the Risk Classification attribute for the product with ID 123456.

User Group Permissions for Data Specifications

Setting a User Group as 'User Group Permissions' for a Data Specification defined in the Elasticsearch configuration limits the availability of this Data Specification as 'Displayed Data' to the selected User Group.

Note: Setting a User Group as 'User Group Permissions' for a Data Specification does not limit the data specification's availability as Full Text or ID Query.



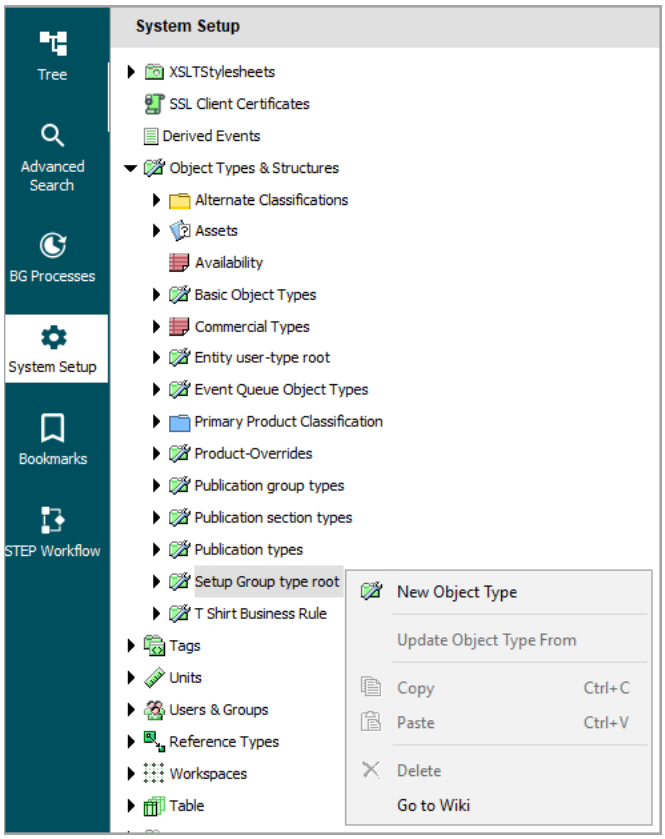
Creating an Elasticsearch Object Type

Before Elasticsearch can be set up and configured for a faceted search experience in Web UI, an Elasticsearch setup group root node and object type must be created. For more information about creating Setup Groups in general, refer to the **Setup Groups** section of the Setup Groups topic.

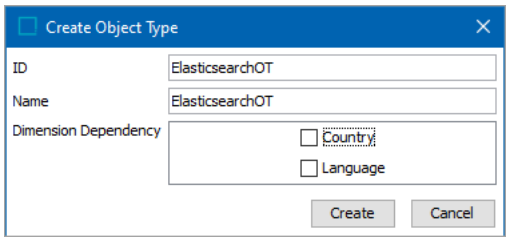
Note: Elasticsearch can display product, entity, classification, and/or asset data only, based on configuration.

Use the following steps to create the Elasticsearch object type.

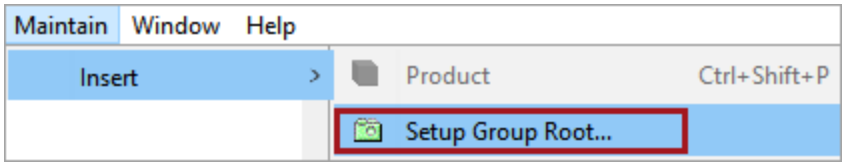
1. In the System Setup, right-click 'Setup Group Type Root' and select 'New Object Type.'



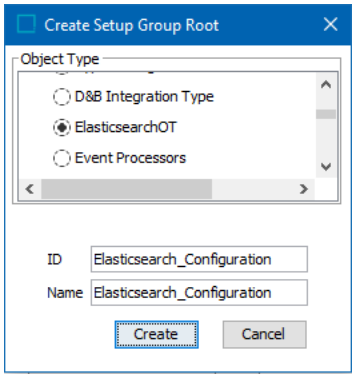
2. In the Create Object Type dialog box, enter a value for the ID and Name text field. In the example below, the user has created an object type with the ID 'ElasticsearchOT' and the Name 'ElasticsearchOT.'



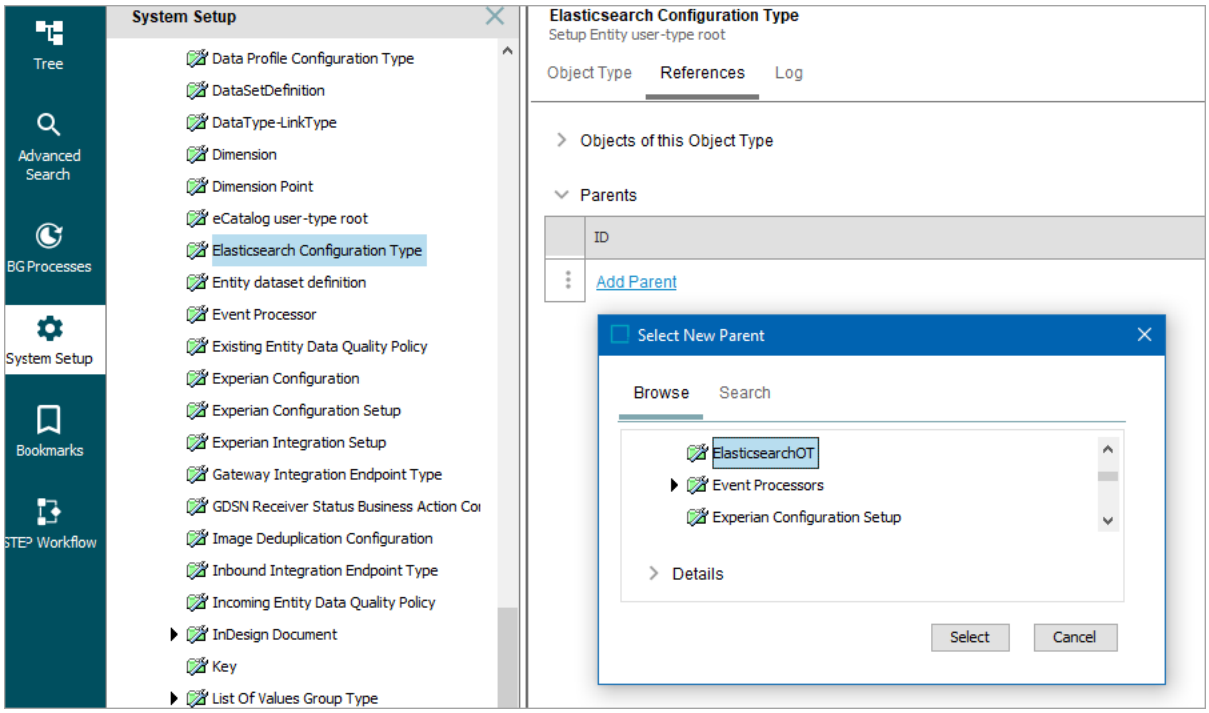
3. Click 'Create' to save the settings and close the dialog.
4. In the toolbar menu, click 'Maintain,' select 'Insert,' and click 'Setup Group Root....'



5. In the Create Setup Group Root dialog, select the object type created in the previous step (in this example, 'ElasticsearchOT') and enter a value for the ID and Name text field. In this example, the user created a setup group root with the ID 'Elasticsearch_Configuration' and the Name 'Elasticsearch Configuration'.



6. Click 'Create' to close the dialog.
7. Select 'Elasticsearch Configuration Type' from the Basic Objects menu in System Setup. In the References tab, select 'Add Parent,' and in the Select New Parent dialog, select the Setup Group (in this example, 'ElasticsearchOT') created in the previous step.



8. Click 'Select' to close the Select New Parent dialog.

Next, run the Elasticsearch Configuration wizard as defined in the Creating and Maintaining an Elasticsearch Configuration topic.

Creating and Maintaining an Elasticsearch Configuration

Follow the steps below to run the configuration wizard to first create and then update the Elasticsearch Configuration setup for a faceted search experience. Steps for deleting an Elasticsearch Configuration and an Elasticsearch event processor are also listed below.

For general information, refer to the Elasticsearch Setup topic. For illustrations of searching results using the faceted Search Screen, refer to the Search Screen Search Result Examples topic.

Note: Elasticsearch can display product, entity, classification, and/or asset data only, based on configuration.

Important: Ideally, the configuration should include only the data necessary to allow users to easily scope and shape the desired search results. Excessive data in Elasticsearch can negatively impact the response time of searches on the faceted Search Screen. Carefully consider the attributes and references to configure initially and expand the configuration as you determine additional information is required.

Prerequisites

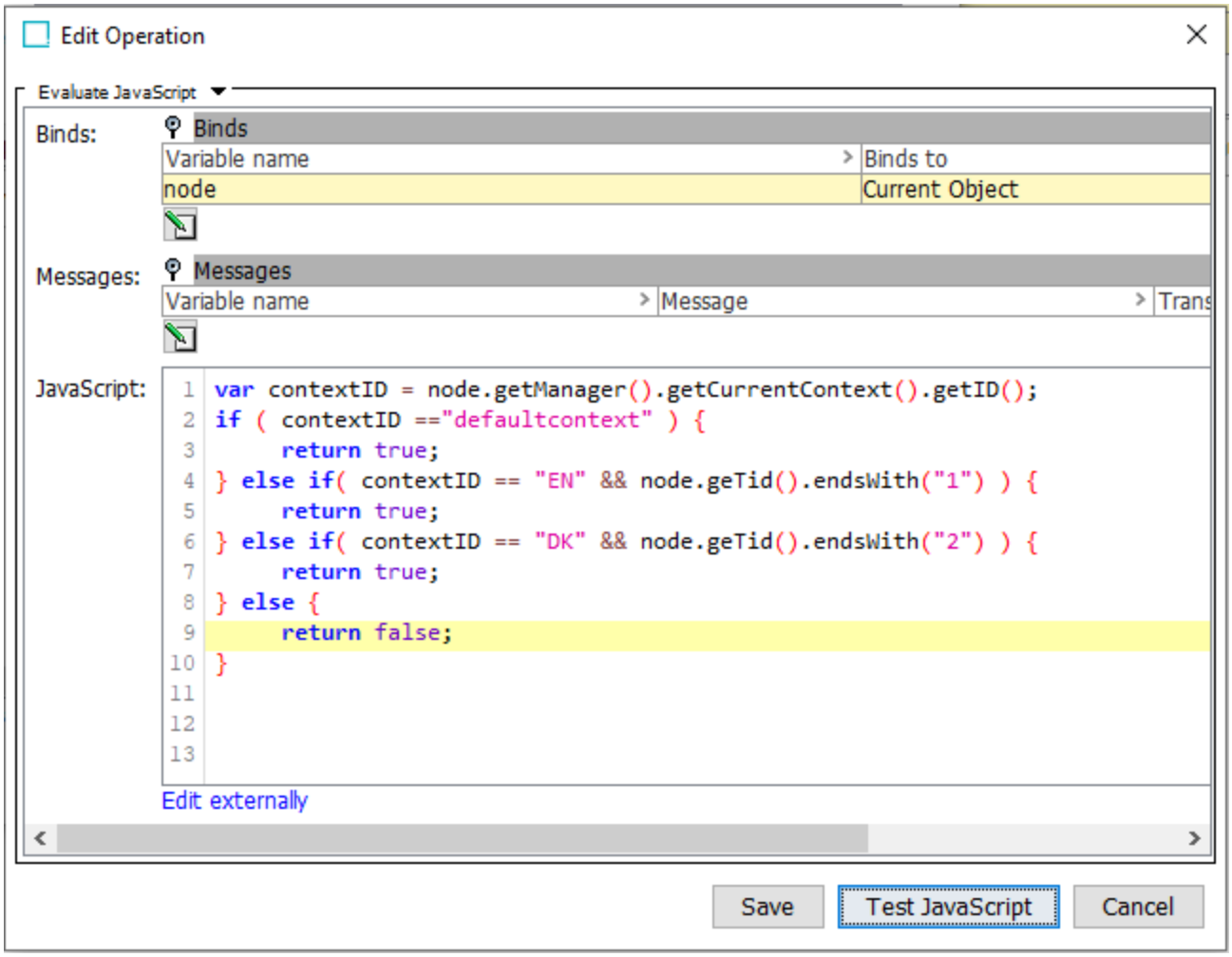
If on-premises, complete the required one-time setup items included in the On-Premises Initial Setup for Elasticsearch topic to use the Elasticsearch search engine with STEP.

A business condition can be selected to restrict the contexts being published to Elasticsearch. When creating the business condition, set the Valid Object Types parameter for the object types being published to the Elasticsearch database. The business condition must return 'true' for contexts to be published and return 'false' for contexts that should be rejected. The business condition can be selected in the Elasticsearch Configuration.

In the following example, these contexts return 'true' and are published:

- The context ID is ‘defaultcontext’. This line will ensure that any object that has been deleted, approved, and is in the recycling bin, will be picked up by the search processor and removed from the search index.
- ID of 'EN' and object IDs that end with the number 1
- ID of 'DK' and object IDs that end with the number 2

All other context-object combinations which return 'false' are rejected during publishing.



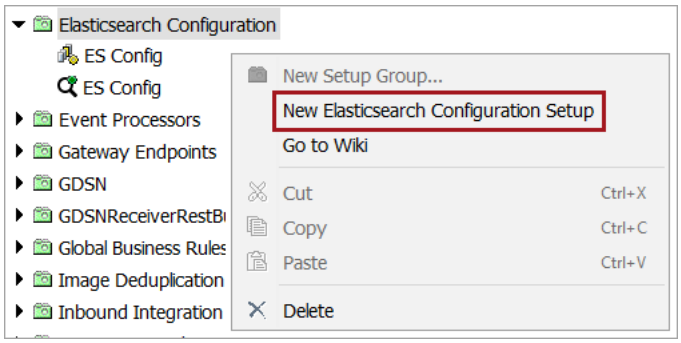
Creating and Editing an Elasticsearch Configuration

Use the following steps to create the required Elasticsearch configuration.

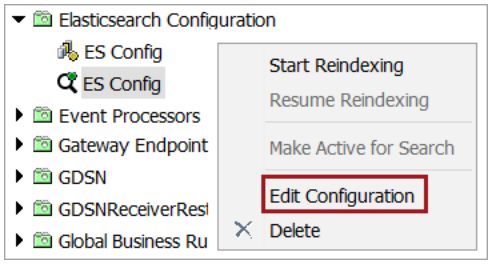
Note: The 'Revert to' a previous revision option on the Status tab of an Elasticsearch Configuration Type object is not allowed. Manual configuration is required to restore previous settings.

Important: You cannot create more Elasticsearch configurations if three or more are already present.

1. To create a new Elasticsearch Configuration or update an existing one, navigate to System Setup on the workbench and find the Elasticsearch Configuration node.
   - To create: Right-click the Elasticsearch Configuration node and select the **New Elasticsearch Configuration Setup** option.

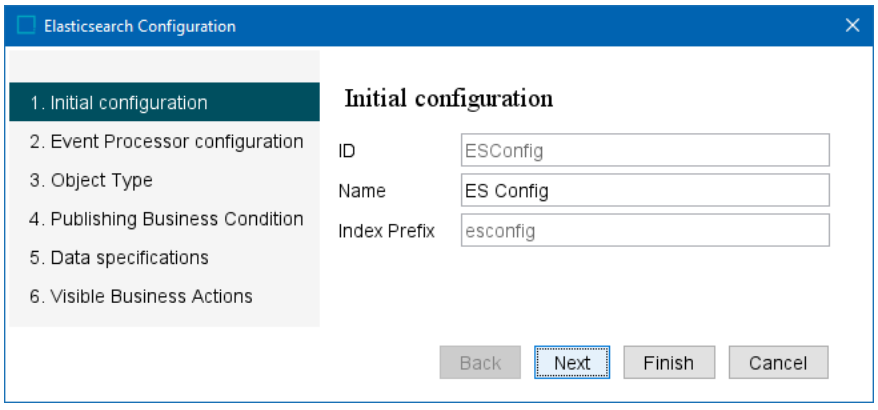


- To update: Click the Elasticsearch Configuration you would like to update. Right-click and select the **Edit Configuration** option.



2. On the Elasticsearch Configuration wizard 'Initial configuration' step:
   - Add an ID and move to the next parameter to duplicate the ID in the 'Name' and 'Index Prefix' parameters.

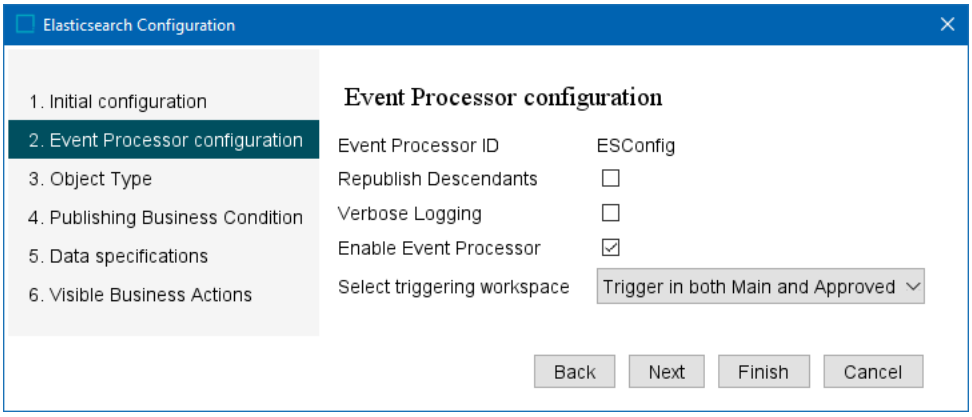
     Note: Using duplicated text for these parameters eliminates confusion when identifying the index associated with this configuration. For example, 'ESConfig' is the text for all parameters in the image below.



     When editing the configuration, only the 'Name' and 'Index Prefix' can be modified.

   - Click the **Next** button.

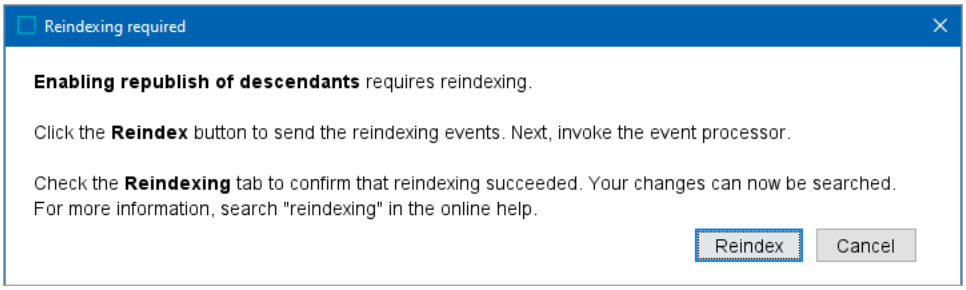
3. On the 'Event Processor configuration' step:



- **Republish Descendants** - Check the box to include children of the selected nodes when reindexing. Any changes made to attribute values will reflect on their descendant attribute values. Updated values are reflected in the search results so long as both parent and descendant object types are included in the Elasticsearch data specification configuration, detailed below in step 5 of the wizard.

  Note: When initially indexing or manually performing the reindex action, inherited values, references, and data containers are always included. However, if this setting is not enabled, once changes on a parent object have triggered a reindex event, the inherited values will not be updated in the index. For more information, refer to the Elasticsearch Indexer Processing Plugin Parameters and Triggers topic in the System Setup documentation.

  If this setting is enabled after initial configuration, the user will be prompted to reindex after completing the configuration wizard.



  Important: This option should be enabled only when necessary as it negatively impacts performance.

- **Verbose Logging** - Check the box to include excessive logging for troubleshooting.
- **Enable Event Processor** - Check the box to activate the event processor created by this wizard. Changing this parameter displays a confirmation dialog. Enabling the event process means publishing of events to Elasticsearch begins immediately upon clicking the wizard Finish button. Disabling the event processor means the Elasticsearch data may not match the STEP data, making search results unreliable.

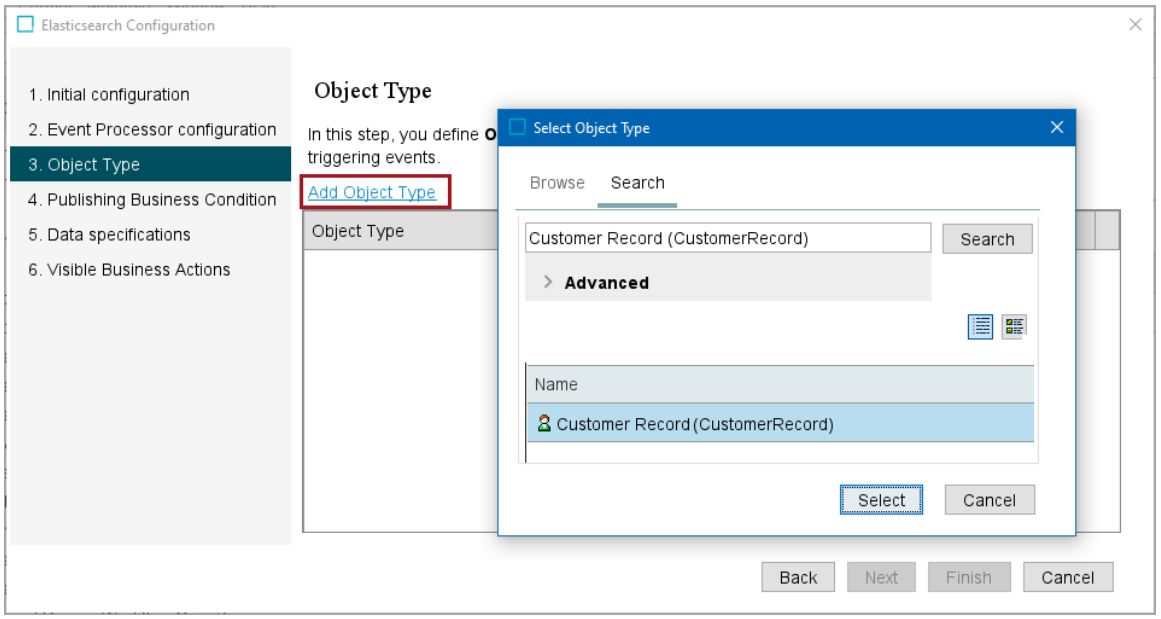
- **Select triggering workspace** - Select the workspace(s) to update the Elasticsearch database.
  - The 'Triggering in Main only' creates an event when a change is made in the Main (maintenance) workspace, prior to approval.
  - The 'Triggering in Approved only' creates events when an action causes an update to the Approved workspace, generally as a result of approving an object.
  - The 'Triggering in both Main and Approved' option results in events both before and after approval.

> **Note:** To activate a change to the Triggering Workspace parameter, you must invoke the event processor with at least one event on the queue.

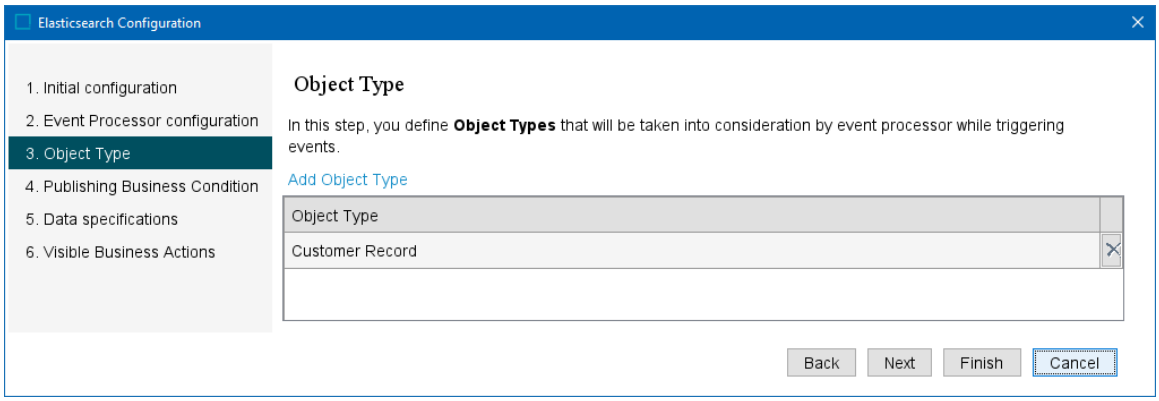
- Click the **Next** button.

4. On the 'Object Type' step:
   - Click the **Add Object Type** link and select the objects that should trigger the event processor and be available for searching in Elasticsearch via the Web UI Search Screen. Object types selected are displayed as values within the Search Screen's object type facet.

> **Note:** Selected object types are added both to the Event Triggering Definitions of the event processor and to the Elasticsearch configuration.

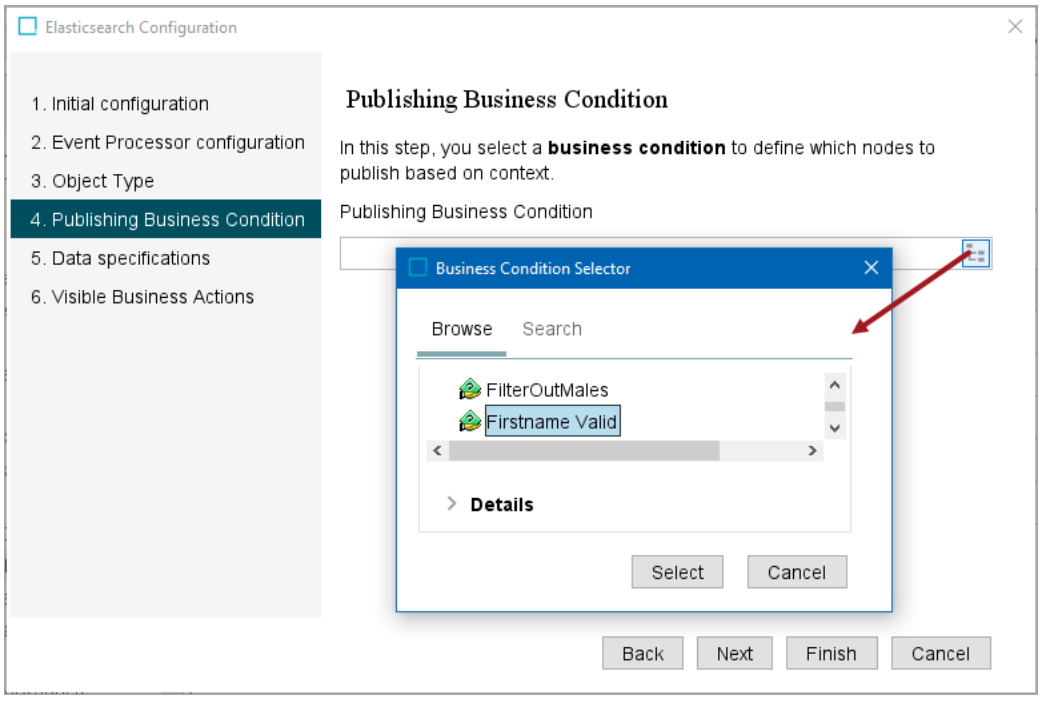


   - Click the **Select** button to add the selections to the Object Type list.



- Click the **Next** button.

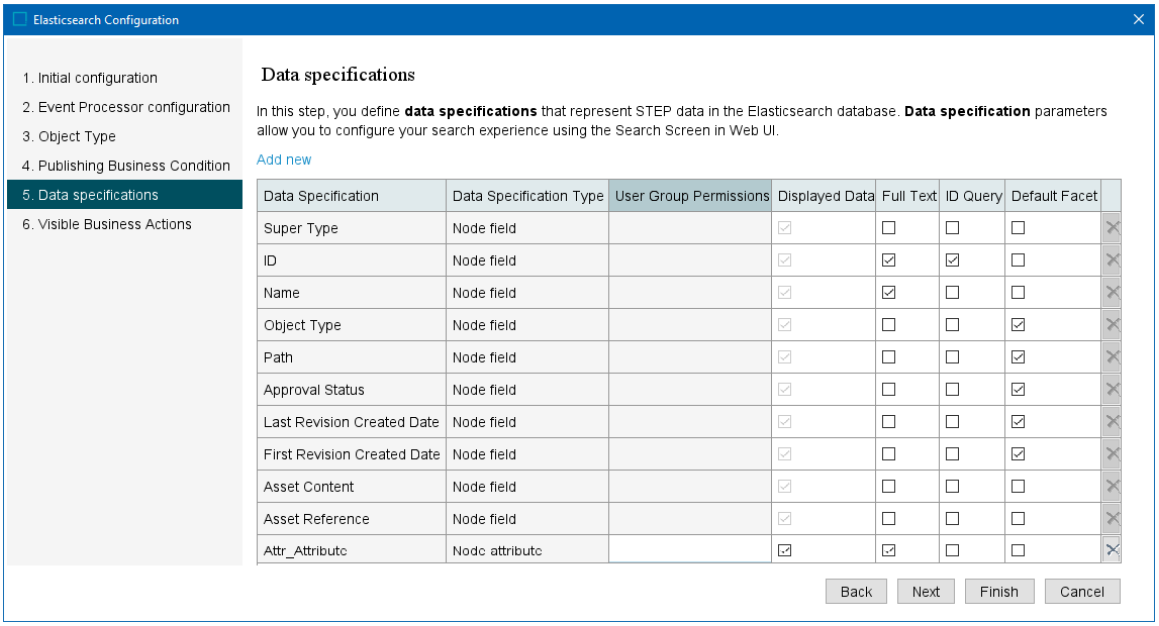
5. On the 'Publishing Business Condition' step:
   - Click the ellipsis button (...) to open the Business Condition Selector and choose the business condition that restricts contexts being published to Elasticsearch. The number of nodes published and rejected based on the business condition are reported in the indexing background process execution report. Refer to the Prerequisites section for a sample business condition.
   - Click the **Select** button.



   - Click the **Next** button.

6. On the 'Data specifications' step:

Note: Hover over a column heading for a definition. Hover over a Data Specification row to view the ID used in the JSON document.



Important: Exceeding the data specifications limit displays an error. Reduce the number of selections to continue with the configuration.

- Node fields are default items and cannot be deleted, as indicated by the gray background for the 'User Group Permissions' column and the disabled delete button ( ). User group permissions cannot be set for these default data specifications.

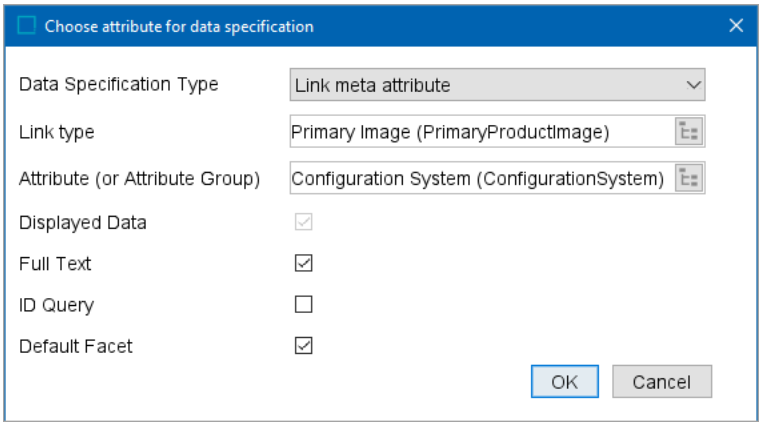
Data Specification	Data Specification Type	User Group Permissions	Displayed D	Full Text	ID Query	Default Fac
Super Type	Node field		☑	☐	☐	☑
ID	Node field		☑	☑	☑	☐
Name	Node field		☑	☑	☐	☐
Object Type	Node field		☑	☐	☐	☑
Path	Node field		☑	☐	☐	☑
Approval Status	Node field		☑	☐	☐	☑
Last Revision Created Date	Node field		☑	☐	☐	☑
First Revision Created Date	Node field		☑	☐	☐	☑
Asset Content	Node field		☑	☐	☐	☑
Asset Reference	Node field		☑	☐	☐	☑

- Click the **Add new** link to modify the data specifications required for the Elasticsearch database and to set the data on the faceted Search Screen for full text searches, ID searches, and the default facets. Manually added items can also be manually deleted using the enabled delete button ( ).

Important: When adding node attributes, removing node attributes, or changing the 'Full Text' setting, you must reindex the Elasticsearch database.

7. After clicking the **Add new** link, on the 'Choose attribute for data specification' dialog, use the following options to complete the Elasticsearch configuration.

Note: Unless mentioned in the 'Data Specification Type' section below, the selected attributes are added as Event Triggering Definitions in the event processor that is automatically created by this wizard.



- **Data Specification Type** - Select one of the following options from the dropdown:
  - **Node field** - Default elements (not included in the dropdown, automatically displayed in the wizard) on the object being searched. Default elements cannot be added or deleted, nor can permissions be set, but the search functions can be changed. ID and Name are used in Full Text searches, ID is used for ID searches, and the object type, path, approval status, and revision information items are set as default facets. An event triggering definition is automatically added to the event processor.
  - **Node attribute** - Attribute on objects being searched. An attribute event triggering definition is automatically added to the event processor.
  - **Link meta attribute** - Meta attribute on an object linked to the object being searched. An attribute trigger and a reference type event trigger are added automatically. However, to track changes on the referenced attribute, add an object type event triggering definition manually, as defined in the **Triggering for Referenced Data** section of the Elasticsearch Indexer Processing Plugin Parameters and Triggers topic.

    While you can designate one attribute for both incoming (References) and outgoing (Referenced By) references, it is recommended to use separate attributes for each of these types of references. Separate attributes result in a cleaner setup and display of data.
  - **Link source attribute** - Attribute on the source object linked to the object being searched. An attribute trigger and a reference type event trigger are added automatically. However, to track changes on the referenced attribute, add an object type event triggering definition manually, as defined

in the **Triggering for Referenced Data** section of the Elasticsearch Indexer Processing Plugin Parameters and Triggers topic.

- **Link target attribute** - Attribute on the target object linked to the object being searched. An attribute trigger and a reference type event trigger are added automatically. However, to track changes on the referenced attribute, add an object type event triggering definition manually, as defined in the **Triggering for Referenced Data** section of the Elasticsearch Indexer Processing Plugin Parameters and Triggers topic.
- **Child attribute** - Attribute on objects that are children to those being searched. An attribute event trigger is added automatically. However, to track changes on the child attribute, add an object type event triggering definition manually, as defined in the **Triggering for Referenced Data** section of the Elasticsearch Indexer Processing Plugin Parameters and Triggers topic.
- **Data container attribute** - Attribute that belongs to a data container on the objects being searched. The data container type must be specified. A data container attribute triggering definition is automatically added to the event processor.
- **Data container reference attribute** - Attribute referenced by a data container attribute on the objects being searched. The data container type and link type must be specified. A data container attribute trigger and a reference type event trigger are added automatically. However, to track changes on the referenced attribute, add an object type event triggering definition manually, as defined in the **Triggering for Referenced Data** section of the Elasticsearch Indexer Processing Plugin Parameters and Triggers topic.

- **Link type** - This parameter only displays for link data specification types. Type a reference or link name or click the ellipsis button (...) to open the 'Choose link type' dialog. Browse or search for a link type and click the **Select** button.
- **Attribute (or Attribute Group)** - Type an attribute or group name or click the ellipsis button (...) to open the 'Choose attribute for data specification' dialog. Browse or search for an attribute or attribute group and click the **Select** button.

  Note: Adding a group updates the data specifications list with the individual attributes in the group. Each attribute can be set for the appropriate search types defined below.

  If you created attributes specifically for use in Elasticsearch, refer to the **Attribute ID Considerations** section below in this topic.
- **User Group Permissions** - This option determines which group(s) can view the data as an available facet. Permissions do not apply to full text search fields, which means that data and facets are not visible for users without permission, but results can include this data if the search complies with any text searchable field. If necessary, limit availability to the data specification in the Search Screen based on user group.
  - Select the data specification field to be modified (the cell turns blue), right-click, and select the **Edit** option.

- On the User Group Selection dialog, select the groups that require access to the data specification in the Search Screen and click the **Select** button.

Important: If no User Group Permissions are set, all users of the Web UI Search Screen can use the data specification as defined in the Elasticsearch Configuration.

Note: Privileges set in an Elasticsearch configuration only impact facets.

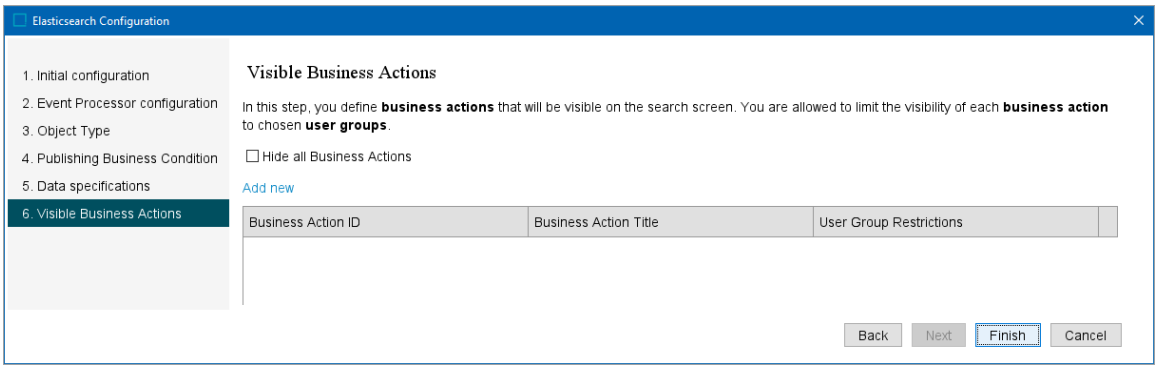
- **Displayed Data** - Check the box to have the data specification visible in the Search Screen as a facet and in the result set to be used for sorting and filtering for all users with permissions to view it. When checked, this setting is counted towards the limit of publishable fields and may count for more than one depending on the data type. Checks in other columns impact the Displayed Data setting, as defined in this section.

Note: The number of attributes that can be indexed as 'Displayed Data' is limited to 450, therefore attribute values that are often used to identify objects (such as manufacturer or country of origin) should take priority. Additionally, attribute values important for data enrichment tasks should be included.

- **Full Text** - Check the box to include the data specification value in full text searches. Full Text selections do not impact the limit of publishable fields. While available for any data specification type, full text is recommended for text-based attributes; LOV attributes are better represented as a default facet.
- **ID Query** - Check the box to include the data specification value in ID searches. When ID Query is checked, the Displayed Data is also automatically checked for the data specification and impacts the limit of publishable fields. While available for any data specification type, ID Query is recommended only for attributes that hold values used as identification of an object. For example, a GTIN attribute or manufacturer ID might be appropriate; an LOV attribute would not typically be used as an ID query.
- **Default Facet** - Check the box to include the data specification as a default static facet for filtering. When Default Facet is checked, the Displayed Data is also automatically checked for the data specification and impacts the limit of publishable fields. While available for any data specification type, default facet is recommended for attributes with values that are useful for narrowing down search results. For example, values for sizes or colors could be valuable as a default facet; long text values are not typical for default facets.
- Click the **OK** button on the dialog.

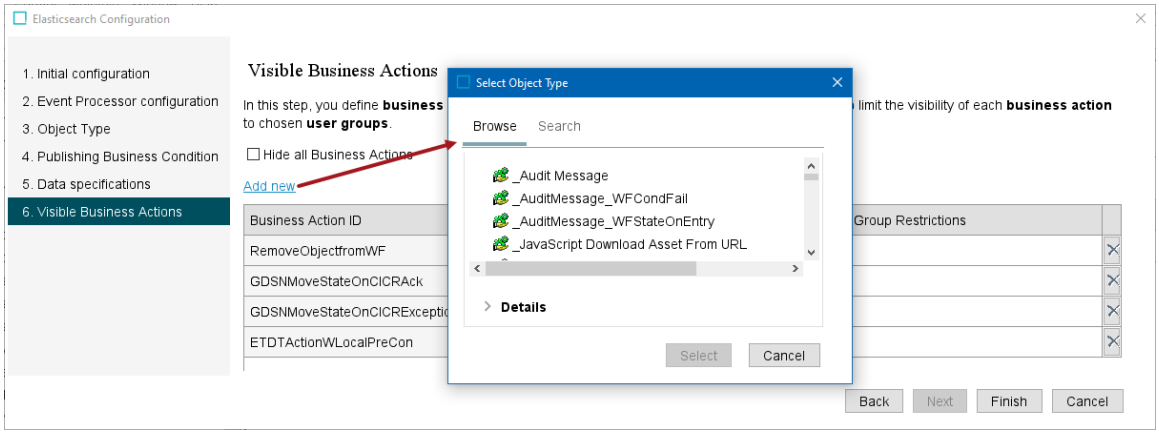
  For more information, refer to the Elasticsearch Data Specification Type Examples topic.

8. On the 'Visible Business Actions' step:

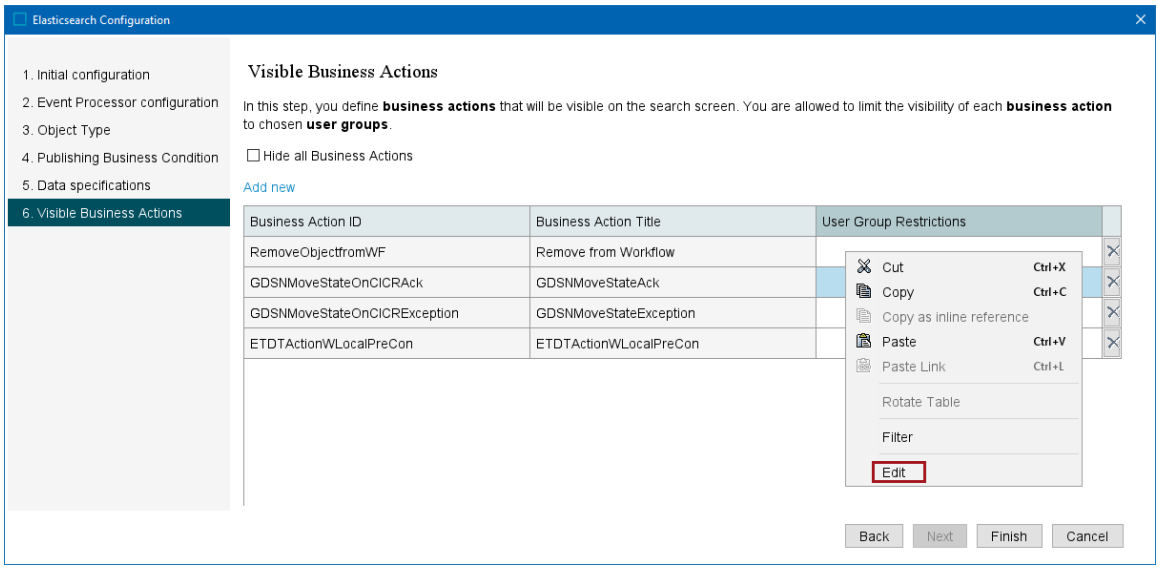


- **Hide all Business Actions** - Check to prevent users from viewing any business actions when clicking the Action button on the Web UI Search screen. This allows an override for any business actions configured on this step. The 'Add To Basket' option on the Actions menu is not impacted by this setting.
- Click the **Add new** link to select the business actions that are viewable from the 'Actions' dropdown on the Web UI Search screen.
- Select the desired business actions from the 'Select Object Type' dialog (shown below) and click the **Select** button.

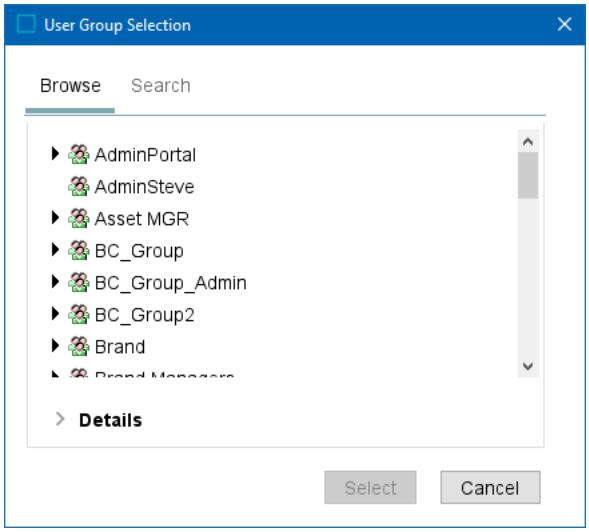
> **Note:** If no business actions are configured on the Visible Business Actions step, all business actions are visible to users. A business action is enabled to run if it is valid for the selected items and the user is privileged to run it.



- To specify which user groups can view and execute specific business actions (and restrict access to those business actions for other user groups), right-click the cell within the 'User Group Restrictions' column that correlates with the business action you want to limit access to and click **Edit**.



- Select the desired user group(s) and click the **Select** button.

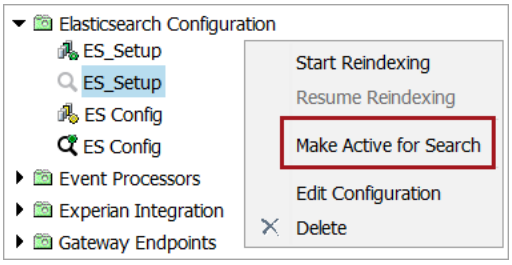


For more information regarding the Actions dropdown option on the Search screen, refer to the Search Screen Actions topic.

9. Complete the wizard:
   - Click the **Cancel** button to exit without saving any changes.
   - Click the **Finish** button to apply the changes made.

> **Note:** The 'Revert to' a previous revision option on the Status tab of an Elasticsearch Configuration Type object is not allowed. Manual configuration is required to restore previous settings.

The first configuration created is automatically activated. Additional configurations must be activated manually and will automatically deactivate previous configurations. To activate a configuration, right-click on configuration and select 'Make Active for Search'.



Icon	Description
	Active - Only one Elasticsearch configuration can be active at a time.
	Inactive - Activating an Elasticsearch configuration automatically disables the previously active configuration.

Note: Saving edits to or replacing an existing Elasticsearch configuration causes the Elasticsearch database to no longer be in sync with STEP data, requiring the data to be reindexed. For more information, refer to the Elasticsearch Index Publishing topic.

Next, complete the steps to publish STEP data to the Elasticsearch database as defined in the Elasticsearch Index Publishing topic.

Important: The number of fields that can be published is limited based on the **Elasticsearch.TotalFieldLimit** property (default 1,000) as defined in the On-Premises Initial Setup for Elasticsearch topic.

Attribute ID Considerations

Take the following information into consideration when creating attribute IDs for attributes that are used for Elasticsearch searches. Refer to the Search Screen topic for information about this functionality.

IDs cannot start and/or end with a period / dot (i.e., '.').

The following words are currently forbidden to be used as part of the ID:

- simpleValue
- lowerCaseValue
- unitId

- numeric
- dateTime

Examples of forbidden attribute IDs:

- [forbidden word], e.g., 'numeric'
- abc.[forbidden word], e.g., 'abc.numeric'
- abc.[forbidden word].abc, e.g., 'abc.numeric.abc'
- end with a dot, e.g., 'abc.'
- start with a dot, e.g., '.abc'
- dot or dots by itself / themselves, e.g., '.', '....'
- etc.

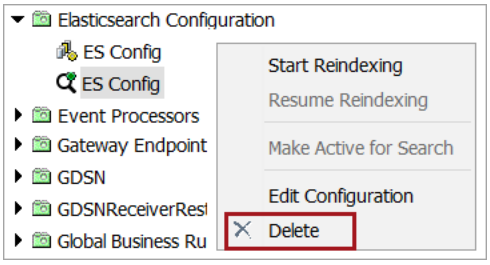
For faceted search, mappings cannot be made for these in Elasticsearch, and the attributes cannot be shown as facets.

Deleting an Elasticsearch Configuration

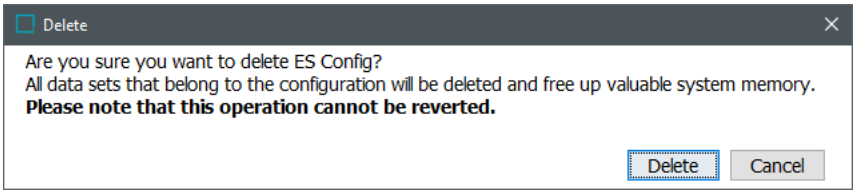
Deleting an Elasticsearch configuration will remove both the Elasticsearch configuration and the Elasticsearch event processor.

Use the following steps to remove an Elasticsearch configuration:

1. In System Setup, select the Elasticsearch configuration, right-click and click the **Delete** option.



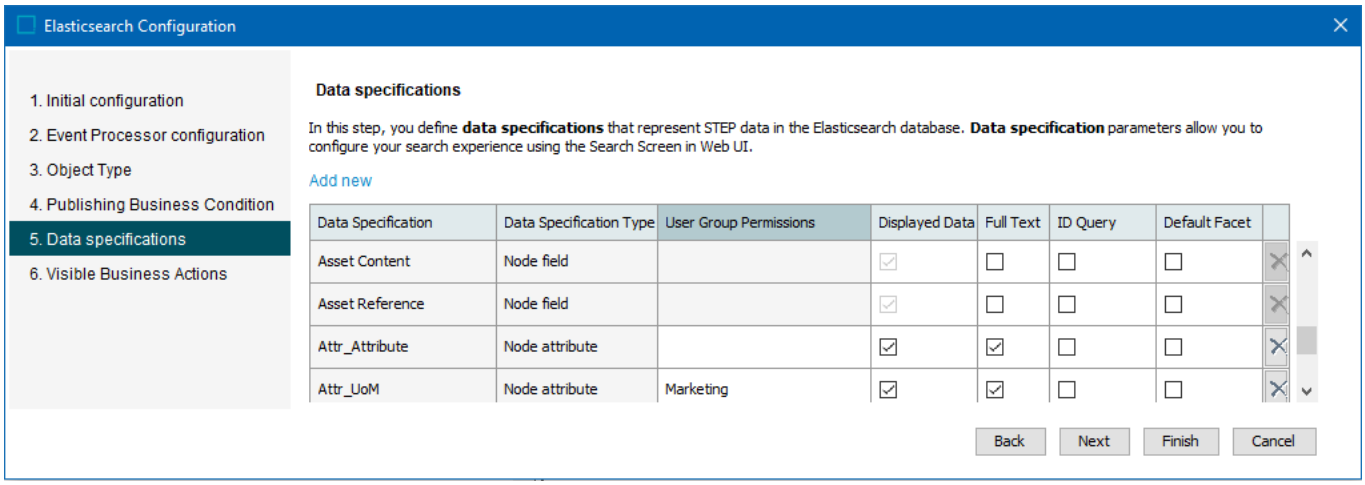
2. Click the **Delete** button to confirm the delete action, and then, click the **Close** button for the 'Delete report' dialog.



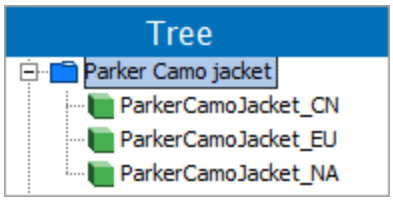
Elasticsearch Data Specification Type Examples

The faceted search Elasticsearch configuration (defined in the Creating and Maintaining an Elasticsearch Configuration topic) provides set up for data specification types. Data specification types are used by faceted search to access attribute values held either on an object, on a link, or on a child object.

Note: Elasticsearch can display product, entity, classification, and/or asset data only, based on configuration.

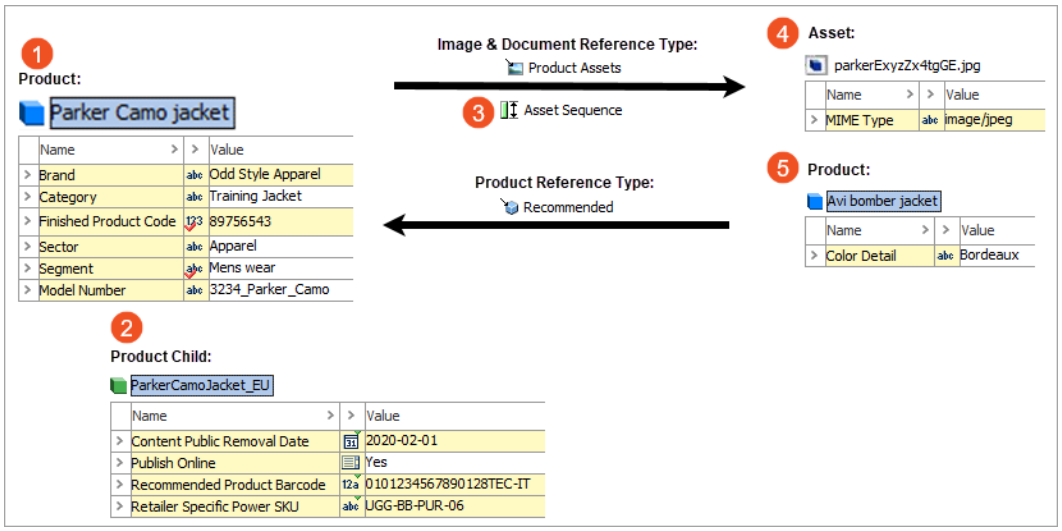


Data specification configuration determines how Elasticsearch data can be searched. Consider the following sample data node and children. The examples show how to access the objects' attributes, referenced objects, and metadata.



In this data, the 'Parker Camo jacket' product object type (blue folder icon) is included in the Elasticsearch configuration and can be found using search. The searched jacket includes a reference to an image asset and that reference has a metadata attribute and a different jacket references the searched jacket. The searched jacket has a child object (green cube icon) that holds its own attribute values.

Specific data on each of these same objects is illustrated below.



Data specifications for these objects give Elasticsearch the following access:

1. **Node attribute** provides searching for any of the attribute values on the Product 'Parker Camo jacket' object.
2. **Child attribute** provides searching for attribute values on the Product Child 'ParkerCamoJacket_EU' object.
3. **Link meta attribute** provides searching for the metadata on the 'Product Assets' reference's 'Asset Sequence' metadata attribute value.
4. **Link target attribute** provides searching for attribute values on the Asset 'parkerExyzZx4tgGe.jpg' object.
5. **Link source attribute** provides searching for attribute values on the 'Recommended' reference's ‘Avi bomber jacket’ object.

The data specification options are further defined in the sections below using this same data and individual sections of this same illustration.

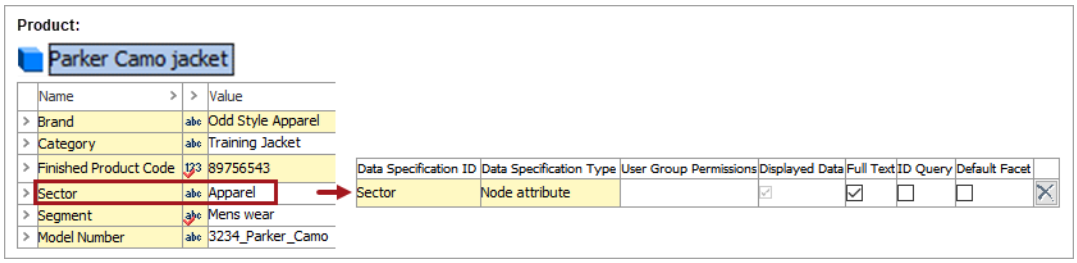
Node and Child Data Specifications

These data specifications give access to attribute values on the objects being searched and their children.

Node Attribute

The 'node attribute' data specification type gives access to attribute values on the node for which an event is being handled.

For example, including a 'node attribute' data specification for the 'Sector' attribute and setting it to 'Full Text' allows the user to find the product by searching for the 'Apparel' value of the Sector attribute using the search bar.

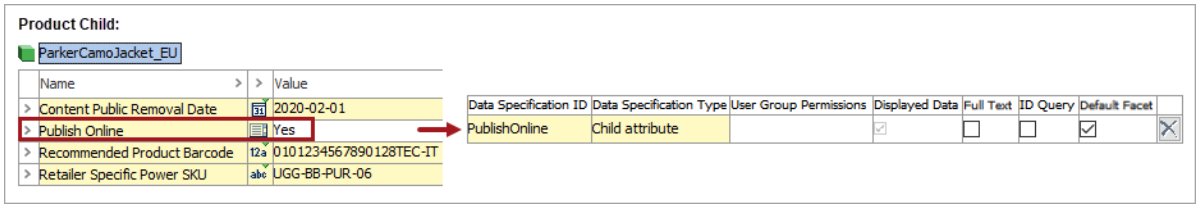


To publish values for attributes on the node for which an event is being handled, attribute IDs can be added to the configuration. The inherited data is automatically included which means that it may be relevant to configure the event processor event triggering definitions to ensure that nodes are republished when the ancestor nodes owning the data are modified. For more information, refer to the **Event Triggers** section of the Elasticsearch Indexer Processing Plugin Parameters and Triggers topic.

Child Attribute

The 'child attribute' data specification type gives access to attribute values on children nodes. The parent object is not republished when values on children change, new children are added, or children are removed.

For example, including a 'child attribute' data specification for the 'Publish Online' attribute and setting it to 'Displayed Data' and 'Default Facet' allows the user to find the product by searching for the Publish Online's Yes or No value using a facet. Additionally, if 'Default Facet' is not checked but 'Displayed Data' is checked, the facet is not included by default, but the user can add the facet as needed in Web UI.



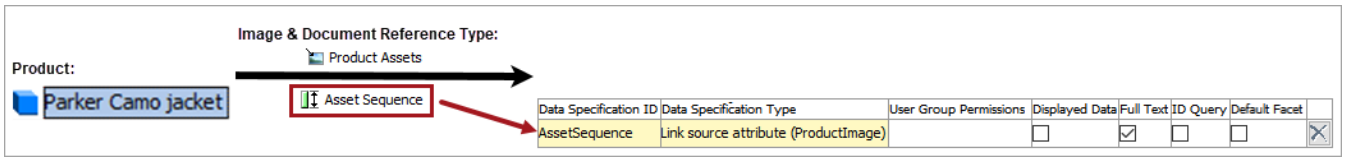
Link Data Specifications

Link data specification types are supported for references / classification product links for a single level. Use these options for stable reference data where it is assumed that the values on reference targets / classifications do not change. The node for which the Elasticsearch document includes aggregated data will not automatically be republished if the values on the reference targets / classifications change.

Link Meta Attribute

The link meta attribute data specification type gives access to attribute values on references / links.

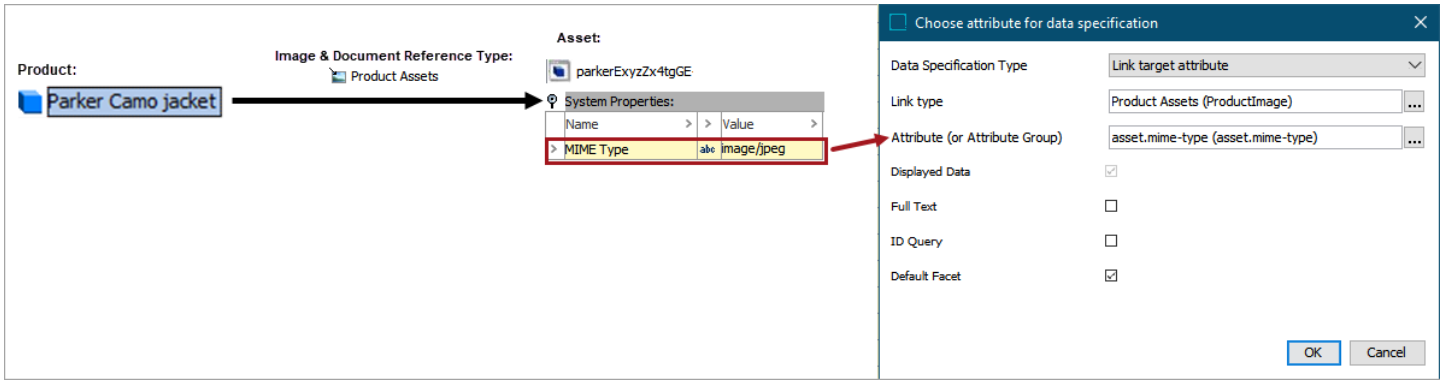
Assume that the 'Asset Sequence' attribute in the sample data includes the value 'Primary' to indicate that the asset should have precedence over the other assets. In this case, including a 'link source attribute' data specification for the 'ProductImage' reference type and setting it to 'Full Text' allows the user to find the product by searching for the Primary value in the search bar.



Link Target Attribute

The link target attribute data specification type gives access to attribute values on reference / link targets.

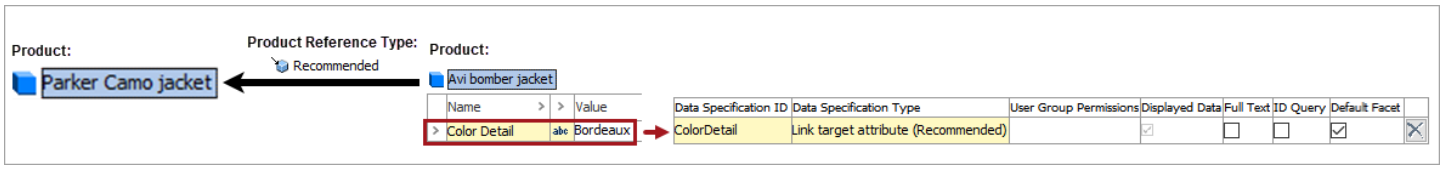
For example, including a 'link target attribute' data specification for the 'Product Assets' reference type and setting it to 'Displayed Data' and 'Default Facet' allows the user to find the product by searching for the MIME Type value in a facet.



Link Source Attribute

The 'link source attribute' data specification gives access to attribute values on incoming references / links.

For example, including a 'link source attribute' data specification for the 'Recommended' reference type and setting it to 'Displayed Data' and 'Default Facet' allows the user to find the product by searching for the Color Detail value in a facet.



Elasticsearch Index Publishing

The Web UI Search Screen offers a modern faceted search experience. This requires STEP data to be published to an Elasticsearch cluster that is accessible from the STEP application server. For the end user, the Search Screen provides search results that can be refined and modified as needed.

Note: Elasticsearch is required to use the search functionality in the Instrument UI.

Important:

- Before starting the configuration outlined in this topic, contact Stibo Systems to activate Elasticsearch.
- To ensure current STEP data is displayed on the Web UI faceted Search Screen, verify that the event processor indicated by the active Elasticsearch configuration is enabled and is set to Read Events.
- Before the Elasticsearch event processor can publish incremental updates to Elasticsearch, the Elasticsearch configuration must be initialized by running reindex. Refer to the Reindex the Elasticsearch Database section below.
- Calculated attributes have a noticeable negative effect on publishing performance. It is recommended to avoid publishing calculated attributes and to instead use a business action to set the values prior to publishing. When it is not possible to avoid calculated attributes completely, publish no more than five (5) calculated attributes to reduce the performance impact.
- Only one reindexing process can run at a time. If the user tries to start a new reindex process, the message 'Reindexing is already in progress' will display.

How it Works

After configuring Elasticsearch using the steps defined in the Elasticsearch Quick Start topic and reindexing, the Reindexing Controlling background process gathers and prepares the data specified by the object type for extraction and begins the indexing process on the Elasticsearch server. It uses a parallel framework that delegates the extraction, transformation, and loading (ETL) processes to multiple Elasticsearch Indexing background processes that run concurrently.

The Elasticsearch Event Processor polls for new incremental updates every 10 seconds and creates up to 5 Elasticsearch Indexing background processes that may run concurrently.

Elasticsearch Event Processor

The Elasticsearch event processor is only used to process incremental update events. This allows updates to the data to occur while reindexing is happening. How the Elasticsearch event processor is managed and maintained is described below.

Elasticsearch Event Processor Performance

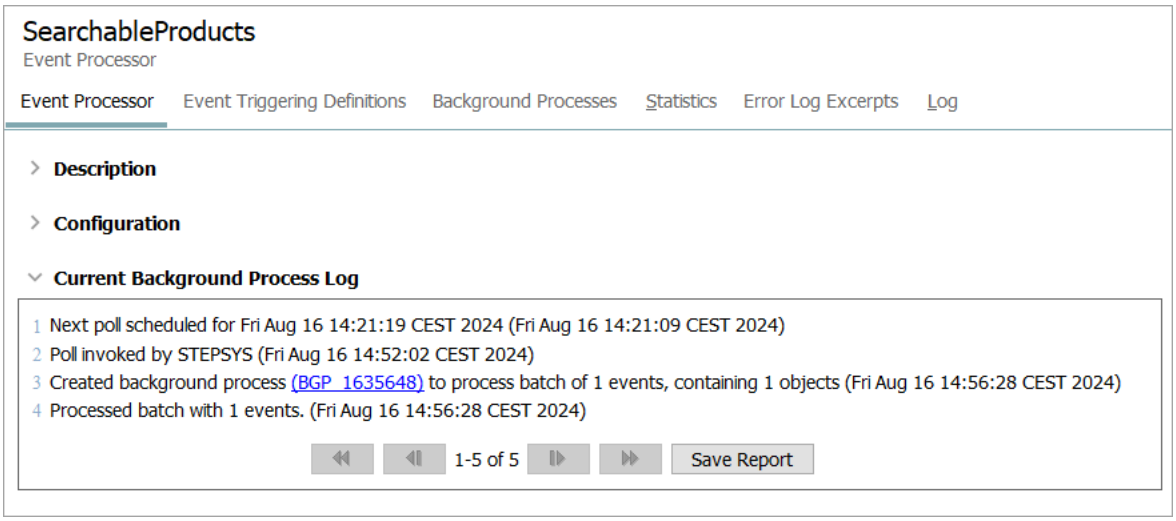
For the best Elasticsearch performance, configure the following:

1. On the event processor associated with the active Elasticsearch configuration:
   - **Enabled** parameter is 'Yes'
   - **Event Mode** parameter is 'Standard' (Setting to 'Duplicate' may slow down performance.)
   - **Queue Status** parameter is 'Read Events'
2. On the Elasticsearch Configuration Type object, click the **Reindexing** tab and verify the last indexing attempt was successful. If there are any failed attempts, review the Execution Report and resolve any issues identified.

Monitoring Elasticsearch Event Processor

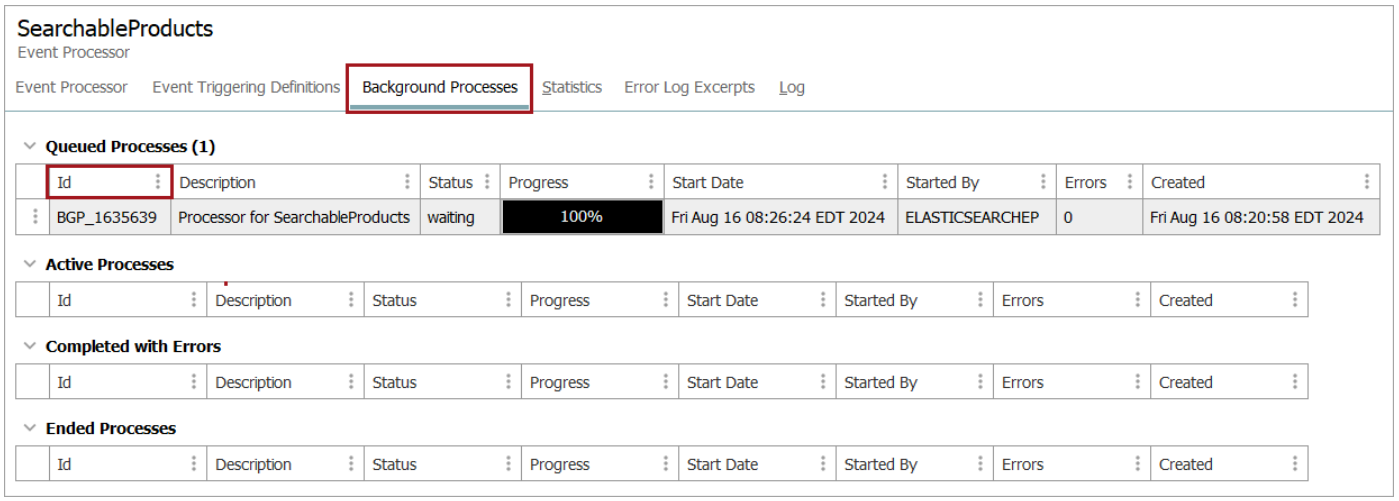
The Elasticsearch event processor is used to process incremental update events. It polls for new events every 10 seconds and when an event is found, an Elasticsearch Indexing background process is created.

1. To view Elasticsearch Indexing background processes, under Event Processor tab for the Elasticsearch event processor, navigate to 'Current Background Process Log' section.

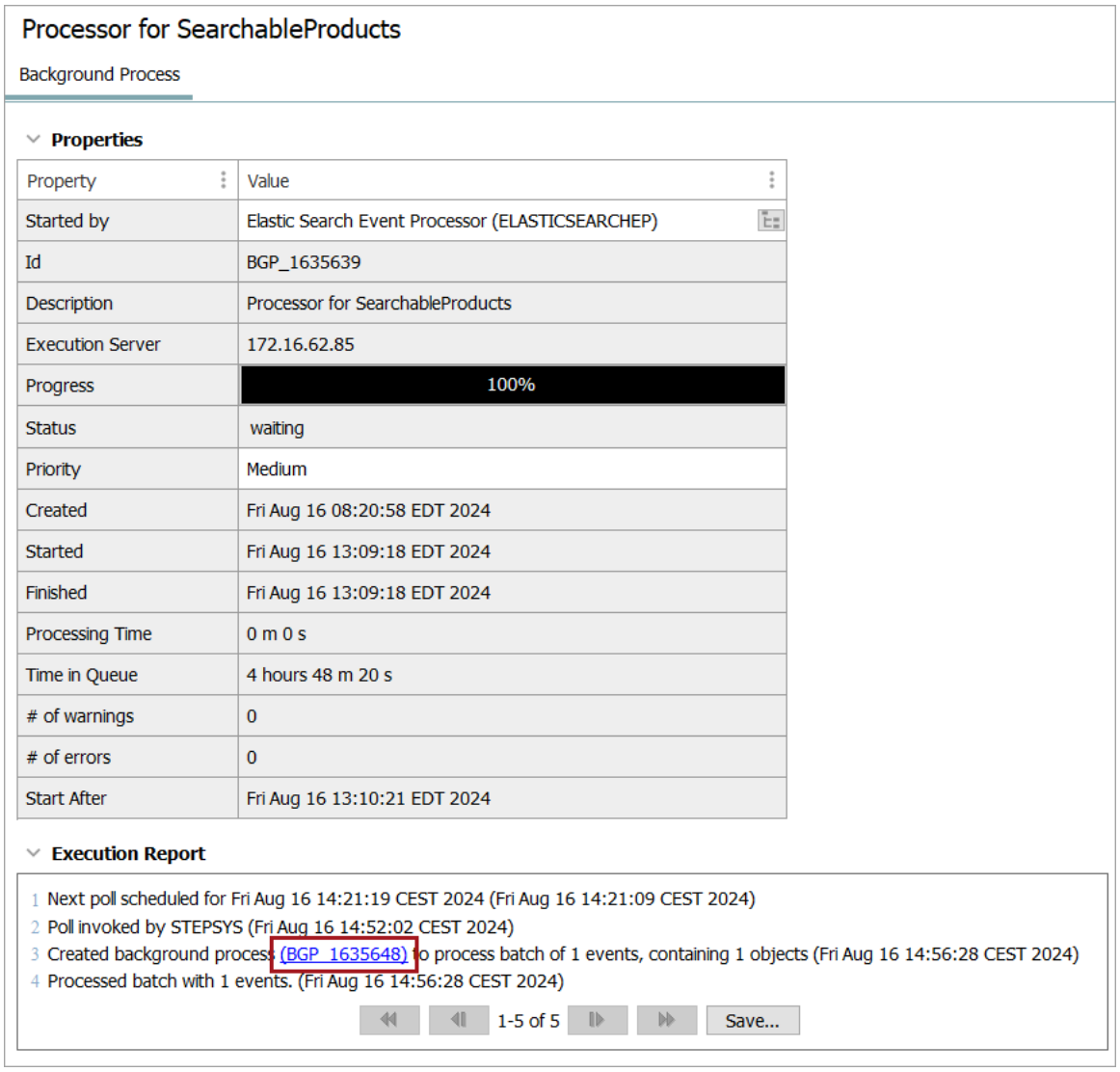


2. Choose a method to review the Elasticsearch Indexing background processes and the related execution report:
   - Click an Elasticsearch Indexing background process link to view an execution report for the selected background process.

- Navigate to the **Background Processes** tab for the event processor, in the 'Id' column, hover over and click the **Id** link of the event processor background process. This will navigate to the execution report for the Elasticsearch processor which will allow you to view all of the Elasticsearch indexing background processes.



- Review an Elasticsearch Indexing background process **Execution Report** and click a background process link to view the details.



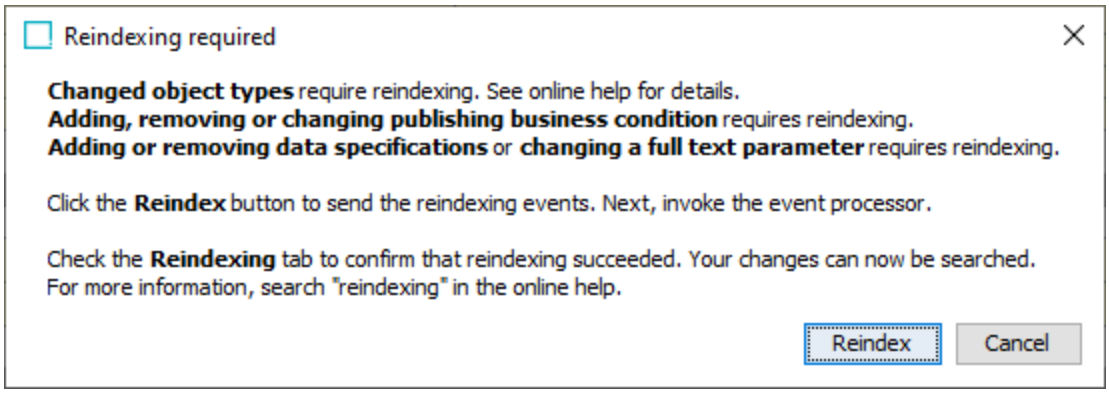
- Navigate to the BGP Processes menu in the STEP Workbench. Refer to the Elasticsearch Indexing Background Processes section for additional information.

Reindex the Elasticsearch Database

Reindexing is necessary for the following reasons:

- Any changes made to an existing Elasticsearch configuration
- Creating a new Elasticsearch configuration
- Any change to the data (e.g. add / remove a business condition)
- Before the Elasticsearch event processor can publish incremental updates to Elasticsearch

- To configure the objects that should trigger the Elasticsearch processor. Refer to the Elasticsearch Indexer Processing Plugin Parameters and Triggers for more information.



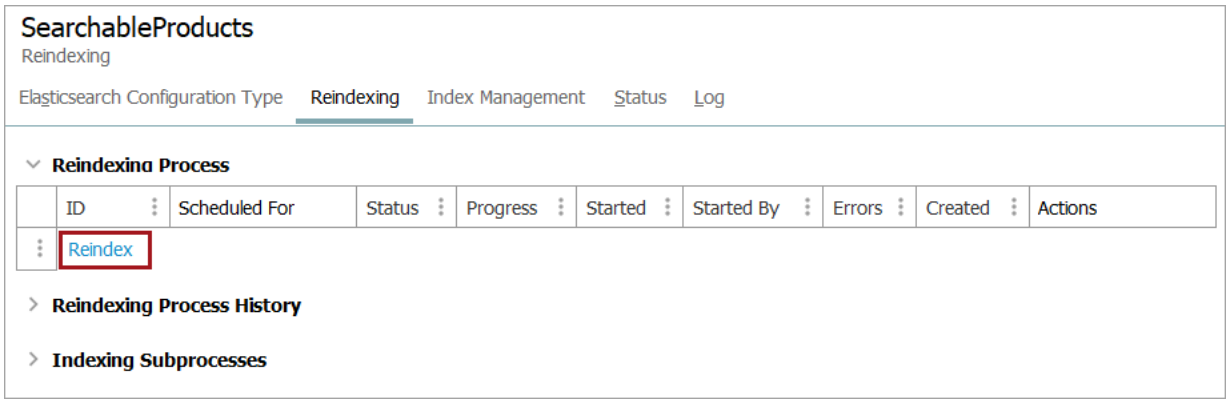
While reindexing the database, Elasticsearch is still available to the end user.

Reindexing an Elasticsearch Configuration

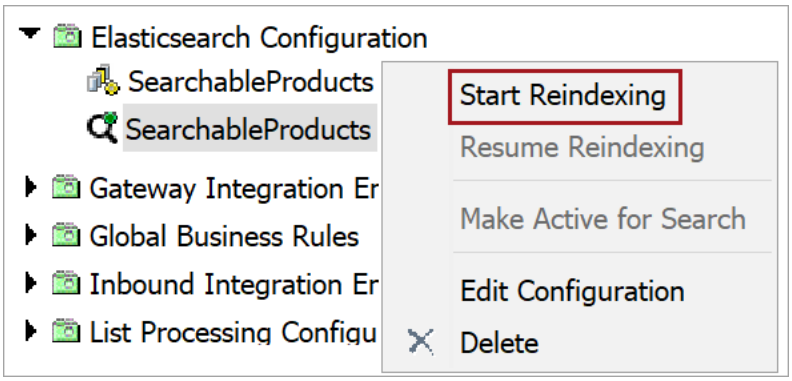
Initial indexing is required for a brand new Elasticsearch configuration and it is also required for a modified existing Elasticsearch Configuration.

Note: If an additional Elasticsearch Configuration has been newly created but was not reindexed upon completing the wizard, initiate a manual reindex by following these steps.

1. Choose a method to start reindexing:
   - Navigate to the **Reindexing** tab on the configuration and under the Reindexing Process table, click the 'Reindex' link.

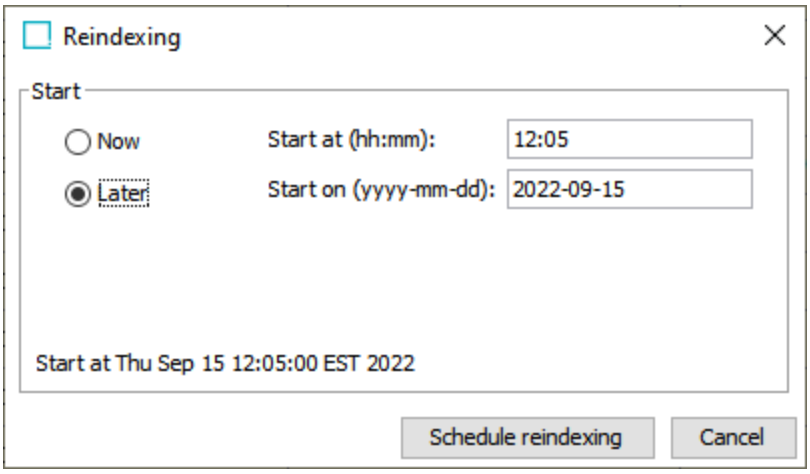


   - Alternatively, right-click the configuration node from System Setup and select 'Reindex' from the context menu.



Note: After the initial Elasticsearch configuration for every new STEP system, the following message may display: 'Elasticsearch is initializing. Try again in 5 minutes. If this problem persists for more than 1 hour, contact Stibo Systems Support'. This triggers the Elasticsearch server to turn on. The user should try again after 5 minutes and contact Stibo Systems Support if the message persists.

2. In the Reindexing window, set the desired Start:
   - Select 'Now' and then click 'Reindex now' to begin the process immediately.
   - Select 'Later' to schedule the reindexing for later, and set a time for the process to initiate, then click 'Schedule reindexing'.

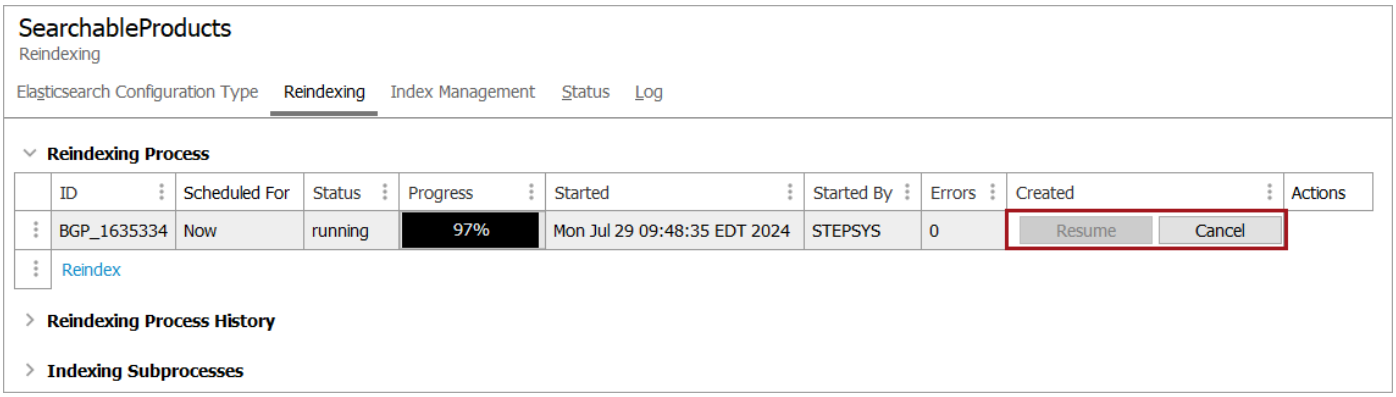


Note: To help balance the strain on the system, it is recommended to schedule reindexing for a later time if many background processes are currently running.

Once reindexing has been initiated, the reindexing controlling background process is created.

3. Navigate to the background process beneath the 'Reindexing Process' section to manage the background process as required:

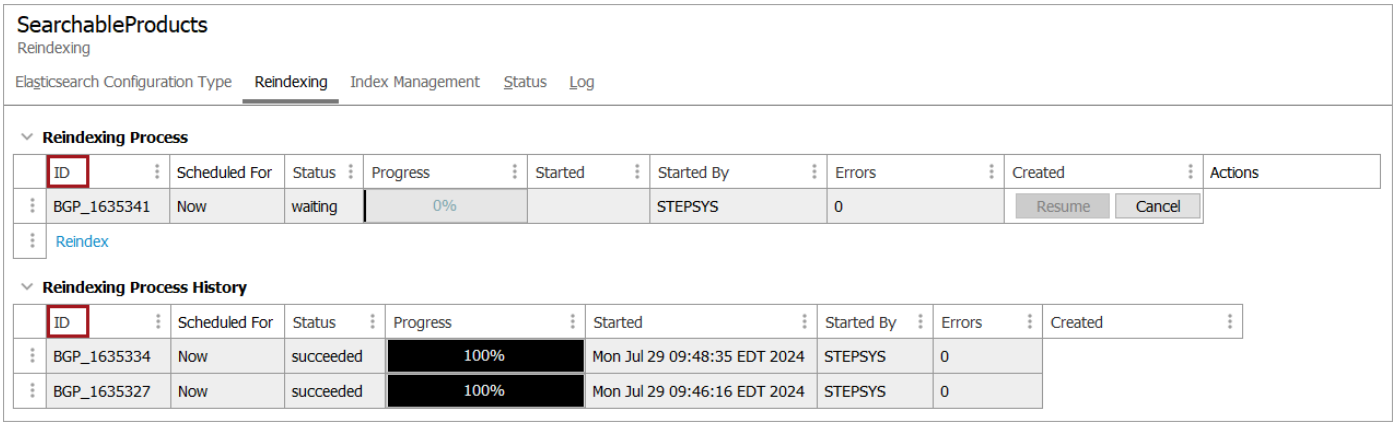
- **Cancel** - stops the reindex process, refer to the Cancellation of Event Processor Background Process below.
- **Resume** - restarts the reindex process.



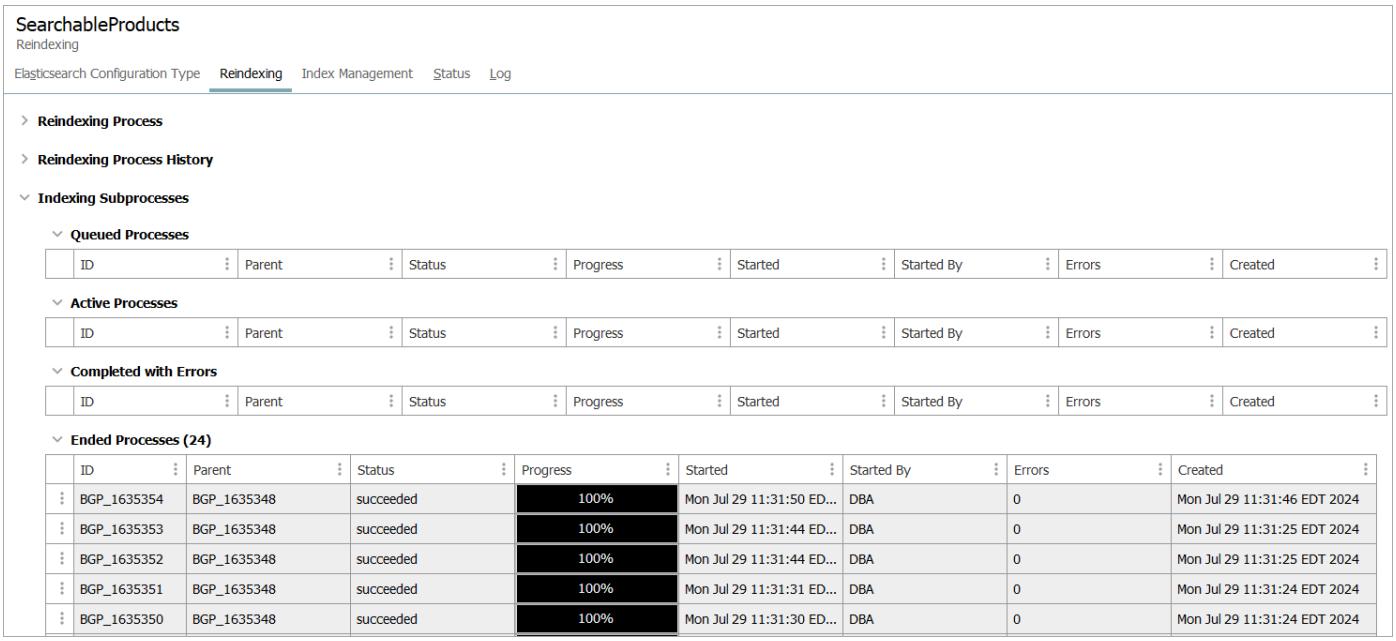
Monitoring Reindex Processes

The **Reindexing** tab on an Elasticsearch configuration provides a list of current and previous reindex events. Details of the background processes are also available from the BG Processes tab in the STEP Workbench. Refer to the Elasticsearch Indexing Background Processes section for additional information.

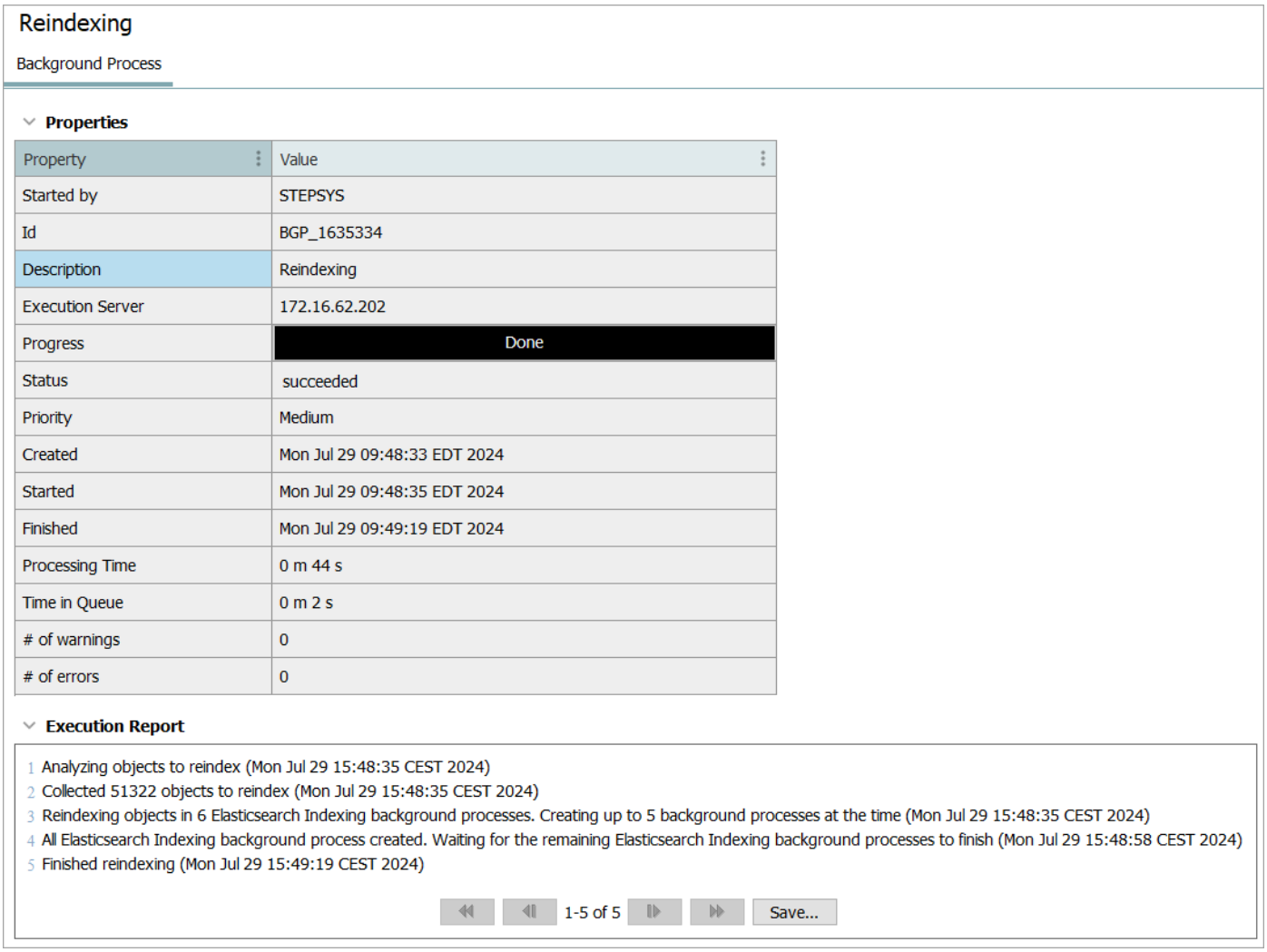
1. To view the details of the current and previous reindexing processes, select the background process to monitor by hovering over and clicking the ID link in either the 'Reindexing Process' or 'Reindexing Process History' sections. The background processes found on this screen are the controlling background processes.



In the 'Indexing Subprocesses' section, the individual reindexing background subprocesses for the controlling reindexing background process are displayed. For details on the subprocess, hover over and select the ID link to display the Background Processes tab for the subprocess.



2. On the **Background Process** tab for the selected background process, review the Properties and the Execution Report. The progress of reindexing can be tracked with the progress bar located under the 'Progress' parameter. The execution report is a full summary of what occurred during reindexing.



Republishing Smaller Sets of Objects to Elasticsearch

If a subset of objects can be identified by a search criteria, it is possible to reindex only those objects by republishing events on those specific objects to the Elasticsearch event processor instead of rebuilding the entire index.

The following methods can be used to republish a smaller set of objects:

- Bulk update using a Send Republish event operation. Refer to the Send Republish Event Operation topic in the Bulk Updates documentation for more information.
- Republishing a collection. Refer to the Maintaining Collections topic in the Getting Started documentation for more information.

These methods cannot be canceled as the Reindex process can.

Important: For reindexing the majority of the indexed objects, it is highly recommended to use the Reindex option rather than republishing.

Republish to the Elasticsearch Database

An alternative solution of reindexing to publish data to Elasticsearch is to use the event processor republish option:

1. Generate events for the STEP data required in the Web UI Search Screen using the **republish** action as defined in the Event-Based OIEP Event Actions topic in the Data Exchange documentation. The republish background process generates events for the configured products, assets, classifications, and/or entities.
2. Publish STEP data to the Elasticsearch database by invoking the event processor running the Elasticsearch Configuration as defined in the Running an Event Processor topic in the System Setup documentation. The event processor background process creates indexes and publishes products, assets, classifications, and/or entities to the Elasticsearch database.

Elasticsearch Indexing Background Processes Scheduling

The number of concurrent running Elasticsearch Indexing background processes is controlled by the background process execution management. Elasticsearch Indexing background processes are created with priority 'Medium'. For more information, refer to the BGP Execution Management topic.

Legacy Background Process Queue Configuration

Priority of background processes does not apply to Legacy Background Process Queue Management (Multiple Queues).

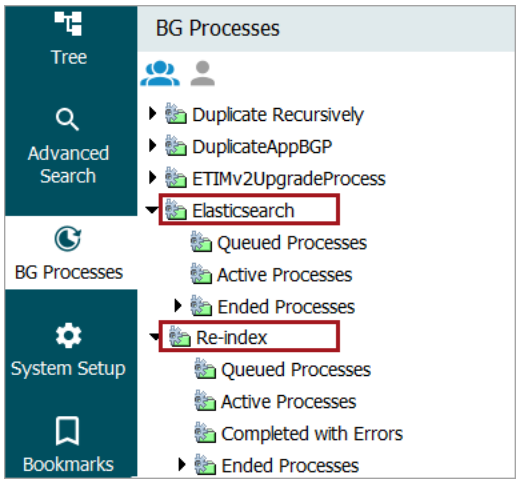
To maximize the throughput of the Elasticsearch Index publishing process, the queue size should be set to 5. For additional information, refer to the Default Configuration for Legacy Background Process Queues topic.

Important: Changing the queue size of the Legacy Background Process Queues may impact other background processing queues running on the STEP system. If you choose to implement the legacy Multiple Queues BGP execution option, perform thorough testing in lower systems of similar sizing before running in production.

Elasticsearch Indexing Background Processes

The background processes for both the controlling reindex background process and subprocesses can be viewed from the BG Process tab. The Elasticsearch node contains reindex subprocesses and the event processor background processes while the Re-index node contains the controlling reindex background processes.

Navigate to the BG Processes tab in the STEP Workbench and expand either the **Elasticsearch** node or the **Re-index** node. Select any of the process phases to review the progress of the background processes.



Note: Additional information about the BG Processes tab can be found BG Processes Tab topic under the Getting Started documentation.

Elasticsearch Server Indexing Capacity (On-Premises Installations)

For on-premises installations, it is relevant to understand that each Elasticsearch Indexing background process with a maximum of 5 processes makes concurrent batch requests to the Elasticsearch Server. The size of each batch request, as well as the actual number of concurrent batch requests, is dynamically adjusted so that no more than half of Elasticsearch server 'Index pressure memory' is consumed. This ensures that the indexing pressure from STEP does not exhaust the Elasticsearch server.

Elasticsearch Troubleshooting

Some of the most common errors encountered when troubleshooting Elasticsearch are listed below.

Failure Handling

Elasticsearch Outages

If the Elasticsearch server is unavailable, the Elasticsearch event processor will display a 'Failed (retrying)' state. The Elasticsearch indexing background processes will continue to retry. By default, the status of the Elasticsearch indexing background processes switches between a 'Running' and 'Waiting' state every 30 seconds. The 'Waiting' state will show as 'Suspended' in the logs and the 'Running' state will continue to try and run in a 'Failed (retrying)' state.

Once the issue with the Elasticsearch server has been resolved, the status will show as 'Running' and indexing will resume where it left off.

Error in Background Process

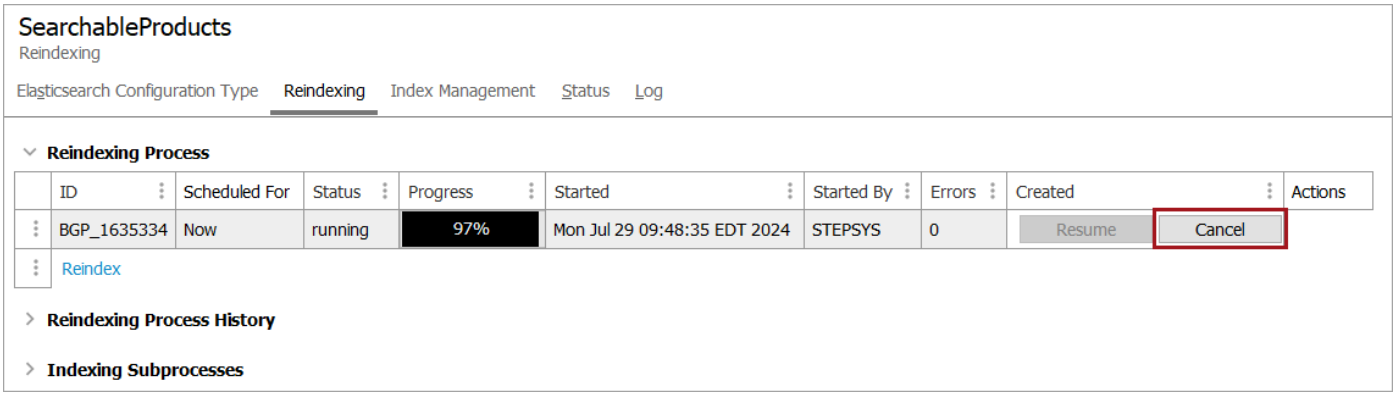
In the case of an Elasticsearch Server not being configured correctly, errors due to incompatible schema, incompatible version of Elasticsearch server, etc., or internal STEP errors, a 'Failed' status displays in the Execution Report. Once the error has been resolved, the controlling Reindexing background processes can be

resumed by clicking the Resume button or the Indexing background processes generated by the event processor will reattempt at the next incremental update.

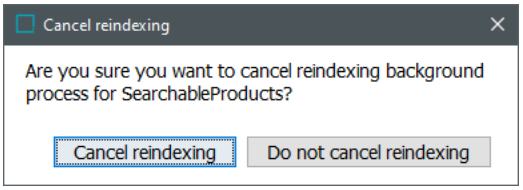
Cancellation of Controlling Reindexing Background Process

Canceling a reindex event causes both controlling and subprocess background processes to be aborted with no possibility to resume. The **Cancel** button will only be available if a cancellation is not already in progress.

1. From the Elasticsearch configuration **Reindexing** tab under 'Reindexing Process', click the Cancel button.



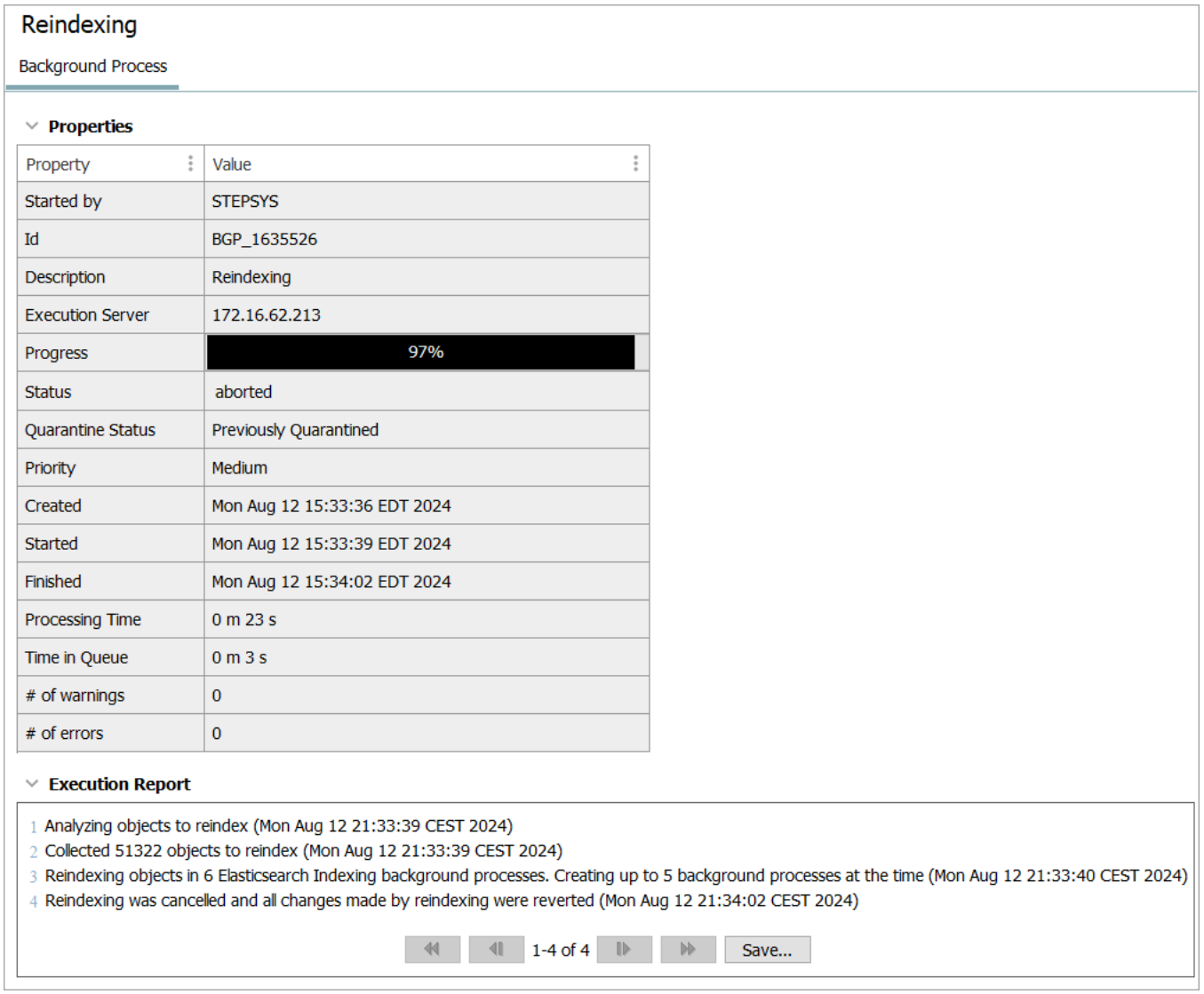
2. Choose an option:



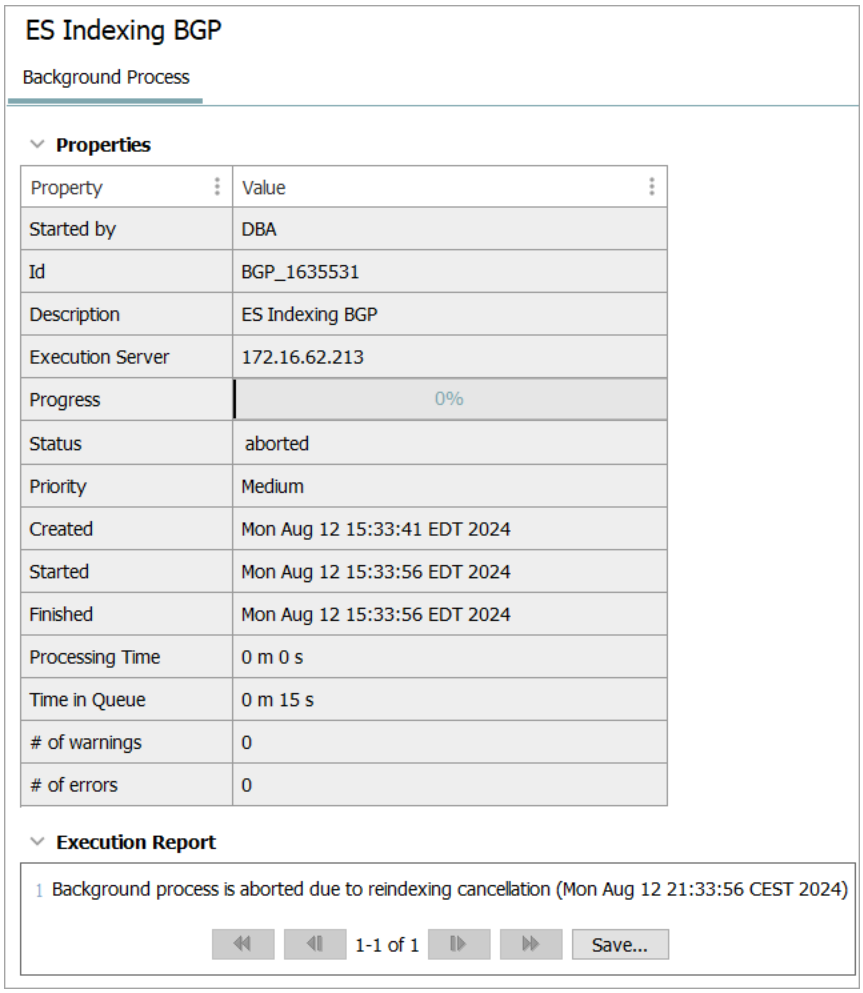
- To stop the cancellation process, click the 'Do not cancel reindexing' button.
- To proceed with the cancellation, click the 'Cancel reindexing' button.

  All background processes that are running or waiting are moved to the 'aborted' state. The Execution Report will look similar to the below:

  Controlling Indexing background process:



Indexing Subprocess:


ES Indexing BGP
Background Process
Properties
Property
Value
Started by
DBA
Id
BGP_1635531
Description
ES Indexing BGP
Execution Server
172.16.62.213
Progress
0%
Status
aborted
Priority
Medium
Created
Mon Aug 12 15:33:41 EDT 2024
Started
Mon Aug 12 15:33:56 EDT 2024
Finished
Mon Aug 12 15:33:56 EDT 2024
Processing Time
0 m 0 s
Time in Queue
0 m 15 s
# of warnings
0
# of errors
0
Execution Report
1 Background process is aborted due to reindexing cancellation (Mon Aug 12 21:33:56 CEST 2024)
1-1 of 1
Save...

On Premises Elasticsearch Index Management

The Web UI Search Screen offers a modern faceted search experience. This requires STEP data to be published to an Elasticsearch cluster that is accessible from the STEP application servers. For the end user, the Search Screen provides search results that can be refined and modified as needed.

Important: The Index Management tab is only available for non-Saas environments.

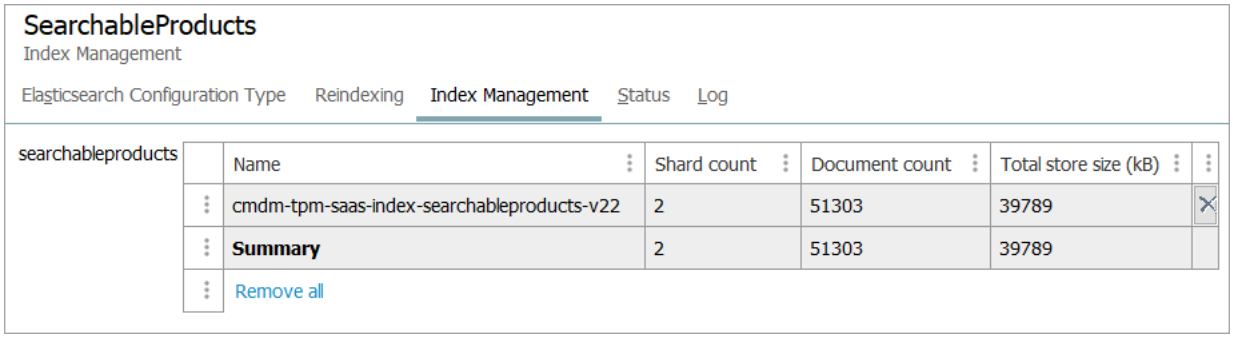
Elasticsearch Indexes and Shards

Before you begin publishing to Elasticsearch, it is important to understand what comprises an Elasticsearch index. At the highest level, an Elasticsearch cluster is a group of one or more node instances that are connected together. Data in Elasticsearch is organized into indexes, each of which is divided into shards (at least one). Shards are required in order to distribute tasks, search, and index data across nodes in the cluster. Adding more nodes and shards allows for efficient management of larger amounts of data.

Shards come in two varieties: primary and replica. Primary shards represent Elasticsearch data itself, and in the event that you start another Elasticsearch instance in the same cluster, having a greater number of primary shards allows for more coverage across that cluster. Replica shards represent a copy of their primary shard counterparts, and are used to increase search performance and for fail-over. A replica shard is never allocated to the same node as their primary shard counterpart. This is so that users can still access the data stored in Elasticsearch in the case of a node instance failure.

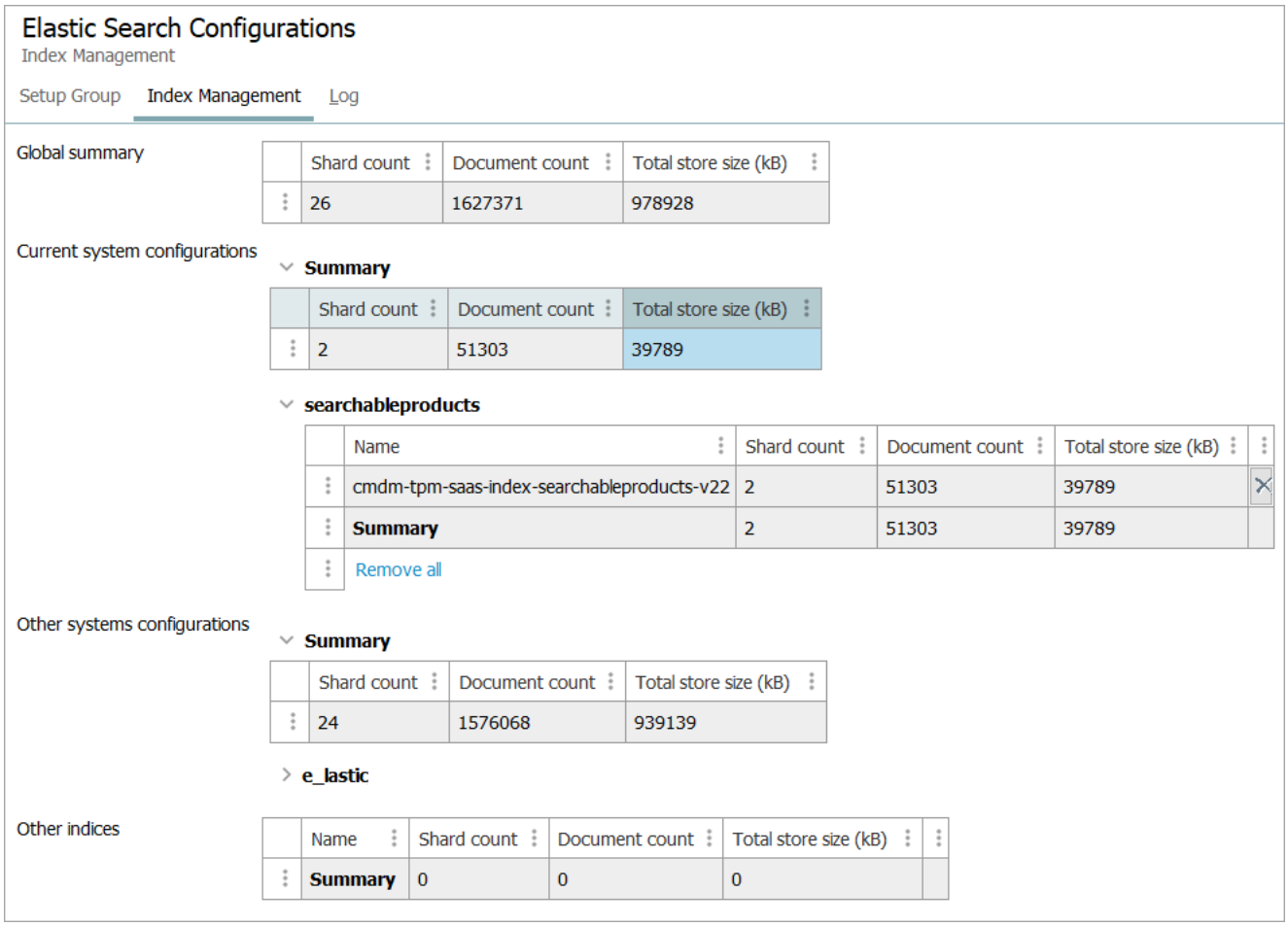
Monitoring and Managing Shards

A list of all indexes for a particular Elasticsearch configuration can be found in the Index Management tab of the Elasticsearch configuration. Every time a configuration is indexed, the table in this tab will update, which provides the shard count, document count, and total storage space usage of each index.



Individual indexes can be deleted by clicking the 'X' at the end of the row or you can click 'Remove All' to delete every index in the configuration.

This tab is also available on the setup group level, allowing the user to manage the indexes of all Elasticsearch configurations from one screen.


Elastic Search Configurations
Index Management
Setup Group
Index Management
Log
Global summary
Shard count
Document count
Total store size (kB)
26
1627371
978928
Current system configurations
Summary
Shard count
Document count
Total store size (kB)
2
51303
39789
searchableproducts
Name
Shard count
Document count
Total store size (kB)
cmdm-tpm-saas-index-searchableproducts-v22
2
51303
39789
Summary
2
51303
39789
Remove all
Other systems configurations
Summary
Shard count
Document count
Total store size (kB)
24
1576068
939139
e_lastic
Other indices
Name
Shard count
Document count
Total store size (kB)
Summary
0
0
0

On-Premises Initial Setup for Elasticsearch

The following one-time set up is required to prepare STEP for using the Elasticsearch search engine to configure a modern faceted search experience for on-premises.

Note: Elasticsearch can display product, entity, classification, and/or asset data only, based on configuration.

Important: Before starting the configuration outlined in this topic, contact Stibo Systems to activate Elasticsearch.

Configuration

1. Using Elasticsearch with STEP requires an external installation process of Elasticsearch 8.12.1. For more information on Elasticsearch, search https://www.elastic.co/.

   Important: Stibo Systems exclusively supports the Elasticsearch cloud service distributed from Elastic.

2. Review the Important note above and contact Stibo Systems to enable the Elasticsearch license on your system.

3. Review the Important note above and activate the 'elasticsearch-integration' component. For on-premises systems, instructions for installing components can be found in the 'SPOT Program' topic in the System Administration documentation found in 'Downloadable Documentation'. For Stibo Systems SaaS environments, contact Stibo Systems Support.

   Important: SaaS systems should automatically upgrade when new Elasticsearch versions are made available. However, on-premise systems will need to be manually upgraded to the new Elasticsearch version.

4. Review the Important notes above and activate the 'ui-search' component. For on-premises systems, instructions for installing components can be found in the 'SPOT Program' topic in the System Administration documentation found in 'Downloadable Documentation'. For Stibo Systems SaaS environments, contact Stibo Systems Support.

5. Add the Elasticsearch cluster name and port, separated by a colon (:), in the sharedconfig.properties file on the STEP application server using the case-sensitive **Elasticsearch.Cluster.Nodes** property as shown below:

   ```
   Elasticsearch.Cluster.Nodes=http://elasticsearch:9200
   ```

   In this example, 'http://elasticsearch' is the name of the cluster and '9200' is the port.

6. In the sharedconfig.properties file on the STEP application server, the case-sensitive **Elasticsearch.Query.CacheRetentionTime** property determines the number of seconds it takes for changes to the Elasticsearch Configuration to be reflected in the Web UI. The default setting is 600 seconds (10 minutes), which is optimized for performance. If you would like to change the frequency of updates, modify this setting.

   ```
   Elasticsearch.Query.CacheRetentionTime=600
   ```

   In this example, the default has not been changed.

7. In the sharedconfig.properties file on the STEP application server, the case-sensitive **Elasticsearch.NumberOfReplicas** and **Elasticsearch.NumberOfShards** properties make it possible to configure the replicas (default 0) and shards (default 1) to be used for the indexes created by STEP. If you need help to configure these properties to match the Elasticsearch setup, contact Stibo Systems Support.

   For troubleshooting an event processor 'maximum shards open' error, refer to the Elasticsearch Index Publishing topic.

8. If required, in the sharedconfig.properties file on the STEP application server, the case-sensitive properties below will allow you to connect via proxy (the properties to the right of the equal sign are examples only):

   ```
   Elasticsearch.Proxy.Host=sample.stibo.com
   Elasticsearch.Proxy.Port=3248
   Elasticsearch.Proxy.User=username
   Elasticsearch.Proxy.Password=password
   ```

9. Kibana is a tool for troubleshooting unexpected Elasticsearch results on the Search Screen. The installed Kibana version must be the same as the installed version of Elasticsearch. The latest versions supported are included in release notes. For more information, search the web.

Changes to the properties file, outlined above, are implemented when the server is restarted.

Note: In instances where the STEP system is set up with both an internal and an external address (i.e., a load balancer or other network gateway between client and server), the **System.ClientName** property should be used to let the STEP system know that all external URLs, such as those used for image resources, need to be created with the external base URL.

Next, create an Elasticsearch object type as defined in the Creating an Elasticsearch Object Type topic.

Events

Within STEP, an event indicates data has been changed. An event triggered automatically is known as a Core Event. For more information, refer to the **Core Events** section.

Optionally, events can be manually generated based on some system action or setup (e.g., business rules, a post-processor on an OIEP, a derived event, and some event handlers can cause events to be generated). For more information, refer to the **Derived Events** section.

Events are processed via event queues which are automatically created when an event-based outbound integration endpoint (OIEP) is created. For more information, refer to the **OIEPs** topic in the **Data Exchange** documentation. Legacy functionality allows manually creating a data event queue, as defined in the **Creating a New Event Queue** topic.

Core Events

Within STEP, an event indicates data has been changed. An event triggered automatically is known as a 'core event'. Core events are always tied to an object in STEP, meaning an event can include data about its creation time, the object for which the event was generated, and the event type. Except for the Republish event, core events are all generated automatically by STEP when the actions defined below are performed.

This topic addresses:

- Core Events and Event Types
- Core Event Generation
- Using Core Events
- Change Flags for Events

Prerequisites

It may be helpful to review the **Workspaces** and **Revisions** sections of the **System Setup** documentation prior to this topic.

For more information on revisability of entities, refer to the **Revisability on Entity Object Type** section of the **System Setup** documentation.

Core Events and Event Types

The table below lists core events, the associated event type, and the action performed to generate the core event.

Core Event	Event Type	Action Performed to Generate the Core Event
APPROVECREATED	Create	A revisable object is approved for the first time.
APPROVEMODIFIED	Modify	A revisable object already in Approved state is approved again.
DELETEAPPROVAL	Delete	The deletion of a revisable object in the recycle bin is approved.
GLOBALATTRIBUTECHANGE	Modify	The value for an Externally Maintained Attribute is changed.
GLOBALEVENT	Create	One of these System Setup objects is created: attribute,

Core Event	Event Type	Action Performed to Generate the Core Event
		attribute group, list of values group, list of values, unit group, unit, product to classification link type, and reference type objects.
GLOBALEVENT	Delete	One of these System Setup objects is deleted: attribute, attribute group, list of values group, list of values, unit group, unit, product to classification link type, and reference type objects.
GLOBALEVENT	Modify	One of these System Setup objects is modified: attribute, attribute group, list of values group, list of values, unit group, unit, product to classification link type, and reference type objects.
GLOBALREFERENCETYPECHANGE	Modify	An Externally Maintained Reference or Link is modified.
GLOBALTERMCHANGE	Modify	A Terms List is modified.
REPUBLISH	Create	An on-demand, manual command is sent using the 'Send Republish Event' operation on a business rule or from bulk update, or the 'Republish' command is used for a Collection. For more on Republish events, refer to **Event-Based OIEP Event Actions**.
REVIVED	Create	A revisable object is revived from the recycle bin.

The timing or action performed to generate a core event is especially important when dealing with an OIEP or Event Processor, because it impacts when an OIEP or an Event Processor is triggered. For more information, refer to the:

- **OIEP - Event-Based - Event Triggering Definitions Tab** section of the **Outbound Integration Endpoints** documentation.
- **Event Triggering Definitions Tab** section of the **Event Processors** documentation.

Important: When exporting delete events, generally events are processed in the same order as they occurred. However, in some circumstances, the order is not reliable. For more information, refer to the Event-Based OIEP Order of Delete Events topic.

Core Event Generation

Core events are automatically generated based on both the **database transaction method** and the **revisability** used. Details for each are below.

Database Transaction Methods

Each time an update is made in STEP, a transaction is used to write the changed data to the STEP database. The method used to make the change is a factor in determining if each transaction generates its own event, or if multiple transactions are collected to create a single event.

Available database transaction methods:

- **STEP Workbench**
  - Generates a transaction each time a field is changed.
  - Does not provide a Save button.
- **Web UI**
  - Generates a transaction when the Save button is clicked.
  - May include several changes in a single transaction.
- **Import**
  - Generates a transaction on the success of the import.
  - May include several changes in a single transaction.

Revisability

Revisability determines when it is possible to include different values per workspace. Revisability can be either global or workspace dependent. Below are details of how revisability works with each of the database transaction methods to affect the generation of events.

- **Global Revisable Objects**
  - Do not require approval (values are the same for all workspaces), thus an event is generated when the database transaction is written.
  - Are system setup objects (workflows, business rules, integration endpoints, event processors, and all publication structures), externally maintained attributes, and entities with the revisability parameter set as global revisable.
  - Create a transaction and event based on the change method, as follows:

Global Revisable	Database Transaction Methods		
	Workbench	Web UI	Import
Transaction and Event	Change to a single field and leave the field (save is automatic)	Click the Save button	Successful Import

For example, assuming an event-based OIEP is set up to listen for appropriate events on the applicable object types, changing data in Web UI on a similar entity object that is global revisable would trigger the OIEP as soon as the change was saved. Whereas on Workbench, if a value of an externally maintained attribute is changed, the value gets reflected automatically in all the workspaces.

- **Workspace Revisable Objects**
  - Do require approval (values can differ per workspace), thus an event is generated when the object is approved.
  - Are products, classifications, assets, and entities set as workspace revisable.
  - Create a transaction and event based on the change method, as follows:

Workspace Revisable	Database Transaction Methods		
	Workbench	Web UI	Import
Transaction	Change to a single field and leave the field (save is automatic)	Click the Save button	Successful Import
Event	Approve change	Approve change	Approve change

For example, assuming an event-based OIEP is set up to listen for appropriate events on the applicable object types, changing data in Web UI or Workbench on an entity object that is workspace revisable would not trigger an OIEP export until that object is approved.

Using Core Events

Core events can be monitored and used to start additional processing (e.g., a derived event, business rules, event processors, a post-processor on an OIEP, and some event handlers can cause events to be generated). Additionally, events can be manually generated based on some system action or setup.

To learn more about:

- Derived events, refer to the **Derived Events** documentation.
- Business rules, refer to the **Business Rules** documentation.
- Event processors, refer to the **Event Processors** documentation.
- How core events can be used to control the output and format of an OIEP (Outbound Integration Endpoint), refer to the **OIEP - Event-Based - Output Templates Section** topic in the **Outbound Integration Endpoints** section of the **Data Exchange** documentation
- Manually generating events on demand, refer to the **Generating Match Codes and Running a Matching Algorithm** section of the **Matching, Linking, and Merging** documentation.

Change Flags for Events

Although actions can trigger events as they occur, a record of the individual actions taken are not stored in the database—only the end result. This means that it is not possible to review a list of actions that comprised an event, and also that STEP does not track the series of individual actions taken by an event, outside of any revision created. For information on revisions, refer to **Revisions**.

When exporting event data, to determine if a change has happened, STEP compares the current values with the values in the revision prior to the event (based on the timestamp). The XML output then reports the current truth along with a 'change flag' or 'changed marker, which is output as **Changed="true"**.

For externally maintained data, since revisions are not created, a change to one externally maintained object results in change flags being included on all externally maintained objects, also referred to as a 'false positive'. This is because STEP cannot determine exactly which externally maintained data on the object has changed. False positives are likely, especially when a large number of externally maintained attributes or references exist on an object. However, you can be certain that when a change flag is present, data has changed. In the event that an externally maintained value of an attribute or reference is deleted, no change flag is output. For more information on externally maintained data, refer to the 'Important considerations for revisions' heading within the **Revisions**.

Limitations and Exceptions

In addition to the caveats on externally maintained data mentioned above, the following limitations exist for change flags:

- No change flags are produced when republishing events. For more information, refer to **Event-Based OIEP Event Actions**.
- No change flags are produced when using the context splitter post-processor on a OIEP Output Template. For more information, refer to **OIEP - Event-Based - Output Templates Section**.
- No change flags are produced for hierarchy inherited values. Change flags are only applied on the node that 'owns' the data. For more information, refer to **Inherited Attributes**.
- No change flags are produced for calculated attributes since the values are not stored in the database. For more information, refer to the **Calculated Attributes** topic.
- If there are multiple edits on an attribute within a scheduled Event publish time, it is not possible to record all the edits and publish the events at a scheduled time as STEP gives the latest change available during the publish of the event.
- No change flags are produced for deleted values.

- Use caution when relying on change flags in combination with dimension inheritance or suppression of references. The complexity of change flags is much greater in these scenarios.
- Derived events are always compared between the first approval of a node and the last approval of the node. This results in an excessive number of change flags.
- When using the Expand LOV Value Changes event processor, if change flags are used in the format for the endpoint receiving the event, the relevant objects will have change flags on all attributes set to true (instead of only the changed attribute), because the endpoint interprets the event generated by the processor as a change to the object rather than to the individual attribute value. For more information, refer to **Expand LOV Value Changes Processing Plugin Parameters and Triggers**.
- Data Container tags are marked **Changed=true** on the data container object itself, and not on that of the individual attribute value tags inside the data container.

Note: To eliminate any concern about when change flags are included (or are not included), you should consider each export as a full replacement.

For an example of a number of transactions and how they are represented by the change flag, refer to the **Change Flag Example** documentation.

Change Flag Example

When processing events via an event processor or an OIEP, a change flag is displayed in XML output as Changed="true". A Change flag indicates the current truth, namely that data in the event being processed is different compared to the approved data currently in STEP.

Consider the transactions (Txn) shown in the table below, and the resulting output, to understand how change flags work. The data was generated using the following setup:

- The exported data is a single, internally maintained attribute (attrWarranty), that has a dimension dependency of Country, and is visible in both contexts being exported.
- The values are modified in two contexts: one that includes the Country dimension point = USA, and a second that includes the Country dimension point = Canada.
- The OIEP is configured for 'No event batching'. This means the OIEP will fully process a single event (run an export, create a file, and deliver the file) before processing the next event in the queue.

Note: In the table, the 'Event XML Processed' column output has been edited to show only the attribute values for product ID, object type (UserTypeID), parent ID, Name, and attrWarranty.

Txn	Action	Event XML Processed
1	attrWarranty value originally set to Y in the USA and Canada dimension points is updated to N in both dimension points. While viewing both contexts using Context Mode in workbench, the object is approved for both contexts, two events are generated, and a revision is created. **OIEP is invoked and processes Event 1 and Event 2.** Export compares current attrWarranty approved values to those in the prior revision:	Event 1: <Products> <Product ID="181120" UserTypeID="Item" ParentID="181119"> <Name QualifierID="USA">Acme Anvil</Name> <Values> <ValueGroup AttributeID="attrWarranty" Changed="true"> <Value QualifierID="USA" Changed="true">N</Value> <Value QualifierID="Canada" Changed="true">N</Value> </ValueGroup> Event 2: <Products> <Product ID="181120" UserTypeID="Item" ParentID="181119"> <Name QualifierID="USA">Acme Anvil</Name> <Values> <ValueGroup AttributeID="attrrWarranty" Changed="true"> <Value QualifierID="USA">N</Value> <Value QualifierID="Canada" Changed="true">N</Value> </ValueGroup>

Txn	Action	Event XML Processed
	• Prior revision values: **Y in USA** and **Y in Canada** • Main values: **N in USA** and **N in Canada** • Approved values: **N in USA** and **N in Canada** For Event 1, the value in the approved workspace for each context is different from the previous revision, so both dimension points are marked with Changed="true" in the XML. For Event 2, because two contexts were approved, a false positive flag is included as the second event, although the change had already been reported in the previous event.	
2	attrWarranty value is cleared in the USA and Canada dimension points. Object is NOT approved, NO revision is created. Since the object is not approved in either context, no event is generated. • Prior revision values: **N in USA** and **N in Canada** • Main values: **{blank} in USA** and **{blank} in Canada** • Approved values: **N in USA** and **N in Canada**	
3	attrWarranty value is set to Y for **USA**.	Event 3:

Txn	Action	Event XML Processed
	Object is approved in the context with USA dimension only, an event is generated, and a revision is created. **OIEP is invoked and processes Event 3.** • Prior revision values: **N in USA** and **N in Canada** • Main values: **Y in USA** and **{blank} in Canada** • Approved values: **Y in USA** and **N in Canada** The value for USA has been changed to Y and approved, so the change flag is true. The removal of the value for Canada has not yet been approved, so it continues to export as N.	<Products> <Product ID="181120" UserTypeID="Item" ParentID="181119"> <Name QualifierID="USA">Acme Anvil</Name> <Values> <ValueGroup AttributeID="attrWarranty" Changed="true"> <Value QualifierID="USA" Changed="true">Y</Value> <Value QualifierID="Canada">N</Value> </ValueGroup>
4	attrWarranty value is set to Y for **Canada**. Object is approved in the context with Canada dimension only, an event is generated, and a revision is created. **OIEP is invoked and processes Event 4.** • Prior revision values: **Y in USA** and **N in Canada** • Main values: **Y in USA** and **Y in Canada** • Approved values: **Y in USA** and **Y in Canada** Compared to the previous revision, only the Canada	Event 4: <Products> <Product ID="181120" UserTypeID="Item" ParentID="181119"> <Name QualifierID="USA">Acme Anvil</Name> <Values> <ValueGroup AttributeID="attrWarranty" Changed="true"> <Value QualifierID="USA">Y</Value> <Value QualifierID="Canada" Changed="true">Y</Value> </ValueGroup>

Txn	Action	Event XML Processed
	value has changed, so the change flag is true.	
5	attrWarranty value is cleared from the USA and Canada dimension points. Object is approved in both contexts, two events are generated, and a revision is created. **OIEP is invoked and processes Event 5 and Event 6.** • Prior revision values: **Y in USA** and **Y in Canada** • Main values: **{blank} in USA** and **{blank} in Canada** • Approved values: **{blank} in USA** and **{blank} in Canada** The attrWarranty attribute is excluded from the XML output because neither of the contexts in the Approved workspace contains a value.	Event 5: <Products> <Product ID="181120" UserTypeID="Item" ParentID="181119"> <Name QualifierID="USA">Acme Anvil</Name> <Values> </Values> </Product> </Products> Event 6: <Products> <Product ID="181120" UserTypeID="Item" ParentID="181119"> <Name QualifierID="USA">Acme Anvil</Name> <Values> </Values> </Product> </Products>

Changing the OIEP to use batching would cause multiple events to be delivered in a single file. This would lessen the number of occurrences of a 'false positive' change flag, but would also require that the downstream system be able to process multiple objects per file. For more information, refer to the **Event-Based OIEP Event Batching** topic in the **Data Exchange** documentation.

Derived Events

A derived event is an event that is triggered based on the triggering of another event. When the trigger you need is not available as a core event, use a derived event.

For example, it is common to configure a derived event to trigger when:

- An object reaches a specific state in a workflow.
- An event-based OIEP cannot discriminate the republish event from other types of events because it would also be registering events and publishing data.
- Referenced images, referenced products, parent products, or products that are linked, removed, or modified in a specific classification structure.
- The triggering object types are set up on an event-based OIEP, and then the business rules are applied to generate derived events based on the original object type triggering.
- An object does not have a change in approval status, but the inherited value changes on the children need to be published.

Prerequisites

Derived Events is an advanced topic, it is expected that anyone reading this documentation is familiar with Core Events. For more information refer to the **Core Events** section of this guide.

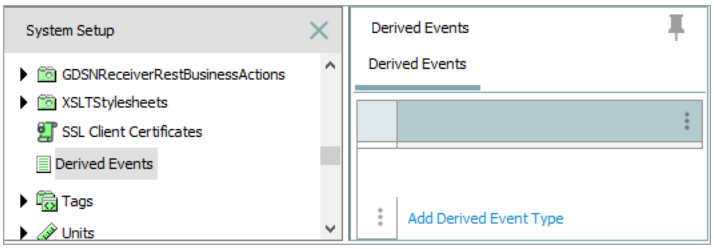
Also, a thorough understanding of business rules is needed to create successful derived events. For more information, refer to the **Business Rules** section, and refer to the **Event-Based Example Business Rules for Derived Events** section of the **Data Exchange** documentation.

Add a Derived Event Type

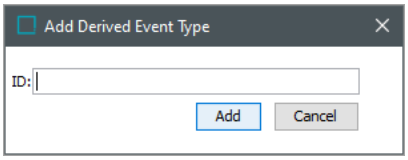
A derived event type must exist before it can be configured for an OIEP.

To create a derived event type:

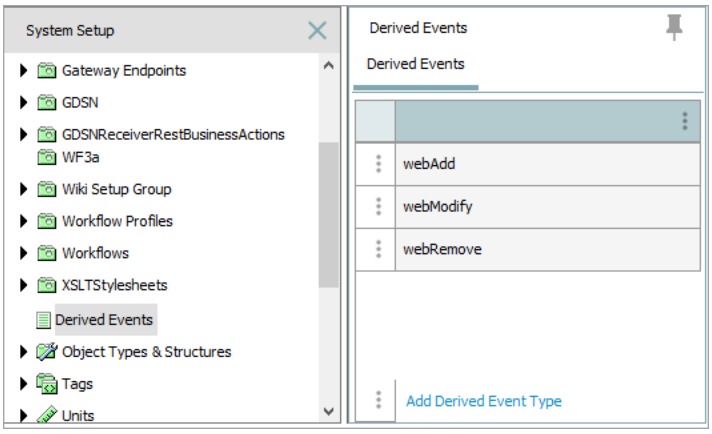
1. Go to System Setup.
2. Click **Derived Events**.



3. On the Derived Events tab, click the **Add Derived Event Type** link to display the Add Derived Event Type dialog.



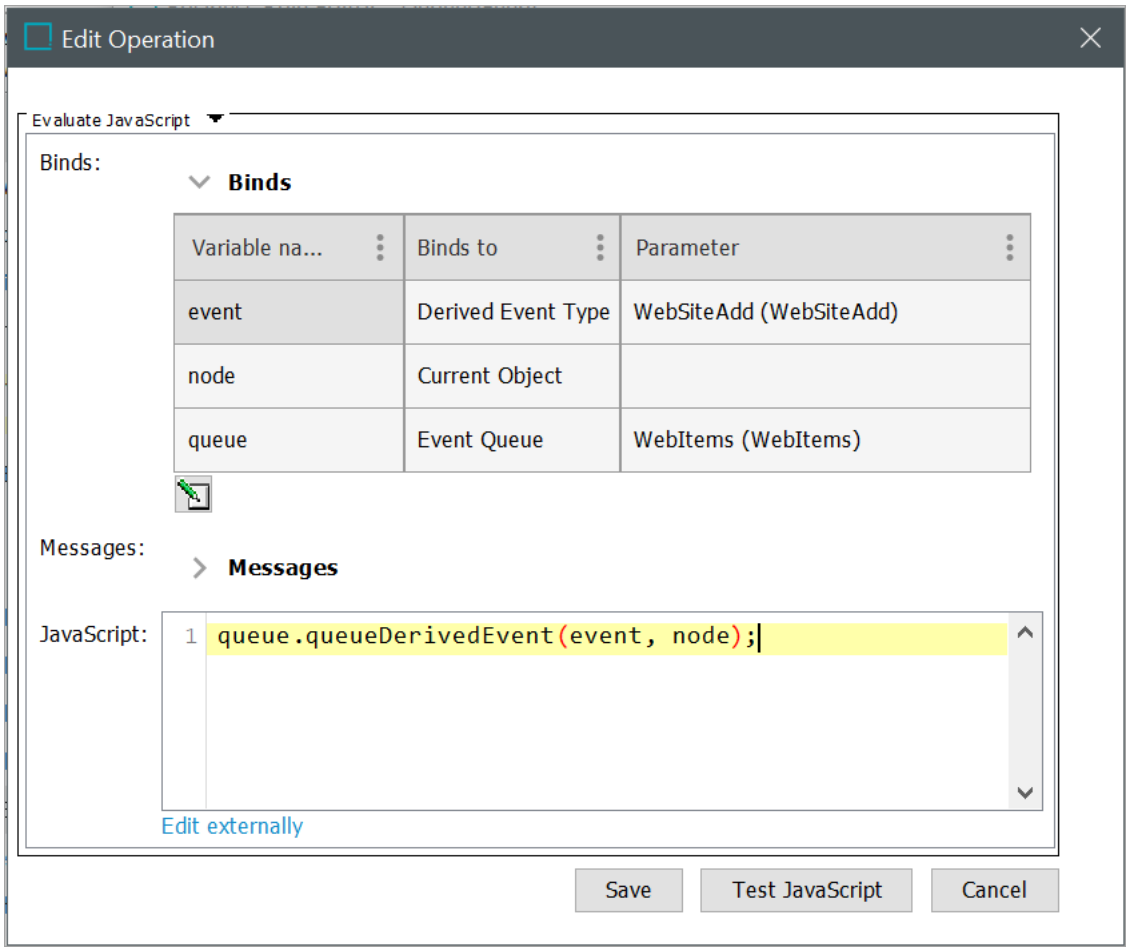
4. Type an ID and click the **Add** button to display the Derived Events tab with the newly added derived event type. In the example below, commonly used derived event types are listed. Once the derived event type is displayed, it is available for use.



Use a Derived Event Type in a Business Rule

JavaScript business rules can access derived event types (such as the WebSiteAdd type shown below) via the **Derived Event Type** bind, as defined in the **Event Handling Binds** topic of the **Resource Materials** documentation in online help. Derived events are generated for an object on event queues (also required to bind), event processors, or outbound integration endpoints (OIEPs) using the necessary binds and one line of JavaScript.

For example, the WebItems event-based OIEP (assigned to the 'queue' variable name) uses the queueDerivedEvent() method, which accepts the derived event WebSiteAdd (assigned to the ‘event’ variable name), and the Current Object (assigned to the ‘node’ variable name), as shown in the image below.



Use a Derived Event Type in an OIEP

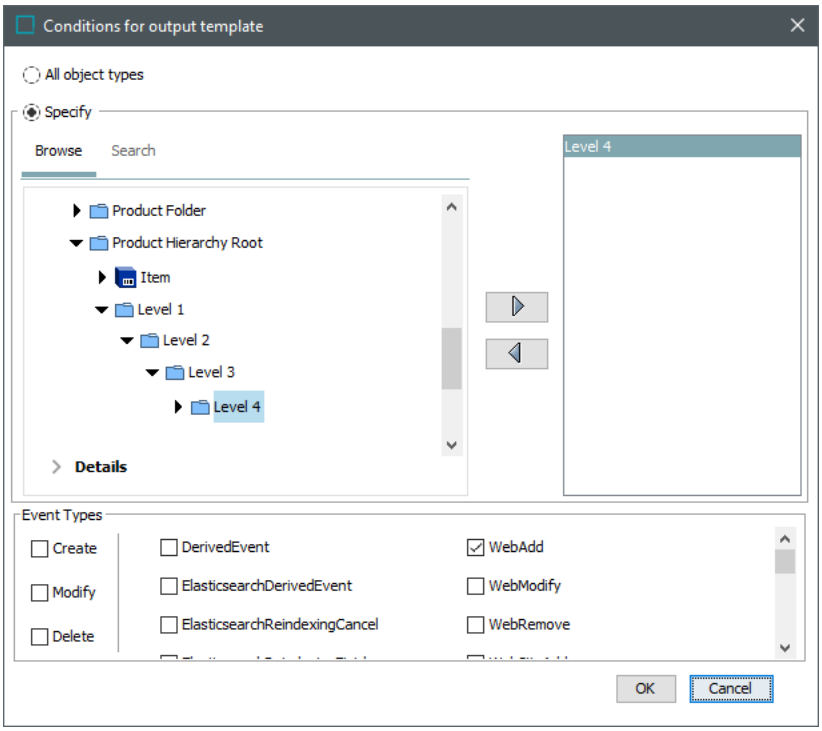
When configuring an event-based OIEP output template, derived event types can be selected to enable sending files formatted in different ways or to include different data based on the action that triggers the event. For example, when pushing data to a website, consider the following derived event types:

- WebAdd - when an object is first linked into a classification.
- WebModify - when an object link to a classification is modified.
- WebRemove - when an object is unlinked from a classification.

Derived events can be used to trigger changes prior to approval by setting the Main workspace on the OIEP.

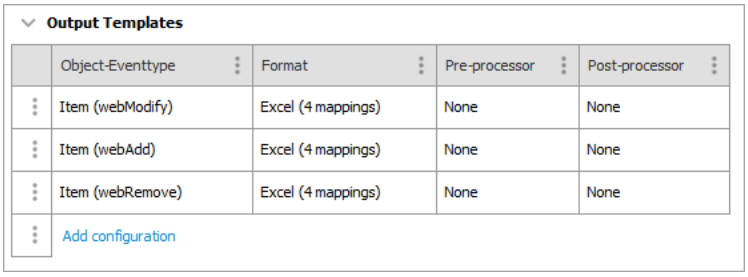
To use a derived event type:

1. In an event-based OIEP, on the Configuration tab, open the Output Templates section and click the **Add configuration** link, or edit an output template that is already displayed.
2. On the **Conditions for Output Template** dialog, select the object type and the derived event type. In this example the derived event type is 'WebAdd'.



3. Repeat the previous steps to create additional output templates for other derived events.

   In this example, the format for all output templates is Excel but the mapping differs in each template based on the derived event being output. It is also possible to specify different output formats for each output template such as Generic XML, STEPXML, or CSV, depending on the specific requirements.



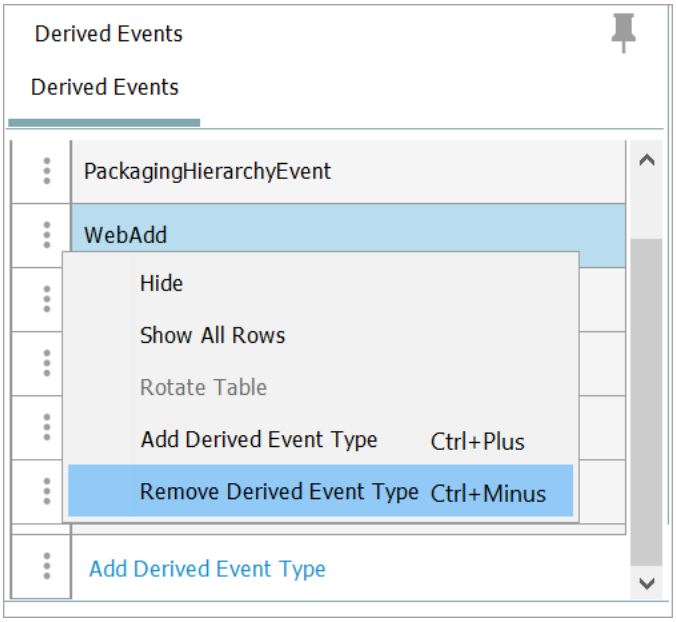
Delete a Derived Event Type

You can delete a derived event type when it is no longer necessary. This also removes it from the available Event Types displayed when configuring an OIEP Output Template.

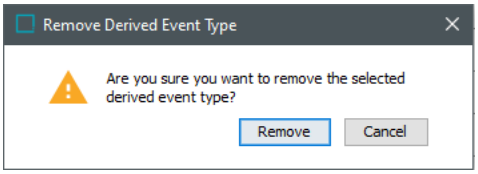
To delete a derived event type:

1. Go to System Setup.
2. Click the **Derived Events** node.

3. Find the derived event type to be removed, right-click the row icon to display the available options.



4. Click **Remove Derived Event Type** to display the Remove Derived Event Type dialog.



5. Click **Remove** and the Derived Events tab no longer lists the deleted derived event type.

Events Not Triggered

While many actions trigger an event as described in the **Events** topics, there are some exceptions.

For Object Types, creation does not trigger an event.

For the following objects, while creation does trigger an event, the changes listed do not trigger an event.

Object	Changes to these items do not trigger an event
Attribute	• Description flipper > Calculated parameter • Description flipper > Type parameter • Description flipper > Dimension Dependencies parameter • Description flipper > metadata parameters defined by system users • Attribute Validation flipper > Validation Base Type parameter • Attribute Validation flipper > List of Values (LOVs) parameter
Business Rules	• Business Rule flipper > Valid Object Types parameter • Business Rule flipper > On Approve parameter • Business Rule flipper > Run as Privileged parameter
LOVs (Lists of Values)	• Description flipper > Use IDs for Sorting parameter
Reference Types	• Type of Reference • Description flipper > Inheritance parameter • Description flipper > Mandatory parameter
Web UIs	• Description flipper > ID parameter • Description flipper > Name parameter • Description flipper > Default parameter

Event Processors

An event processor can be used to monitor events within STEP. Each event processor has many parameters but most notably the collective configuration of a processing plugin, a processor queue, and event triggering definitions. These allow for the collected events to be logically processed, and actions automatically performed, based upon each event processor's specific configuration.

Event processors can be used to automatically perform actions based on triggering events, however much of what an event processor can do is controlled by the processing plugin. Before creating an event processor, you should know the processing plugin to be used. For a complete list of STEP processing plugins, refer to the **Processing Plugins** documentation.

Prerequisites

Before an Event Processor can be created / configured the one-time setup tasks described in the **Initial Setup for Event Processors** must be completed to allow for the creation of event processors.

It is expected that anyone configuring an event processor is familiar with how and when events are generated. For more information, refer to the **Events** section of the **System Setup** documentation.

Setup Requirements

Setting up and using an event processor involves the following steps:

1. Perform one-time setup tasks to allow for the creation of event processors as described in **Initial Setup for Event Processors** topic.
2. Launch the event processor wizard as described in **Creating an Event Processor** topic.
3. In the wizard, add an ID, name, and object type as described in **EP - Identify Event Processor** topic.
4. In the wizard, specify the processing and error handling as described in **EP - Configure Event Processor** topic.
5. In the wizard, specify the information specific to the processing plugin selected in the previous step as described in **EP - Configure Processing Plugin** topic.
6. In the wizard, specify how often the event processor should start as described in **EP - Schedule Event Processor** topic.
7. In the wizard, populate the send report to address parameter as described in **EP - Error Handling and Reporting** topic.
8. Confirm / Update triggering definitions as described in **Event Triggering Definitions** topic.
9. Set Queue Status Events to 'Read Events' as described in the **Queue Status** section of the **EP - Event Processor Tab** topic.
10. Enable the event processor as described in the **Enable Event Processor** section of the **Running an Event Processor** topic.

Note: An event processor definition can be exported as comments and submitted to an external source control system for comparison purposes. For details, refer to the **Configuration Management** documentation.

Event Processor Results

An event processor has no delivery method, but is otherwise similar to an event-based outbound integration endpoint (OIEP). Event processors can be used alone when the results are only required internally to STEP. However, if the delivery of the results of the event processor is required externally, the event processor can be used in conjunction with an OIEP. For more information, refer to the **Outbound Integration Endpoints** section within the **Data Exchange** documentation.

Monitoring the progress of an event processor from an external system is available by way of a STEP Monitoring Sensor. For details, refer to the **Monitoring an Event Processor via External System** documentation. For information on the recommended practices for Error Handling, refer to the **Recommended Error Handling Practices** topic in **Resource Materials** documentation.

Processing Plugins

An event processor consists of an outer Event Processor Framework for finding and reacting on events, and an inner processing mechanism (processing plugin) that deals with the actual event batch. The Event Processor Framework is the same for all event processors, whereas there are many different types of processing plugins.

For more information on Event Processors, refer to the **Event Processors** documentation.

When creating an event processor to monitor events within STEP, a processing plugin must be selected and configured. By default, all processing plugins skip deleted objects (objects in the recycle bin).

Below is a list of available processing plugins and links to their configuration details. Custom processors can be created for various business requirements. For more information, contact Stibo Systems.

Note: Some processing plugins may not be available without enablement of a corresponding add-on component and/or license. Contact Stibo Systems to begin the process of enabling a license or licenses for your system. For on-premises systems, instructions for installing components can be found in the 'SPOT Program' topic in the System Administration documentation found in 'Downloadable Documentation'. For Stibo Systems SaaS environments, contact Stibo Systems Support.

Processing Plugin Name	Description
Asset Publisher	Offers many of the same options as traditional Asset Push functionality and can be configured to publish asset content directly to cloud blob storage. Refer to the **Asset Publisher Processing Plugin Parameters and Triggers** documentation. Also, refer to the Asset Push documentation within the Digital Assets documentation.
Asynchronous Translation Message Processor	Allows users to send scheduled translation jobs to asynchronous translation services based on a derived event, and depending on user preferences, batch translation events into as little as one translation job, reducing translation costs. Refer to the **Asynchronous Translation Message Processor Processing Plugin Parameters and Triggers** documentation.
CASS Certification Report	Generates CASS (Coding Accuracy Support System) certification reports. Only available for users in the US who have both a Loqate Local integration and a CASS license. Refer to the **CASS Certification Report Processing Plugin Parameters and Triggers** documentation.
Data Sufficiency Calculator	Works in tandem with the sufficiency configuration type to calculate sufficiency scores for a given product. Assesses all the sufficiency configuration types within a system and calculates the sufficiency scores for the products included in the

Processing Plugin Name	Description
	'Triggering Object Types' parameter in the 'Event Triggering Definitions' tab of the event processor. Refer to the **Data Sufficiency Calculator Processing Plugin Parameters and Triggers** documentation.
Elasticsearch Indexer	Allows STEP to publish data to Elasticsearch for a faceted search experience. Refer to the **Elasticsearch Indexer Processing Plugin Parameters and Triggers** documentation.
Execute Business Action	Allows a business action to be run from an event processor, so that when changes occur, a custom business action on objects can be asynchronously triggered. Refer to **Execute Business Action Processing Plugin Parameters and Triggers** documentation.
Execute Business Action for Event Batch	Allows a business action to be run from an event processor, so that when changes occur, a custom business action can be asynchronously triggered. The configured business action executes once per event batch (instead of once per event like the Execute Business Action). Refer to **Execute Business Action for Event Batch Processing Plugin Parameters and Triggers** documentation.
Expand LOV Value Changes	Allows the event processor to react on all LOV value update events (only for LOVs that use Value IDs), including those made manually from workbench or Web UI, via LOV value merge, via import, etc. Refer to **Expand LOV Value Changes Processing Plugin Parameters and Triggers** documentation.
Experian Email Validation	Allows the event processor to be configured with an Experian Email Validation Configuration, and a business condition used to revalidate email information (Email Revalidation). The common setup is to configure to listen for 'Account' events made by changes in the 'Email Field' and the 'Experian Email Validation' processing plugin. Refer to **Experian Email Validation Processing Plugin Parameters and Triggers**.
Historic Data Analyzer	Allows for the analysis for data for historic reporting. The event processor (IdOfReport_RA) is created automatically when starting the report. Refer to the **Historic Reporting** documentation in **Resource Materials**.
Historic Data Generator	Allows for the generation of historic reports. The event processor (IdOfReport_RG) is created automatically upon generation of a historic report. Refer to the **Historic Reporting** documentation in **Resource Materials**.
Image Cache	Allows the event processor to generate images for required conversions asynchronously and saves the resulting files to the image cache. Refer to **Image**

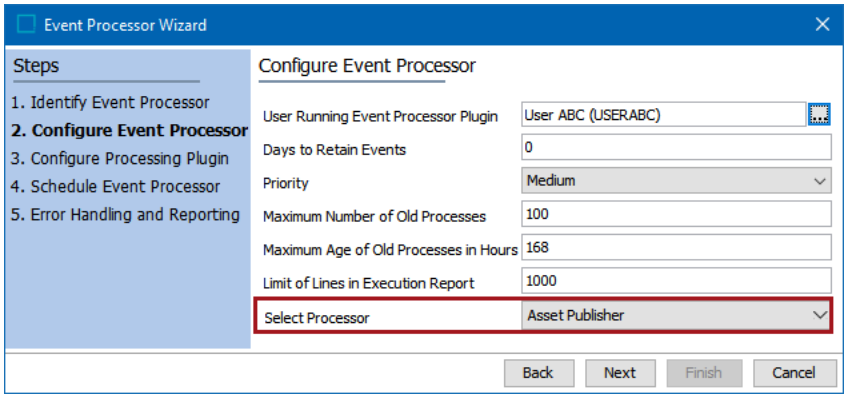
Processing Plugin Name	Description
	Cache Processing Plugin Parameters and Triggers documentation.
Matching	Allows for the generation and/or updating of match code values, as well as the option to run matching algorithms, whenever an event is processed on the objects acted on by the algorithm. Refer to **Matching Processing Plugin Parameters and Triggers** documentation.
Revision Management	Allows automatic purging of object revisions to limit the total number of revisions retained. Refer to **Revision Management Processing Plugin Parameters and Triggers** documentation.
Source Record Data Management – Historical Values Cleanup	Allows incremental purging of the oldest historical source data and optimizing storage to keep disk usage as low as possible. Storage of source data is only supported on object types identified by the 'Matching - Merge Golden Records' component model. Refer to **Source Record Data Management Processing Plugin Parameters and Triggers** documentation.
Splitting Processor	Designed for historical reporting. The functionality is in ramp-up status, and while accessible, may not work for you as expected since it is still under development. Historical reporting is traditionally extremely slow, and there is a need to distribute events in a controlled manner. The Splitting Processor takes a number of queues from other event processors or outbound integration endpoints, and either copies the entire batch of events to all of them or distributes the events evenly between the queues. Refer to **Splitting Processor Processing Plugin Parameters and Triggers** documentation.

Asset Publisher Processing Plugin Parameters and Triggers

The Asset Publisher event processor plugin can be configured to publish asset content to a specific location.

Deleted objects (objects in the recycle bin) are ignored during processing.

To access the 'Configure Processing Plugin' parameters, the **Asset Publisher** processor must be selected within the Select Processor parameter during the wizard step 'Configure Event Processor.'



The **Parameters** and **Event Triggers** sections below contain important information on settings that should be considered when creating an event processor using this processing plugin.

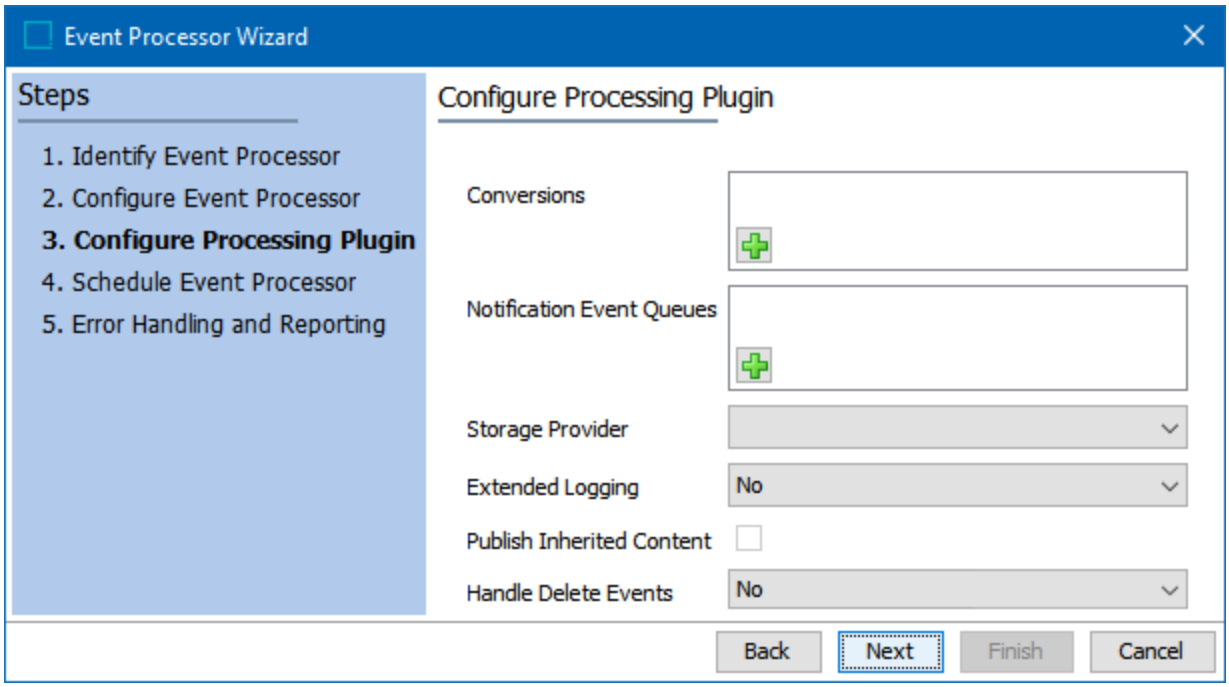
Prerequisites

This section of documentation describes configuration steps for this specific processor, but that is only one part of configuring an event processor. For the full set of instructions on configuring an event processor, refer to the Event Processors topic.

Additionally, if image conversion is required as part of the asset push, the image conversion configuration must be completed prior to the asset push configuration, so that the conversion can be selected as part of the configuration. Refer to the **Image Conversion Configuration** topic for more information.

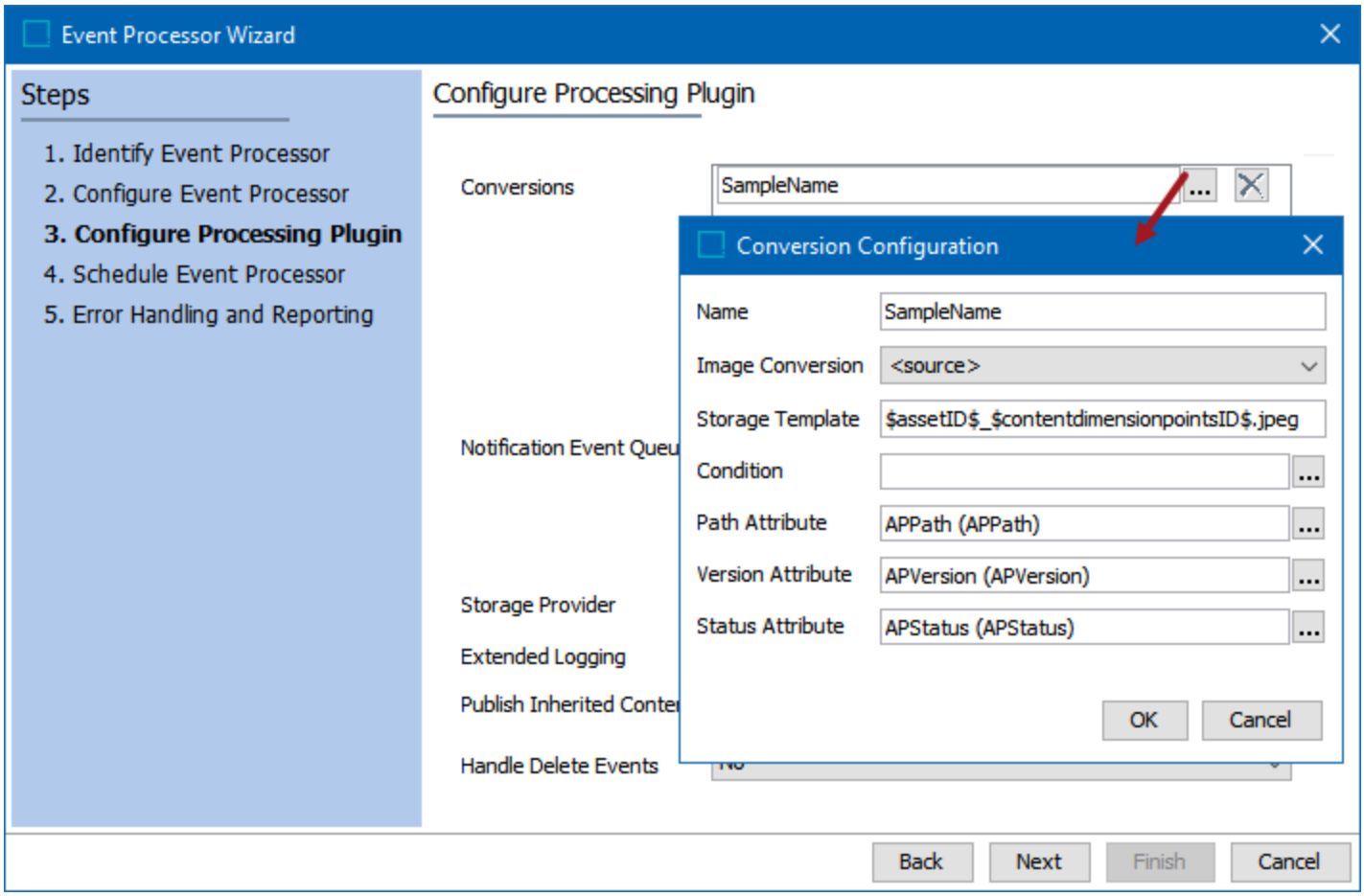
Parameters

Each of the relevant parameters for the Event Processor Wizard 'Configure Processing Plugin' step are described below. Any additional wizard parameters with importance for this plugin are also included in this topic.



Note: You can hover over the parameter value fields within the wizard to access descriptive tool tip text.

Conversions - These are the image conversions to publish. Click the plus button (+) in the parameter to add a row within the field. Click the ellipsis button (...) to display the Conversion Configuration dialog.



The Conversion Configuration dialog has the following parameters:

- **Name** - add the mandatory name of the conversion; it must be unique within an Asset Publisher configuration.
- **Image Conversion** - select the mandatory image conversion to be used. If the asset format, size, or image color settings need to be converted when pushed to the target system, select the relevant conversion configuration from the list. The <source> option is default and will produce no conversions. The dropdown list contains the conversions that are available in the system. Configurations that have (conversion) appended to their names are custom conversions and can be changed and/or edited. Those without (conversion) appended are standard conversions and cannot be changed and/or edited.
- **Storage Template**- specify the mandatory path and file name to store the conversion on blob (binary large object) storage. The following variables / macros are available:
  - **$assetID$** - ID of the asset being published
  - **$assetNAME$** - NAME of the asset being published

- **$IDpath$** - Two path levels constructed from the last four (4) characters of the asset ID; use when folder structure for assets is needed
- **$attribute:attributeID$** - Value of the description attribute of the asset is being published
- **$contentdimensionpointsID$** - ID(s) of the dimension point(s) for which the asset is being published
- **$extension$** - The original extension for the asset. Will not include leading dot (.)
- **$autodetected-extension$** - The extension produced by the asset conversion. Should only be used for the rate case where the conversion can produce files with different extensions. If a conversion always produces the same extension, the information should be hardcoded instead. Will not include leading dot (.)

Note: For the Storage Template file path, similar to Asset Push, the system makes letters lowercase and replaces characters that are illegal in a Windows file system with '_'. Illegal Windows characters are: \ / : * ? < > | For example, if assetid is 'ABC<>' and the storage template is '$IDpath$/$assetID$.jpg', then it resolves to the storage path 'bc/__/ABC__.jpg'.

Validation is done when saving the configuration. You can choose to fix the issue (if one exists) at that point or save the configuration as-is and update later.

- **Condition** - if specified, this optional condition must evaluate to be true for the given asset to be published by this conversion.

  You can bind asset content to restrict that asset conversion only be done on, for example, specific MIME types by using the 'Current Asset Content Object' bind as described in the **Other Binds** topic in the **Resource Materials** documentation.

  To restrict conversion only on assets in specific classifications, define a condition in the triggering condition on the queue (where it will be the asset itself that can be bound in the condition as opposed to asset-content).

Important: The following constraints are checked when the event processor is processing events. If the constraints are not fulfilled, the event processor stops and fails.

- **Path Attribute** - The Path Attribute is only mandatory when used for DaaS configuration and when the 'Handle Delete Events' parameter (defined below) is set to 'Yes.' Otherwise, it is used to store the actual published path of this asset (from the storage template). Refer to the **Publishing to Data as a Service** topic in the **Data as a Service** documentation. Configure the attribute as follows:
  - Single-valued, description attribute
  - Externally maintained
  - Must have same dimension-dependencies as asset content

    - Must be valid for an object type used in triggering-object-types of event processor and the path attribute must not be used in any other enabled Asset Publisher event processor

- **Version Attribute**: This mandatory attribute is used to store the version of the published asset. The value is stored on the asset. Configure the attribute as follows:
    - Single-valued, description attribute
    - Externally maintained
    - Must have same dimension-dependencies as asset content
    - Must be valid for an object type used in triggering-object-types of event processor and the path attribute must not be used in any other enabled Asset Publisher event processor
- **Status Attribute**: If specified, this optional attribute is used to store the status of the publish operation. The value is stored on the asset. Configure the attribute as follows:
    - Single-valued, description attribute
    - Externally maintained
    - Must have same dimension-dependencies as asset content
    - Must be valid for an object type used in triggering-object-types of event processor and the path attribute must not be used in any other enabled Asset Publisher event processor

Note: The Path attribute is mandatory when $assetNAME$ and $attribute:attributeID$ macros are used.

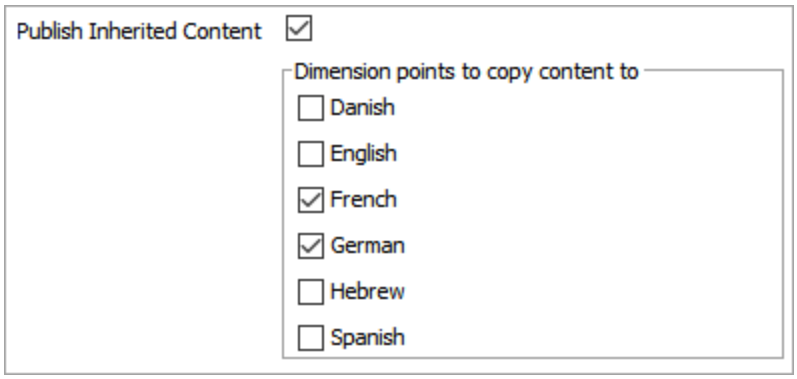
Notification Event Queues - Click the plus button ( ) in the parameter to add a row within the field. Click the ellipsis button ( ) to display the Select Processor for Events dialog. Select the processor using standard Browse / Search Node Picker functionality.

Storage Provider - Storage provider for which converted images are pushed. Options in the dropdown are available when a Gateway Integration Endpoint is created and configured. For specific information on how to set up Gateway Integration Endpoints for the Asset Publisher functionality, refer to the following topics located in the **Data Exchange** documentation:

- **Configuring a Gateway Integration Endpoint - Amazon S3 Blob Storage**
- **Configuring a Gateway Integration Endpoint - Google Cloud Storage**
- **Configuring a Gateway Integration Endpoint - Microsoft Azure Blob Storage**

Extended Logging - Set to 'Yes' to enable extended logging in the execution report of the event processor. This logs information for each upload taking place. The default setting is 'No.'

Publish Inherited Content - This option is available on systems where asset content is dimension dependent and the content depends on a single dimension. By default, asset content is only published for the dimension points to which it is local. Use this option to export content for specific dimension points that the content can be inherited to.



Handle Delete Events - Set this parameter to 'Yes' to perform ongoing cleanup of the blob storage. To process delete events, you must also select a 'Path Attribute' and set the 'Storage Template' within the Conversion Configuration dialog (defined above). With this configuration, the blob storage is managed by attempting to delete the blob / binary identified in delete events based on the current configuration. A 'best effort' approach is used for deletions based on the Storage Template of the current configuration. If the published asset cannot be found because the Storage Template has been modified since publishing, the published asset is not deleted.

By default, the 'No' setting indicates that binaries are not deleted from the blob storage based on delete events.

Event Triggers

For the event processor to take effect, it must be configured to only listen for changes on asset type objects housed within the same previously selected classification folder.

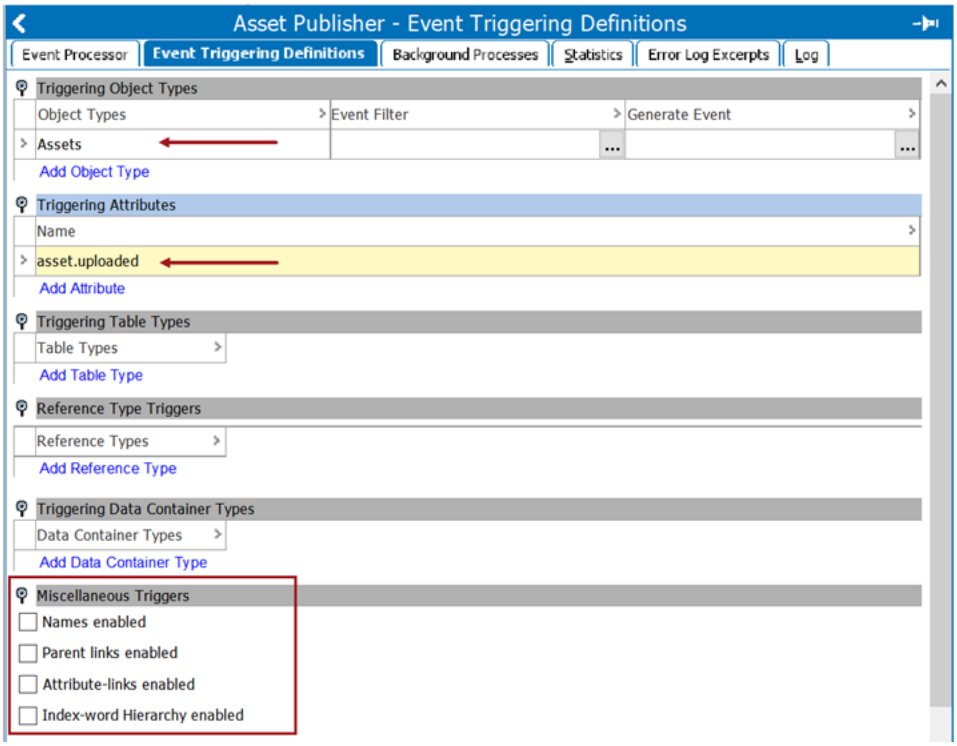
By default, events are triggered on the Approved workspace. Derived event functionality is available for triggering events prior to approval, as defined in the Derived Events topic in the System Setup documentation.

The recommended setup of the triggering definition of the Asset Publisher event processor includes:

1. In the Triggering Object Types flipper, click the **Add Object Type** link to display the Select Object Types dialog.
2. Select **one or more asset object types that will be monitored for changes**. When business rules are not required in the Event Filter and Generate Event fields, multiple object types can be selected within the same Triggering Object Types row.

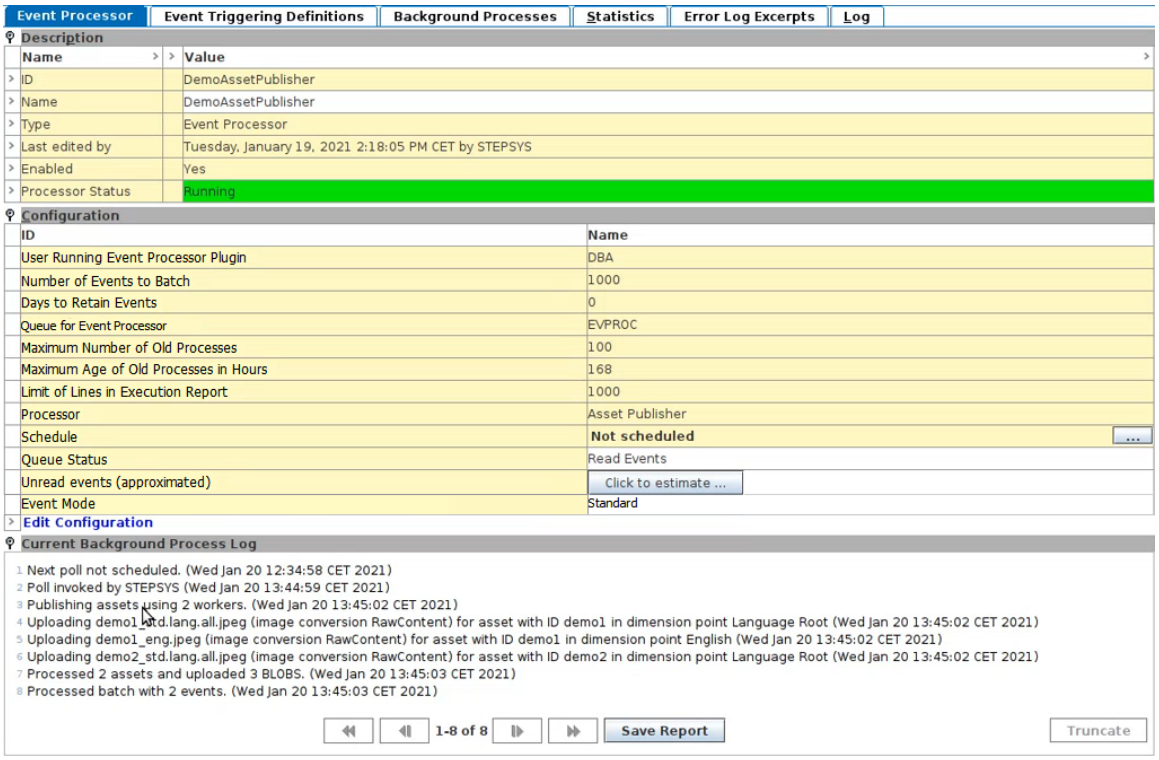
   Important: You must select at least one asset type for Triggering Object Types, or nothing will be processed by the event processor.

3. Click the **OK** button to add the selection to the Triggering Object Types table.
4. In the Triggering Attributes flipper, add the attribute ‘asset.uploaded.’
5. In the Miscellaneous Triggers flipper, uncheck all the checkboxes.

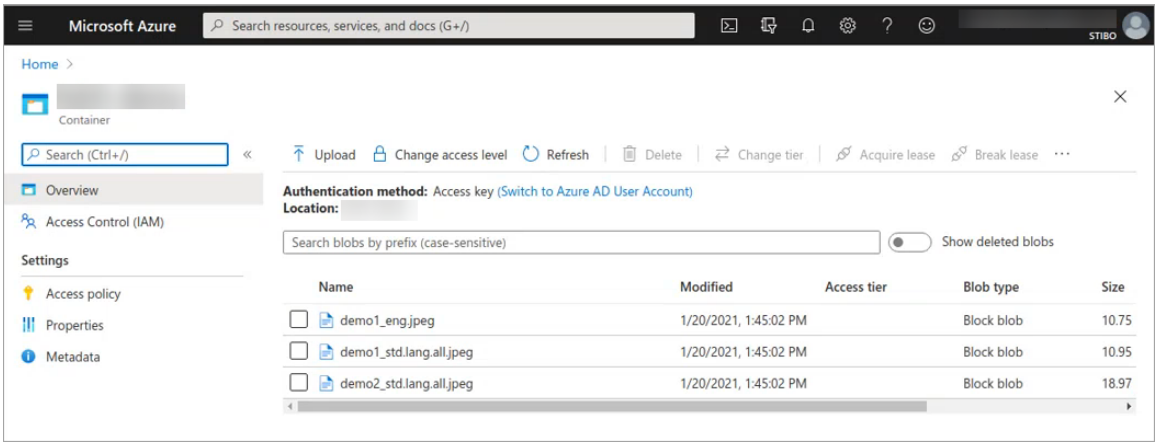


When the event processor runs, the configuration is validated. The attributes set for path and version should have the same dimension dependencies as asset content. Upon validation, if anything is wrong, the event processor stops. You will then need to reconfigure and run again.

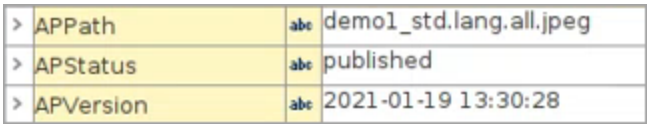
Below is an example of an event processor that processed successfully. It processed two (2) assets and uploaded three (3) blobs.



Continuing the example above, there are three blobs in blob storage:



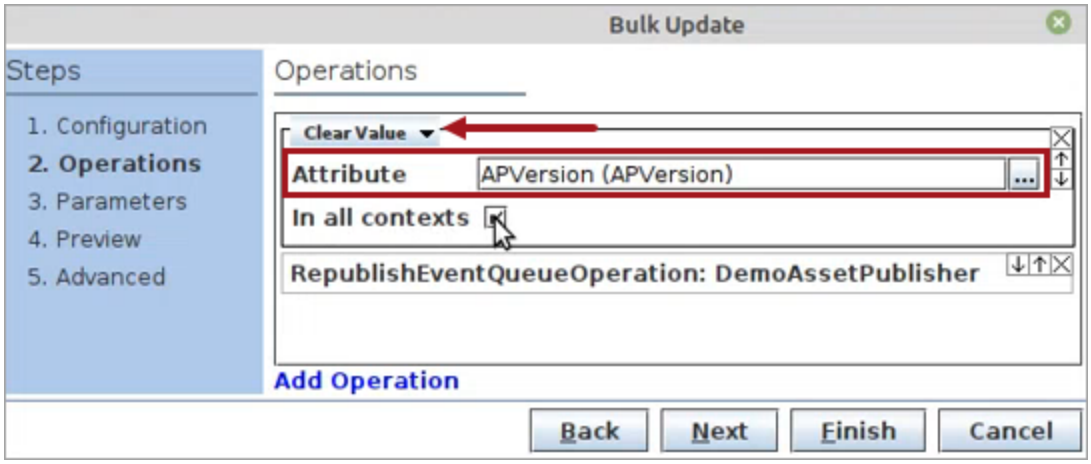
Return to the asset(s) published for the updates for the path, status, and version. Your results will depend on your own setup and upload time.



Republishing Assets

To republish assets that were, for example, deleted from blob storage, resized, or had the path changed, etc., run a bulk update using the Clear Value operation to clear the value for a specific attribute. Or, run more than one Clear Value operation to clear the value for multiple attributes. For details, refer to the **Attribute Values: Clear Value Operations** topic in the **Bulk Updates** documentation.

Send a republish event for the asset(s) and then invoke the event processor again to republish the assets to blob storage.



Asynchronous Translation Message Processor Processing Plugin Parameters and Triggers

The Asynchronous Translation Message Processor plugin allows users to send scheduled translation jobs to asynchronous translation services based on a derived event, and depending on user preferences, batch translation events into as little as one translation job, reducing translation costs.

Deleted objects (objects in the recycle bin) are ignored during processing.

For information regarding sending a scheduled translation job to an asynchronous translation service, refer to the Scheduling a Collection of Objects for Translation topic in the Translations documentation.

Note: The Asynchronous Translation Message Processor processing plugin is only available to users that have the external-async-kernel component installed in their system. For more information, contact Stibo Systems.

Prerequisites

This document describes configuration steps for this specific processor, but that is only one part of configuring an event processor. For the full set of instructions on configuring an event processor, refer to the Event Processors documentation.

In addition to the configuration of the event processor, the following items need to be configured:

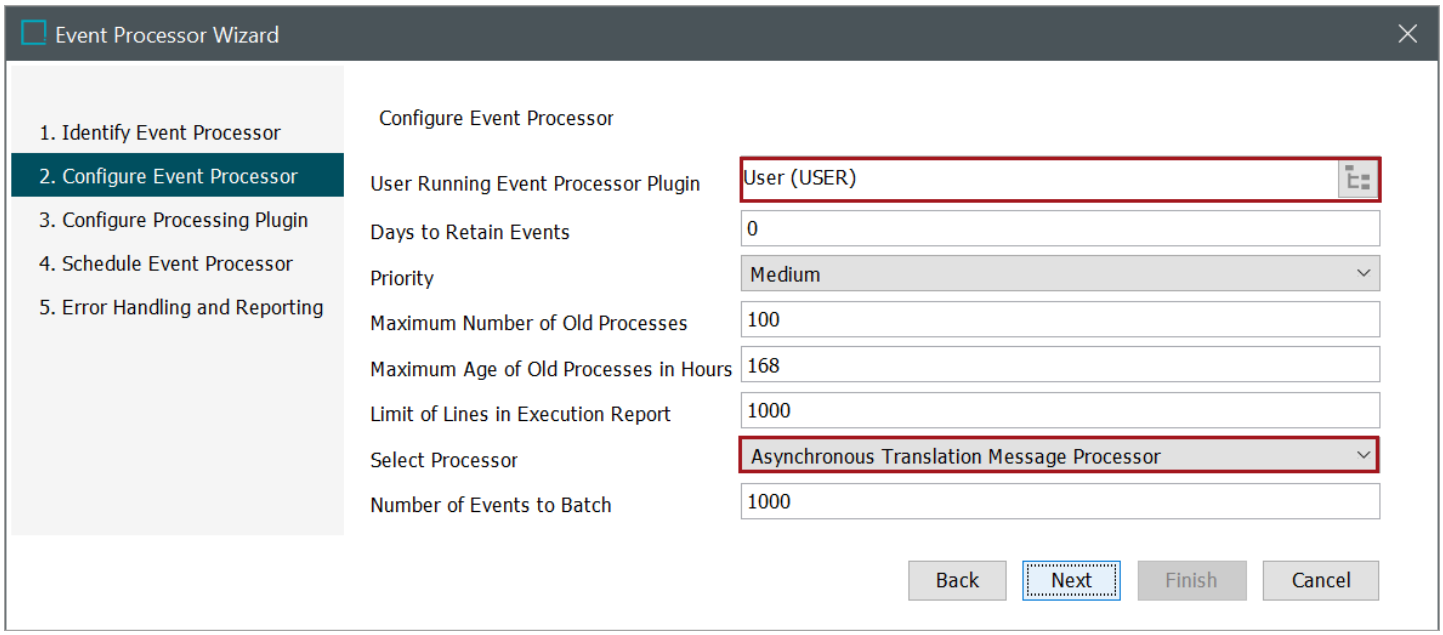
- At least one asynchronous translation service, with at least one translation configuration as part of that service
- A derived event

For more information regarding asynchronous translation services, refer to the Asynchronous Translations topic in the Data Integration documentation.

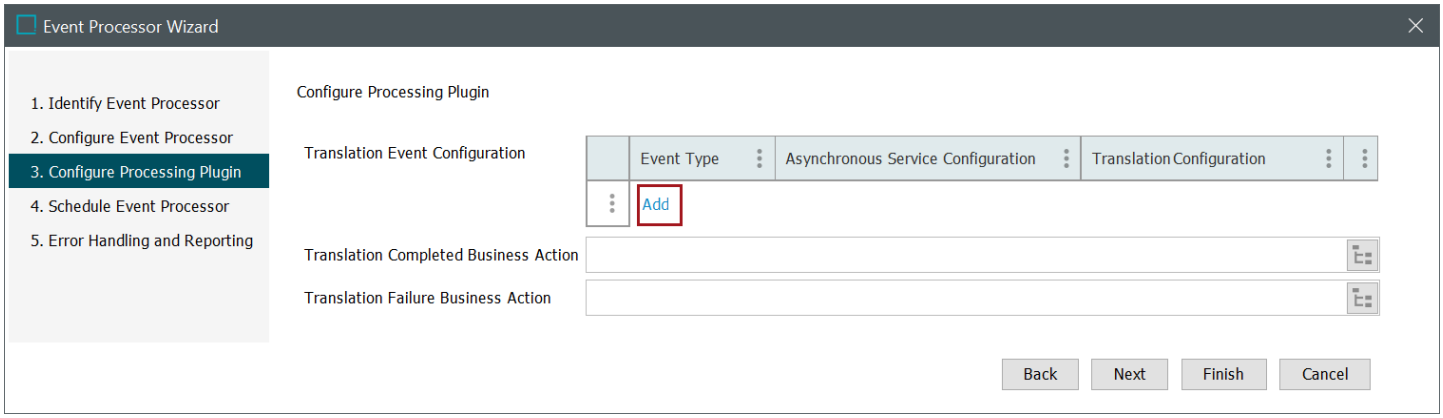
For more information regarding derived events, refer to the Derived Events topic.

Parameters

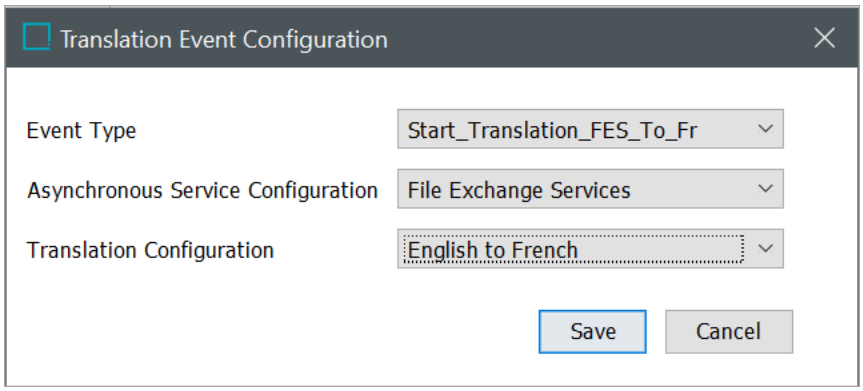
Each of the relevant parameters for the Event Processor Wizard 'Configure Processing Plugin' step are described below. Any additional wizard parameters with importance for this plugin are also included in this topic.



1. For the **User Running Event Processor Plugin** parameter, recommended practice is to create a user specifically for this event processor with adequate privileges to access the data that will be published.
2. For the **Select Processor** parameter, choose the **Asynchronous Translation Message Processor** processing plugin to display the expected parameters on the Configure Processing Plugin step.
3. Click the **Next** button to display the wizard step 'Configure Processing Plugin'.



4. Click **Add**. The Translation Event Configuration window opens.



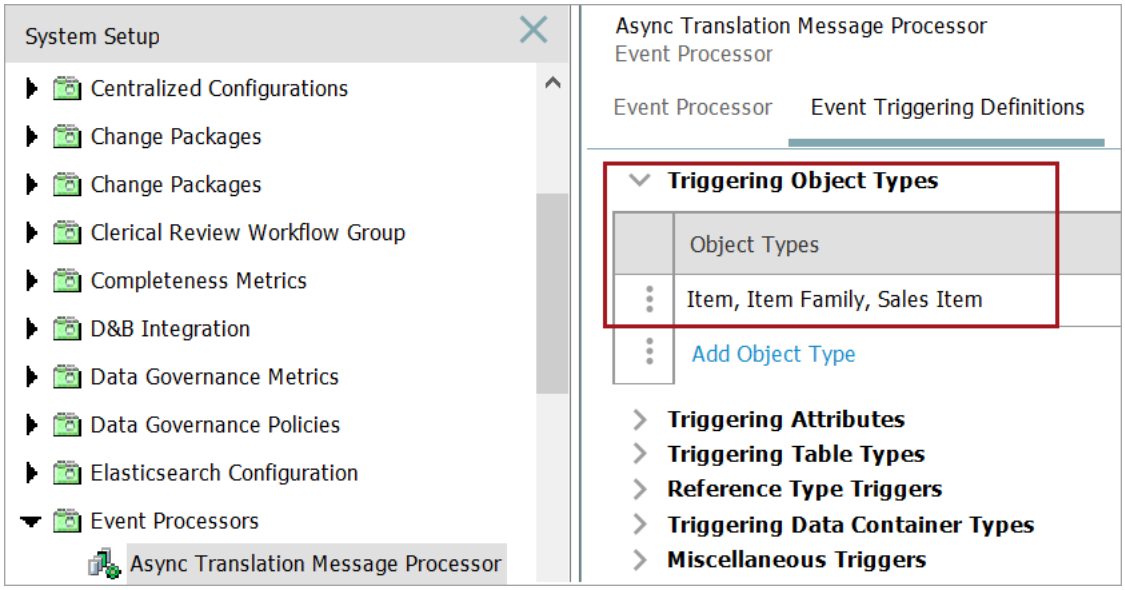
5. For the **Event Type** parameter, select the derived event you would like to use for the scheduled translation. In this example, the user has selected 'Start_Translation_FES_To_Fr.'
6. For the **Asynchronous Service Configuration** parameter, select the asynchronous service configuration that you would like to use for the scheduled translation. In this example, the user has selected 'File Exchange Service.'
7. The **Translation Configuration** parameter contains selection options based on the asynchronous service configuration that is selected for the Asynchronous Service Configuration parameter. In this example, the user has selected 'English to French.'

Event Triggers

When configuring the Asynchronous Translation Message event processor, all item object types that are collected for a translation must be included in the 'Triggering Object Types' parameter on the 'Event Triggering Definitions' tab within the event processor.

By default, events are triggered on the Approved workspace. Derived event functionality is available for triggering events prior to approval, as defined in the Derived Events topic in the System Setup documentation.

The image below demonstrates an example of triggering object types found in a collection created for translation purposes.



CASS Certification Report Processing Plugin Parameters and Triggers

The CASS Certification Report processing plugin allows for an event processor to be configured to generate CASS certification reports. CASS certification reports are text files stored as assets in the STEP Workbench classification hierarchy. These documents serve as a record of addresses that are validated through the CASS address standardization service and are provided to the USPS, upon request. These reports can be downloaded from within the workbench or by using standard Web UI components.

CASS (Coding Accuracy Support System) is a certification program run by the United States Postal Service (USPS) and is offered to all mailers, service bureaus, and software vendors that would like the USPS to evaluate the quality of their address matching. Mailers who use CASS-certified software to check their mailing addresses can qualify for discounted postage rates from the USPS. CASS is only valid for US addresses.

Note: It is strongly recommended to create a CASS certification report event processor by using the 'Easy setup of CASS Component Model' wizard, which is available by right-clicking on the CASS Address Component Model object in System Setup. Using the easy setup wizard is the most user-friendly and straightforward method for creation of a CASS event processor. However, the below sections of this documentation topic provide information for users who may choose to create this event processor manually. For more information, refer to the **CASS Address Component Model** topic in the **Data Integration** documentation.

Deleted objects (objects in the recycle bin) are ignored during processing.

The **Parameters** and **Event Triggers** sections below contain important information on settings that should be considered when creating an event processor using this processing plugin.

Prerequisites

This section of documentation describes configuration steps for this specific processor, but that is only one part of configuring an event processor. For the full set of instructions on configuring an event processor, refer to the Event Processors topic.

Before configuration of an event processor using the CASS Certification Report processor can occur, the following conditions must be met.

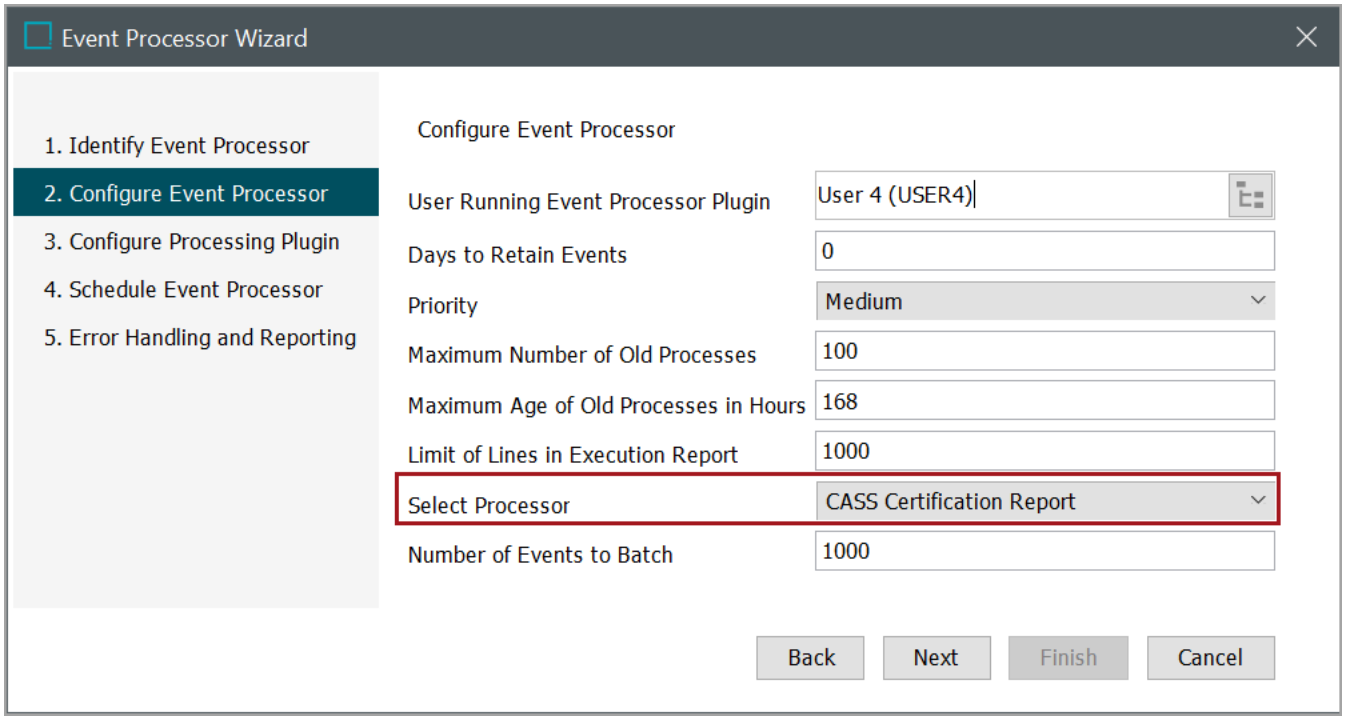
- Users must be based in the United States, as CASS is not valid outside of the US.
- Users must be connected to a Loqate Local server installation and have purchased a CASS license. The CASS components will not work with a Loqate Cloud API installation. For more information, refer to the **Loqate Integration** topic in the **Data Integration** documentation.
- The Address Component Model must already be configured. It is strongly recommended to configure this component model using the 'Easy setup of Address Component Model' wizard. For more information, refer to the **Address Component Model** section of the **Loqate** documentation.

Note: Ideally, the CASS Address Component Model should also be previously configured. However, if the CASS component model has already been configured through the easy setup method, a CASS certification report event processor should have already been created automatically during that process. If so, the below sections of this documentation provide additional information on manual setup of event processors with some CASS-specific details highlighted, as users may need to return to the event processor and make manual changes later.

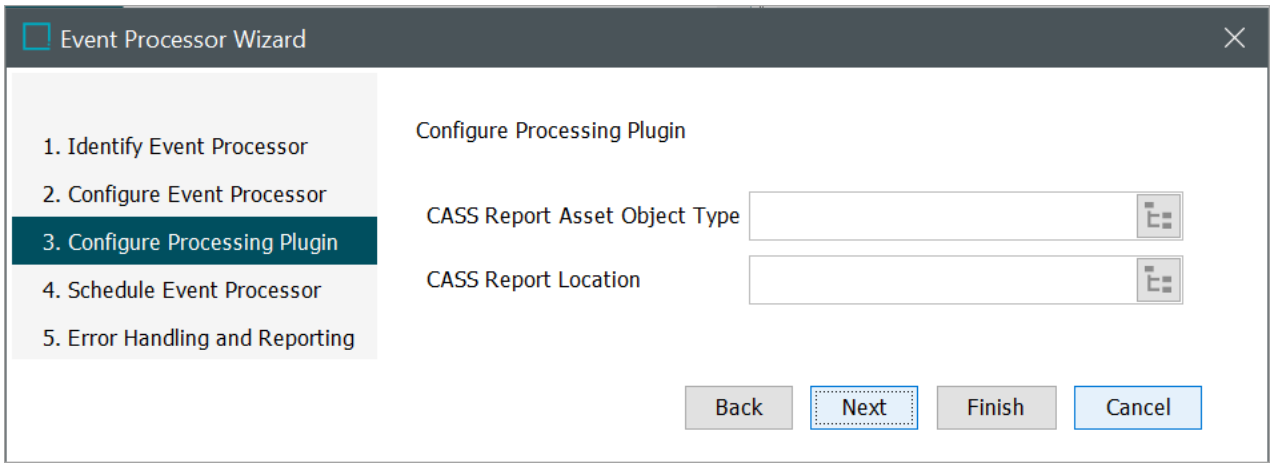
Parameters

Each of the relevant parameters for the Event Processor Wizard 'Configure Processing Plugin' step are described below. Any additional wizard parameters with importance for this plugin are also included in this topic.

To access the 'Configure Processing Plugin' parameters as shown below, the **CASS Certification Report** processing plugin must be selected within the Select Processor parameter during the wizard step 'Configure Event Processor.'



Once the CASS Certification Report processing plugin has been selected, click the **Next** button to display the 'Configure Processing Plugin' wizard screen.



- **CASS Report Asset Object Type:** Click the ellipsis button (...) to display the 'Select Objecttype' dialog, then select the asset object type that should be used for the CASS certification reports. CASS certification reports are assets generated as .txt files by the CASS certification report event processor.
- **CASS Report Location:** Click the ellipsis button (...) to display the 'Select Classification' dialog, then select the classification folder where the CASS certification report asset objects should be stored after being generated by the event processor.

Once any required configurations are made, click the **Next** button to display the wizard step 'Schedule Event Processor.'

Refer to the **EP - Schedule Event Processor** topic within the EP - Schedule Event Processor section of the **Event Processors** documentation.

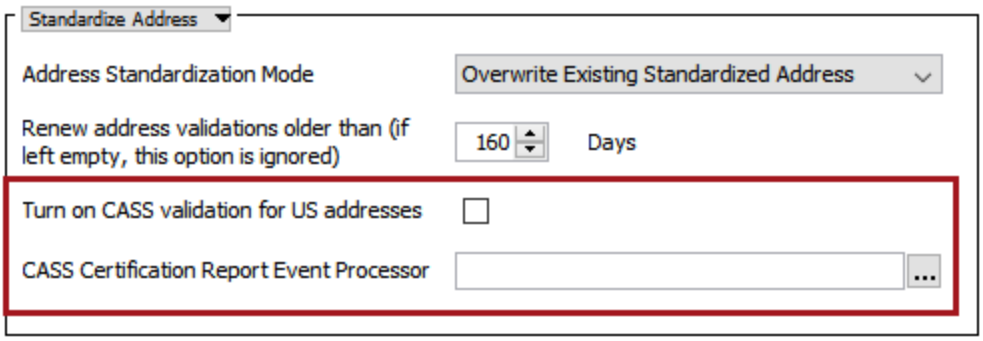
Event Triggers

Unlike other event processors, no triggering events are required to be configured on the Event Triggering Definitions tab for CASS certification report event processors.

By default, events are triggered on the Approved workspace. Derived event functionality is available for triggering events prior to approval, as defined in the Derived Events topic in the System Setup documentation.

CASS certification report event processors are typically triggered when addresses are CASS validated through an 'Address Standardization' bulk update or business action. After validation and the return of information from the Loqate server, the actioned objects (e.g., address objects or entity objects that carry address data containers) are sent as events to the event processor.

To standardize US addresses with CASS, two options must be enabled when configuring the 'Standardize Address' operation for business actions and bulk updates—'Turn on CASS validation for US addresses' and 'CASS Certification Report Event Processor.' The following screenshot shows these options as they appear in the 'Operations' step of the Bulk Update wizard and on the 'Edit Operation' dialog of the Business Rule Editor.



For more information on the Standardize Address operation for bulk updates, refer to the **Data Quality: Standardize Address Operation** topic in the **Bulk Updates** documentation. For more information on the Standardize Address operation for business actions, refer to the **Business Action: Standardize Address** topic in the **Business Rules** documentation.

Important: By default, events are discarded. For more information about the optional configuration to enable the Queue Status, refer to the **Queue Status** section of the **EP - Event Processor Tab** topic.

Data Sufficiency Calculator Processing Plugin Parameters and Triggers

The Data Sufficiency Calculator processing plugin works with the Sufficiency Configuration Type to calculate sufficiency scores for a given product or entity. When run, the plugin evaluates all the sufficiency configuration types within the system and calculates the sufficiency scores for the products or entities included in the 'Triggering Object Types' parameter on the 'Event Triggering Definitions' tab of the event processor. These scores are subsequently output to data containers on the evaluated objects. The sufficiency scores can be viewed in the Sufficiency panel in the Web UI and data containers in the workbench for applicable objects.

Note: To access the Data Sufficiency Calculator Processor plugin, the 'data-sufficiency' add-on component must be activated on your system. Contact Stibo Systems for more information.

Deleted objects (objects in the recycle bin) are ignored during processing.

For more information, refer to these topics in the Data Governance documentation:

- Sufficiency Configuration Type
- Sufficiency Panel

Prerequisites

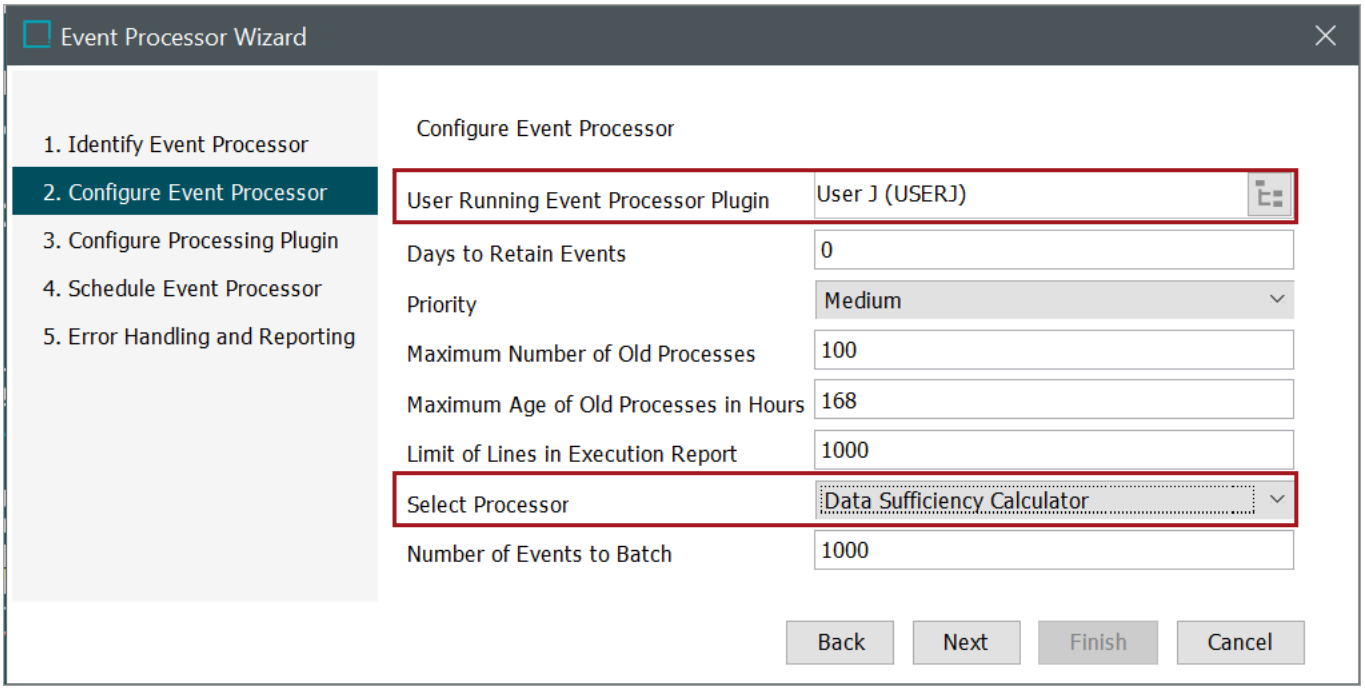
This section of documentation describes configuration steps for this specific processor, but these steps are only part of configuring an event processor. For the full set of instructions for event processor configuration, including event triggering definitions, refer to the Event Processors documentation.

For the Data Sufficiency Calculator event processor plugin to use multiple threads for calculating data sufficiency metrics, set the number of threads via the `BackgroundProcess.Queue.<QUEUE_NAME>.Parallel` configuration property, which defaults to 2.

Parameters

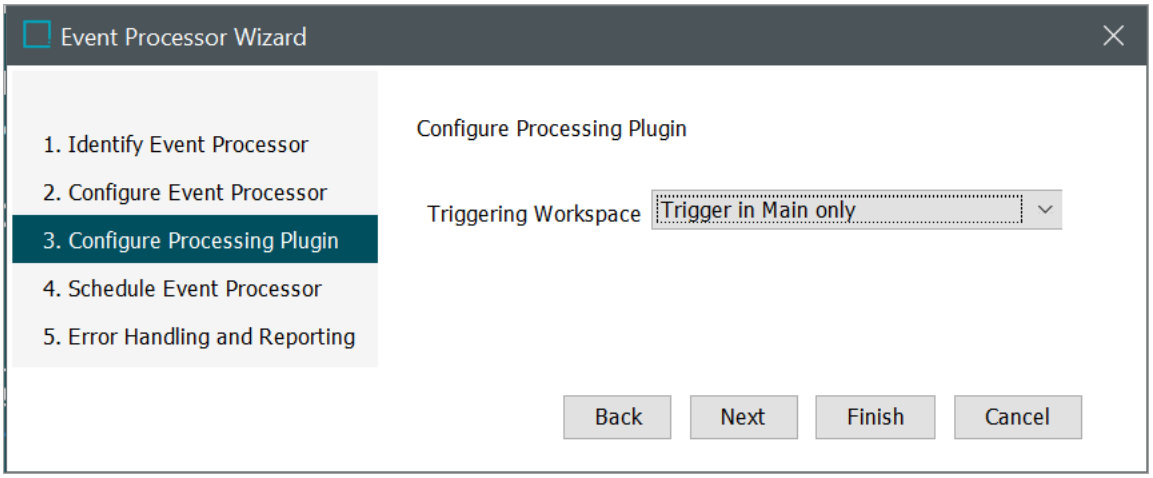
Each of the relevant parameters for the Event Processor Wizard 'Configure Processing Plugin' step are described below. Any additional wizard parameters with importance for this plugin are also included in this topic.

1. On the Configure Event Processor step:



- For the **User Running Event Processor Plugin** parameter, recommended practice is to create a user specifically for this event processor with adequate privileges to access the data that will be published.
- For the **Select Processor** parameter, choose the **Data Sufficiency Calculator** processing plugin to display the expected parameters on the Configure Processing Plugin step.

2. On the Configure Processing Plugin step, set the **Triggering Workspace** parameter:

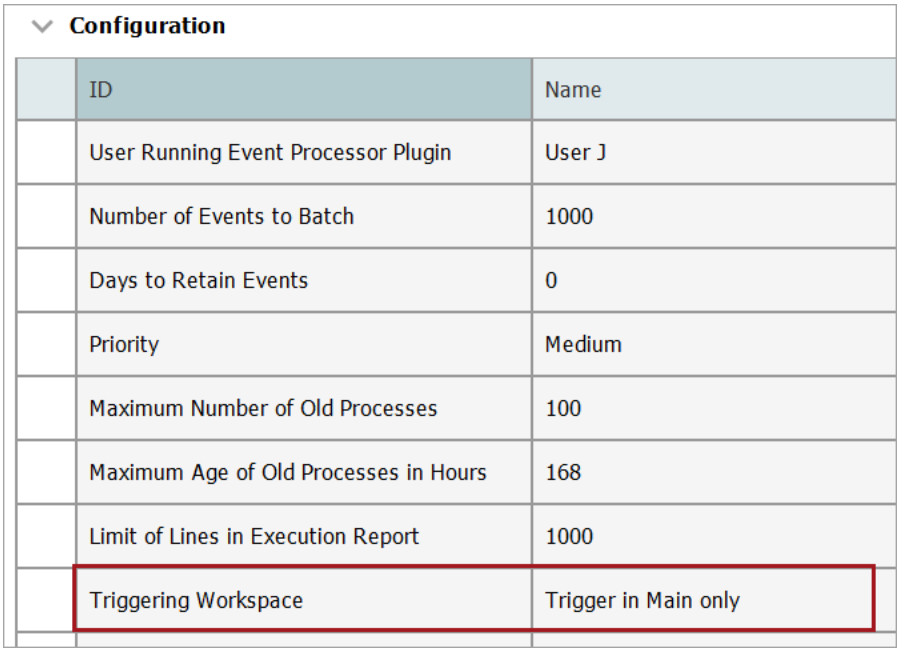


Important: Use 'Trigger in Main only' or 'Trigger in both Main and Approved' option if unapproved data should be used for sufficiency calculations. This can lead to poor performance particularly if you are triggering on a high volume of data changes or have a high number of complex metrics. Since the benefits of triggering from 'Main' can outweigh the performance risk, thoroughly test in lower environments before running in production. Alternatively, derived events can be used to trigger events prior to approval, as defined in the Derived Events topic of the System Setup documentation.

- The 'Trigger in Main only' option calculates data sufficiency as changes are made in the maintenance workspace, prior to approval.
- The 'Trigger in Approved only' option calculates data sufficiency upon approval.
- The 'Trigger in both Main and Approved' option calculates data sufficiency as changes are made and again upon approval.

Note: To activate a change to the Triggering Workspace parameter, you must invoke the event processor with at least one event on the queue.

The selection made in the wizard is displayed in the Event Processor tab under the Configuration section.



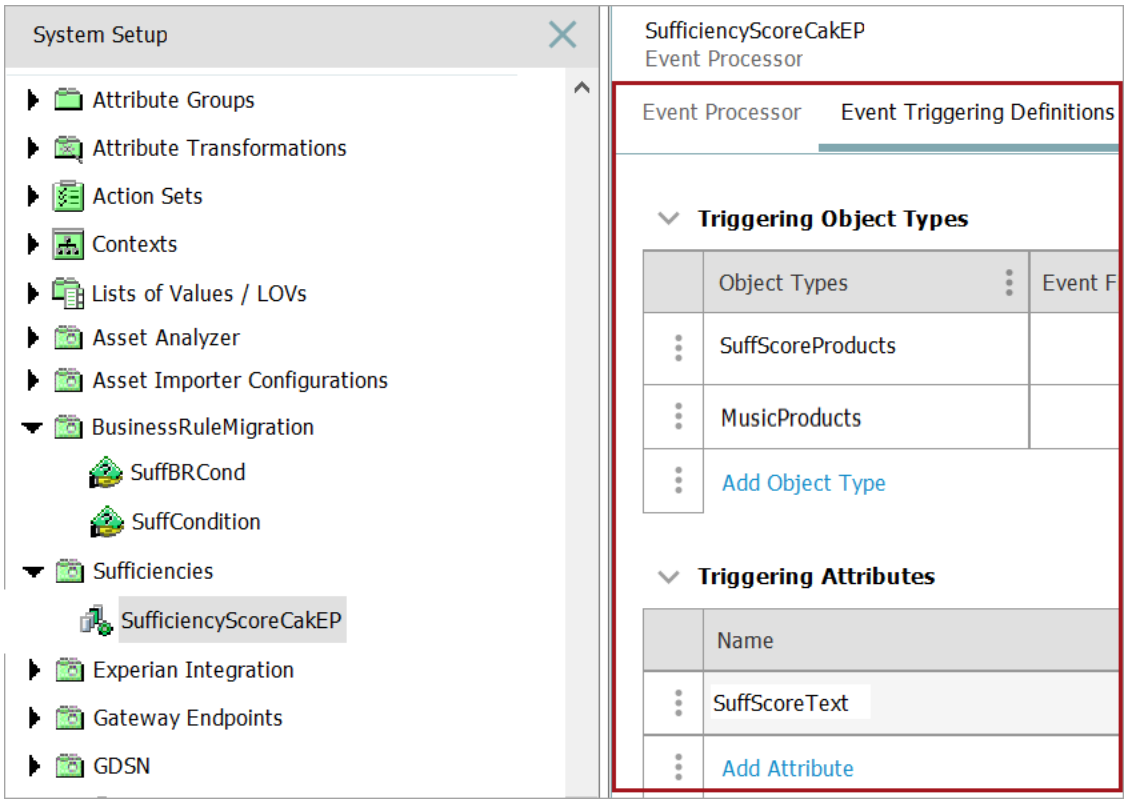
Triggering Workspace Flipper

This flipper is displayed in rare cases, specifically, only if either the 'Main' or the 'Main and Approved' option was previously selected in a release where the option was available.

Although changing the selection to the default 'Approved' radio button removes the flipper from the event processor, the setting can be observed from the Event Processor Wizard on the Configure Processing Plugin step, as defined, and are further explained in the **Parameters** section above.

Event Triggers

The 'Triggering Object Types' parameter, located within the Event Triggering Definitions tab, must include the object types and the attributes included in the metrics that are part of the sufficiencies being run to evaluate data quality and completeness. In the example below, the object types 'SuffScoreProducts' and 'MusicProducts' will be evaluated for quality and completeness when the event processor is run. 'SuffScoreText' is the triggering attribute for the event processor.



Note: When configuring the Data Sufficiency Calculator event processor, attributes included in the 'Data Sufficiency Attribute Group' attribute group should not be added as triggering attributes; additionally, data containers within the 'Data Sufficiency Attribute Group' attribute group should not be added as triggering data

container types. Adding either of these as triggers for the event processor can produce unintended events. For more information regarding the Data Sufficiency Attribute Group, refer to the Sufficiency Scores for Data Quality and Completeness topic in the Data Governance documentation.

Elasticsearch Indexer Processing Plugin Parameters and Triggers

Elasticsearch Indexer processes core and derived events to trigger the publication of STEP data to the Elasticsearch search engine for display on the faceted Search Screen in Web UI.

Note: Faceted search, powered by Elasticsearch, no longer requires a separate commercial license for STEP 2023.3 systems and newer.

Deleted objects (objects in the recycle bin) are ignored during processing.

The **Parameters** and **Event Triggers** sections below contain important information on settings that should be considered when creating an event processor using this processing plugin.

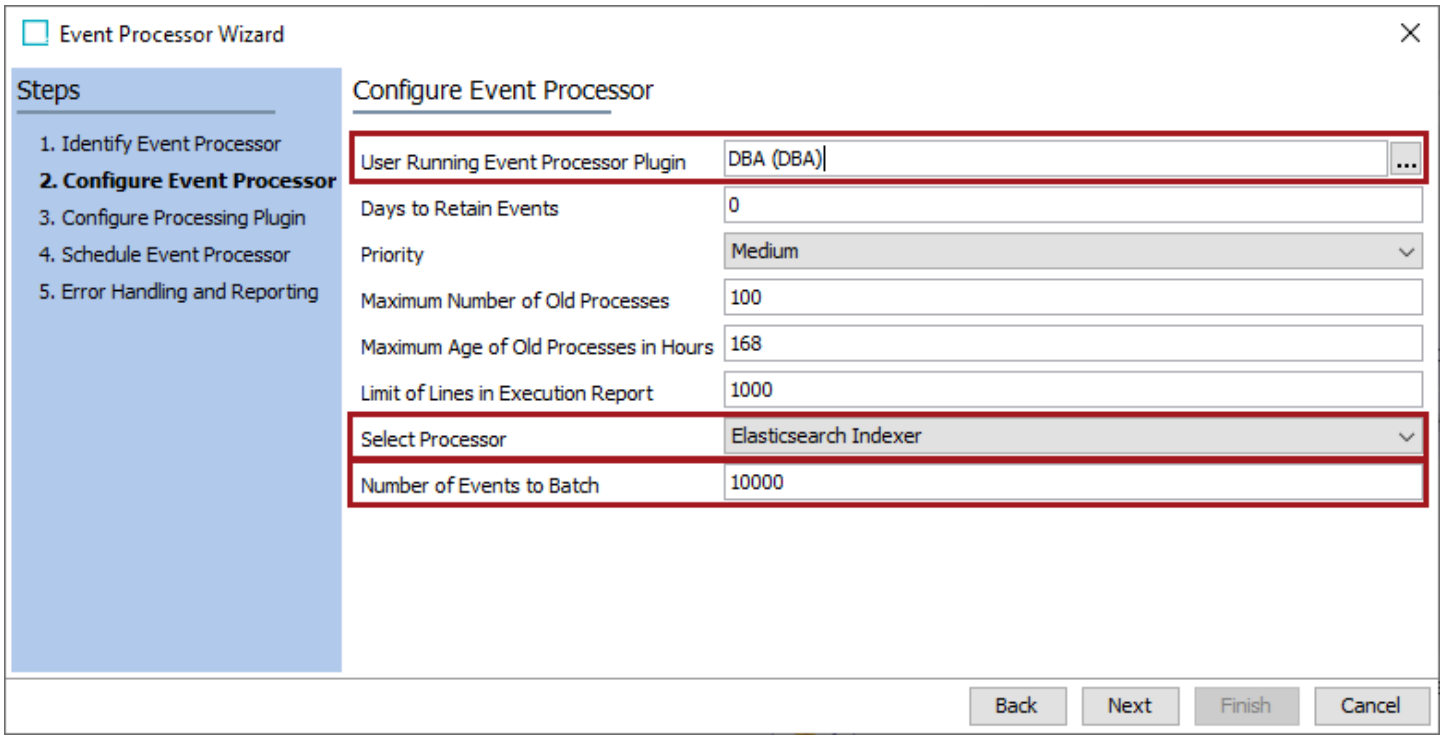
Prerequisites

This section of documentation describes configuration steps for this specific processor, but that is only one part of configuring an event processor. For the full set of instructions on configuring an event processor, refer to the Event Processors topic.

The Elasticsearch Indexer requires an Elasticsearch configuration created via a wizard (not manually). For details, refer to the Creating and Maintaining an Elasticsearch Configuration topic.

Parameters

Each of the relevant parameters for the Event Processor Wizard 'Configure Processing Plugin' step are described below. Any additional wizard parameters with importance for this plugin are also included in this topic.



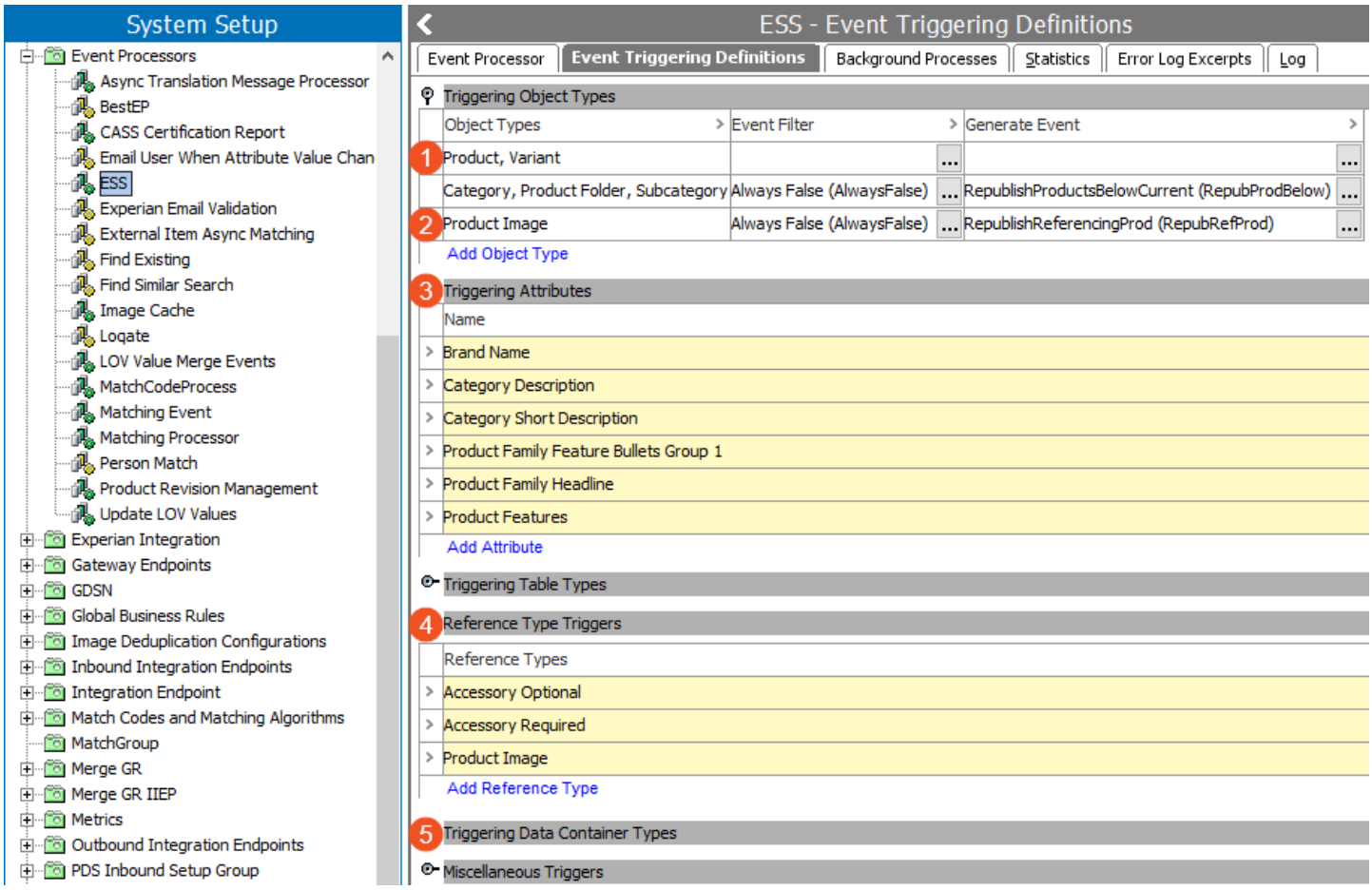
While the event processor is created automatically by clicking the Finish button on the Elasticsearch Configuration wizard, the following parameters can be edited directly on the event processor.

1. On the 'Configure Event Processor' step, for the **User Running Event Processor Plugin** parameter, it is recommended to select 'DBA' as the user.
2. For the **Select Processor** parameter, choose the **Elasticsearch Indexer** processing plugin to display the expected parameters on the 'Configure Processing Plugin' step.
3. For the **Number of Events to Batch** parameter, use the default value of 10,000 for optimal performance.
4. Click the **Next** button twice to display the wizard step 'Schedule Event Processor' and schedule as required.

Other changes to an existing Elasticsearch event processor must be made from the Elasticsearch configuration, as defined in the Creating and Maintaining an Elasticsearch Configuration topic.

Event Triggers

Event Triggering Definitions are the same in Event Processors as they are in an OIEP. For details about the triggers, refer to the OIEP - Event-Based - Event Triggering Definitions Tab topic in the Data Exchange documentation.



Basic event triggers are set using the Elasticsearch Configuration wizard. Set additional triggers based on your data model and as identified by the numbered items 1 and 2 in the image above.

- **Triggering Object Types** - add object type(s) for which instances contain data to be published to Elasticsearch.

  Note: Selected object types are added both to the Event Triggering Definitions of the event processor and to the Elasticsearch configuration.

  Additionally, include business rules and/or derived events as necessary to provide referenced data, as follows:

  Triggering for Inherited Data: When triggering on specific object types, such as 'Product' (item 1), data inherited to the Product object could be changed on the parent. To handle this case, ensure that 'Republish Descendants' is enabled in the Elasticsearch configuration. Refer to the Creating and Maintaining an Elasticsearch Configuration topic for more information.

  Note: Updating a specification attribute value on a parent node will trigger a republish event for all child nodes. This may impact performance if there is a high volume of children.

Triggering for Referenced Data: When triggering on specific object types, such as 'Product' (item 2), you can republish the Product object when data changes on an object referencing the Product. To handle this case, the Product object referenced image (item 3) is triggered and then processed via a business condition in the Event Filter parameter, and a business action in the Generate Event parameter. The condition always returns 'False' since you do not want the referenced object types to be published.

The action generates a derived event to evaluate the incoming references from products array, and if the source of a reference is a Product, creates an event for it. Use this only when the Elasticsearch configuration includes data from referenced objects, for example, when those objects change, you want to republish the 'root node' to publish the data to Elasticsearch.

For similar use cases and samples of the JavaScript business rules, refer to the Event-Based OIEP Examples topic in the Data Exchange documentation.

Note: Using event generators in this manner may impact performance when writing the data. Updating one value may lead to millions of republish events.

- **Triggering Attributes** - add all attributes (item 3) that should be monitored.
- **Reference Type Triggers** - add reference types (item 4) that should be monitored.
- **Triggering Data Container Types** - Sufficiency score data container information (item 5) is automatically included for publication and is not required to be defined as an event trigger.
- **Triggering Workspace** - set the workspace trigger via the Elasticsearch Configuration object, as defined in the Creating and Maintaining an Elasticsearch Configuration topic.

The presence of a Triggering Workspace flipper indicates that the event processor was configured prior to release 11.0 if either the 'Main' or the 'Main and Approved' option was previously selected. Although changing the selection to the default 'Approved' radio button removes the flipper from the event processor, the setting can be observed on the Elasticsearch Configuration object tab and can also be modified as defined in the Creating and Maintaining an Elasticsearch Configuration topic.

Note: To activate a change to the Triggering Workspace parameter, you must invoke the event processor with at least one event on the queue.

Although changing the selection to the default 'Approved' radio button removes the flipper from the event processor, the setting can be observed from the Event Processor Wizard on the Configure Processing Plugin step, as defined, and further explained in the **Parameters** section above.

Next, publish data to the Event Processor running the Elasticsearch Indexer as defined in the Elasticsearch Index Publishing topic.

Execute Business Action for Event Batch Processing Plugin Parameters and Triggers

The Execute Business Action for Event Batch processing plugin allows the configured business action to be executed once per event batch instead of once per event like when using the Execute Business Action processing plugin. The ability to execute one action for an event batch is especially relevant when communicating with external services that accept batch requests.

The **Parameters** and **Event Triggers** sections below contain important information on settings that should be considered when creating an event processor using this processing plugin.

Prerequisites

This section of documentation describes configuration steps for this specific processor, but that is only one part of configuring an event processor. For the full set of instructions on configuring an event processor, refer to the Event Processors topic.

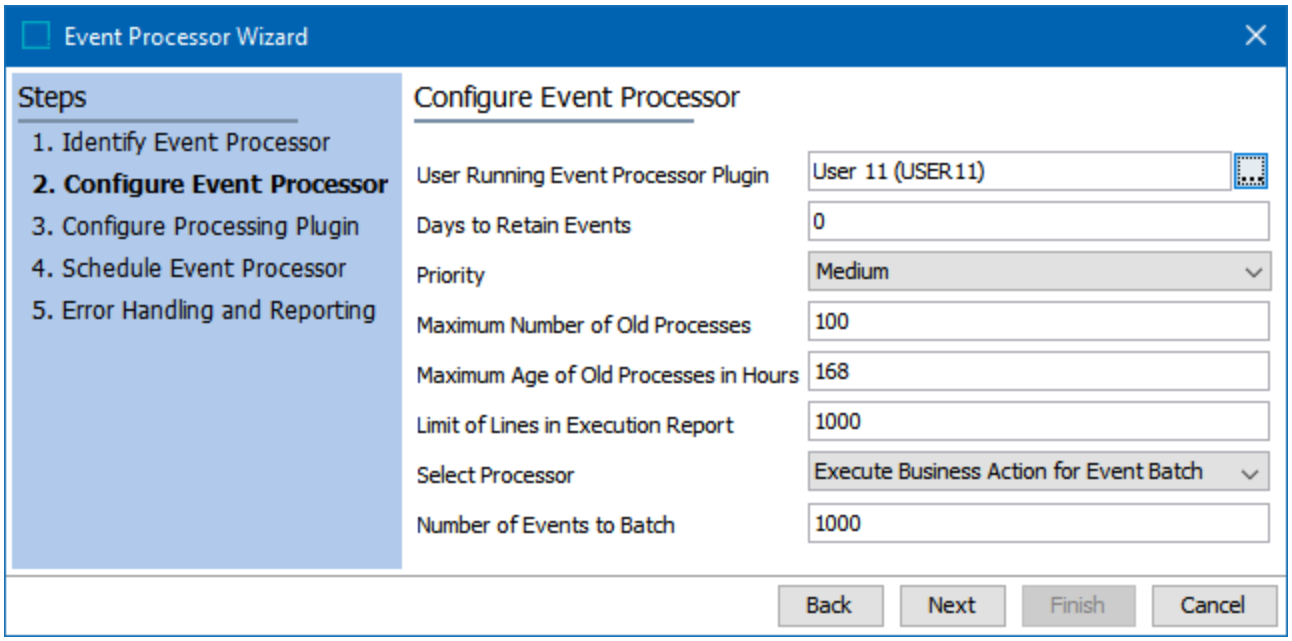
Before configuration of an event processor using the Execute Business Action for Event Batch processor can occur, a business action must be created. For more information, refer to the **Business Actions** section within the **Business Rules** documentation.

The business action referenced from the Execute Business Action for Event Batch plugin has no concept of 'current object.' Therefore, the JavaScript Current Object bind, and most non-JavaScript business action plugins cannot be used. Business actions referenced from the plugin must be made applicable for all object types.

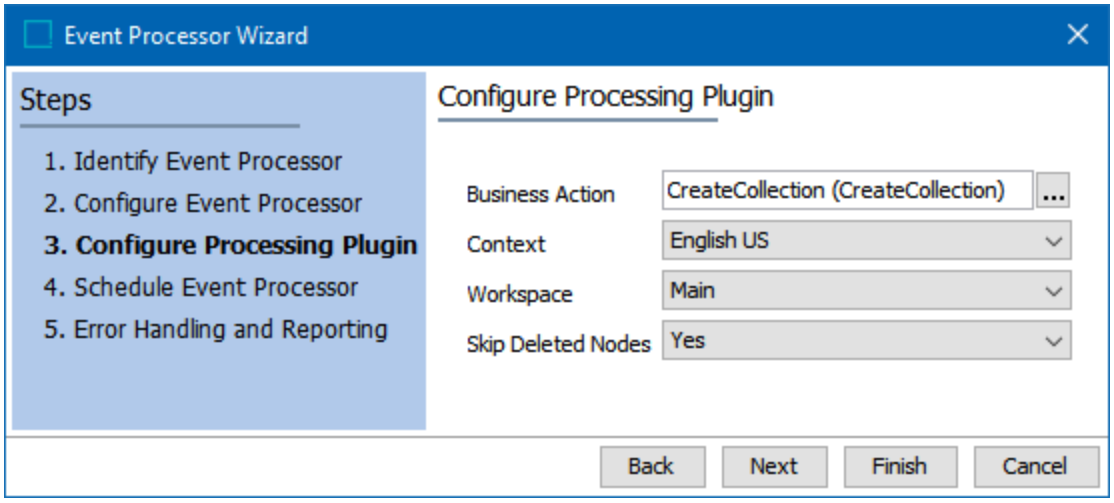
Parameters

Each of the relevant parameters for the Event Processor Wizard 'Configure Processing Plugin' step are described below. Any additional wizard parameters with importance for this plugin are also included in this topic.

To access the 'Configure Processing Plugin' parameters as shown below, the **Execute Business Action for Event Batch** processing plugin must be selected within the Select Processor parameter during the wizard step 'Configure Event Processor.'



Once the Execute Business Action for Event Batch processing plugin has been selected, click the **Next** button, and the wizard step 'Configure Processing Plugin' will display.

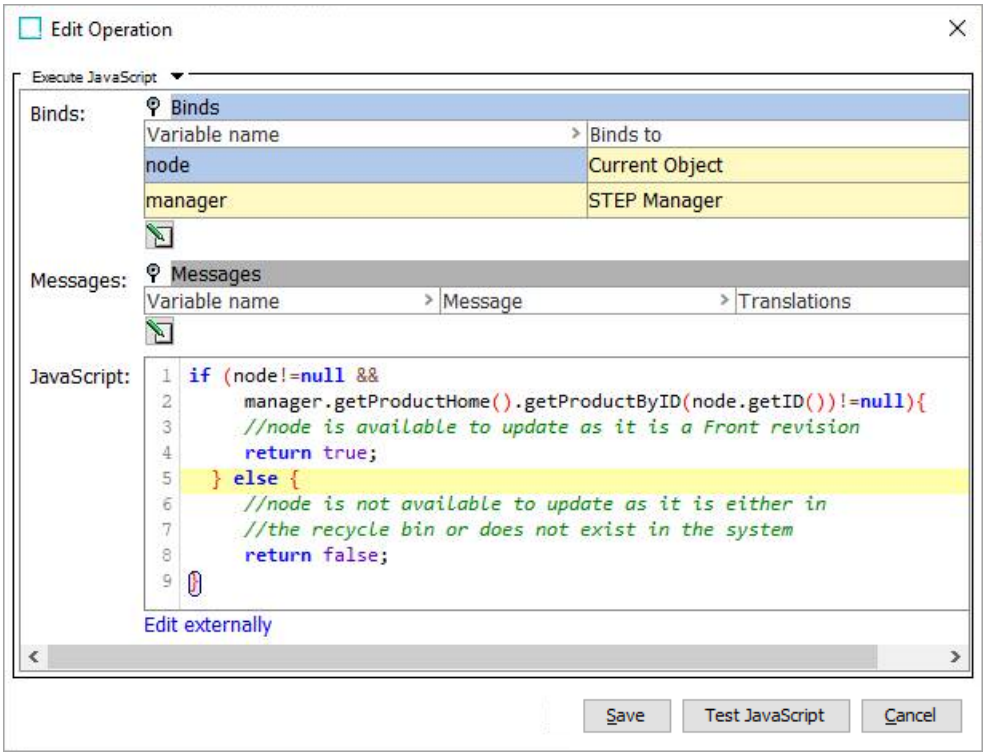


- **Business Action:** Click the ellipsis button (...) to display the Select Action dialog and select the necessary business action.
- **Context:** Select a context from the dropdown. This will determine the context in which the business action will run.
- **Workspace:** Select a workspace from the dropdown. This will determine the workspace in which the business action will run.

- **Skip Deleted Nodes:** 'Yes' is the recommended setting, which means that deleted objects do not cause the EP to stop or fail.

  When set to 'No', either the EP fails when attempting to process events for deleted objects or the deleted object handling is addressed via JavaScript. When Skip Deleted Nodes is disabled, and the selected business rule commits changes to nodes, use JavaScript to determine if the node exists with the following considerations:

  - Knowledge of the revisability of the node will dictate if **node!=null** is necessary for globally revisable objects.
  - Knowledge of the node type is required to use the correct Home. For a product node type (shown below with 'manager' bind to STEP Manager), use **manager.getProductHome().getProductByID (node.getID())**. For a classification node type, use **manager.getClassificationHome ().getClasificationByID(node.getID())**.



  - If the node exists, add relevant JavaScript to perform actions required on nodes that can be edited.
  - If null is returned, consider removing references on related nodes that point to the node in the recycle bin and/or other data cleanup related to a node that is no longer editable.

Important: The Business Action will always read from the configured Context / Workspace independently of how the events are actually triggered.

Once any required configurations are made, click the **Next** button to display the wizard step 'Schedule Event Processor.'

Refer to the **EP - Schedule Event Processor** topic within the EP - Schedule Event Processor section of the **Event Processors** documentation.

As mentioned above, the JavaScript Current Object bind, and most non-JavaScript business action plugins cannot be used. The following JavaScript example iterates the events in a batch and logs the ID of each associated Node:

```
// logger bound to Logger
// batch bound to Current Event Processor Event Batch
var it = batch.getEvents().iterator();

while (it.hasNext()) {
                var event = it.next();
                var node = event.getNode();
                if (node) {
                                logger.info("Handling " + event.getNode().getID());

                }
}
```

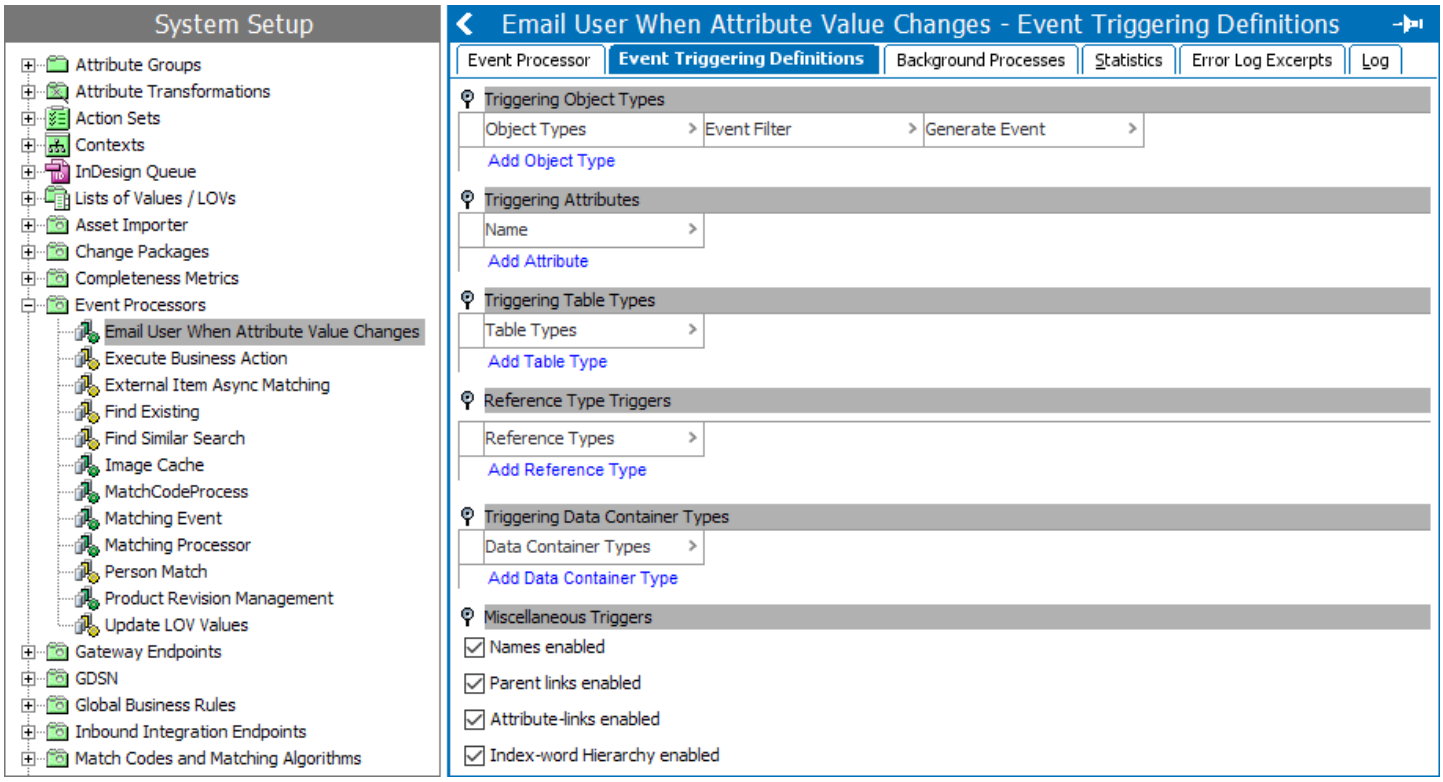
It is not recommended to have long-running business actions. This plugin should only be used for cases where it is critical that the business action work on a batch of events.

Event Triggers

For the event processor to execute the business action, the Event Triggering Definitions tab must be correctly configured.

By default, events are triggered on the Approved workspace. Derived event functionality is available for triggering events prior to approval, as defined in the Derived Events topic in the System Setup documentation.

Select an event processor configured to use the Execute Business Action for Event Batch processor and click on the Event Triggering Definitions tab. Use the various triggering flippers to configure the event processor to listen for changes on anything that should cause the event processor to execute. At a minimum, an object type must be selected.



- Upon creation, the parameters within the Miscellaneous Triggers flipper are enabled.
- When a configured trigger causes an event to reach the event processor queue, the business action will execute.
- When an event batch is successfully processed, no message is written into the execution report of the corresponding background process (BGP).
- If the event processor encounters a problem processing a batch, the event processor will retry the business actions on each event in the batch until all events have been processed or the failing event is identified, in which case the event processor will enter the failed state and stop processing new events.
- There is no guarantee that actions will not run multiple times, even when batch size is equal to one. However, the likelihood is reduced by having a batch size of one, but performance can then be affected.

Execute Business Action Processing Plugin Parameters and Triggers

The Execute Business Action processing plugin allows for an event processor to be configured with a predefined custom business action. The custom business action determines when and how to act upon the events from the event processor. This is useful when changes occur on objects and custom actions need to occur.

For example, when changes to relationships between objects occur, an email may be sent to a specific user or attribute values may be recalculated. Another example is when an email object is changed, the email object can then be sent to an external service for validation. By design, business actions are highly customizable.

The **Parameters** and **Event Triggers** sections below contain important information on settings that should be considered when creating an event processor using this processing plugin.

Prerequisites

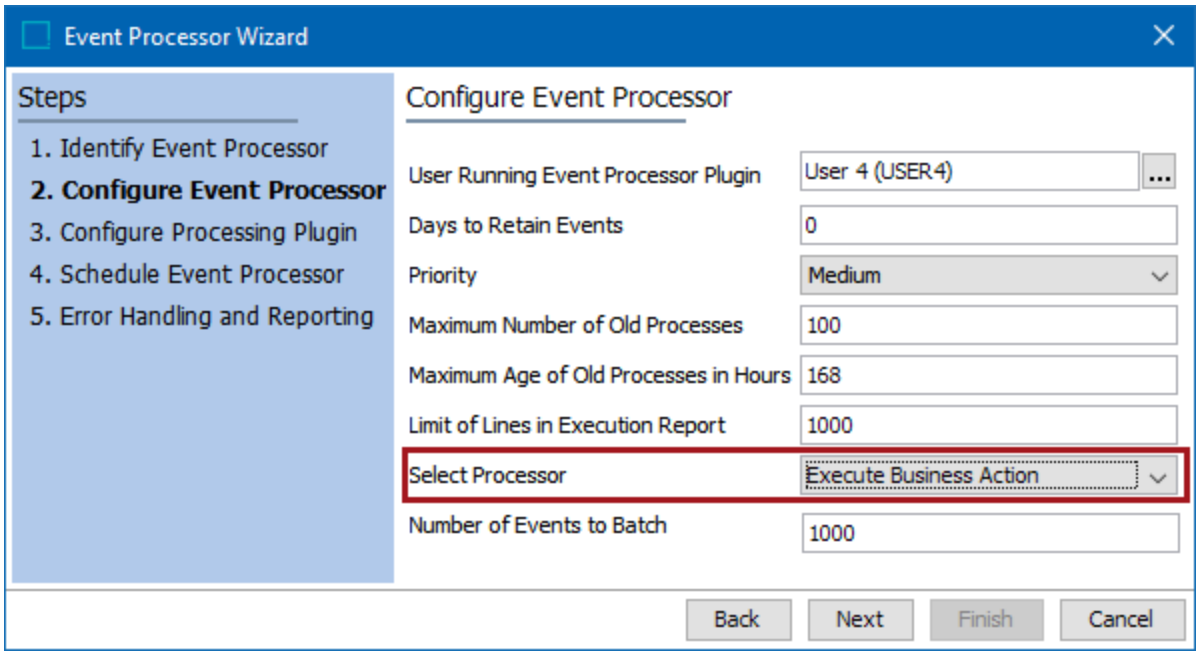
This section of documentation describes configuration steps for this specific processor, but that is only one part of configuring an event processor. For the full set of instructions on configuring an event processor, refer to the Event Processors topic.

Before configuration of an event processor using the execute business action processor can occur, a business action must be created. For more information, refer to the **Business Actions** section within the **Business Rules** documentation.

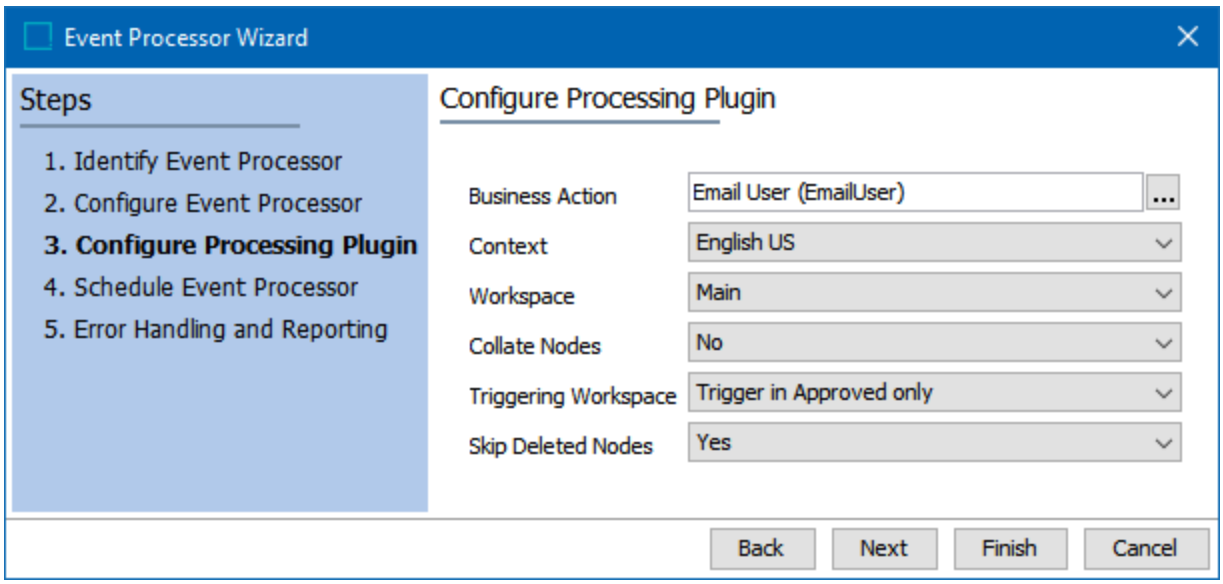
Parameters

Each of the relevant parameters for the Event Processor Wizard 'Configure Processing Plugin' step are described below. Any additional wizard parameters with importance for this plugin are also included in this topic.

To access the 'Configure Processing Plugin' parameters as shown below, the **Execute Business Action** processing plugin must be selected within the Select Processor parameter during the wizard step 'Configure Event Processor.'



Once the Execute Business Action processing plugin has been selected, click the **Next** button, and the wizard step 'Configure Processing Plugin' will display.



- **Business Action:** Click the ellipsis button (...) to display the Select Action dialog and select the **necessary business action**.
- **Context:** Select a context from the dropdown. This will determine the context in which the business action will run.

- **Workspace:** Select a workspace from the dropdown. This will determine the workspace in which the business action will run.
- **Collate Nodes:** When set to 'No', the business action is executed for each node in the batch, in order of appearance, even if the node occurs more than once. When set to 'Yes', the business action is executed only once for each node in the batch.
- **Triggering Workspace:** Determine the appropriate triggering workspace based on your business action use case:

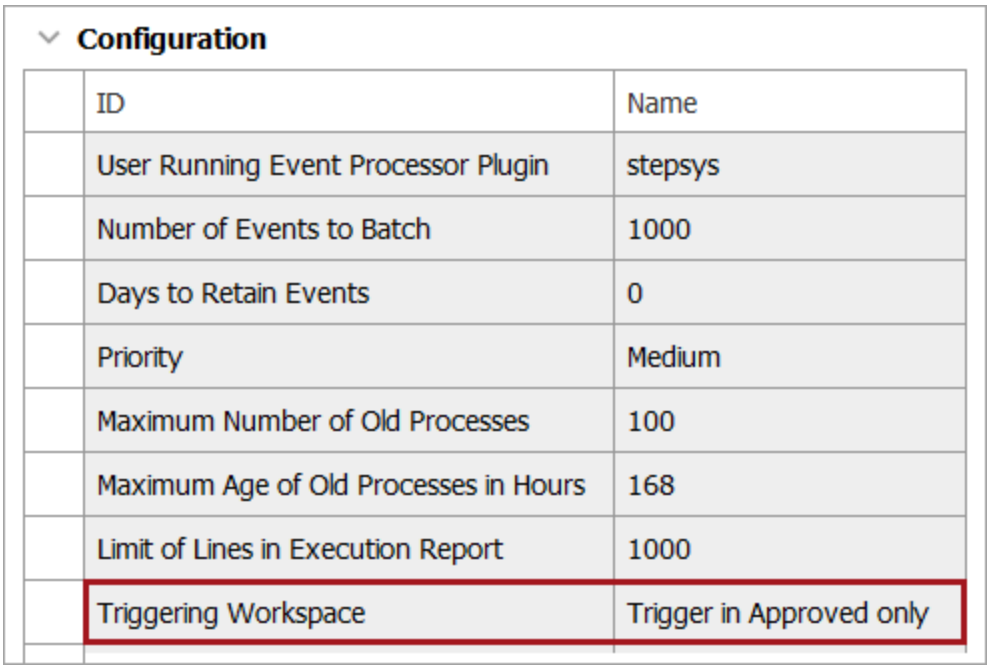
  Important: The Business Action always reads from the configured Context / Workspace independently of how the events are triggered.

  Use 'Trigger in Main only' or 'Trigger in both Main and Approved' option if data in the main workspace should be executed by the business action. This can lead to poor performance particularly if you are triggering on a lot of attributes or have a high volume of data changes. Since the benefits of triggering from 'Main' can outweigh the performance risk, thoroughly test in lower environments before running in production. Alternatively, derived events can be used to trigger events prior to approval, as defined in the **Derived Events** topic of the **System Setup** documentation.

  - The 'Trigger in Main only' creates an event when a change is made in the maintenance workspace, prior to approval.
  - The 'Trigger in Approved only' creates an event when an action updates the Approved workspace.
  - The 'Trigger in both Main and Approved' option (individually defined above).

  Note: To activate a change to the Triggering Workspace parameter, you must invoke the event processor with at least one event on the queue.

The selection made in the wizard is displayed in the Event Processor Configuration tab.



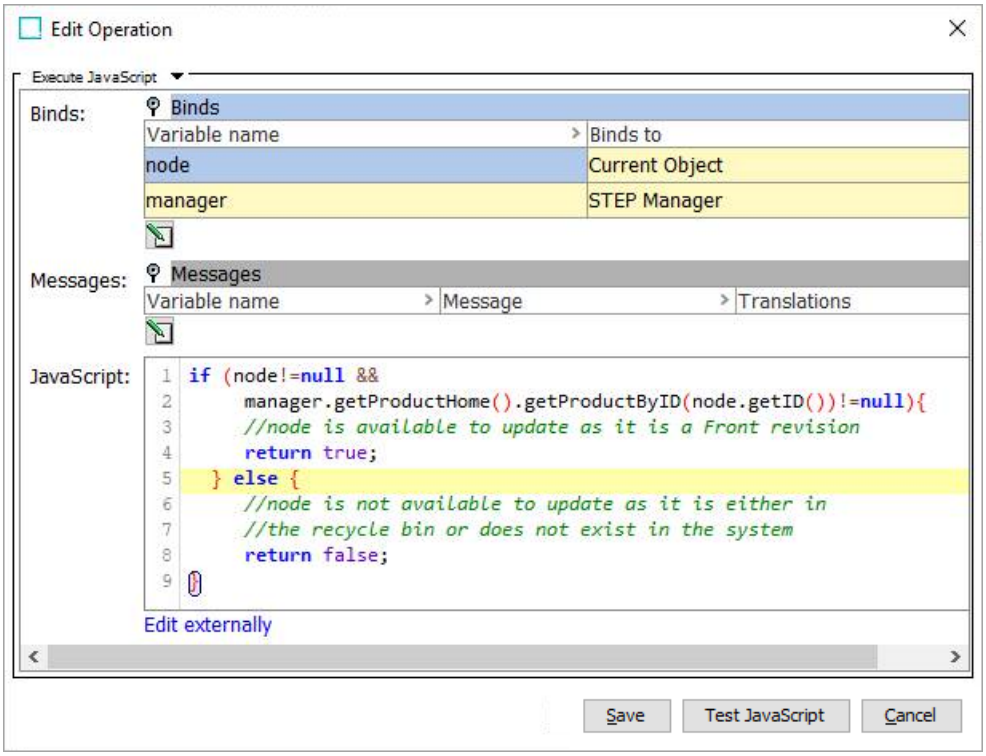
Configuration

ID	Name
User Running Event Processor Plugin	stepsys
Number of Events to Batch	1000
Days to Retain Events	0
Priority	Medium
Maximum Number of Old Processes	100
Maximum Age of Old Processes in Hours	168
Limit of Lines in Execution Report	1000
Triggering Workspace	Trigger in Approved only

- **Skip Deleted Nodes:** 'Yes' is the recommended setting, which means that deleted objects do not cause the EP to stop or fail.

  When set to 'No', either the EP fails when attempting to process events for deleted objects or the deleted object handling is addressed via JavaScript. When Skip Deleted Nodes is disabled, and the selected business rule commits changes to nodes, use JavaScript to determine if the node exists with the following considerations:

  - Knowledge of the revisability of the node will dictate if **node!=null** is necessary for globally revisable objects.
  - Knowledge of the node type is required to use the correct Home. For a product node type (shown below with 'manager' bind to STEP Manager), use **manager.getProductHome().getProductByID (node.getID())**. For a classification node type, use **manager.getClassificationHome ().getClasificationByID(node.getID())**.



- If the node exists, add relevant JavaScript to perform actions required on nodes that can be edited.
- If null is returned, consider removing references on related nodes that point to the node in the recycle bin and /or other data cleanup related to a node that is no longer editable.

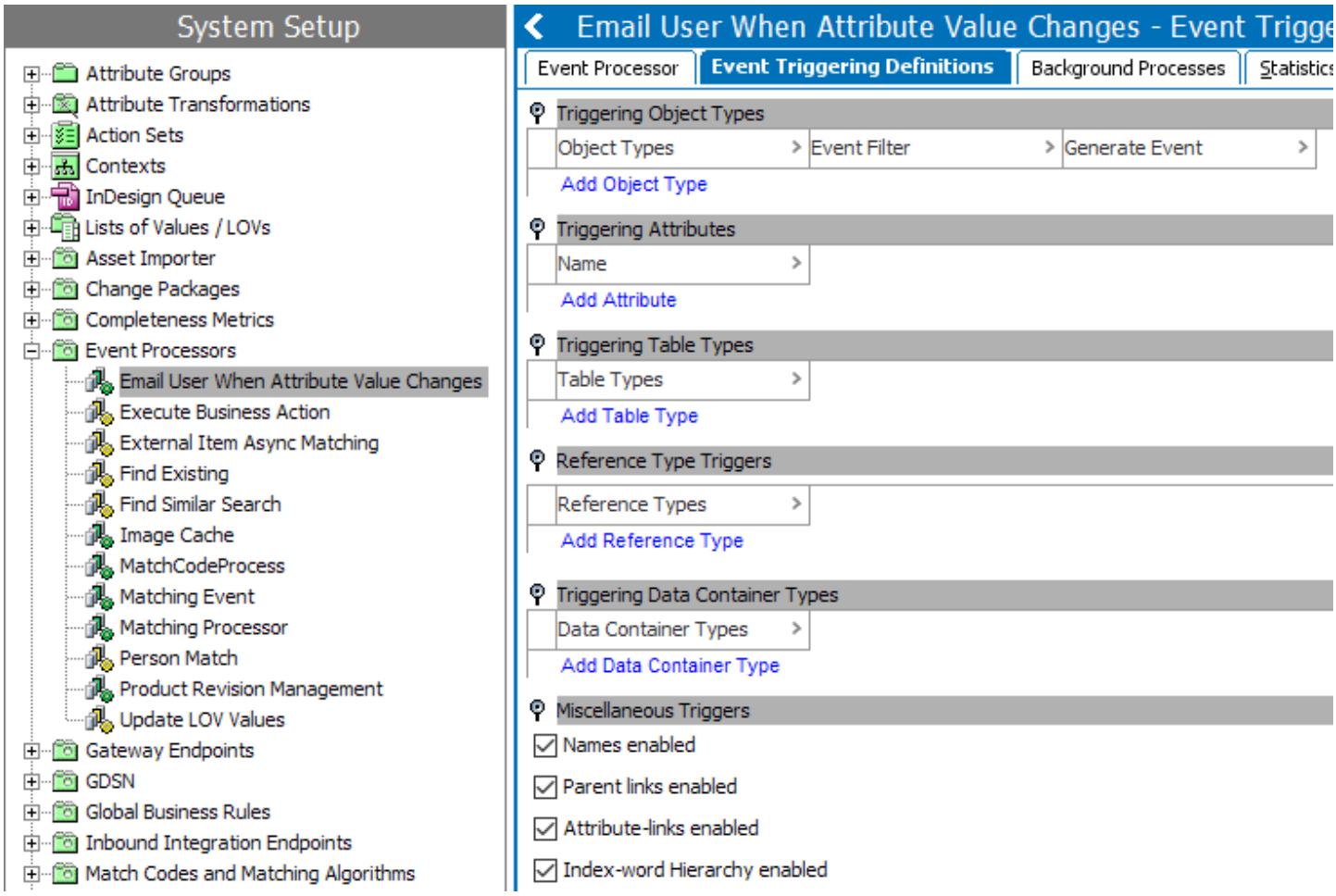
Once any required configurations are made, click the **Next** button to display the wizard step 'Schedule Event Processor.'

Refer to the **EP - Schedule Event Processor** topic within the EP - Schedule Event Processor section of the **Event Processors** documentation.

Event Triggers

For the event processor to execute the business action, the Event Triggering Definitions tab must be correctly configured.

Select an event processor configured to use the Execute Business Action processor and click on the Event Triggering Definitions tab. Use the various triggering flippers to configure the event processor to listen for changes on anything that should cause the event processor to execute. At a minimum, an object type must be selected.



Triggering Workspace Flipper

This flipper is displayed in rare cases, specifically, only if either the 'Main' or the 'Main and Approved' option was previously selected in a release where the option was available.

Although changing the selection to the default 'Approved' radio button removes the flipper from the event processor, the setting can be observed from the Event Processor Wizard on the Configure Processing Plugin step, as defined, and further explained in the **Parameters** section above.

Considerations

- Upon creation, the parameters within the Miscellaneous Triggers flipper are enabled.
- When a configured trigger causes an event to reach the event processor queue, the business action will execute.
- When an event batch is successfully processed, no message is written into the execution report of the corresponding background process (BGP).
- When JavaScript is used to write the business action, the originating object of the event will be available via the 'Current Object' bind.
- If the event processor encounters a problem processing a batch, the event processor will retry the business actions on each event in the batch until all events have been processed or the failing event is identified, in which case the event processor will enter the failed state and stop processing new events.
- There is no guarantee that actions will not run multiple times, even when batch size is equal to one. However, the likelihood is reduced by having a batch size of one, but performance can then be affected.

Important: By default, events are discarded. For more information about the optional configuration to enable the Queue Status, refer to the **Queue Status** section of the **EP - Event Processor Tab** topic.

Expand LOV Value Changes Processing Plugin Parameters and Triggers

Expand LOV Value Changes allows the event processor to react on all LOV value update events (only for LOVs that use Value IDs) including those made manually from workbench or Web UI, via LOV value merge, via import, etc. Note that the processing plugin handles LOV value updates only, not additions or deletions.

Deleted objects (objects in the recycle bin) are ignored during processing.

The **Parameters** and **Event Triggers** sections below contain important information on settings that should be considered when creating an event processor using this processing plugin.

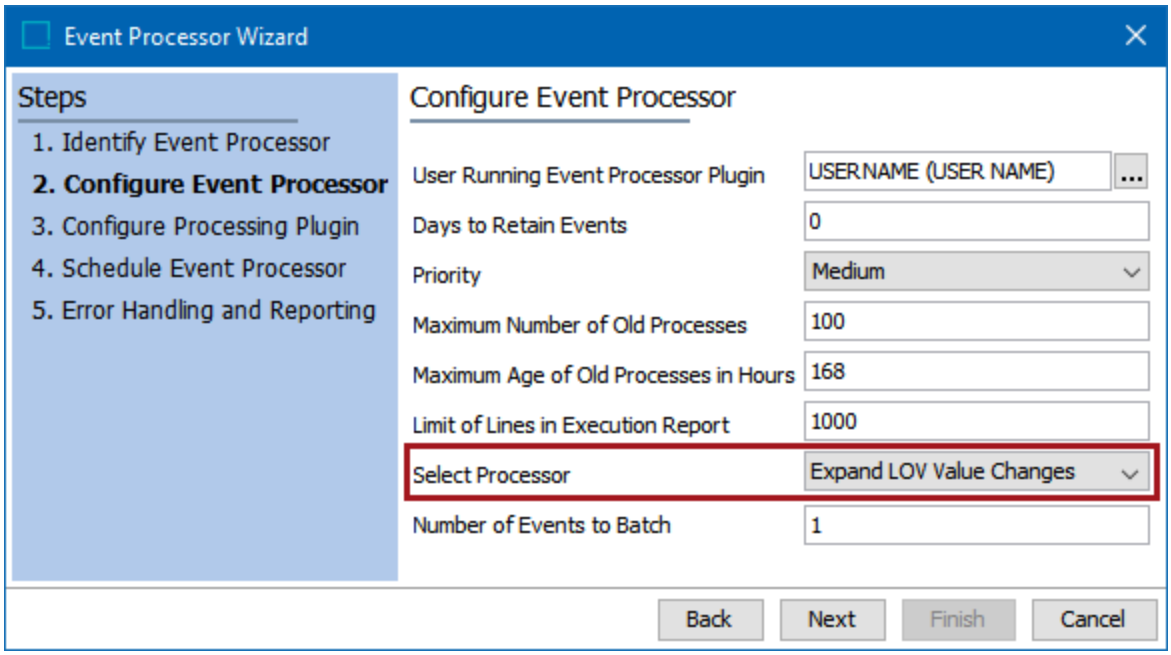
Prerequisites

This section of documentation describes configuration steps for this specific processor, but that is only one part of configuring an event processor. For the full set of instructions on configuring an event processor, refer to the Event Processors topic.

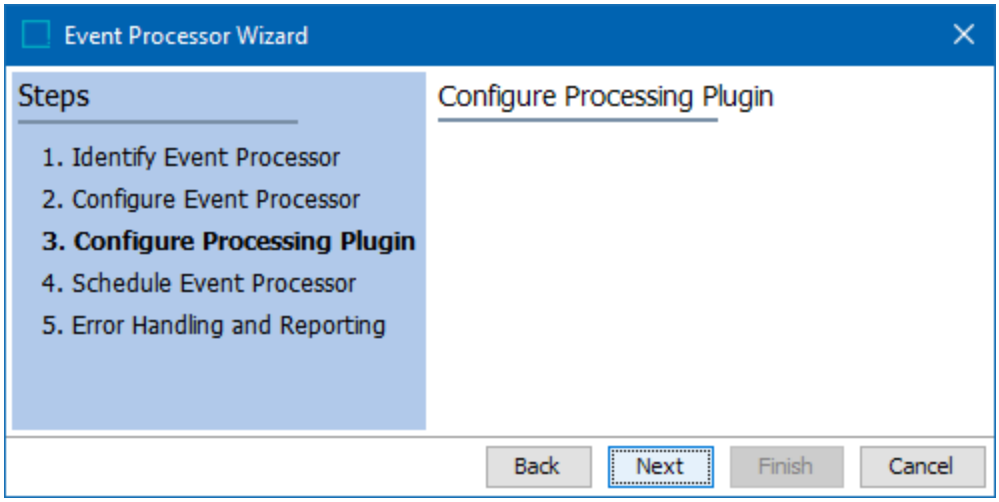
It is expected that anyone configuring the Expand LOV Value Changes processing plugin is familiar with the **List of Values** documentation within the **System Setup** guide.

Parameters

To access the 'Configure Processing Plugin' parameters as shown below, the **Expand LOV Value Changes** processing plugin must be selected within the Select Processor parameter during the wizard step 'Configure Event Processor.'



Once the Expand LOV Value Changes processing plugin has been selected, click the **Next** button, and the wizard step 'Configure Processing Plugin' will display.

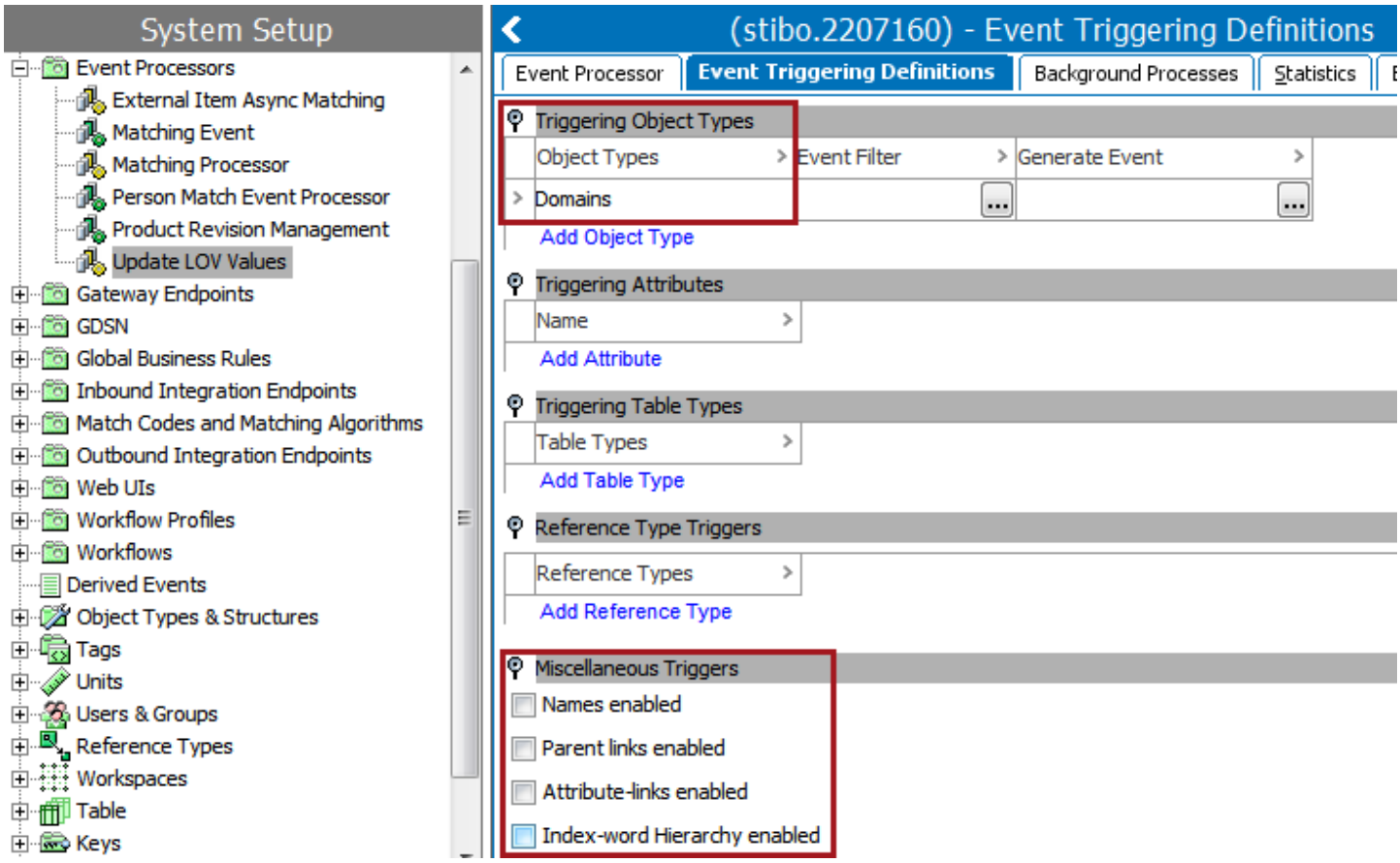


On the Event Processor Wizard 'Configure Processing Plugin' step, no further configuration is required for the Expand LOV Value Changes processing plugin, therefore no parameters are displayed.

Event Triggers

For the event processor to take effect, it must be configured to only listen for changes on LOVs (Domains), and all other default triggering definitions should be unselected.

By default, events are triggered on the Approved workspace. Derived event functionality is available for triggering events prior to approval, as defined in the Derived Events topic in the System Setup documentation.



For Use with External Systems

An OIEP can be configured to listen for changes to LOV values and generate events for objects using the modified values.

For more information, refer to the **Event-Based Outbound Integration Endpoint** section of the **Outbound Integration Endpoint** documentation.

If change flags are used in the format for the endpoint receiving the event, the relevant objects will have change flags on all attributes set to true (instead of only the changed attribute), because the endpoint interprets the event generated by the processor as a change to the object rather than to the individual attribute value.

For more information, refer to the **Change Flags for Events** section of the **Core Events** documentation.

Important: When an integration endpoint listens for changes on LOV values, it is possible that information about the modified LOV will be published before objects using affected LOV values are published. This means that until both the LOV and the objects are published, an object's value (for example, a product's attribute value) may not correspond with values in the LOV.

Experian Email Validation Processing Plugin Parameters and Triggers

Experian Email Validation processing plugin can be used in an event processor and must be configured with an Experian Email Validation Configuration and a business condition used to revalidate email information (Email Revalidation). Common setup is to configure the event processor to listen for events made by changes in the 'Email Field.'

Deleted objects (objects in the recycle bin) are ignored during processing.

The **Parameters** and **Event Triggers** sections below contain important information on settings that should be considered when creating an event processor using this processing plugin.

Prerequisites

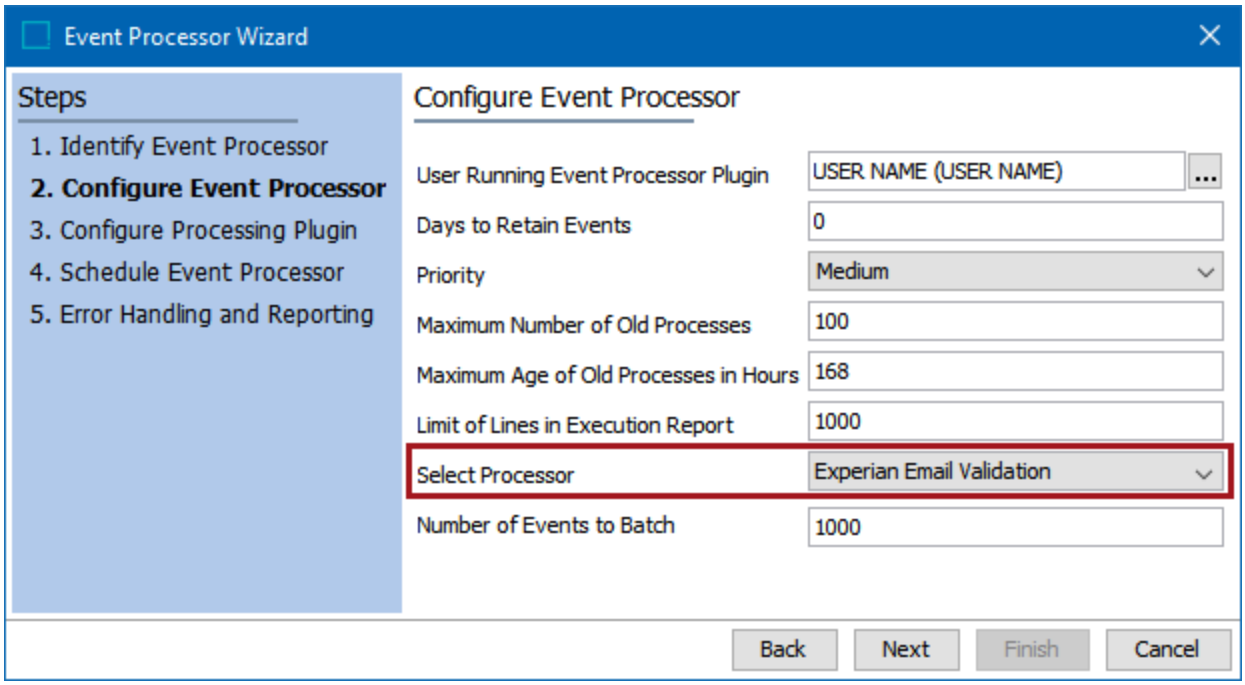
This section of documentation describes configuration steps for this specific processor, but that is only one part of configuring an event processor. For the full set of instructions on configuring an event processor, refer to the Event Processors topic.

The configuration requires an understanding of the Experian Email Validation Integration. For more information, refer to the Experian Email Validation Integration section of the Data Integration documentation.

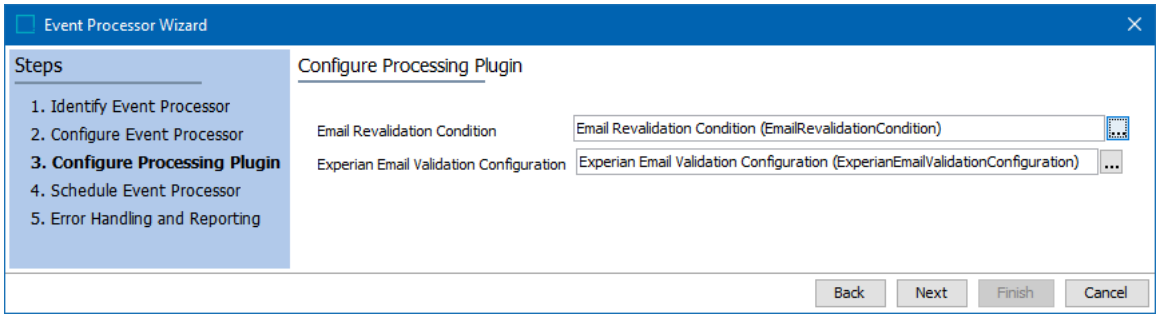
Parameters

Each of the relevant parameters for the Event Processor Wizard 'Configure Processing Plugin' step are described below. Any additional wizard parameters with importance for this plugin are also included in this topic.

To access the 'Configure Processing Plugin' parameters as shown below, the **Experian Email Validation** processor must be selected within the Select Processor parameter during the wizard step 'Configure Event Processor.'



Once the Experian Email Validation processing plugin has been selected, click the **Next** button, and the wizard step 'Configure Processing Plugin' displays.



Note: Optionally, use the Email Component Model Easy Setup wizard to automatically configure these options. For more information, refer to the **Email Component Model** section of the Configuring Experian Email Validation Integration topic.

- **Email Revalidation Condition:** Click the ellipsis button (...) to display the Select Condition dialog, select your email revalidation condition. For more information, refer to the **Email Revalidation Business Condition** section of the Configuring Experian Email Validation Integration topic in the Data Integration documentation.
- **Experian Email Validation Configuration:** Click the ellipsis button (...) to display the Select Experian Email Validation Configuration dialog and select your configuration.

Once any required configurations are made, click the **Next** button to display the wizard step 'Schedule Event Processor.'

Refer to the **EP - Schedule Event Processor** topic within the EP - Schedule Event Processor section of the **Event Processors** documentation.

Event Triggers

On the event processor's Event Triggering Definitions tab, use the Triggering Object Types, Triggering Attributes, and Miscellaneous Triggers flippers to configure the event processor to listen for changes made on the configured Triggering Object Types in the 'Email Field.'

By default, events are triggered on the Approved workspace. Derived event functionality is available for triggering events prior to approval, as defined in the Derived Events topic in the System Setup documentation.

If the Email Component Model Easy Setup wizard was used, then the Object Types selected during the wizard step 'Create New Email Data Container,' automatically displays within the Triggering Object Types flipper. Any email attributes selected or created during the wizard step 'Configure Email Fields,' automatically displays within the Triggering Attributes flipper.

For more information, refer to the Configuring Experian Email Validation Integration Using the Easy Setup Wizard topic of the Data Integration documentation.

In the example below, during the Email Component Model Easy Setup wizard step 'Create New Email Data Container,' the Object Types 'Sales Manager' and 'Employee' were selected, and during the wizard step 'Configure Email Fields' the 'Email Field' attribute was automatically created.

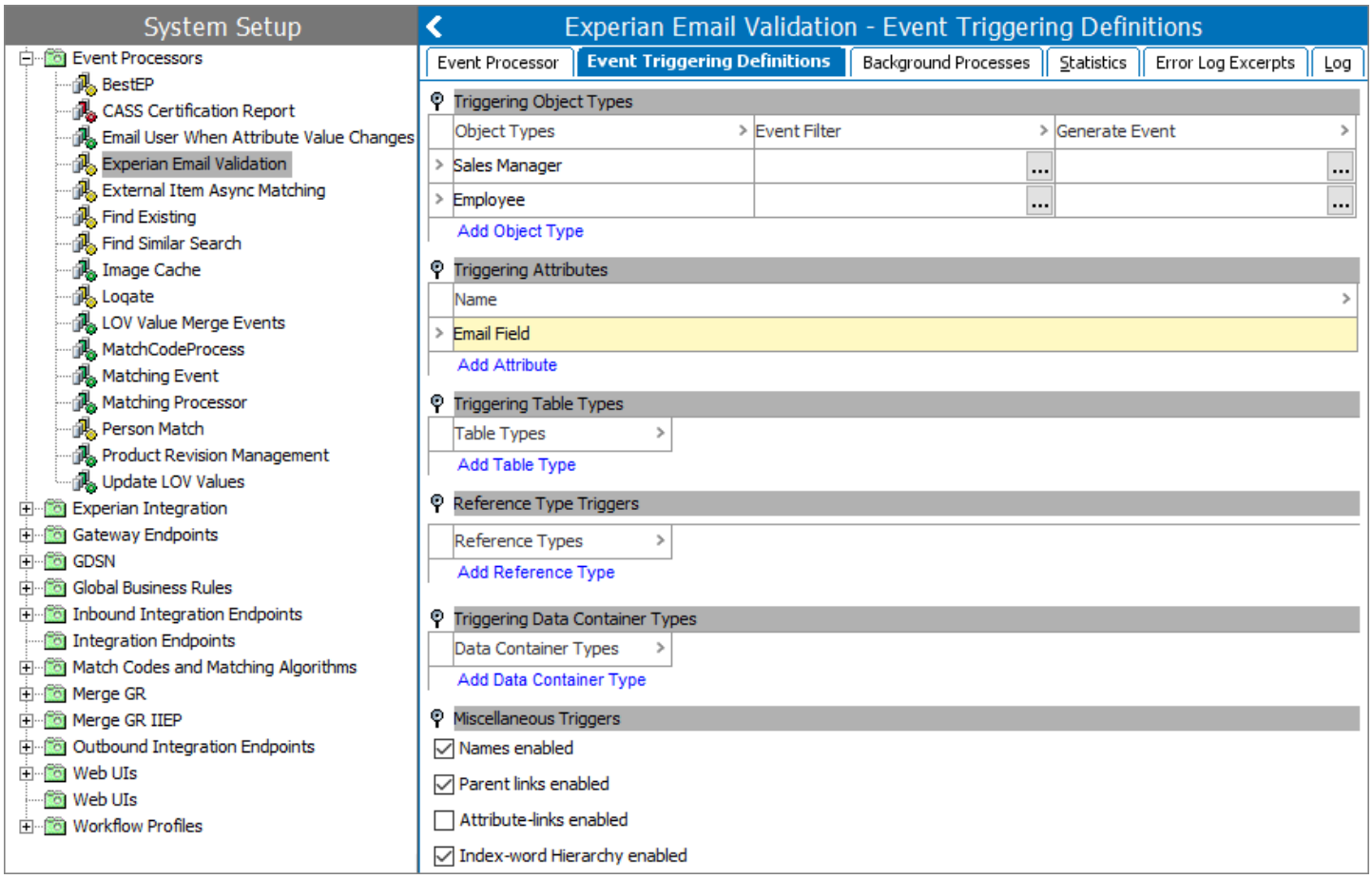
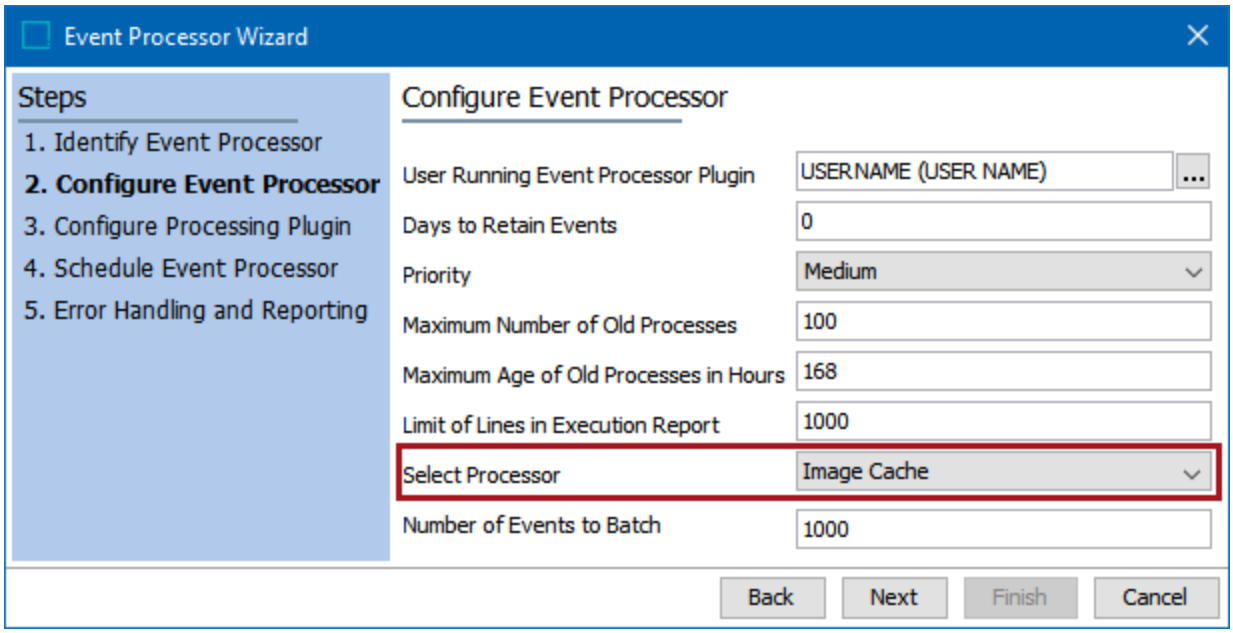

System Setup
Event Processors
BestEP
CASS Certification Report
Email User When Attribute Value Changes
Experian Email Validation
External Item Async Matching
Find Existing
Find Similar Search
Image Cache
Loqate
LOV Value Merge Events
MatchCodeProcess
Matching Event
Matching Processor
Person Match
Product Revision Management
Update LOV Values
Experian Integration
Gateway Endpoints
GDSN
Global Business Rules
Inbound Integration Endpoints
Integration Endpoints
Match Codes and Matching Algorithms
Merge GR
Merge GR IIEP
Outbound Integration Endpoints
Web UIs
Web UIs
Workflow Profiles
Experian Email Validation - Event Triggering Definitions
Event Processor
Event Triggering Definitions
Background Processes
Statistics
Error Log Excerpts
Log
Triggering Object Types
Object Types
Event Filter
Generate Event
Sales Manager
Employee
Add Object Type
Triggering Attributes
Name
Email Field
Add Attribute
Triggering Table Types
Table Types
Add Table Type
Reference Type Triggers
Reference Types
Add Reference Type
Triggering Data Container Types
Data Container Types
Add Data Container Type
Miscellaneous Triggers
Names enabled
Parent links enabled
Attribute-links enabled
Index-word Hierarchy enabled

Image Cache Processing Plugin Parameters and Triggers

Image Cache allows the event processor to generate images for required conversions asynchronously and saves the resulting files to the image cache. Common setup is for all STEP systems to use this event processor as a means of optimizing asset export time to external systems.

Deleted objects (objects in the recycle bin) are ignored during processing.

To access the 'Configure Processing Plugin' parameters as shown below, the **Image Cache** processor must be selected within the Select Processor parameter during the wizard step 'Configure Event Processor.'

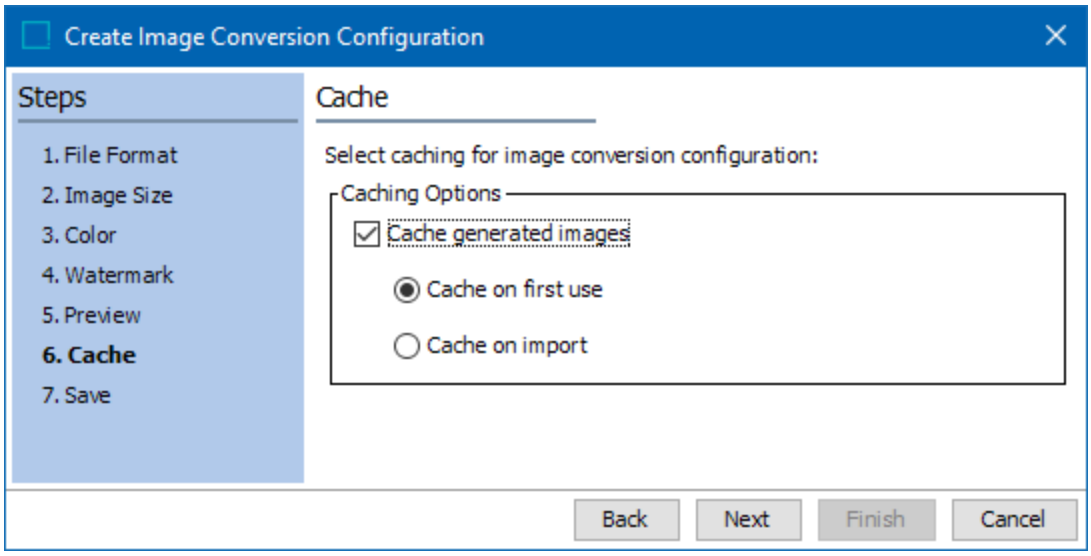


The **Parameters** and **Event Triggers** sections below contain important information on settings that should be considered when creating an event processor using this processing plugin.

Prerequisites

This section of documentation describes configuration steps for this specific processor, but that is only one part of configuring an event processor. For the full set of instructions on configuring an event processor, refer to the Event Processors topic.

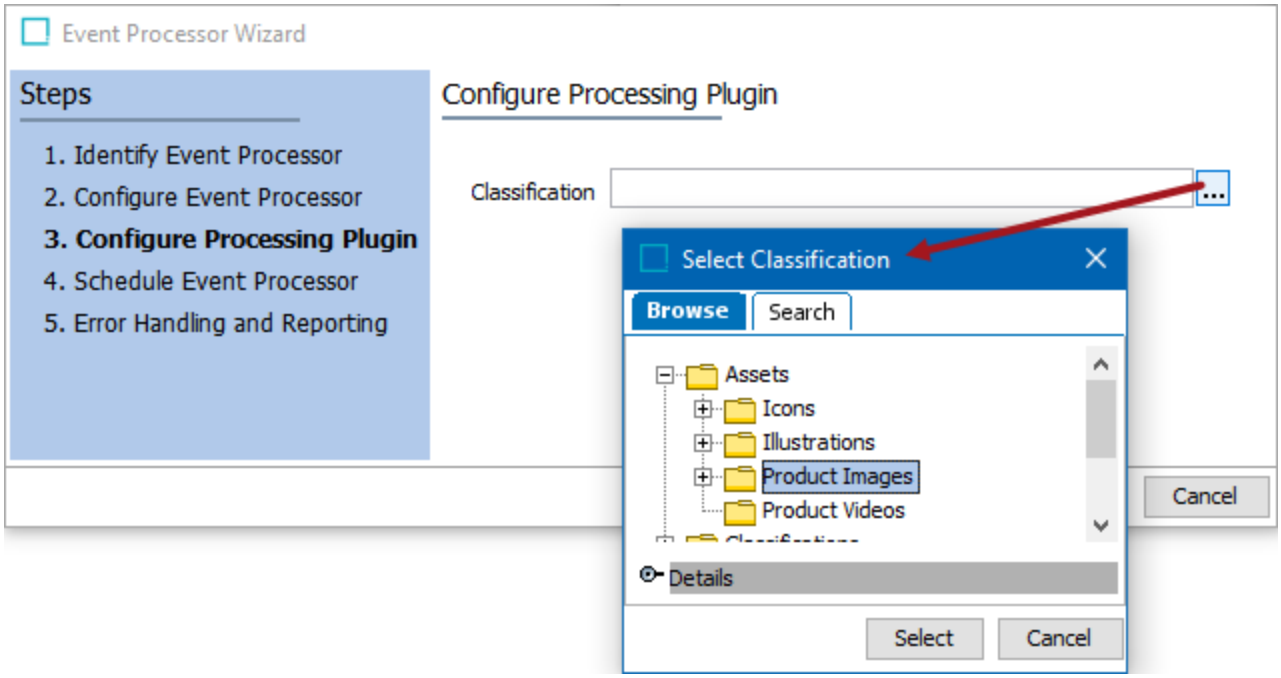
An image conversion that uses caching must have been previously created. Only Image conversion configurations with the 'Cache generated images' option checked are handled by this event processor. For more information on creating these conversions, refer to the **Image Conversion Configuration** topic of the **Digital Assets** documentation.



Parameters

Each of the relevant parameters for the Event Processor Wizard 'Configure Processing Plugin' step are described below. Any additional wizard parameters with importance for this plugin are also included in this topic.

- **Classification:** click the ellipsis button (...) to display the Select Classification dialog. Choose the classification folder that will be monitored for images to be cached and click the **Select** button. Each time an asset is added to the folder, or an existing asset is modified, that corresponds to the triggering definitions (below), an event will be generated for the image cache processor.



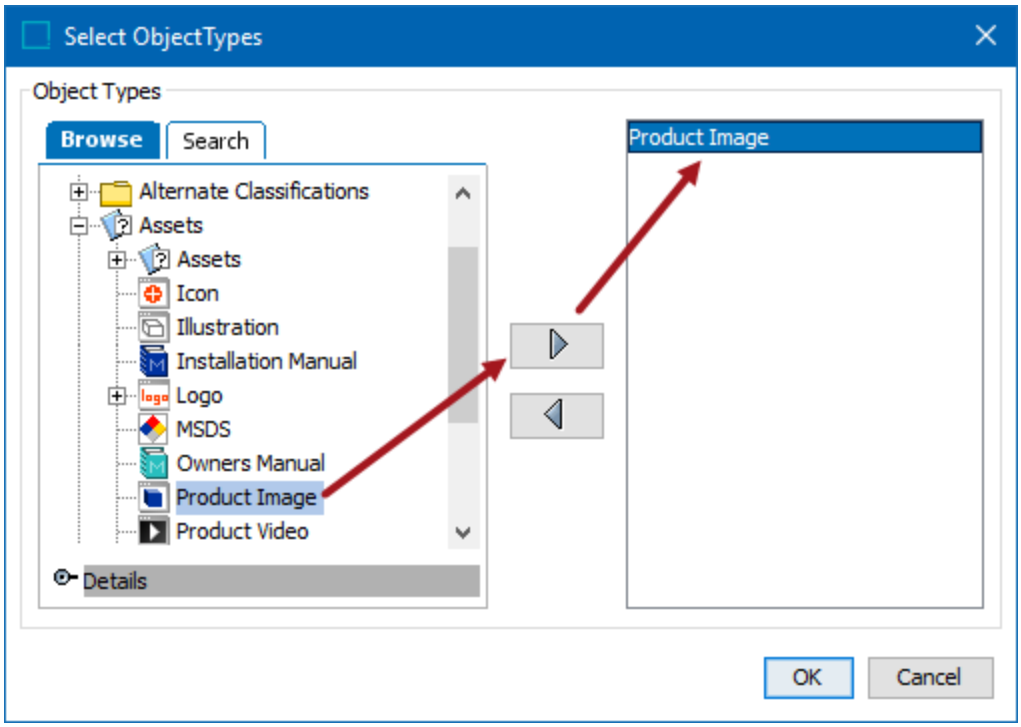
Important: Although caching images is optional, a cache improves export performance, especially for those assets that are exported frequently. Image caching is automatically defined for STEP with no setup required. All image caching is controlled by the ImageCache.* properties in the sharedconfig.properties file (any property that begins with 'ImageCache.' regardless of what text follows). Contact Stibo Systems Technical Support for assistance when modifying the default settings to meet your needs.

Event Triggers

For the event processor to take effect, it must be configured to only listen for changes on asset type objects housed within the same previously selected classification folder.

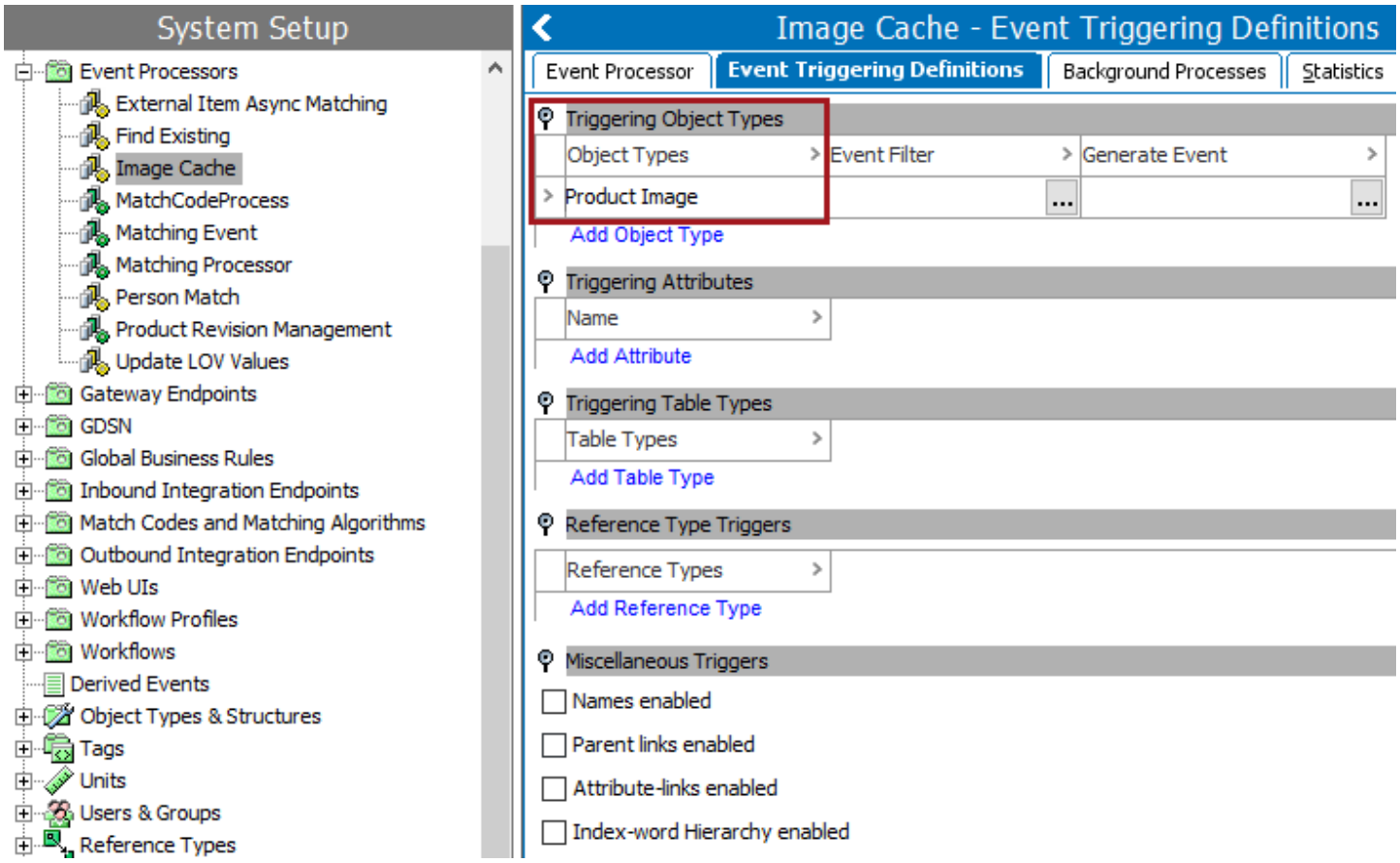
By default, events are triggered on the Approved workspace. Derived event functionality is available for triggering events prior to approval, as defined in the Derived Events topic in the System Setup documentation.

1. Click the **Add Object Type** link to display the Select Object Types dialog.
2. Select **one or more asset object types that will be monitored for changes**. When business rules are not required in the Event Filter and Generate Event fields, multiple object types can be selected within the same triggering object types row.



Important: You must select at least one asset type for Triggering Object Types, or nothing will be processed by the event processor.

3. Click the **OK** button to add the selection to the Triggering Object Types table.



4. Click the ellipsis button (...) in the respective Event Filter and Generate Event fields to add any required business rules.

Matching Processing Plugin Parameters and Triggers

The result of matching may change when data changes. Updates result in events and matching allows for the generation / updating of match code values, as well as the option to run matching algorithms, whenever an event is processed on the objects acted on by the algorithm.

Deleted objects (objects in the recycle bin) are ignored during processing.

The **Parameters** and **Event Triggers** sections below contain important information on settings that should be considered when creating an event processor using this processing plugin.

Prerequisites

This section of documentation describes configuration steps for this specific processor, but that is only one part of configuring an event processor. For the full set of instructions on configuring an event processor, refer to the Event Processors topic.

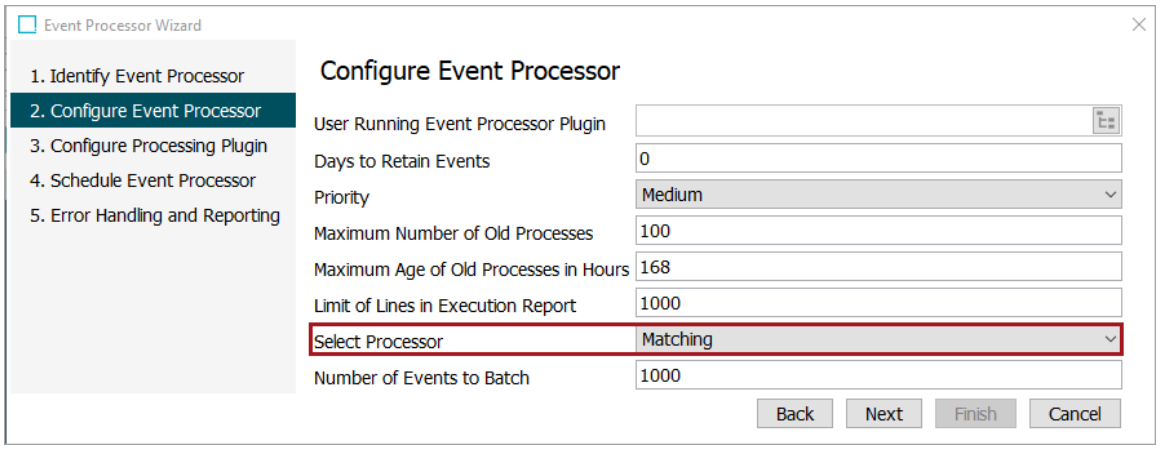
The configuration requires selection of a matching algorithm, and that match codes are only updated for objects acted on by the algorithm and only when events are passed for those objects. For details about match codes and matching algorithms, refer to **Matching, Linking, and Merging Elements** in the **Matching, Linking, and Merging** documentation.

Important: The 'Run Matching Algorithm' functionality is controlled by System Setup > Action Sets > Setup Actions > Maintain Deduplication Configurations.

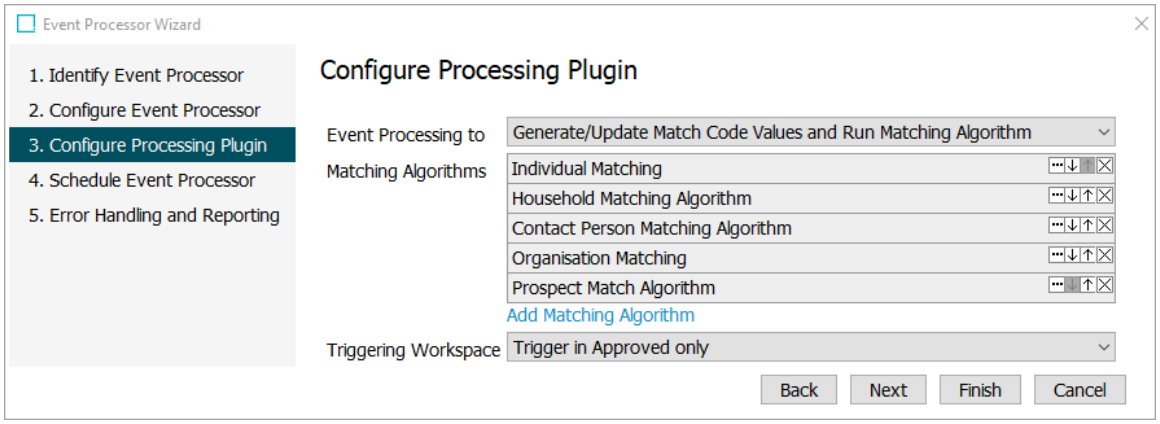
Parameters

Each of the relevant parameters for the Event Processor Wizard 'Configure Processing Plugin' step are described below. Any additional wizard parameters with importance for this plugin are also included in this topic.

To access the 'Configure Processing Plugin' parameters as shown below, the **Matching** processing plugin must be selected within the Select Processor parameter during the wizard step 'Configure Event Processor.'



Once the Matching processing plugin has been selected, click the **Next** button, and the wizard step 'Configure Processing Plugin' displays.



- **Event Processing to:** Select an option from the dropdown.
  - **Run Matching Algorithm Only:** runs the selected algorithm(s) using the existing match codes.
  - **Generate / Update Match Code Values Only:** creates missing match codes, deletes invalid match codes, but does not run the algorithm(s).
  - **Generate / Update Match Code Values and Run Matching Algorithm:** this is the recommended option and does both of the first two options. If configured to generate / update match code values, only objects included in the matching algorithms specified on this step are affected.
- **Matching Algorithms:** Specify which matching algorithm(s) to run by clicking the **Add Matching Algorithm** link and use search or browse.

- When multiple algorithms are selected, they are processed in order, from top to bottom.
- When working in a golden record scenario, consider the order of algorithms when there are references between multiple golden records within multiple matching algorithms. Common setup is to match 'reference targets' before 'reference sources' to ensure optimal matching performance, and as complete an initial construction of golden records as possible.

Important: While it is possible to use the same Matching Algorithm across Event Processors, this scenario will usually result in an optimistic locking and/or unique constraint violation when the two processors conflict with one another. Optimistic locking is the implementation where objects are modified concurrently. The result of this is that the system cannot know which value should be represented. To avoid these issues, ensure that each algorithm on the system is run by a single Event Processor.

- **Triggering Workspace**: Set the triggering workspace based on your implementation.

  Important: Use 'Trigger in Main only' or 'Trigger in both Main and Approved' option if checking for duplicated data while matching products before approval. This can lead to poor performance particularly if you are triggering on a high volume of data changes. Since the benefits of triggering from 'Main' can outweigh the performance risk, thoroughly test in lower environments before running in production. Alternatively, derived events can be used to trigger events prior to approval, as defined in the **Derived Events** topic of the **System Setup** documentation.

  - For entities, this option only has effect for workspace revisable object types.
  - For products:
    - 'Trigger in Approved only' is the recommended option.
    - 'Trigger in Main only' can be used if your use case requires searching for duplicates prior to approval.
    - 'Trigger in both Main and Approved' is available if necessary and the benefit is greater than the performance impact.

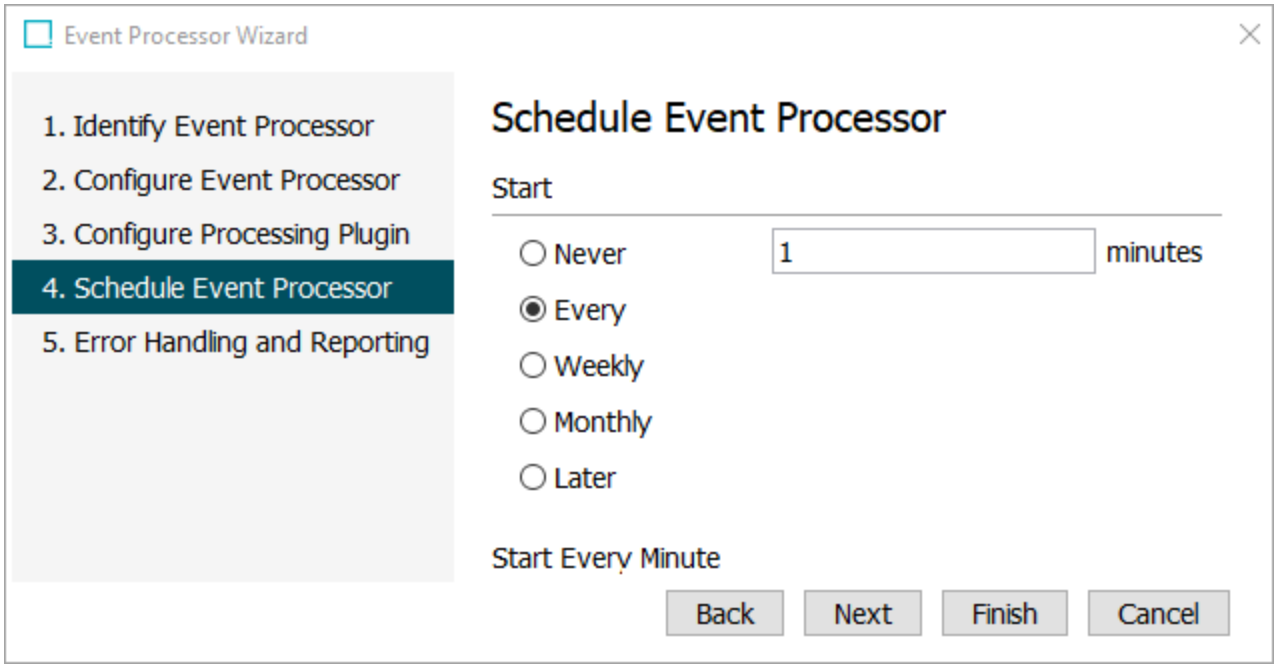
  Note: To activate a change to the Triggering Workspace parameter, you must invoke the event processor with at least one event on the queue.

The selection made in the wizard is displayed in the Event Processor Configuration tab.

Configuration

ID	Name
User Running Event Processor Plugin	stepsys
Number of Events to Batch	1000
Days to Retain Events	0
Priority	Medium
Maximum Number of Old Processes	100
Maximum Age of Old Processes in Hours	168
Limit of Lines in Execution Report	1000
Triggering Workspace	Trigger in Approved only

On the Schedule Event Processor step, select the desired schedule. The recommendation is every one (1) minute.



Note: The comparison run by a Matching event processor happens asynchronous to the actual import, leaving up to a minute between importing a record that should go into the clerical review workflow and making the record visible in the clerical review workflow.

Event Triggers

On the event processor's Event Triggering Definitions tab, use the Triggering Object Types, Triggering Attributes, and Miscellaneous Triggers flippers to configure the event processor to listen for changes on anything that the match code or matching algorithm needs to perform.

- If the event processor will update match code values, expand the Triggering Attributes flipper and click the Add Attribute link to select the attributes used by the Match Code definition.
- If the event processor will run a matching algorithm, select the respective object types, attributes, and links that are specified by the Matching Algorithm within the Global Binds or the Match Criteria flippers. These can include attribute values, IDs, names, attribute references, and parent links.

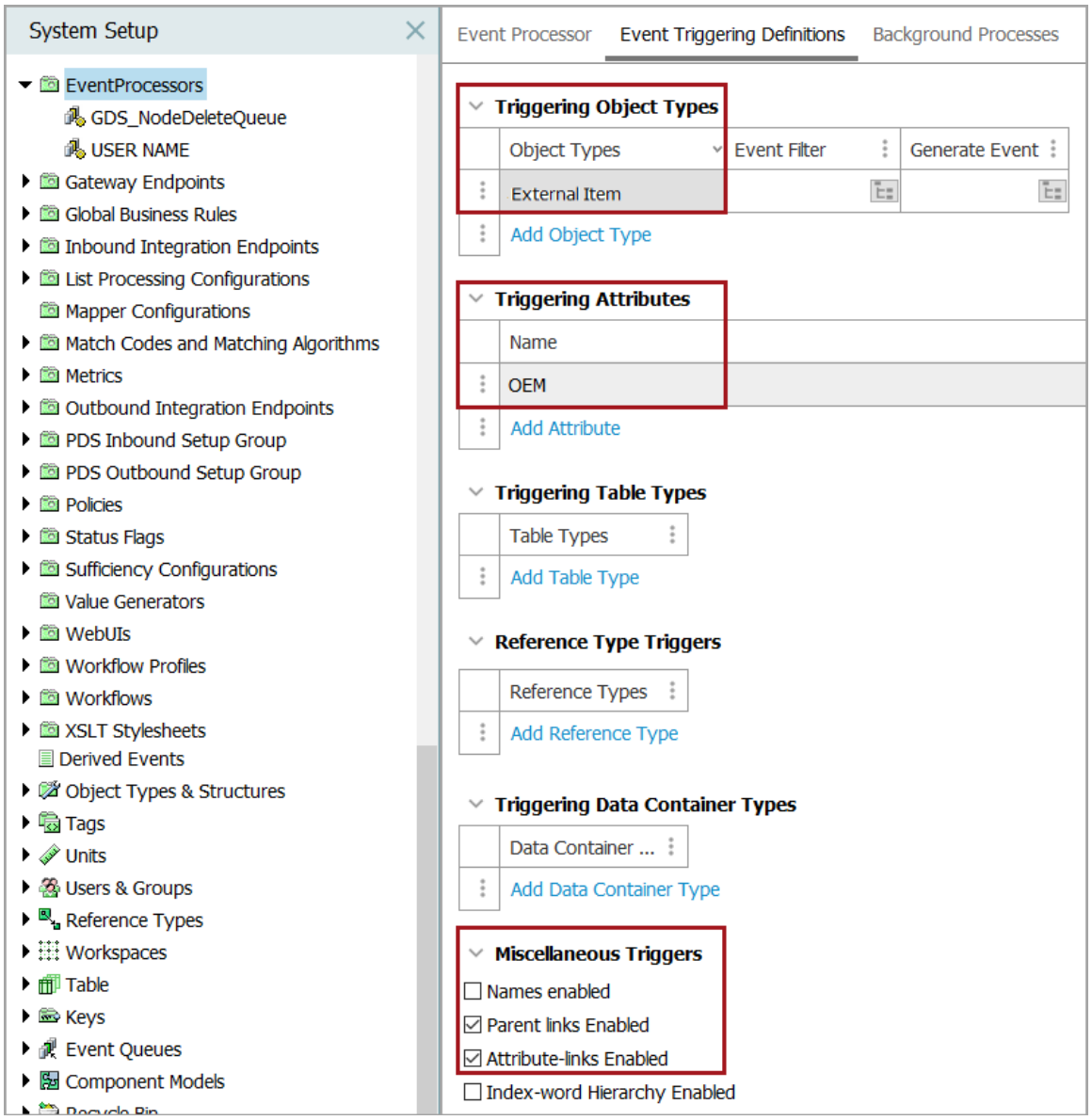
For a **match and merge** scenario, based on the selected algorithm, for existing golden records, the event processor performs a merge or initiates a clerical review. Add triggers for the following:

- references defined by your **Matching component model**: Non-Duplicate Reference Types. For details, refer to the topic Configuring Matching Component Model
- references defined by your **Matching - Merge Golden Record References component model**: Unmerged-From Relation Reference Types. For details, refer to the topic Configuring the Matching - Merge Golden Record Component Model.
- attributes, references, and data containers included in your Match Criteria. For details, refer to the Match Criteria topic.

> **Important:** For accurate match and merge functionality, the event processor must trigger on updates that can change the outcome of the record comparisons. To accomplish this, the recommendation is to trigger on any attribute, reference, or data container that is used in the match criteria.

For a match and merge scenario, avoid triggers on the following attributes and reference types as defined by your component models:

- Potential Duplicate Reference Type
- Merged-Into Relation Reference Types
- Source Relation Reference Type
- Potential Duplicate Match Algorithm ID Attribute
- Source Record ID Attribute
- Deactivated Attribute



Triggering Workspace Flipper

This flipper is displayed in rare cases, specifically, only if either the 'Main' or the 'Main and Approved' option was previously selected in a release where the option was available.

Although changing the selection to the default 'Approved' radio button removes the flipper from the event processor, the setting can be observed from the Event Processor Wizard on the Configure Processing Plugin step, as defined, and further explained in the **Parameters** section above.

> **Note:** To activate a change to the Triggering Workspace parameter, you must invoke the event processor with at least one event on the queue.

When configuration is complete, enable the matching event processor. For detailed steps, refer to the **Enabling Event Processors** section of the Running an Event Processor topic in the System Setup documentation.

Matching Recommendations and Retry Logic for Match Recommendation Service Connectivity

The matching processing plugin has a built-in retry logic when connecting to the cloud environment through a matching agent to get merge / reject recommendations for a clerical review task list. For more information, refer to the Machine Learning Match Recommendations topic in the Matching, Linking, and Merging documentation.

Troubleshooting

The following logs and statistics provide information for troubleshooting the event process.

- Review the event processor background process log to determine when events were processed and what actions were taken in response.
- Review event processor performance measurements on the Statistics tab for both matching algorithms and match code configurations.

Revision Management Processing Plugin Parameters and Triggers

Revision Management allows automatic purging of object revisions to limit the total number of revisions retained. Multiple revision management event processors can be configured, which enables the number of revisions to differ based on the object type. It is strongly recommended that all STEP systems have this event processor set up as a means of managing the STEP database size.

Deleted objects (objects in the recycle bin) are ignored during processing.

The **Parameters** and **Event Triggers** sections below contain important information on settings that should be considered when creating an event processor using this processing plugin.

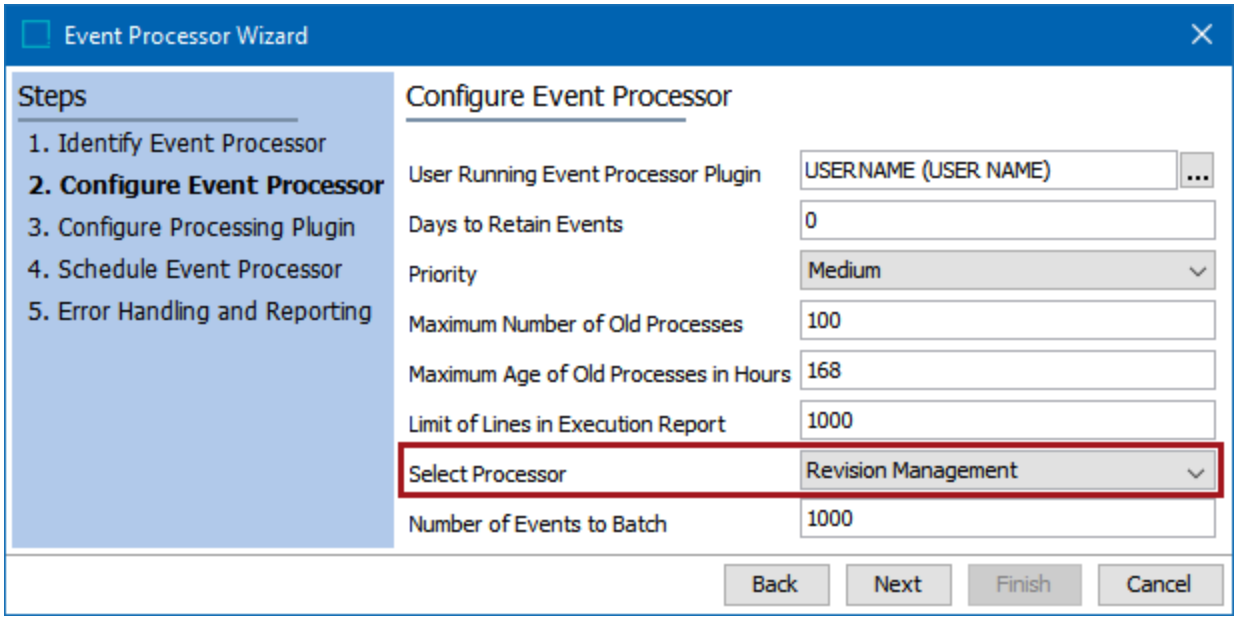
Prerequisites

This section of documentation describes configuration steps for this specific processor, but that is only one part of configuring an event processor. For the full set of instructions on configuring an event processor, refer to the Event Processors topic.

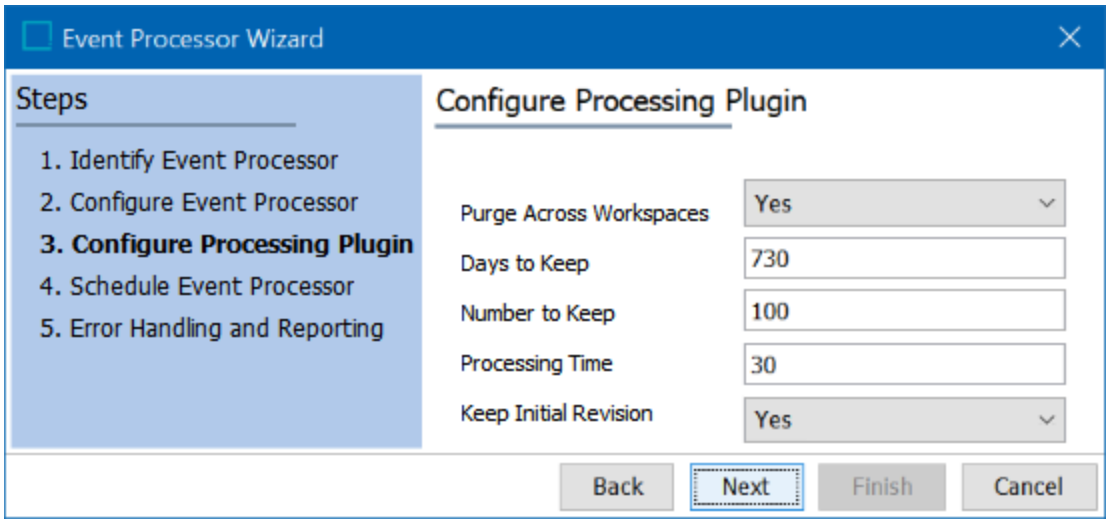
Parameters

Each of the relevant parameters for the Event Processor Wizard 'Configure Processing Plugin' step are described below. Any additional wizard parameters with importance for this plugin are also included in this topic.

To access the 'Configure Processing Plugin' parameters as shown below, the **Revision Management** processing plugin must be selected within the Select Processor parameter during the wizard step 'Configure Event Processor.'



Once the Revision Management processing plugin has been selected, click the **Next** button, and the wizard step 'Configure Processing Plugin' will display.



- **Purge Across Workspaces:** select 'Yes' to purge object revisions across all workspaces or 'No' (the default) for only the execution workspace. More revisions can typically be removed if the analysis and removal is done across workspaces, but this method takes more time. When this option is enabled, the 'Processing time' and 'Keep initial revision' settings will have no effect.

  Important: The event processor fails if both the 'Purge across workspaces' and the 'Keep initial revision' are set to 'Yes.'

- **Days to Keep:** uses calendar days to determine the age of a revision, and keeps only those that are less than the number of days specified. Consider setting this to 1 for most implementations.
- **Number to Keep:** maximum number of revisions remaining after processing. Consider setting this to 1 for most implementations.
- **Processing time:** determines the maximum number of seconds that the processor will run on each object. **Must be set to 30.**

  Note: Setting 'Processing time' to any number other than 30 results in a Runtime Exception when events are processed.

- **Keep Initial Revision:** select Yes to keep the first revision even if it falls outside all other conditions. Common setup is to keep the initial revision if you want to know when an object was initially created. If this option is set to No, the first revision will be deleted.

  Important: A revision is deleted when it meets at least one of the conditions set in the Days to keep, Number to keep, and Processing time parameters. These parameters work as an 'OR' statement to determine the revisions to permanently remove.

  For example, considering the values in the image above, a revision is deleted if:

  - The revision being processed is at least 731 days old, **or**
  - More than 100 revisions will remain after deletion of the revision being processed, **or**
  - The processor has not run for 30 seconds on the revision being processed.

Event Triggers

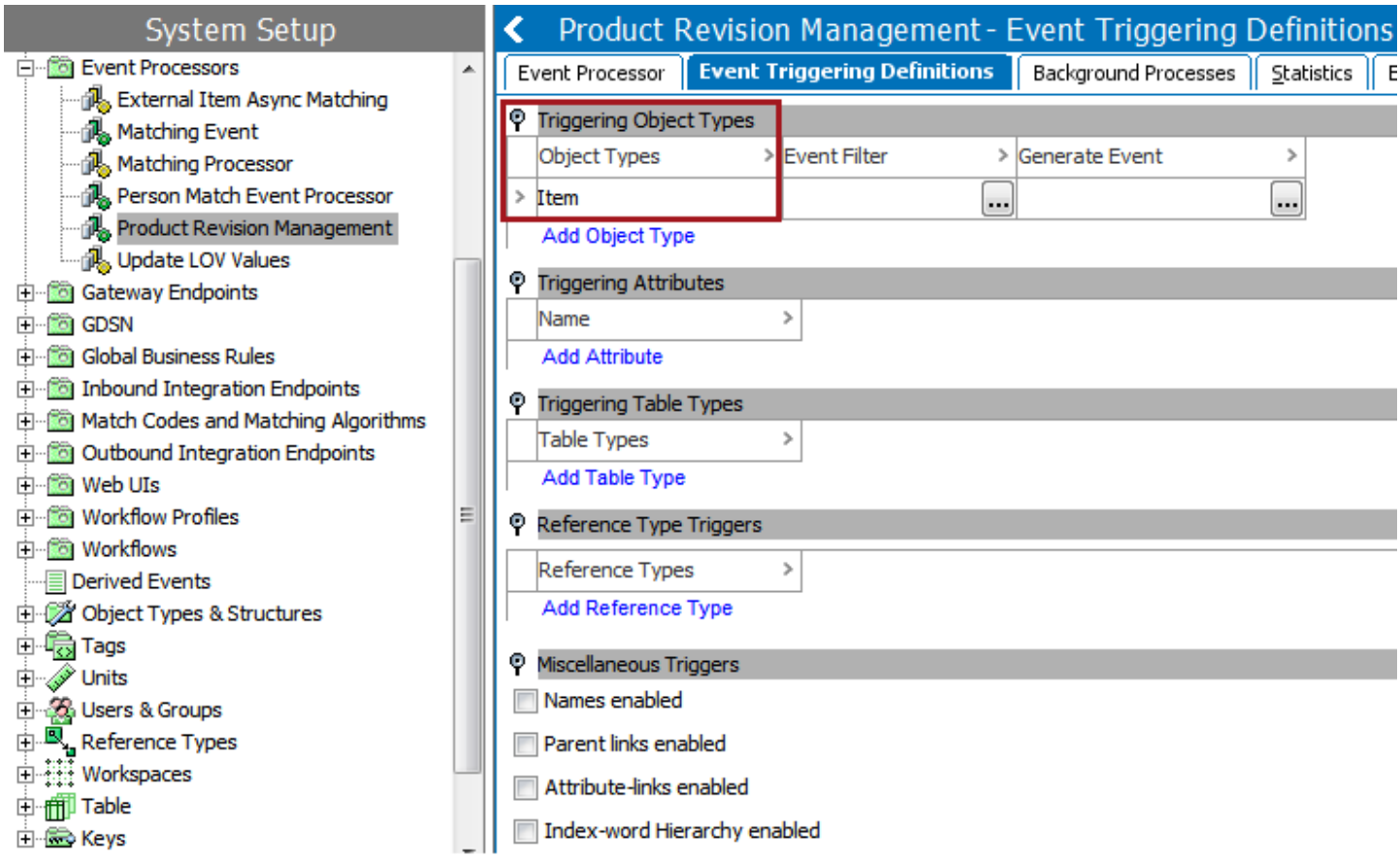
Select the object type(s) that should have revisions deleted according to the configured limits.

Note: The revision management event processor **does not** search the database and remove the revisions of all objects when the revision management event processor criteria are met. Instead, the revision management event processor **does** remove revisions only according to the criteria set of a single object when an event is triggered for the object.

If a different number of revisions is needed based on the object type, create an additional event processor with the necessary configuration limits.

Additionally, set Triggering Attributes, Reference Triggering Types, and/or Miscellaneous Triggering Types as necessary. Event Triggering Definitions are the same in Event Processors as they are in an OIEP. For details about the triggers, refer to the **OIEP - Event-Based - Event Triggering Definitions Tab** in the **Data Exchange** documentation.

By default, events are triggered on the Approved workspace. Derived event functionality is available for triggering events prior to approval, as defined in the Derived Events topic in the System Setup documentation.



Splitting Processor Processing Plugin Parameters and Triggers

The Splitting Processor is designed for historical reporting. Historical reporting is traditionally slow, and there is a need to distribute events in a controlled manner. The Splitting Processor takes a number of queues from other event processors or outbound integration endpoints, and either copies the entire batch of events to all of them or distributes the events evenly between the queues.

> **Note:** The functionality is in ramp-up status, and while accessible, may not work as expected since it is still under development.

Deleted objects (objects in the recycle bin) are ignored during processing.

The **Parameters** and **Event Triggers** sections below contain important information on settings that should be considered when creating an event processor using this processing plugin.

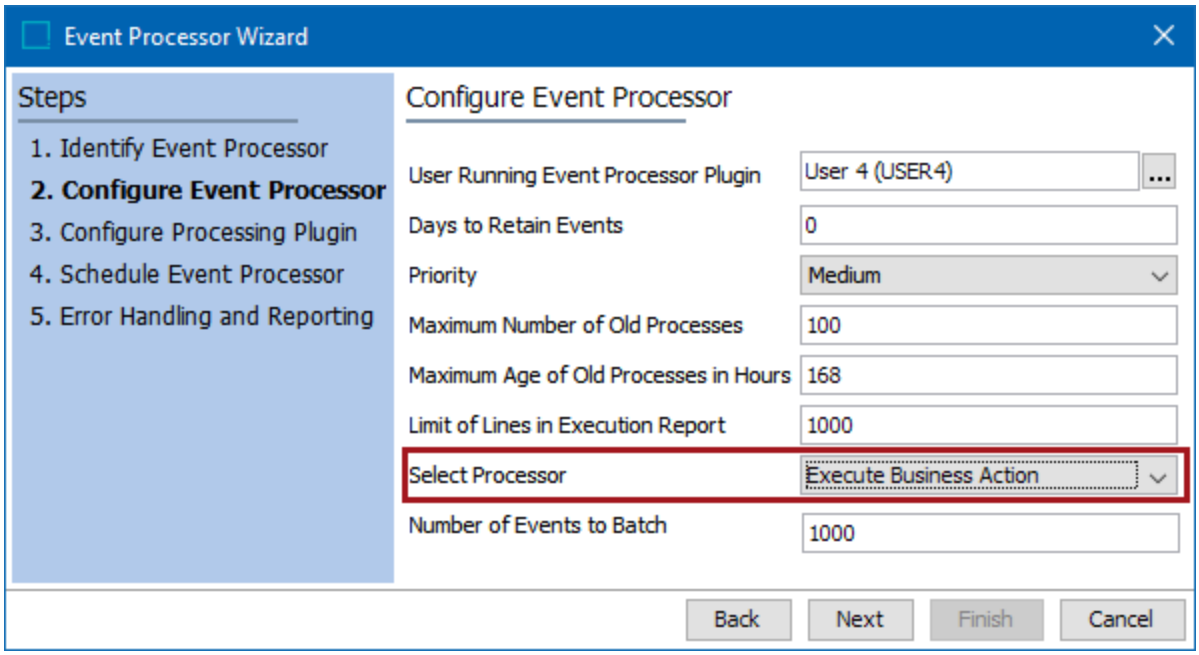
Prerequisites

This section of documentation describes configuration steps for this specific processor, but that is only one part of configuring an event processor. For the full set of instructions on configuring an event processor, refer to the Event Processors topic.

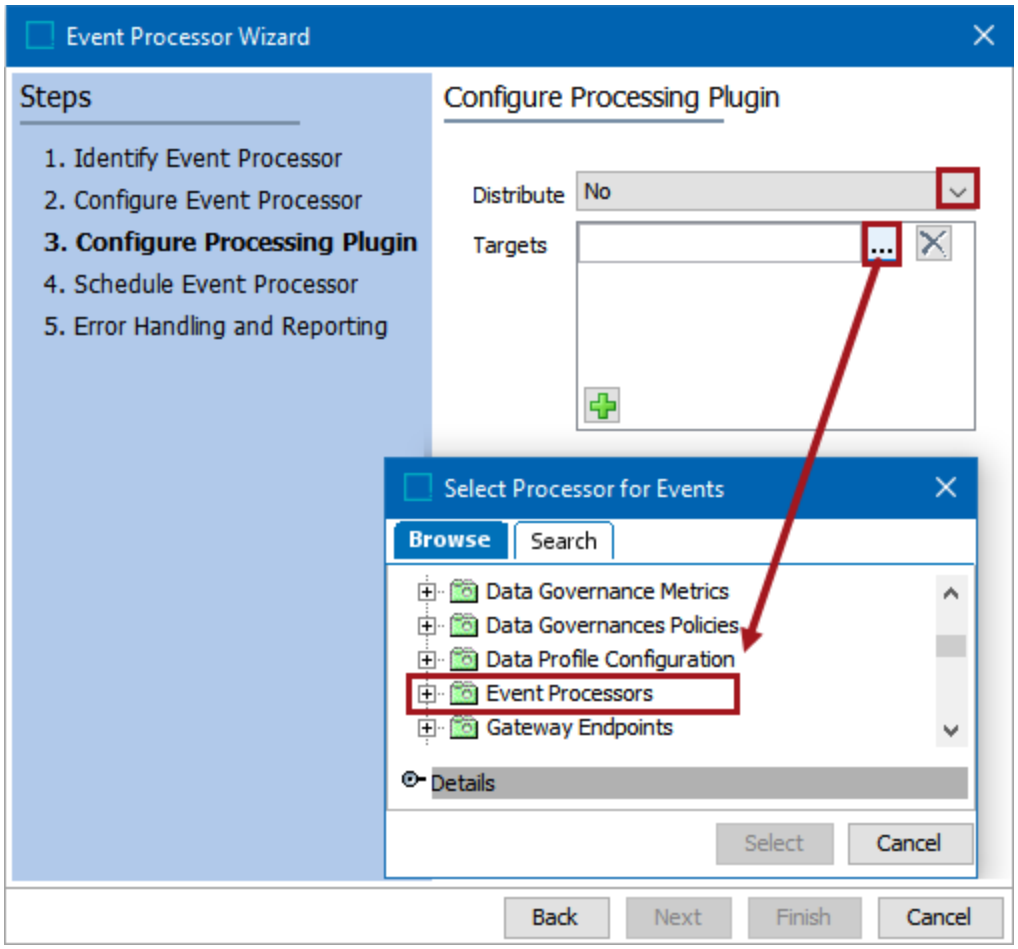
Parameters

Each of the relevant parameters for the Event Processor Wizard 'Configure Processing Plugin' step are described below. Any additional wizard parameters with importance for this plugin are also included in this topic.

To access the 'Configure Processing Plugin' parameters as shown below, the **Splitting Processor** processing plugin must be selected within the Select Processor parameter during the wizard step 'Configure Event Processor.'



Once the Execute Business Action processing plugin has been selected, click the **Next** button, and the wizard step 'Configure Processing Plugin' will display.



- **Distribute:** Use the dropdown to choose between Yes or No (defaults to No). When 'No' is selected, the system copies the entire batch of events to the designated target, and 'Yes' will have the system distribute the events evenly between the queues designated in the Target parameter.
- **Targets:** Click the ellipsis button (...) to display the Select Processor for Events dialog, and select the **event processor** or **endpoint** that has the receiving event queue. Use the green add button (plus sign) to add more Targets.

Once any required configurations are made, click the **Next** button to display the wizard step 'Schedule Event Processor.'

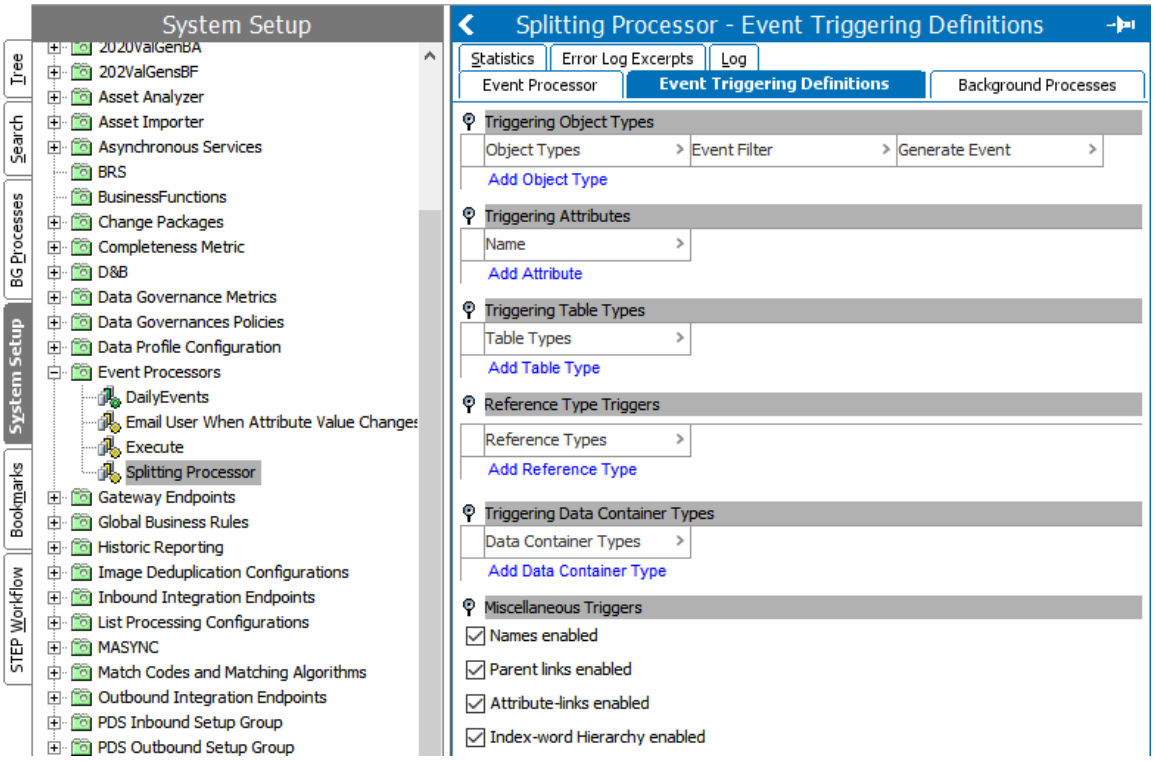
Refer to the **EP - Schedule Event Processor** topic within the EP - Schedule Event Processor section of the **Event Processors** documentation.

Event Triggers

For the event processor to execute the business action, the Event Triggering Definitions tab must be correctly configured.

By default, events are triggered on the Approved workspace. Derived event functionality is available for triggering events prior to approval, as defined in the Derived Events topic in the System Setup documentation.

Select an event processor configured to use the Splitting Processor and click on the Event Triggering Definitions tab. Use the various triggering flippers to configure the event processor to listen for changes on anything that should cause the event processor to execute. At a minimum, an object type must be selected.



- Upon creation, the parameters within the Miscellaneous Triggers flipper are enabled.
- When a configured trigger causes an event to reach the event processor queue, the business action will execute.
- When an event batch is successfully processed, no message is written into the execution report of the corresponding background process (BGP).
- When JavaScript is used to write the business action, the originating object of the event will be available via the 'Current Object' bind.
- If the event processor encounters a problem processing a batch, the event processor will retry the business actions on each event in the batch until all events have been processed or the failing event is identified, in which case the event processor will enter the failed state and stop processing new events.
- There is no guarantee that actions will not run multiple times, even when batch size is equal to one. However, the likelihood is reduced by having a batch size of one, but performance can then be affected.

Important: By default, events are discarded. For more information about the optional configuration to enable the Queue Status, refer to the **Queue Status** section of the **EP - Event Processor Tab** topic.

Source Record Data Management Processing Plugin Parameters and Triggers

Storing source data takes up disk space in the database. To keep the extra storage impact stable over time, the historical source data values should eventually be purged. The source data does not use the In-Memory functionality and so does not require additional memory. When importing new records, individual records can require an additional 20-30 percent of space to accommodate for the source records. However, with minor updates to existing golden records, source data can require 250-300 percent of additional disk space for the individual records.

The 'Source Record Data Management – Historical Values Cleanup' event processor incrementally purges the oldest historical source data. This includes simultaneously cleaning historical values and optimizing storage to keep disk usage as low as possible. Depending on the average amount of changing values at each import, the extra storage impact for updates could be reduced to 50-80 percent.

The purging logic is individual per source record and per attribute / reference / data container, so frequently changing values does not cause other historical values to be purged prematurely.

Deleted objects (objects in the recycle bin) are ignored during processing.

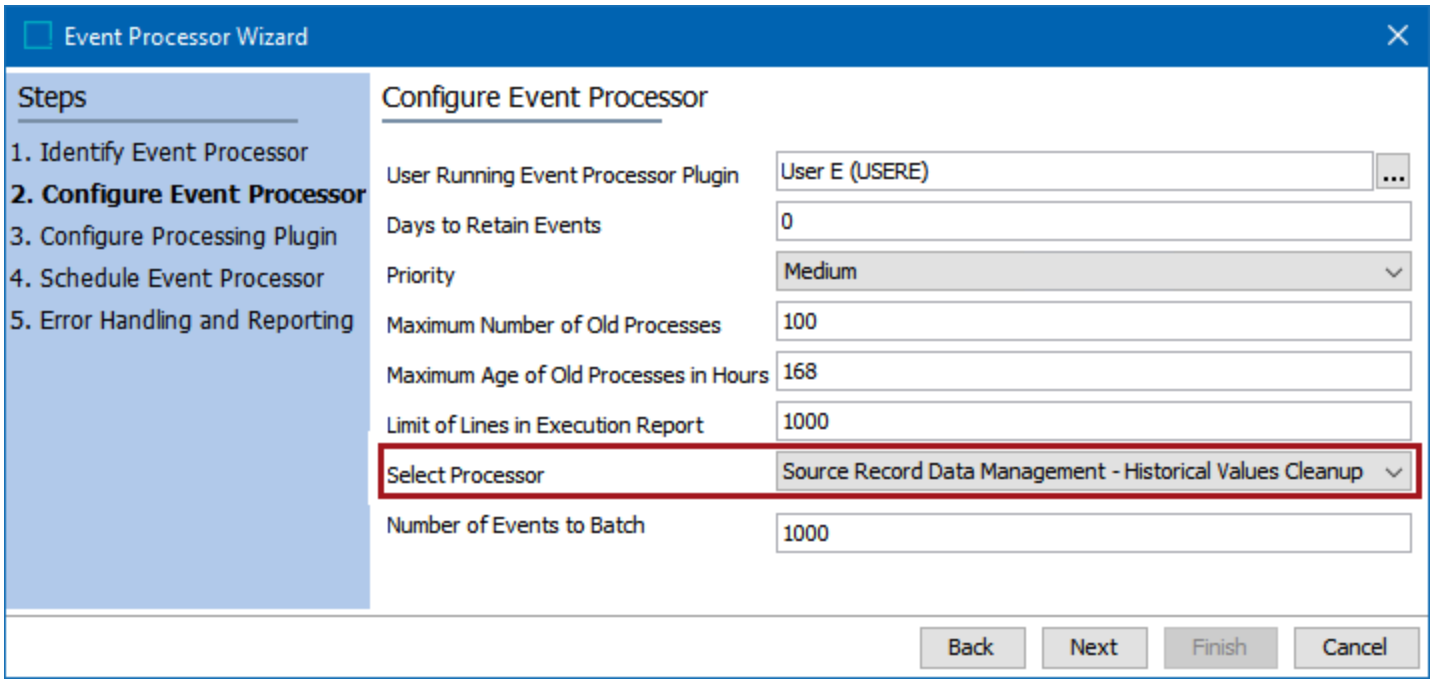
The **Parameters** and **Event Triggers** sections below contain important information on settings that should be considered when creating an event processor using this processing plugin.

Prerequisites

This section of documentation describes configuration steps for this specific processor, but that is only one part of configuring an event processor. For the full set of instructions on configuring an event processor, refer to the Event Processors topic.

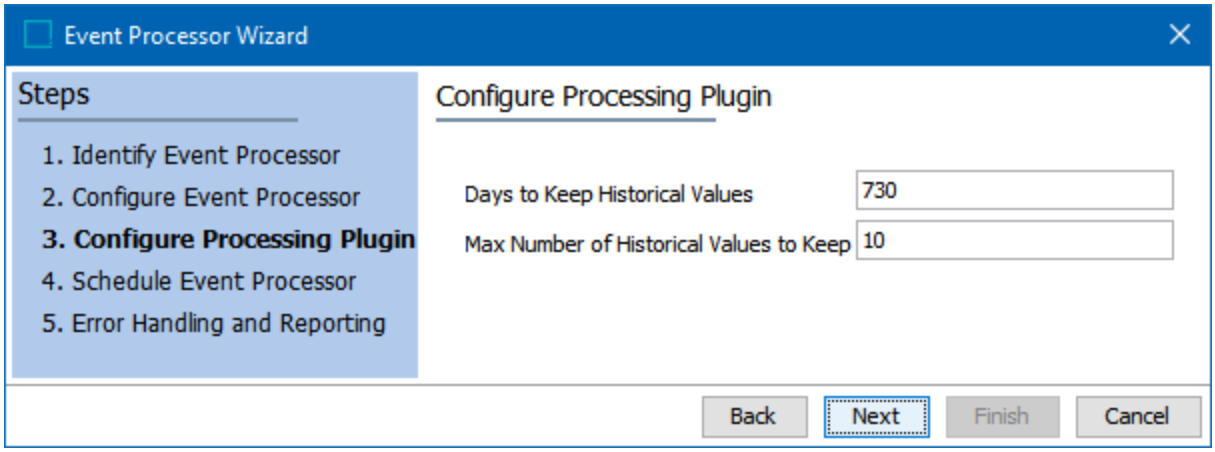
Parameters

Each of the relevant parameters for the Event Processor Wizard 'Configure Processing Plugin' step are described below. Any additional wizard parameters with importance for this plugin are also included in this topic.

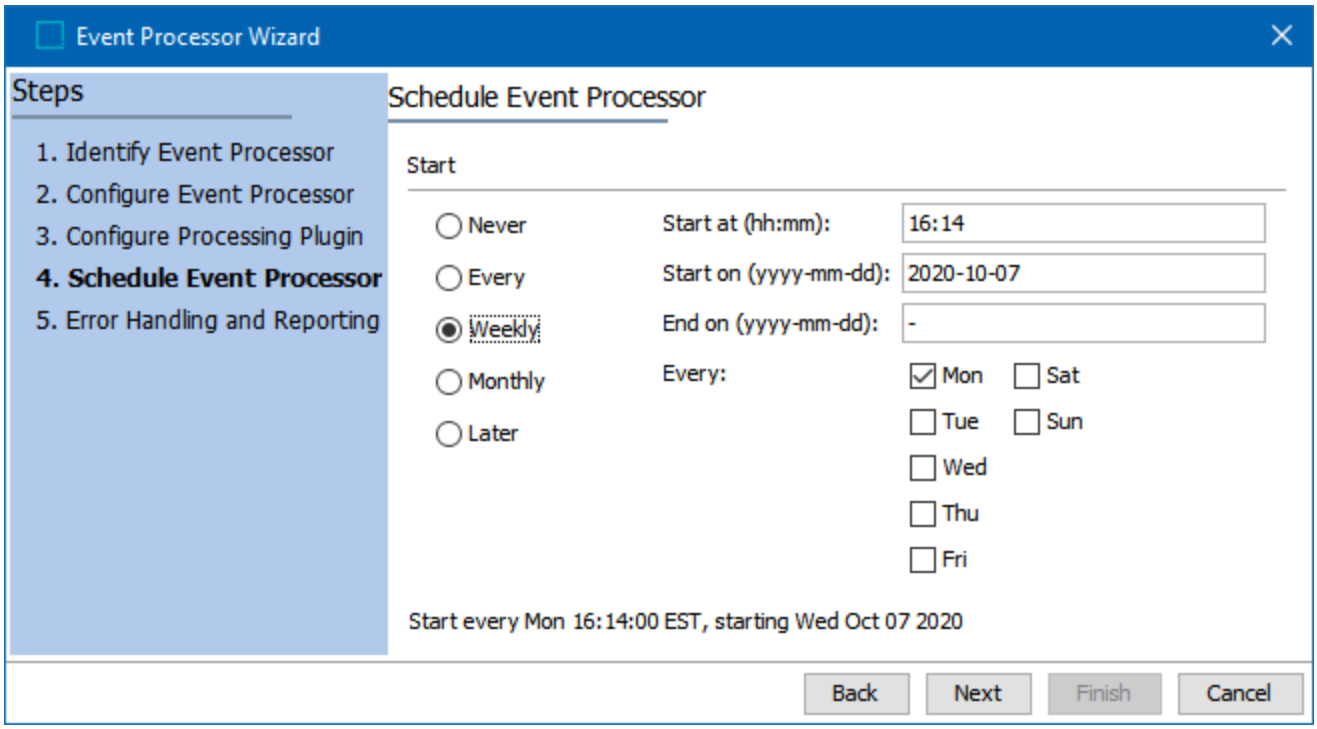


1. On the 'Configure Event Processor' step, for the **Select Processor** parameter, choose the **Source Record Data Management – Historical Values Cleanup** processing plugin to display the expected parameters on the 'Configure Processing Plugin' step.
2. Click the **Next** button to display the wizard step 'Configure Processing Plugin' and set the following parameters:
   - Days to keep historical values – The number of days historical values are kept before purging
   - Max number of historical values to keep – The number of values, changing over time, to keep

> **Note:** The data purge occurs if just one of the two configuration criteria are met. To disable the purging of historical values and keep the disk usage optimization functionality, set both configuration values to a very high number.



3. Click the **Next** button to display the wizard step 'Schedule Event Processor' and schedule as required.



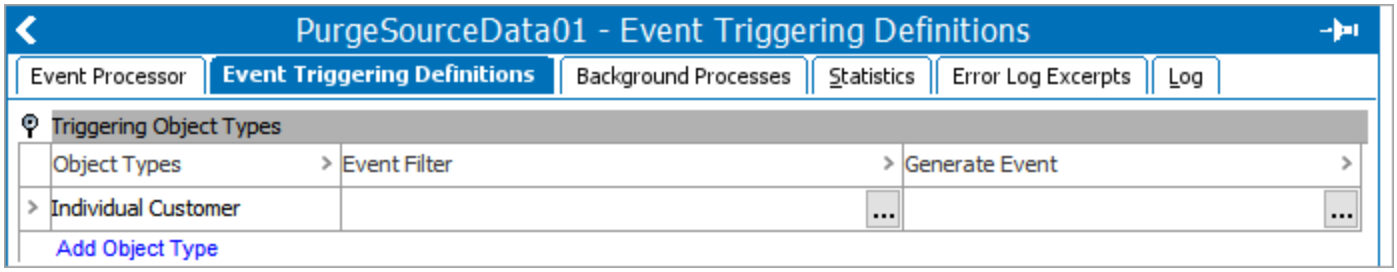
4. Click the **Next** button to display the wizard step 'Error Handling and Reporting' and configure as required.
5. Click the **Finish** button.

Event Triggers

For the event processor to function as scheduled, the Event Triggering Definitions tab must be configured correctly.

By default, events are triggered on the Approved workspace. Derived event functionality is available for triggering events prior to approval, as defined in the Derived Events topic in the System Setup documentation.

- **Triggering Object Types** - set at least one valid Golden Record object types.



Event Triggering Definitions are the same in Event Processors as they are in an OIEP. For details about the triggers, refer to the **OIEP - Event-Based - Event Triggering Definitions Tab** in the **Data Exchange** documentation.

Initial Setup for Event Processors

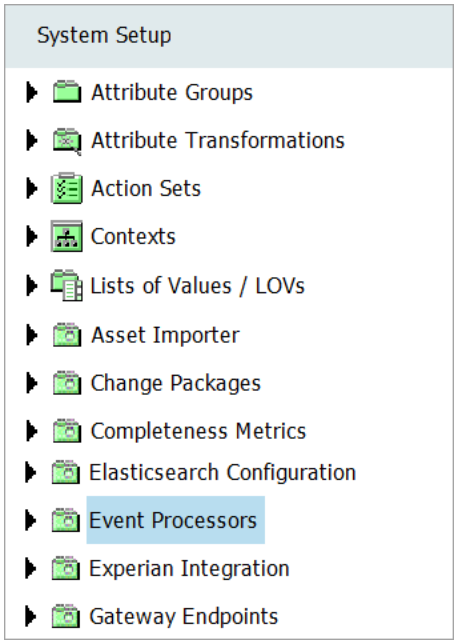
Before you can create an event processor, the following one-time setup steps must be completed. Details for each of these are provided below.

1. Create setup group type for event processors.
2. Link event processor object types to setup group types.
3. Create an event processor setup group.
4. Configure action sets and privileges.

Prerequisites

Only users with the relevant privileges can view or maintain event processors. For detailed information, refer to the Action Sets and Users and Groups topics.

Review your System Setup tab to determine if an event processor node already exists. The name of the node on your system is not required to match the one in the image below.

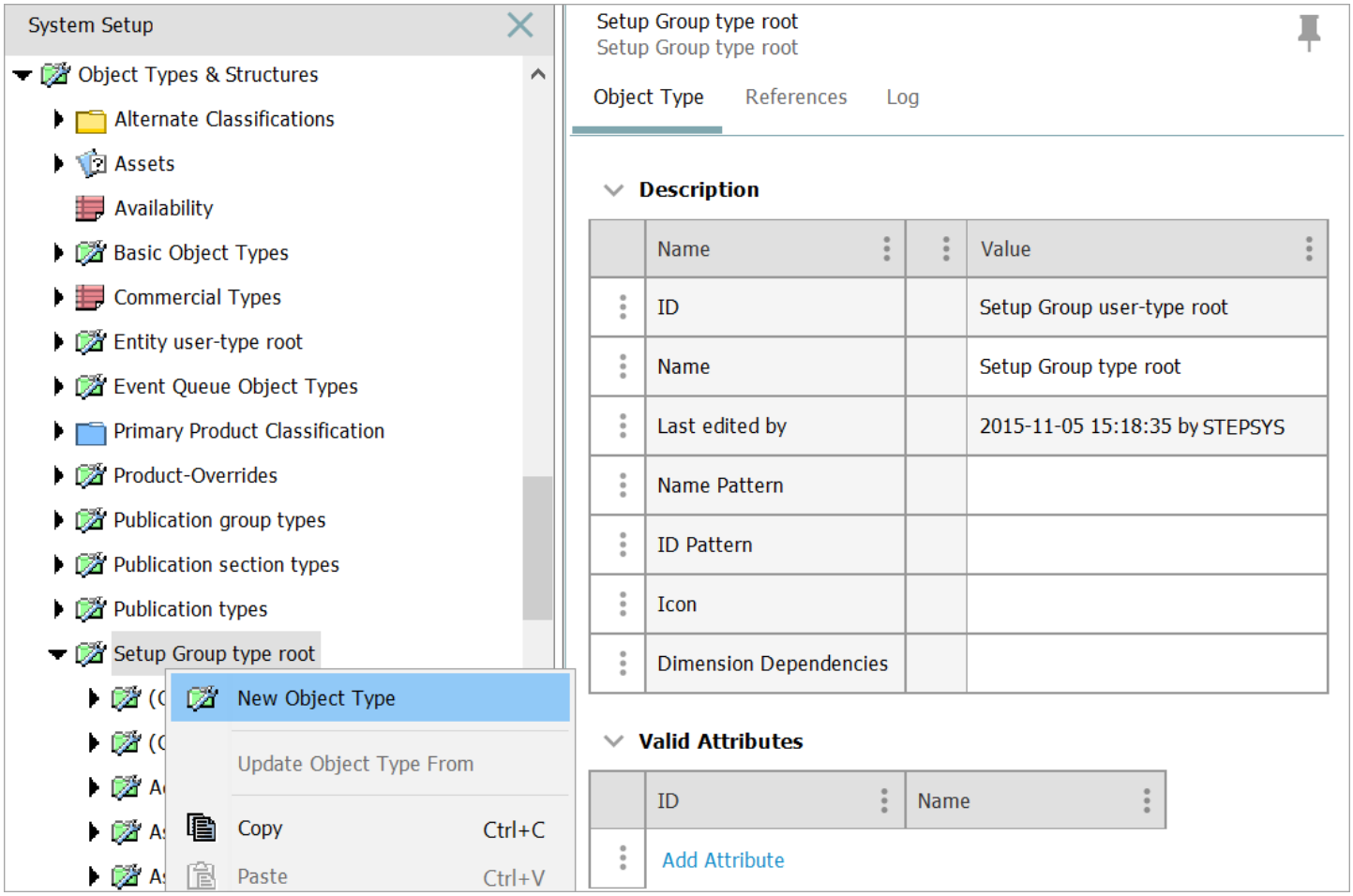


Once the setup has been completed, the steps in this section are only needed if additional levels of organization are desired.

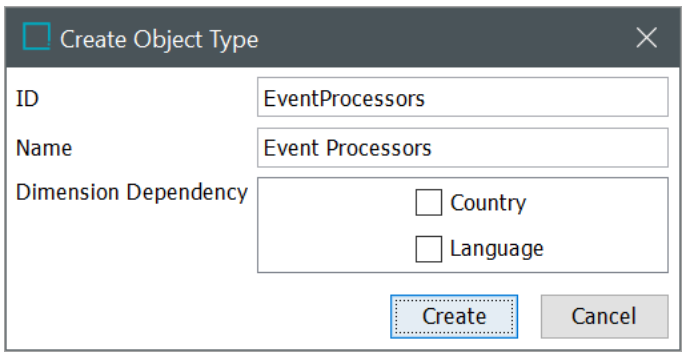
Create Setup Group Type for Event Processors

An event processor setup group type defines the structure and allowed locations of an Event Processor.

1. Go to System Setup, open the Object Types & Structures node, and select **Setup Group type root**.
2. Right-click **Setup Group type root**, and the New Object Type option displays.

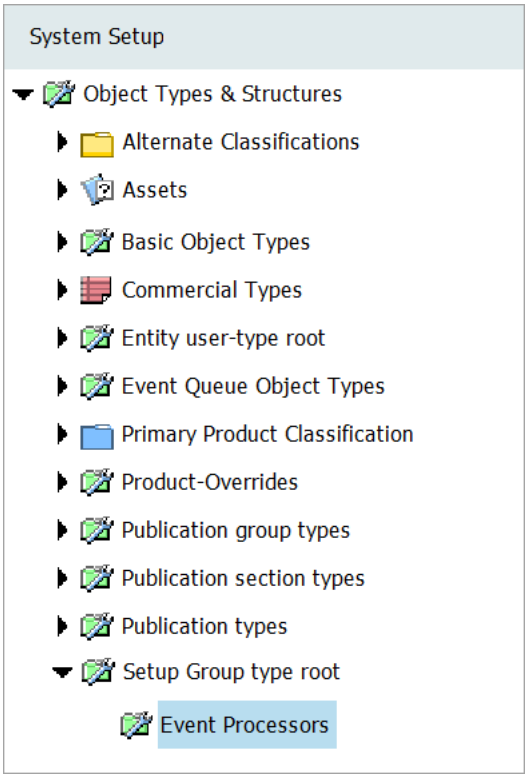


3. Click **New Object Type**, and the Create Object Type dialog will display.

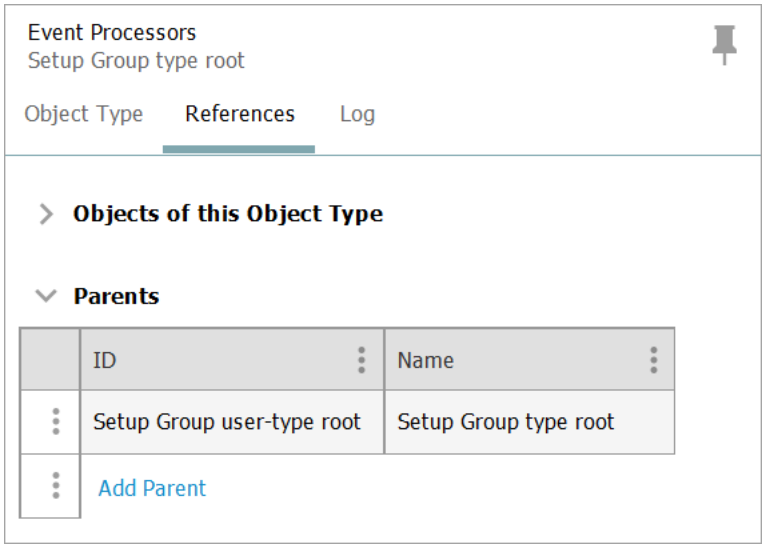


4. Enter an **ID**.
5. Enter a **Name**.
6. Select any required **Dimension Dependency**.
7. Click **Create.**

The Create Object Type dialog will close, and the newly created object type for the event processors will display beneath the Setup Group type root.



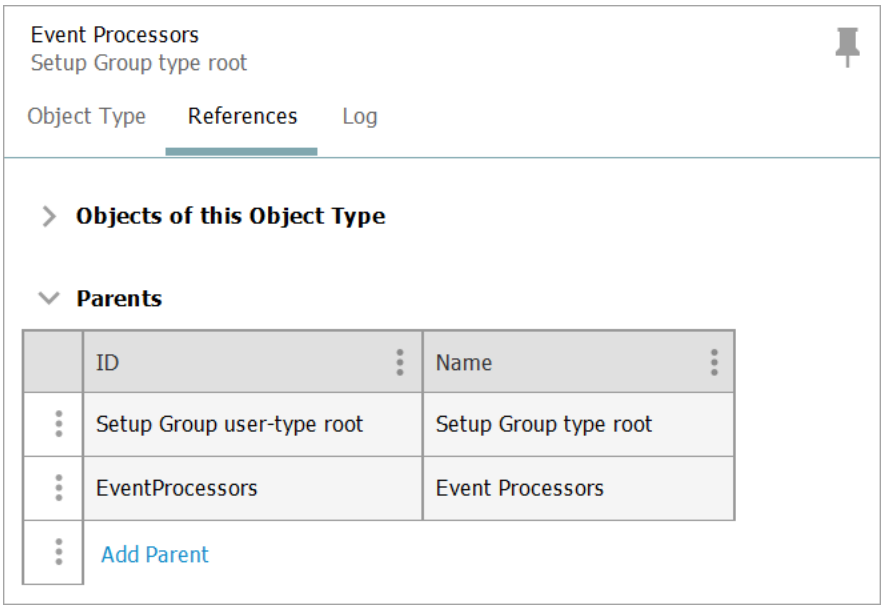
8. Select the newly added Setup Group type and click the References tab, then open the Parents flipper.



Important: By default, the Setup Group type root is listed as the parent. Optionally, add the newly created setup group type as a parent of itself so that additional event processors group types can be added below the main level.

9. Click **Add Parent**, and the Select New parent dialog will display.
10. Browse or search to select **the relevant setup group type**.
11. Click the **Select** button.

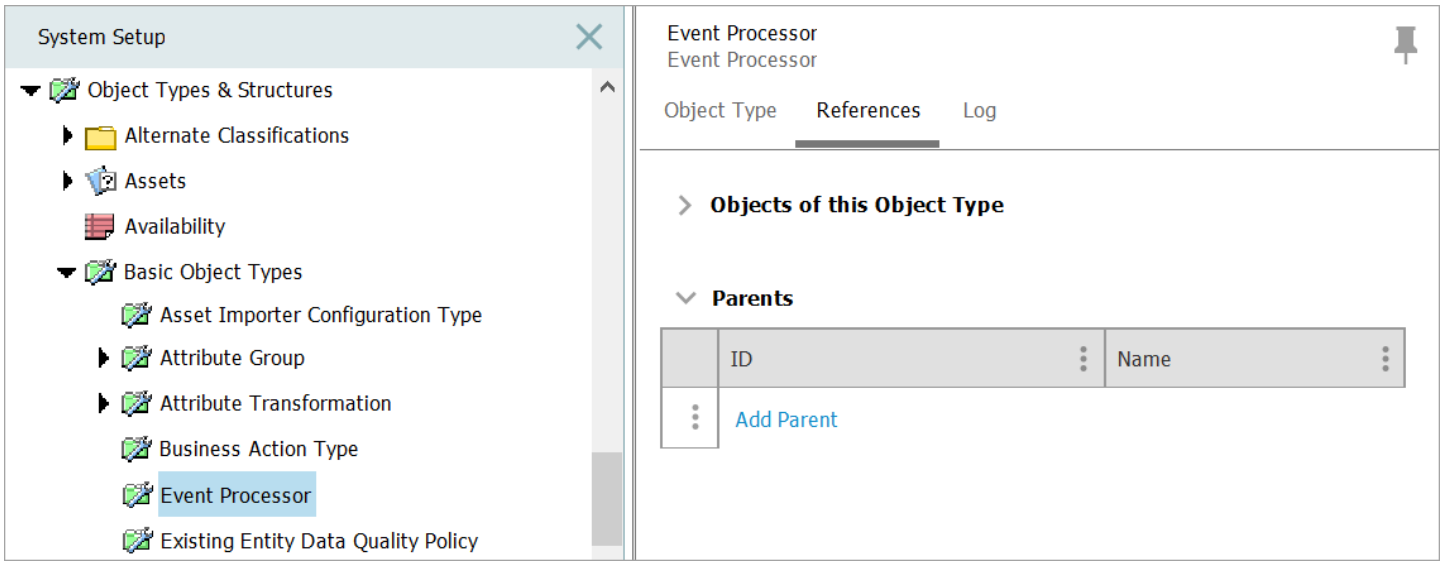
    The dialog will close, and the newly created setup group type (i.e., Event Processors) will be listed as a parent along with the Setup group user-type root.



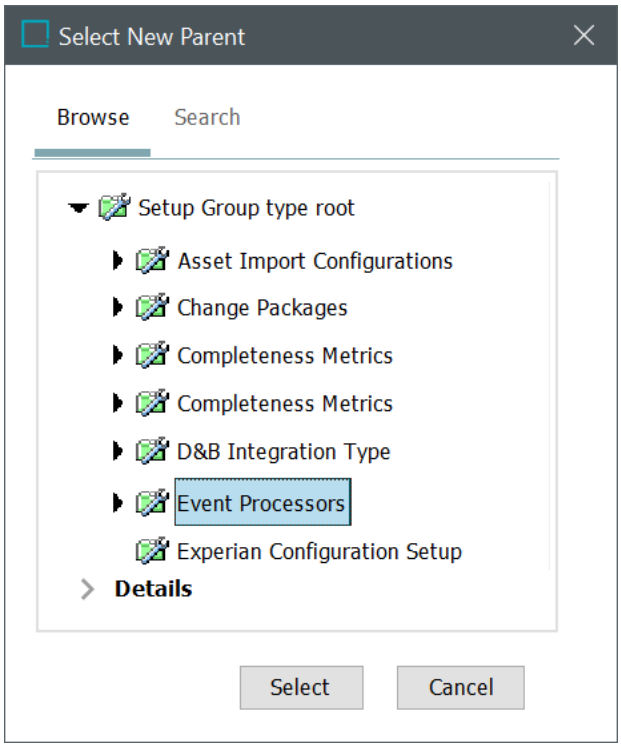
Link Event Processor Object Types to Setup Group Types

Linking determines the object types that can be displayed at each level of a hierarchy.

1. Go to System Setup and open the Object Types & Structures node, then click **Basic Object Types**.
2. Select **your event processor object type** to display the editor.



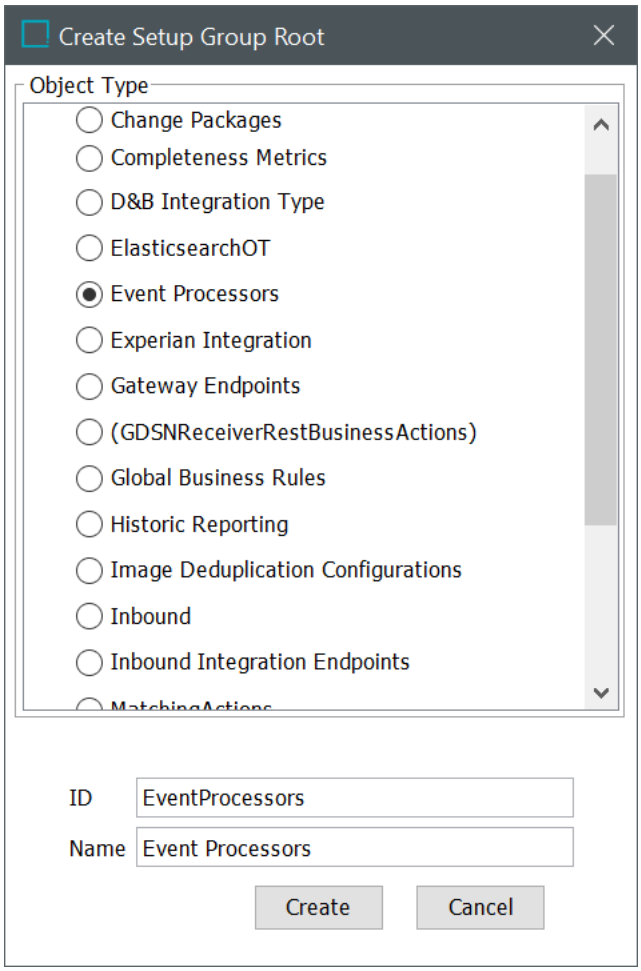
3. Click the **References** tab.
4. Open the **Parents** flipper.
5. Click the **Add Parent** link, and the Select New Parent dialog will display.
6. Browse or search to select **the relevant setup group type**.
7. Click the **Select** button.



Create an Event Processor Setup Group

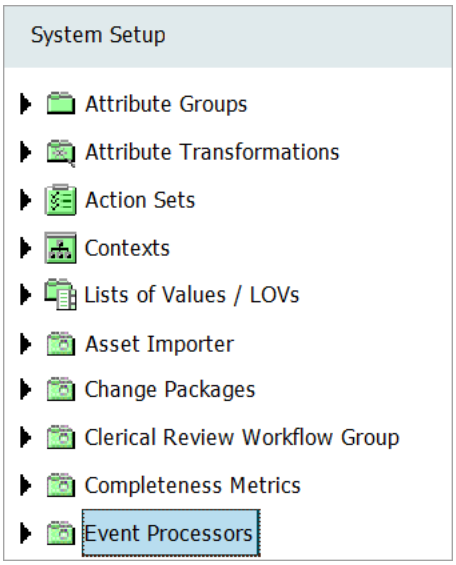
Creating a setup group allows your event processor setup group type to appear as a node in the System Setup hierarchy.

1. Go to System Setup and select **any object in the hierarchy**.
2. On the menu bar, select the **Maintain** menu, click **Insert** and click **Setup Group Root**, and the Create Setup Group Root dialog displays.



3. Select **your event processors object type**.
4. Enter an **ID**.
5. Enter a **Name**.
6. Click **Create**.

   The setup group is created and appears as a node in the System Setup hierarchy.



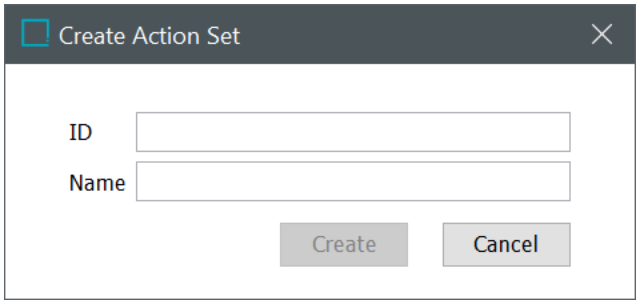
Configure Action Sets and Privileges

When you configure privileges, you first specify one or more action sets that apply to event processors, and then you associate the action sets with one or more users or user groups. The action set defines actions the members of the user group are allowed to perform on the event processors.

In some situations, it can be useful to create an event processor specific action set. For example, if you have users who are allowed to maintain event processors and users who are only allowed to view event processors.

Create Event Processor Action Sets

1. Go to System Setup > Action Sets > select **Setup Actions**.
2. Right-click **Setup Actions**.
3. Click **New Action Set**, and the Create Action Set dialog will display.
4. Enter an **ID**.
5. Enter a **Name**.
6. Click **Create**.



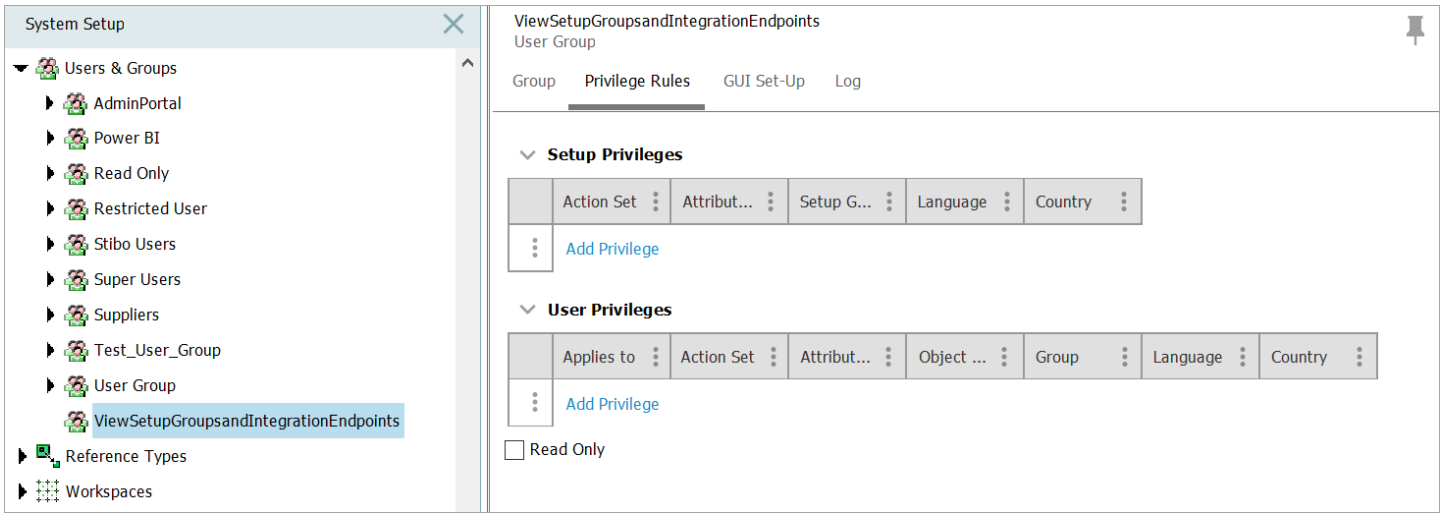
7. Go to the new Action Set and on the Action Set tab click **Add Action**, and the Select Action dialog will display.
8. Select **one or more of the listed actions** that are relevant for event processors that you want to be part of this action set.
9. Click the **Select** button.

   Some commonly used Actions are described below:

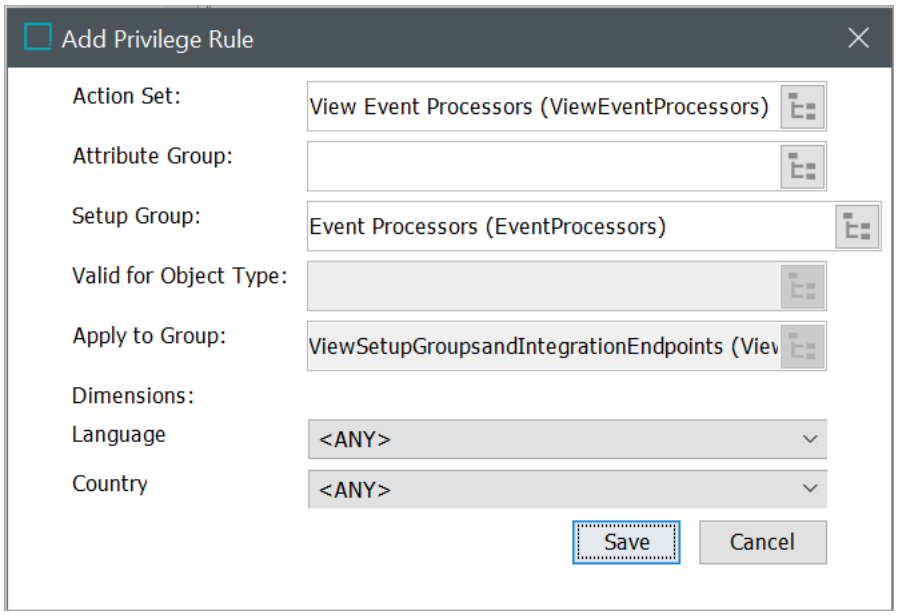
   - **Maintain Event Processor** - Users can create, delete, and configure event processors. Users can also use the cut, copy, and paste actions.
   - **Maintain Setup Group** - Users can create and delete setup groups. User can also use the cut, copy, and paste actions.
   - **View Event Processor** - Users view event processors defined in STEP.
   - **View Setup Group** - Users can view setup groups.

Configure Event Processor Privileges

1. Go to System Setup, open the Users & Groups node, and select **the relevant user group** that will have the new event processor action(s).
2. Click the **Privilege Rules** tab.



3. Under the Setup Privileges flipper, click the **Add Privilege** link to display the Add Privilege Rule dialog.



4. In Action Set, click the ellipsis button (...), and then select **the relevant event processor action set**.
5. In Setup Group, click the ellipsis button (...), and then select **the relevant event processor setup group**.
6. Click **Save**.

   For more information on privileges, refer to the Adding User Privileges for a Group topic and for action sets refer to the Action Sets topic.

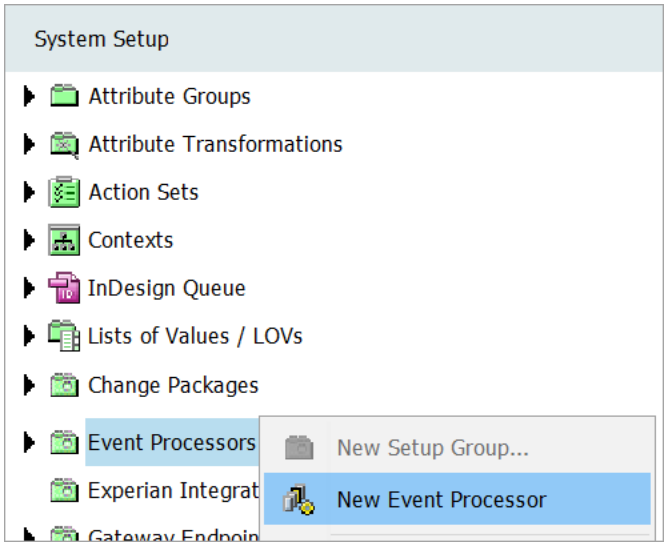
Creating an Event Processor

Prior to creating an event processor, the one-time setup tasks (as described in the Initial Setup for Event Processors topic) must be performed to allow for the creation of event processors. After creating a setup group for event processors, create an event processor to monitor changes in STEP, and utilize the functionality of a specific processor.

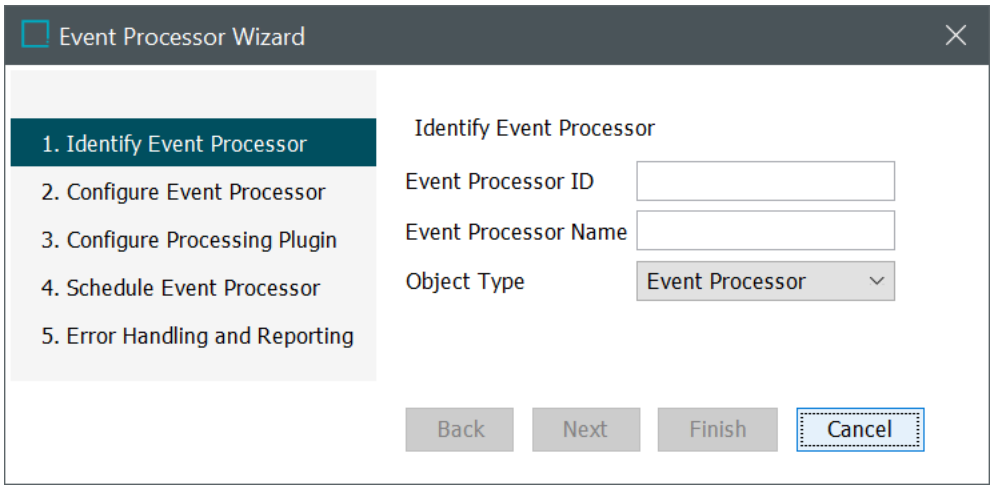
An event processor is created in the workbench System Setup using an event processor wizard. Below are general steps for creating a new event processor. However, the event processor wizard 'Configure Processing Plugin' dialog will vary based upon the processing plugin selected. Information for configuring each of the processing plugins can be found in the Processing Plugins topic.

To create a new event processor:

1. Go to **System Setup**, right-click **your event processors setup group,** and click **New Event Processor.**



2. The Event Processor Wizard displays and involves the following steps:

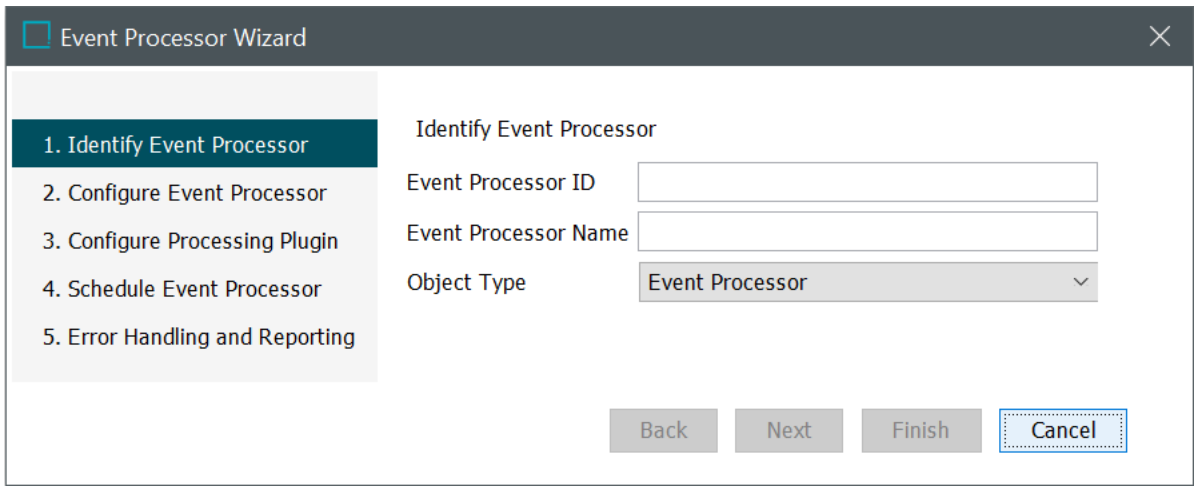


Complete setup requires providing data in the wizard as well as some manual configuration. All setup includes the following sections:

1. In the wizard, specify an ID, name, and object type as described in the EP - Identify Event Processor topic.
2. In the wizard, specify the processing and error handling as described in the EP - Configure Event Processor topic.
3. In the wizard, specify the information specific to the event processor selected in the previous step as described in the topic EP - Configure Processing Plugin topic.
4. In the wizard, specify how often the event processor should start as described in the EP - Schedule Event Processor topic.
5. In the wizard, populate the send report to address parameter as described in the EP - Error Handling and Reporting topic.
6. Confirm / Update triggering definitions as described in the EP - Event Triggering Definitions Tab topic.
7. Set Queue Status Events to 'Read Events' as described in the **Queue Status** section of the EP - Event Processor Tab topic.
8. Enable the event processor as described in the **Enable Event Processor** section of the Running an Event Processor topic.

EP - Identify Event Processor

To complete the Event Processor Wizard Identify Event Processor steps:

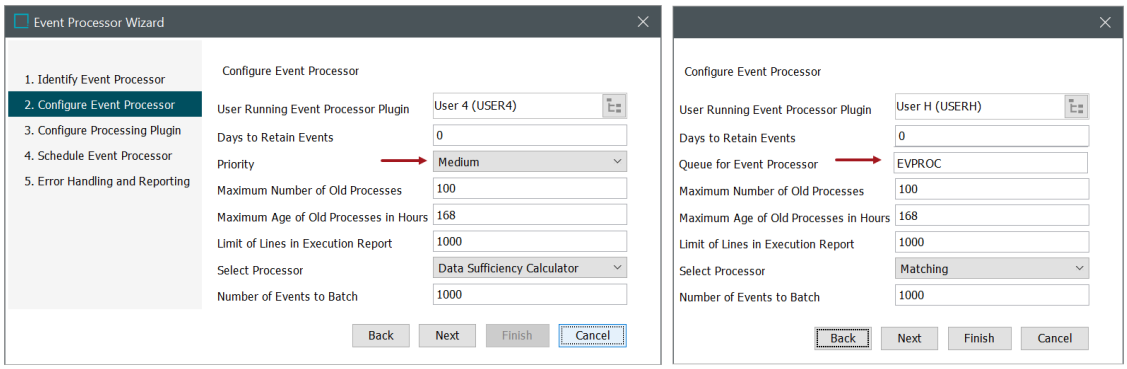


1. Enter an ID without spaces. (IDs should never contain spaces, especially leading or trailing spaces.)
2. Enter a Name for the event processor. The name will be displayed as the name of the background process.
3. Confirm the object type parameter is set to the default event processor object type.
4. Click the **Next** button to display the EP - Configure Event Processor.

EP - Configure Event Processor

Configure the new event processor by populating the available parameters. Common setup is to use the default settings unless there is a valid reason to change them.

For more information on each of the parameters, refer to the Maintaining an Event Processor topic.



1. **User Running Event Processor Plugin:** Click the ellipsis button (...) to search or browse for a user.

   Important: The privileges of the selected user determine which actions the Event processor can perform and what data can be processed. Common setup is to create a special system user for this purpose so that the effects of the event processor are easily identified.

2. **Maximum Age of Old Processes in Hours:** Specify the maximum age of ended processes that the system will keep.

3. **Days to Retain Events**: Optionally enter the number of days to keep events once processed. Common setup is to leave this at 0 since this option is not valid for an event processor; it is available for reprocessing events via an OIEP.

4. **Priority**: When the recommended 'One Queue' BGP execution mechanism is configured, waiting BGPs are prioritized for execution based on the priority setting of the BGP and the created time. Refer to the 'Priority Mechanism' section of the BGP One Queue topic in the System Setup documentation. The legacy 'Queue for event processor' parameter is not available.

   Queue for event processor: Enter the name of a queue to process data from the event processor. This legacy option is not available when the recommended One Queue, priority-based background process (BGP) execution mechanism is configured. (Refer to the BGP One Queue topic in the System Setup documentation.) 'EVPROC' is the default, however entering the name of a new queue will result in the new queue automatically being created upon completion of the wizard.

5. **Maximum Number of Old Processes:** Specify the number of ended processes the system will keep.

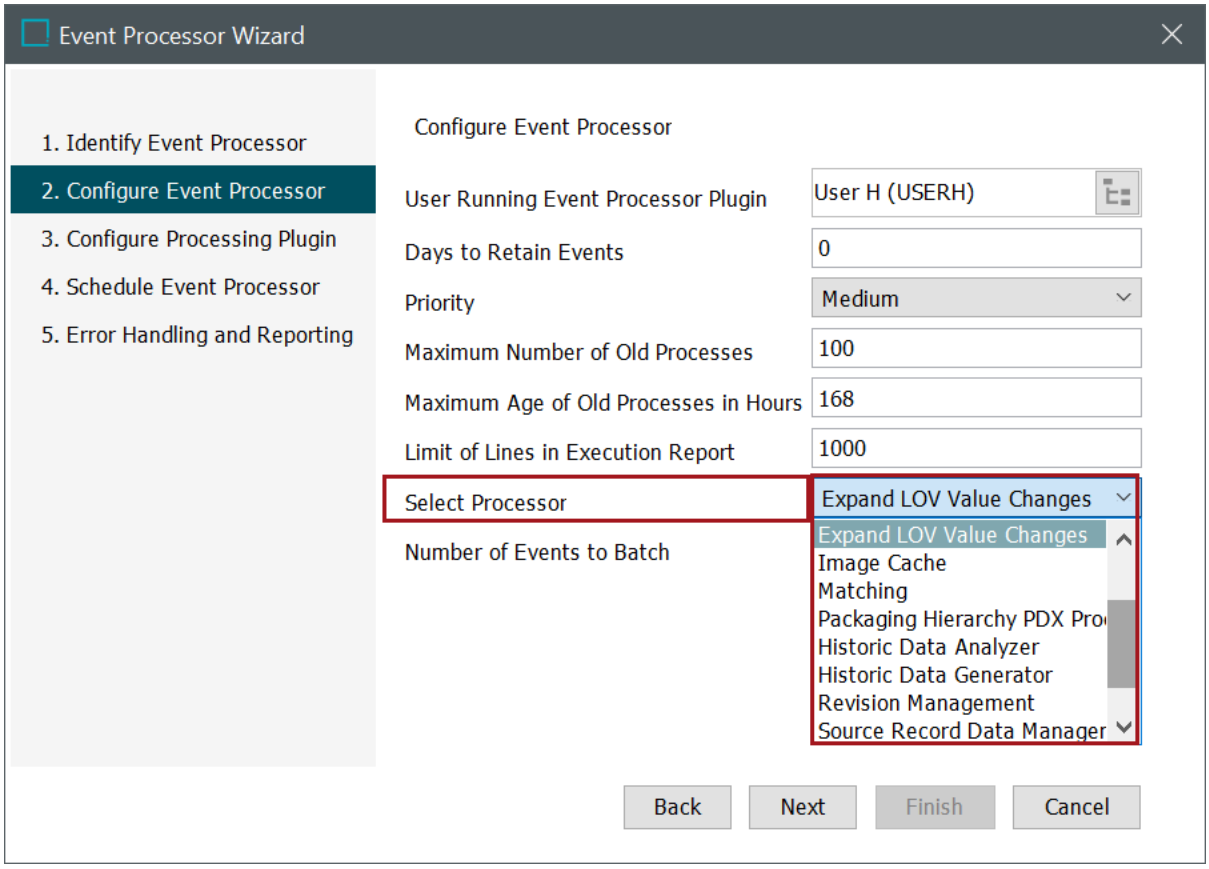
6. **Limit of Lines in Execution Report:** Specify the maximum number of lines to store from the execution report in the log.
7. **Select Processor:** Choose from the available options, For more information, refer to the Processing Plugins topic.
8. **Number of Events to Batch:** Specify the batch size. The events are handled one by one, but will be more effective and ensure increased performance by committing changes in larger batches. If you are experiencing slow processing times, try increasing your batch size.
9. Click the **Next** button to display the wizard step 'Configure Processing Plugin'. Refer to the EP - Configure Processing Plugin topic.

EP - Configure Processing Plugin

When creating an event processor to monitor events within STEP, a processor must be selected and then the processing plugin must be configured.

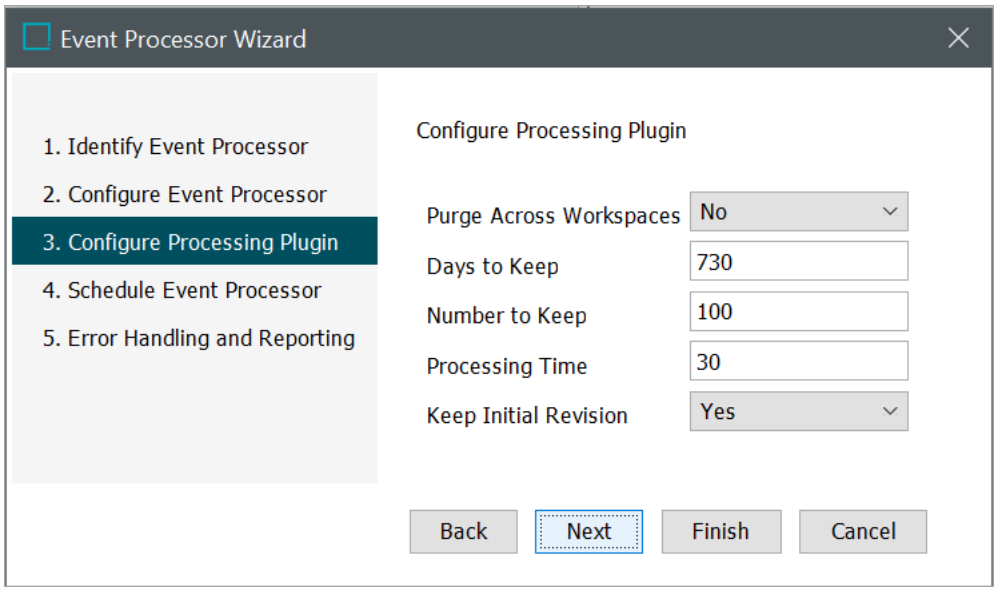
The options / parameters displayed within the Event Processor Wizard step 'Configure Processing Plugin' will vary depending on the processor selected during the previous step, 'Configure Event Processor.'

The screenshot below displays an example of the Event Processor Wizard step where the Select Processor parameter displays a dropdown list of available processors.



Once the Select Processor parameter is populated, and the Next button is clicked, the Event Processor Wizard step 'Configure Processing Plugin' relative to the selected processor will display.

The screenshot below displays an example of the Event Processor Wizard step 'Configure Processing Plugin' that displays when the Revision Management processor is selected.



Information on each of the processors and their respective important parameters and event triggers that should be considered when configuring the event processor and processing plugin can be found below.

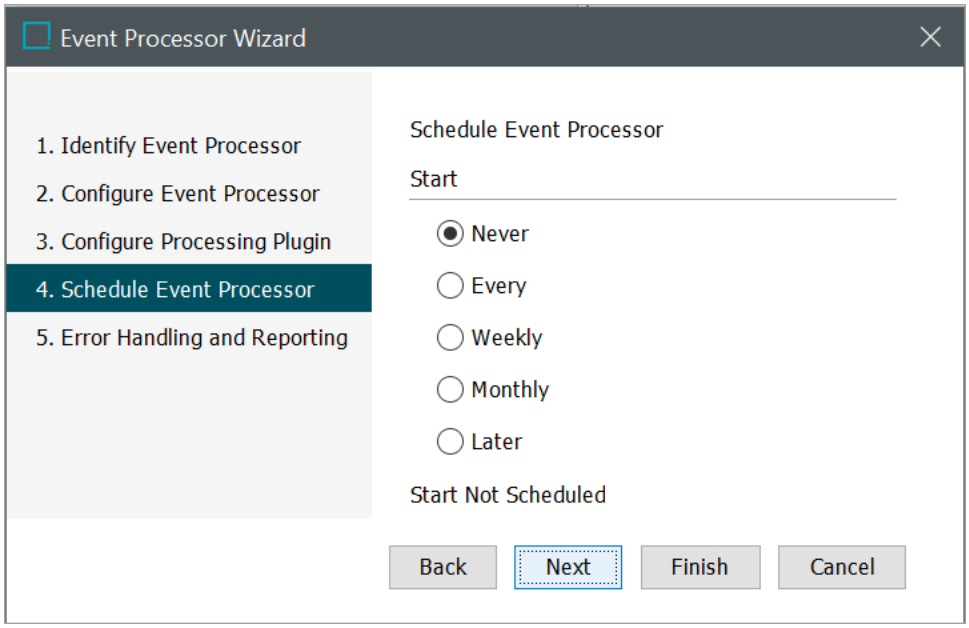
- **Asset Publisher Plugin Parameters and Triggers**
- **Asynchronous Translation Message Processor Processing Plugin Parameters and Triggers**
- **CASS Certification Report Processing Plugin Parameters and Triggers**
- **Data Sufficiency Calculator Processing Plugin Parameters and Triggers**
- **Elasticsearch Indexer Processing Plugin Parameters and Triggers**
- **Execute Business Action Processing Plugin Parameters and Triggers**
- **Execute Business Action for Event Batch Processing Plugin Parameters and Triggers**
- **Expand LOV Value Changes Processing Plugin Parameters and Triggers**
- **Experian Email Validation Processing Plugin Parameters and Triggers**
- **Historic Data Analyzer (within Historic Reporting)**
- **Historic Data Generator (within Historic Reporting)**
- **Image Cache Processing Plugin Parameters and Triggers**
- **Matching Processing Plugin Parameters and Triggers**
- **Revision Management Processing Plugin Parameters and Triggers**
- **Splitting Processor Processing Plugin Parameters and Triggers**

Once any required configurations are made, click the **Next** button to display the wizard step 'Schedule Event Processor.'

Refer to the **EP - Schedule Event Processor** topic.

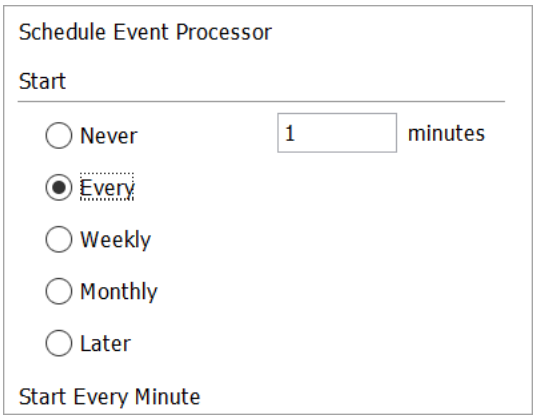
EP - Schedule Event Processor

The wizard step 'Schedule Event Processor' will display with the following Start options.

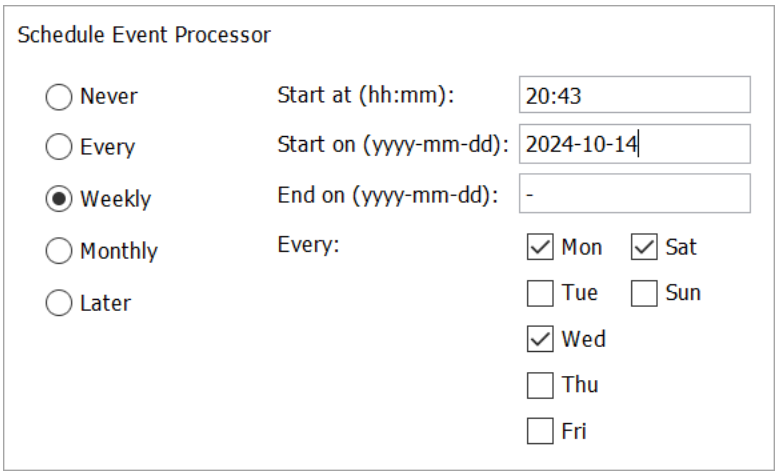


Important: Consider the time zone of the application server compared to that of the workbench (the client) where the schedule is created or viewed. When scheduling a job, the local time zone is displayed in the workbench, but the time zone of the server is used to run the background process. Although displayed, the time zone of the client is not included in the instruction to the server to run the job. This can cause confusion about when the job will run since the scheduled time is not automatically converted to accommodate potential differences in time zones.

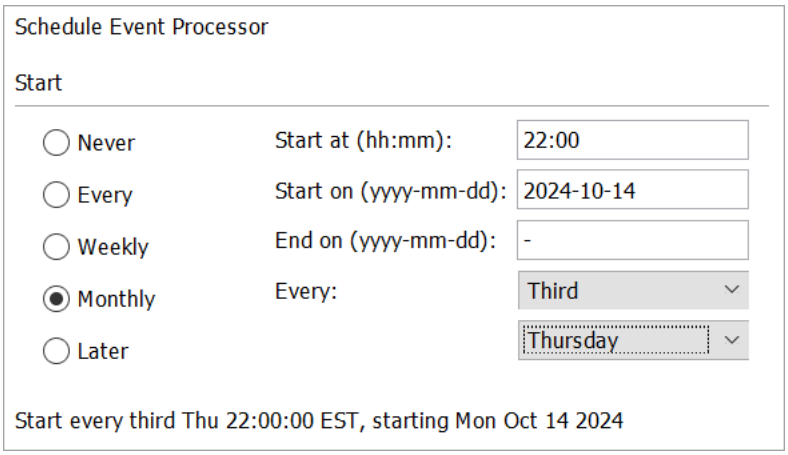
- **Never** - invoke the event processor manually, no additional parameters are required, and no schedule is applied. This is the default setting and should be used while testing your endpoint.
- **Every** - automatically run the event processor repeatedly, every selected number of minutes. One (1) minute is the shortest interval allowed and is closest to real time. Enter the number of minutes in the text box. The selection is summarized at the bottom of the dialog.



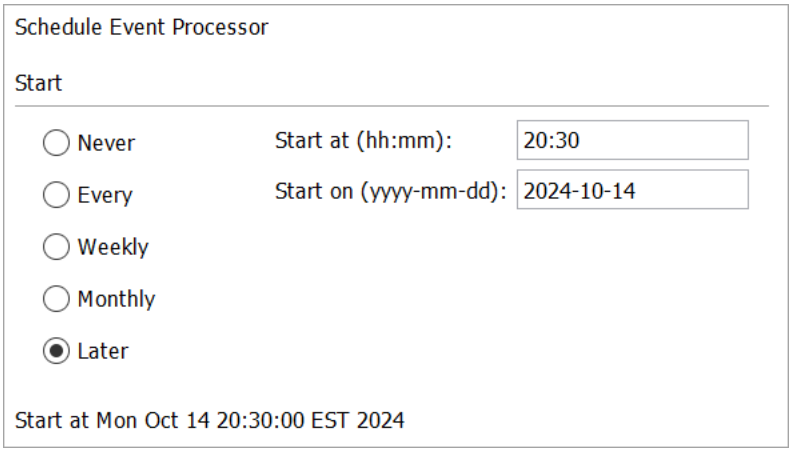
- **Weekly** - automatically run the endpoint repeatedly, based on the selected time, start and end dates, and days of the week. Use this option if a daily schedule is needed. The 'Start at' parameter determines the time of day that the endpoint will run. The 'Start on' parameter determines the date the endpoint will first run, while the 'End on' parameter determines the date of the endpoint's final run. The 'Every' checkboxes determine the days of the week when the endpoint will run. The selections are summarized at the bottom of the dialog.



- **Monthly** - automatically run the event processor repeatedly, once a month, based on the selected time, start and end dates, week of the month, and day of the week. The 'Start at' parameter determines the time of day that the event processor will run. The 'Start on' parameter determines the date the event processor will first run, while the 'End on' parameter determines the date of the event processor's final run. The 'Every' dropdown parameter selections for the week of the month and the day of the week determine when the event processor will run. The selections are summarized at the bottom of the dialog.



- **Later** - automatically run the event processor only once, at the time and date specified. The selections are summarized at the bottom of the dialog.

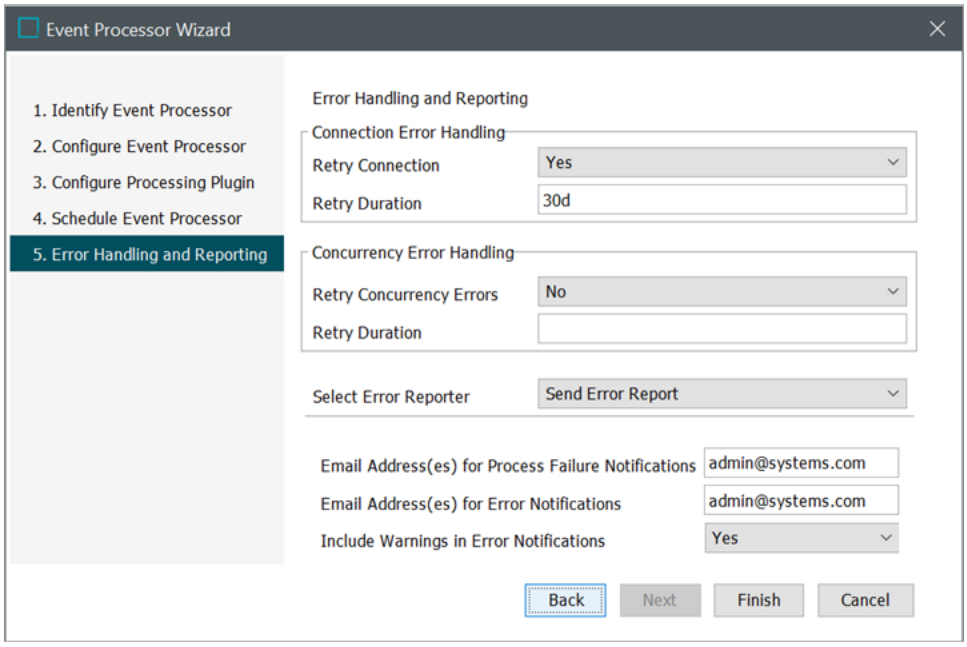


Important: Selecting a 'Schedule Event Processor' setting will **not** enable / start the event processor. Additional steps are required after completing the wizard to enable / start the event processor. The selection within this step can be edited later. Choosing an option will set the schedule for the event processor *after* the additional configuration steps have been completed. Optionally, you can invoke the event processor manually, if you need to immediately publish the events to a downstream system and do not want to wait for the schedule.

Once any required configurations are made, click the **Next** button to display the wizard step 'Error Handling and Reporting.' Refer to the EP - Error Handling and Reporting topic.

EP - Error Handling and Reporting

Configure connection and concurrency retry handling and reporting for errors and warnings.



1. **Connection Error Handling**: Allows automated reconnection attempts when the external system is unavailable. For example, on EPs where external connections are used, if the target system is offline or is temporarily timed out due to too many requests, an error message is logged to the Execution Report. Refer to the **Automated Retries** section below for more information.

   - **Retry Connection**: Set to 'Yes' to enable automated connection error retries. A 'No' setting requires manually restarting the EP if the connection fails.

     Note: Authentication-related connection errors are not retried, and the EP fails immediately.

   - **Retry Duration**: Set the time frame during which retrying should continue. Valid settings are an integer plus one of the following time indicators: s (seconds), m (minutes), h (hours), and d (days). For example, 45m indicates that connection retries will continue for 45 minutes, during with time, the EP shows a Failed (retrying) state. Multiple integers with time units in order of size may also be used. For example, 1h45m30s indicates that connection retries will continue for 1 hour, 45 minutes and 30 seconds. During the wait time, other processes can run as the system has available resources. When the 'Retry Duration' expires, if the connection cannot be re-established, the EP fails, and email alerts are distributed based on the 'Select Error Reporter' settings.

2. **Concurrency Error Handling**: Allows automatic retries of database transactions encountering optimistic locking (concurrency) errors. For example, concurrency errors can occur when an event processor attempts to commit a transaction, but the object is already being modified by another user or process. These typically occur when there is a high level of activity on the system and/or long-running business actions. Refer to the **Automated Retries** section below for more information.

   - **Retry Concurrency Error**: A 'No' setting requires manually restarting the EP if optimistic locking errors occur. Before setting to 'Yes' to enable automated concurrency retries, review any issues reported in the 'Optimistic Lock Recovery' healthcheck (in the **Healthcheck Test Index** topic in the Administration Portal documentation) to determine if business rule logic or other changes to the configuration can be improved to reduce or eliminate the errors.

   - **Retry Duration**: Set the time frame during which retrying should continue. During the wait time, other processes can run as the system has available resources. When the 'Retry Duration' expires, if the issue is not resolved, the EP fails, and email alerts are distributed based on the 'Select Error Reporter' settings.

3. **Select Error Handling and Reporting:** Allows configuration of email addresses for notifications on errors and warnings, based on the selection from the dropdown.

   - **Do nothing**: No email alerts are sent for errors or warnings.

   - **Send Error Report**: Use the following parameters to add a relevant email address (or use a semi-colon to add more than one email address) or group email that can be used to receive error reports. When emailing multiple accounts, consider creating a group email and use that email address in the 'Send report to address' parameter instead of adding multiple email addresses for individuals. With this configuration, a single email group can be updated as the group members change while the 'Select Error Reporter' parameter remains unchanged.

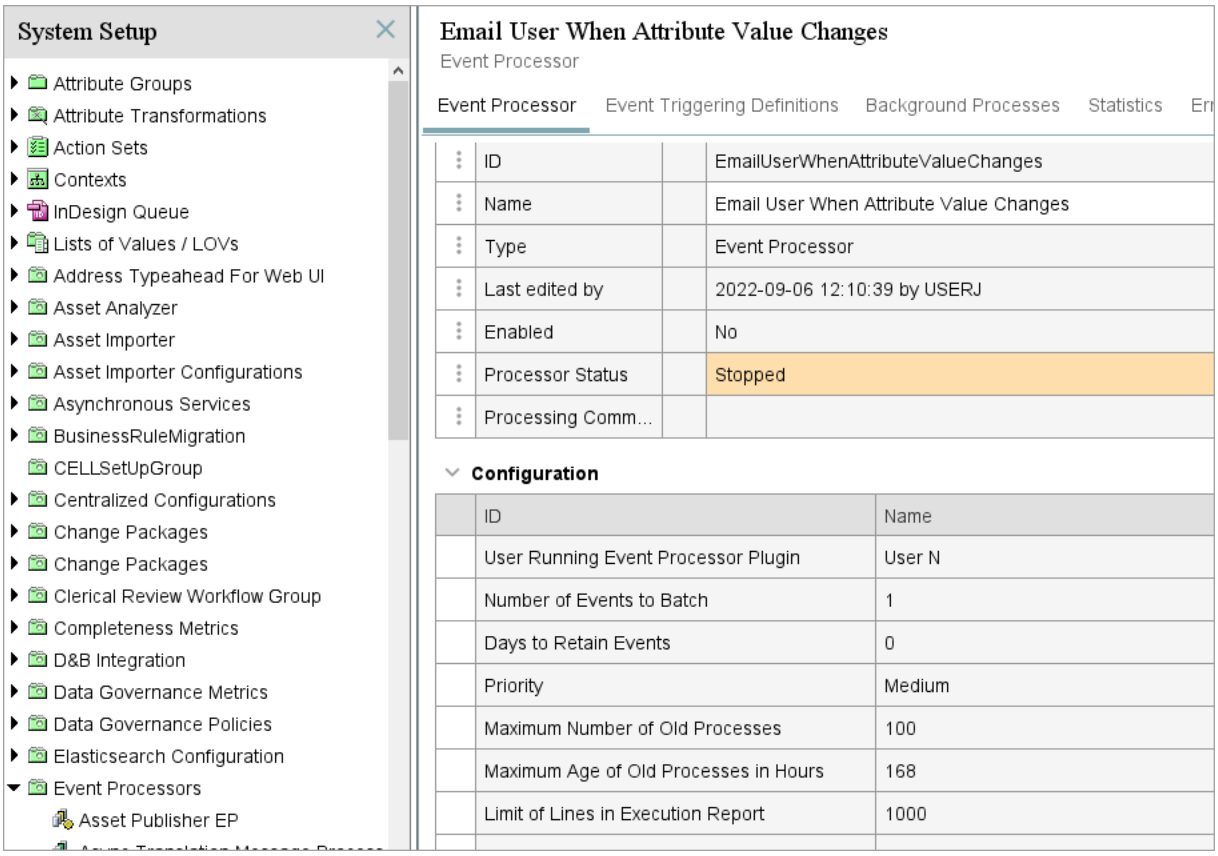
     Email Address(es) for Process Failure Notifications: Sends an alert email to the listed address(es) when a fatal processing error occurs that puts the EP in a failed state.

     Email Address(es) for Error Notifications: Sends an alert email to the listed address(es) when data warnings and/or errors occur that do not cause the process to stop.

     Include Warnings in Error Notifications: A 'Yes' setting means alert emails include information on both warnings and errors. A 'No' setting means only error information is addressed in Error Notification emails.

     > **Note:** To send email, the SMTP server must be configured on the application server. For information on configuring email from STEP, refer to the Email from STEP topic in the Resource Materials online help documentation.

4. Click the **Finish** button to complete the wizard. The workbench image below displays the event processor editor for the newly created event processor.

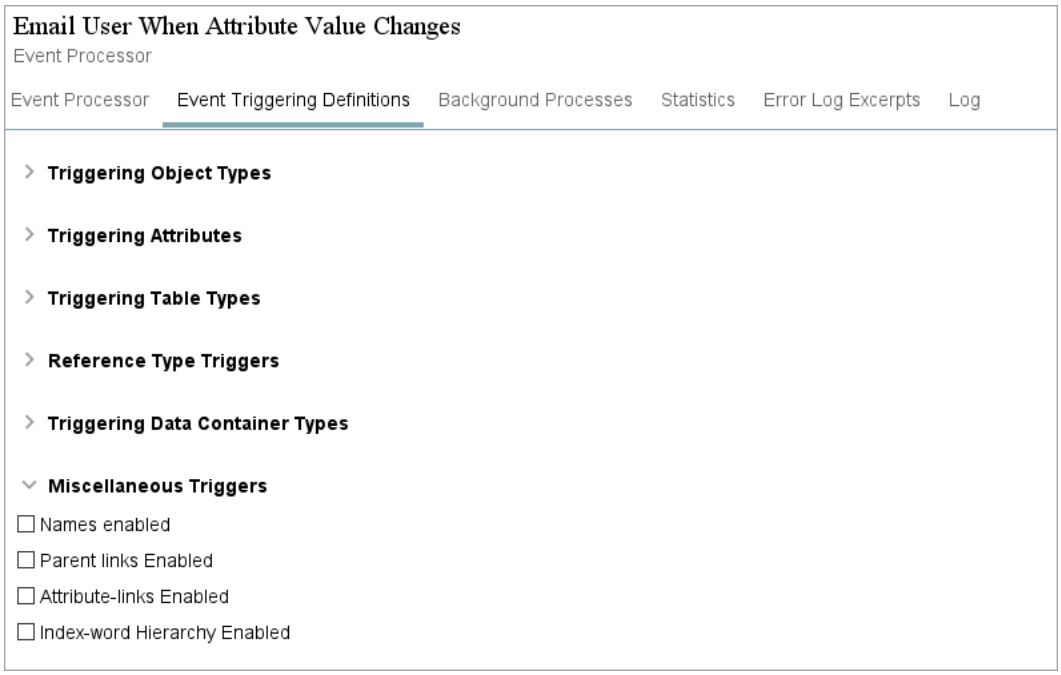


Regardless of the selections made in the wizard, new event processors are created with the following 'Event Processor' tab parameter settings:

- **Enabled:** No
- **Processor Status:** Stopped
- **Queue Status:** Discard Events

Also, all event processors are created with only the 'Miscellaneous Triggers' flipper settings enabled on the 'Event Triggering Definitions' tab:

- Names enabled
- Parent links enabled
- Attribute-links enabled
- Index-word Hierarchy enabled

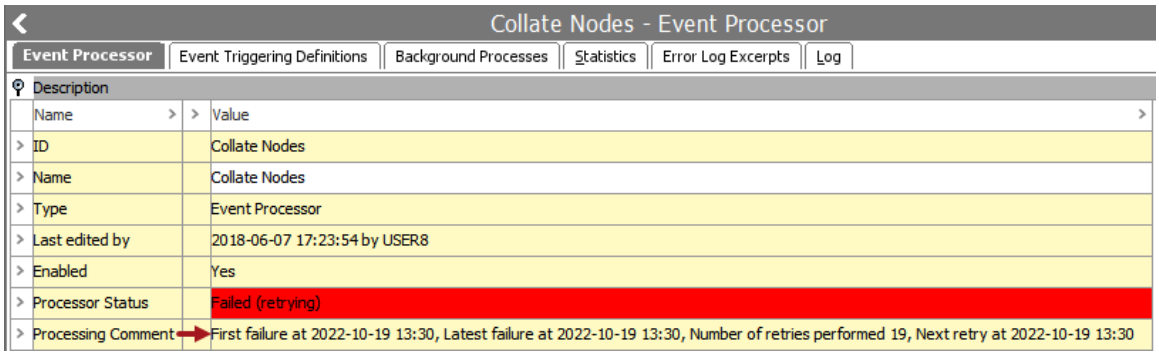


Important: Before the event processor can be used, the event triggering definitions must be set, refer to the EP - Event Triggering Definitions Tab topic.

Automated Retries

The 'Connection Error Handling' or the 'Concurrency Error Handling' options avoid processing interruptions and degraded performance. When an error handling option is enabled, the event processor does not fail immediately. Instead, connection or concurrency errors send the event processor to the 'Failed (retrying)' state. Increasingly longer wait times between retries during the Retry Duration period improves the likelihood that the issue can be resolved without manual interaction. If the error that caused the event processor to go in a 'Failed (retrying)' state is not resolved during the Retry Duration period then the event processor will do nothing and eventually go into a 'Failed' state. The user should resume the event processor once the issue is fixed and the event processor will go into a 'Running' state again.

On the 'Event Processor' tab of the EP editor, the 'Processing Comment' parameter (shown below) displays details about the 'Failed (retrying)' next wait time. For more information on Processor Status options, refer to the Running an Event Processor topic.


Collate Nodes - Event Processor
Event Processor
Event Triggering Definitions
Background Processes
Statistics
Error Log Excerpts
Log
Description
Name
Value
ID
Collate Nodes
Name
Collate Nodes
Type
Event Processor
Last edited by
2018-06-07 17:23:54 by USER8
Enabled
Yes
Processor Status
Failed (retrying)
Processing Comment
First failure at 2022-10-19 13:30, Latest failure at 2022-10-19 13:30, Number of retries performed 19, Next retry at 2022-10-19 13:30

Running an Event Processor

After configuring an event processor (EP), it must be enabled before it can run on schedule or be invoked manually. EPs run in optimistic mode, meaning that save-points will not be created, thus decreasing execution time and increasing performance.

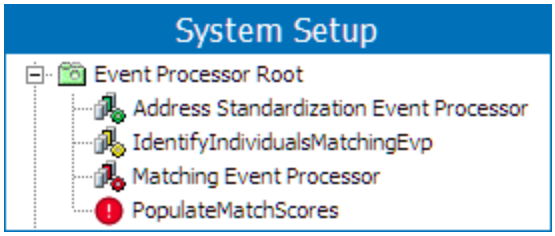
The status of an EP is very important. This section addresses the different EP status options and how to enable, invoke, or disable an EP.

Event Processor Status Options

An event processor (EP) can be in one of these statuses: Stopped, Running, Failed (retrying), and Failed. Each EP status is described in the table below.

Icon	Enabled	Processor Status	Description
	No	Stopped	The EP has not yet been enabled or has been disabled by a user.
	Yes	Running	The EP is running.
	Yes	Failed (retrying)	The EP is running and is attempting to recover from a connection or concurrency error. The background process (BGP) for an EP in this state is in a Waiting state when the wait time begins before the next attempt to retry processing. When the wait time expires, the BGP state changes to running and processing is reattempted. For more information, refer to the **Fail and Retry Exception** section below.
	Yes	Failed	The EP has stopped because of a failure.

In the following example, a list of EPs is displayed within the Workbench on System Setup in the Event Processors Root node. Using the EP status icons makes it easy to decipher the status of each of the EPs.



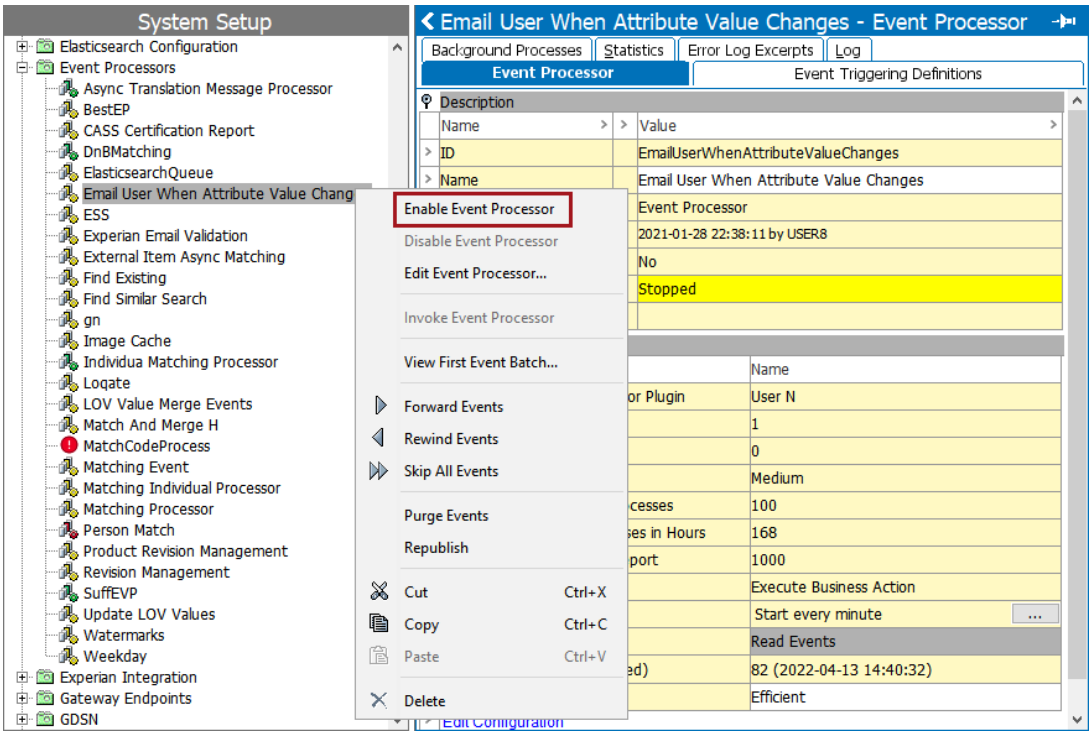
The EP status information is also displayed in text on the Event Processor tab of the editor. For more information refer to the **EP - Event Processor Tab** documentation.

When configuring and managing EPs, it is important to monitor their status, because an EP only functions when it is enabled.

Enable Event Processor

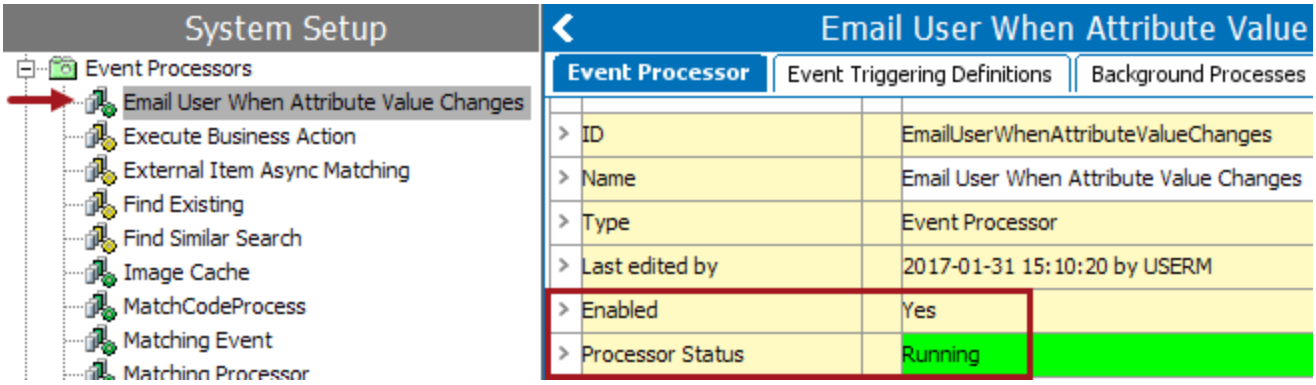
When an EP is created, it is in a stopped or disabled status, and must be enabled to be used. The steps below describe how to enable an EP when it has been disabled or stopped because of failure.

1. Go to System Setup, expand the Setup Group created for event processors, and select the **Event Processor you want to enable.**
2. Right-click the EP and click **Enable Event Processor**.



3. Confirm the EP is now enabled by viewing the:
   - Enabled icon next to the specific EP.
   - Enabled parameter is set to 'Yes' within the EP editor.

- Processor Status parameter is set to 'Running', and highlighted green within the EP editor.

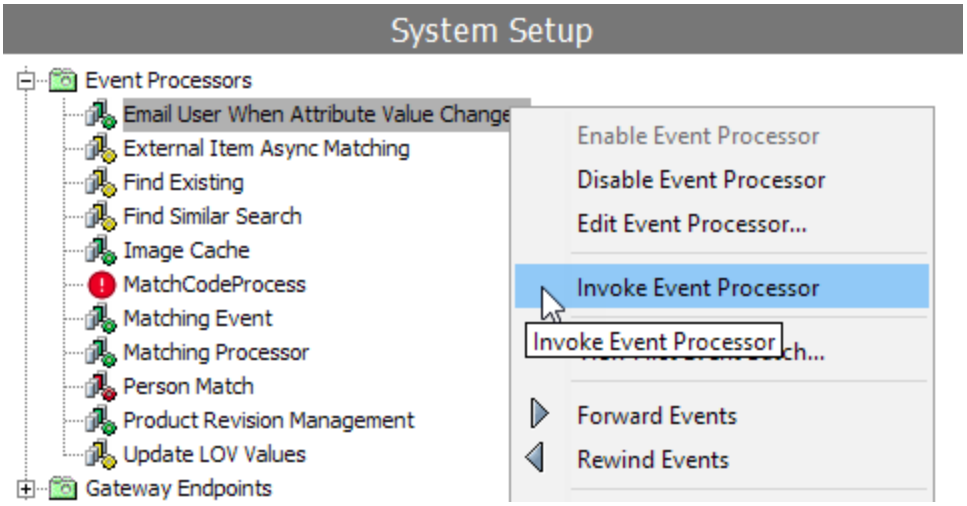


Important: If you are ready for the processor to apply the actions based on the event triggers, ensure the Queue Status parameter is also set to Read Events, otherwise the enabled EP will not queue events. For more information refer to the **Queue Status** section of the **EP - Event Processor Tab** topic.

Invoke Event Processor

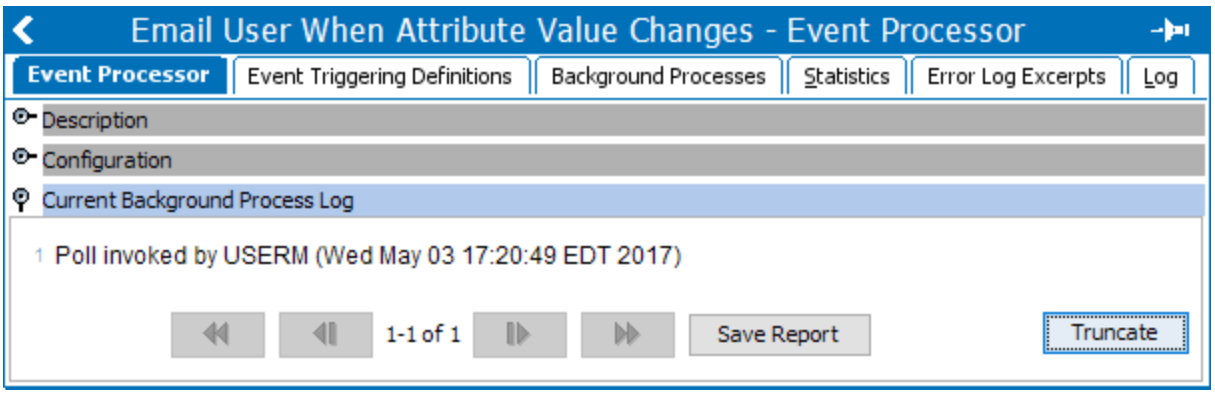
An EP can only be invoked if its status is Enabled. The steps to invoke an EP are below.

1. On the System Setup tab, select the EP to be invoked.
2. Right-click to display and select the **Invoke Event Processor** option.



3. If successful, the Current Background Process Log will display the following 'Poll invoked by [user name]

(Date and Time Stamp)'.



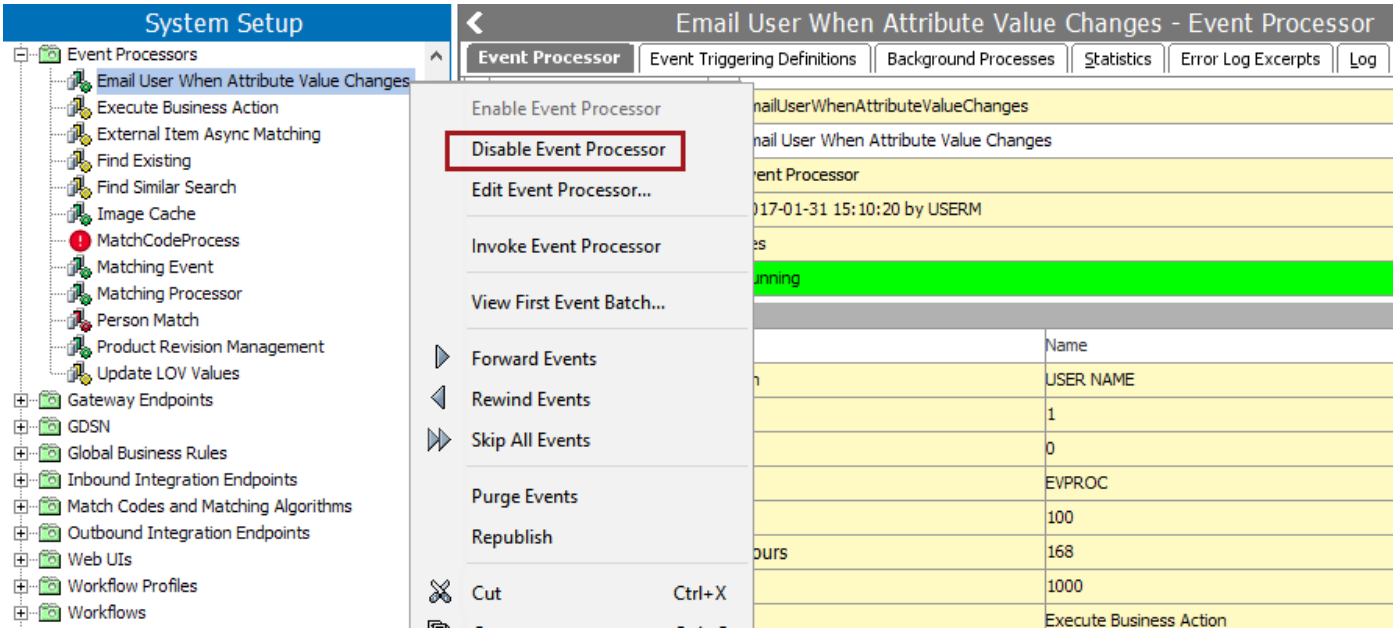
Disable Event Processor

If an EP is no longer necessary or needs to be stopped, a user can disable it, and if necessary, enable it later. The option to disable an EP is only available when an EP is in the enabled status. If the EP is no longer necessary, the Queue Status should also be set to Discard Events to prevent excessive events that can affect system performance.

The steps below describe how to disable an EP in an enabled status.

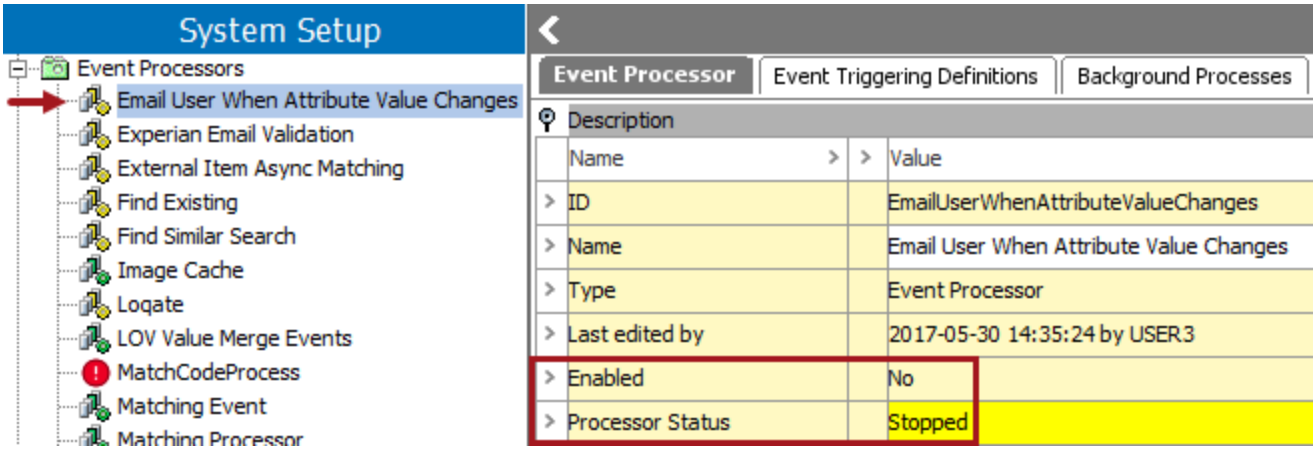
1. Go to System Setup, expand the Setup Group created for Event processors, and select the **Event Processor you want to enable.**

2. Right-click the EP and click **Disable Event Processor**.



3. Confirm the EP is now disabled by viewing the:

- Disabled icon next to the specific EP.
- Enabled parameter within the EP editor is set to 'No.'
- Processor Status parameter within the EP editor is set to 'Stopped,' and highlighted yellow.



Generating Events from Main

By default, an approval action triggers an event for workspace revisable objects, meaning that saving an edit (but not approving it) from the Main workspace does not generate an event.

For a limited set of event processors, you can set the triggering workspace to include Main, as defined in each EP type topic linked from the **Processing Plugins** topic in the **System Setup** documentation.

Derived event functionality is available for triggering events prior to approval, as defined in the **Derived Event** topic of the **System Setup** documentation.

Fail and Retry Exception

The EP has a built-in retry logic when getting the FailAndRetryException. It enters the 'Failed (retrying)' state and retries sing a function that increases wait times between retries and will retry for a default of 30 days (maximum) before failing. If a shorter duration is more suitable for your use case, the Retry Duration of 30 days can be changed on the 'Error Handling and Reporting' step of the Event Processor Wizard. When the operation eventually succeeds and the entire batch has completed, the EP returns to its normal ‘Running’ state.

Business actions used in an EP can have exception handling for certain connectivity exceptions and throw the FailAndRetryException to use the retry logic. This allows the EP to self-recover when the problem is solved. The following is an example of this exception handling using a bind to an existing Gateway Integration Endpoint:

```
1    var request = gateway.post().path('/service/v1').urlEncodedBody(body);
2    try {
```

```
      var response = request.invoke();
    } catch (e) {
    if (e.javaException instanceof
    com.stibo.gateway.rest.exception.RESTGatewayStatusCodeWithBodyException) {
    var statusCode = e.javaException.getHttpStatusCode();
    if (statusCode >= 502 && statusCode <= 504) {
    throw new com.stibo.core.domain.integration.faulttolerance.FailAndRetryException("Response
    status " + statusCode + " (will retry failed operation after some time): " +
    e.javaException.toString(), e.javaException);
            }

        } else if (e.javaException instanceof com.stibo.gateway.rest.RESTGatewayIOException) {

    throw new com.stibo.core.domain.integration.faulttolerance.FailAndRetryException("Connection
    issue (will retry failed operation after some time): " + e.javaException.toString(),
    e.javaException);

        }

    throw(e); // All other exceptions MUST be re-thrown

    }
```

The EP will stop and go to the 'Failed' state when getting any other exception including the EventProcessorInterruptedException.

For more information on the FailAndRetryException and the EventProcessorInterruptedException, refer to the **Javadoc** in the **Scripting API** section of the **Technical Documentation**.

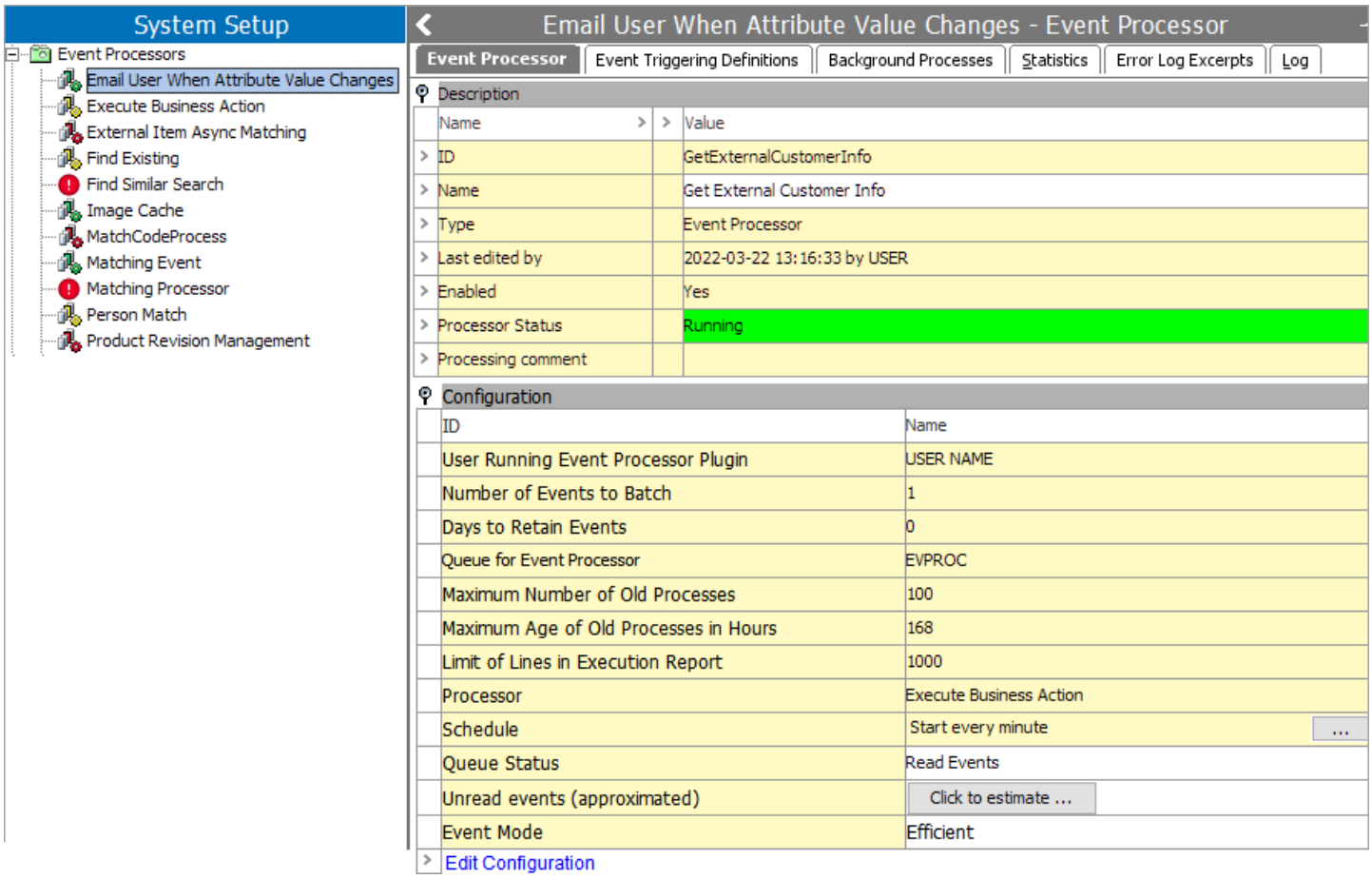
Maintaining an Event Processor

Once an event processor is created, it can be viewed and edited via the event processor editor. This section describes how to access an event processor editor, details for each of the event processor editor tabs, and how to edit and delete an event processor.

To access an event processor editor go to the workbench System Setup, click the Event Processors node, and select **your event processor**.

The event processor editor displays with the following tabs:

- Event Processor
- Event Triggering Definitions
- Background Processes
- Statistics
- Error Log Excerpts
- Log



Edit Event Processor

There are many reasons and methods to edit an event processor.

Steps to edit an event processor are below.

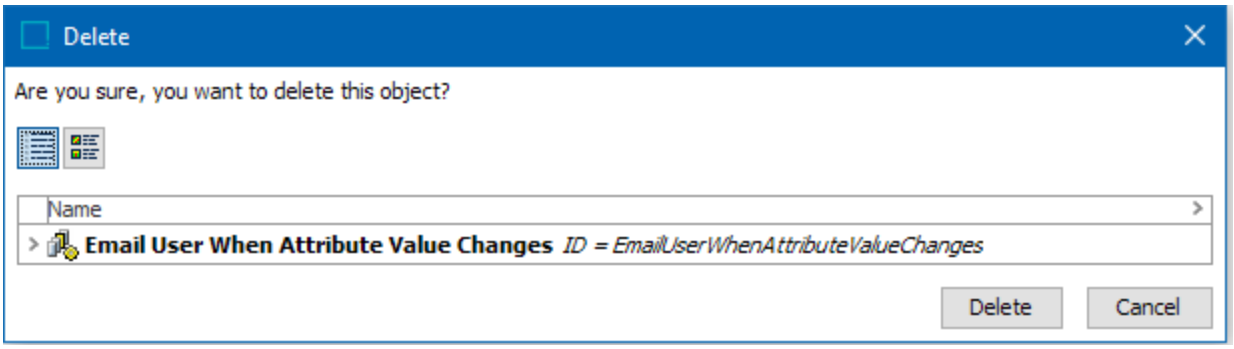
1. On the System Setup tab, select **the event processor to be edited**.
2. Choose a method to edit the wizard settings displayed in the Event Processor editor on the Event Processor tab under the Configuration flipper:
   - Right-click the event processor and select **Edit Event Processor**.
   - Expand the Configuration flipper, click the **Edit Configuration** link, and the event processor wizard will display.
   - Change Event Triggering Definitions on the editor's **Event Triggering Definitions** tab.

Delete Event Processor

An event processor can only be deleted if its status is Disabled. Once the event processor is deleted, it does ***not*** move to the recycle bin, it is completely deleted from the system.

Steps to delete an event processor are below.

1. On the System Setup tab, select the event processor, right-click it, and select **Disable Event Processor**.
2. Select the event processor again, right-click it, select **Delete**, and the Delete confirmation displays.



3. Verify the correct event processor is being deleted, and click the **Delete** button.

EP - Event Processor Tab

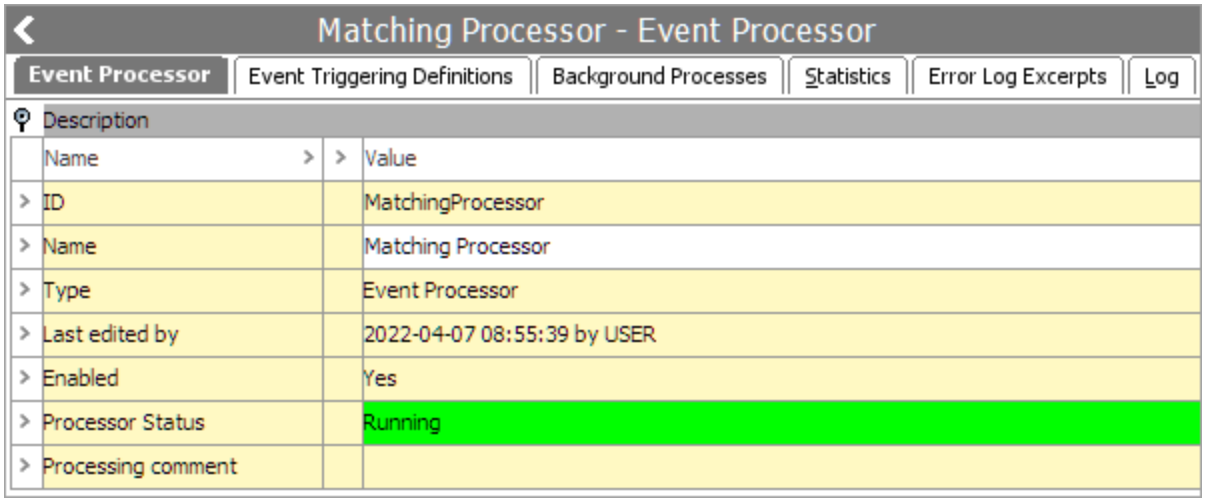
The Event Processor tab on an event processor contains information about the description, configuration, and current background process log.

The Event Processor tab is part of the event processor editor. Information about the event processor editor can be found in the Maintaining an Event Processor topic in the System Setup documentation.

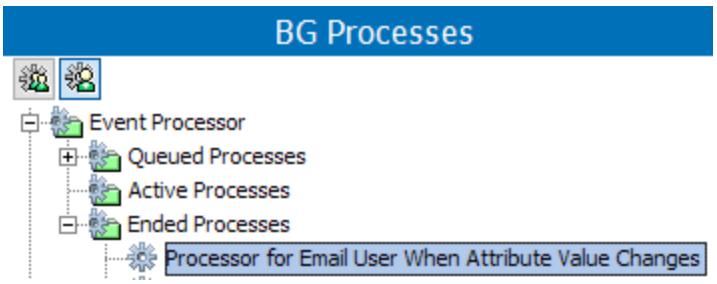
Description Section

The Description section includes basic information to identify the event processor. The name can be edited. This data is originally set up in the event processor wizard, refer to EP - Identify Event Processor topic.

For information on the processor status, refer to Running an Event Processor topic.



- **ID** - Read only, established during the event processor creation, using the Event Processor Wizard and cannot be edited.
- **Name** - Established during the event processor creation, using the Event Processor Wizard and appears as the processor description when viewing background processes.

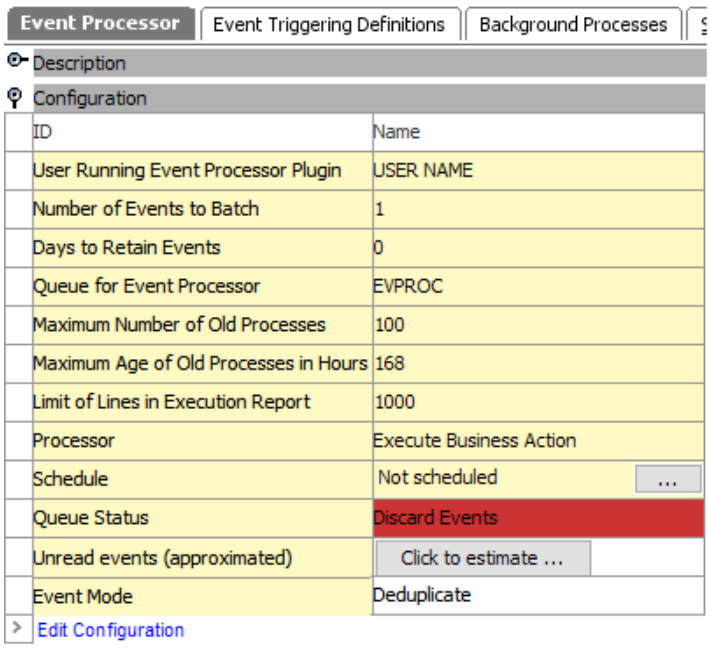


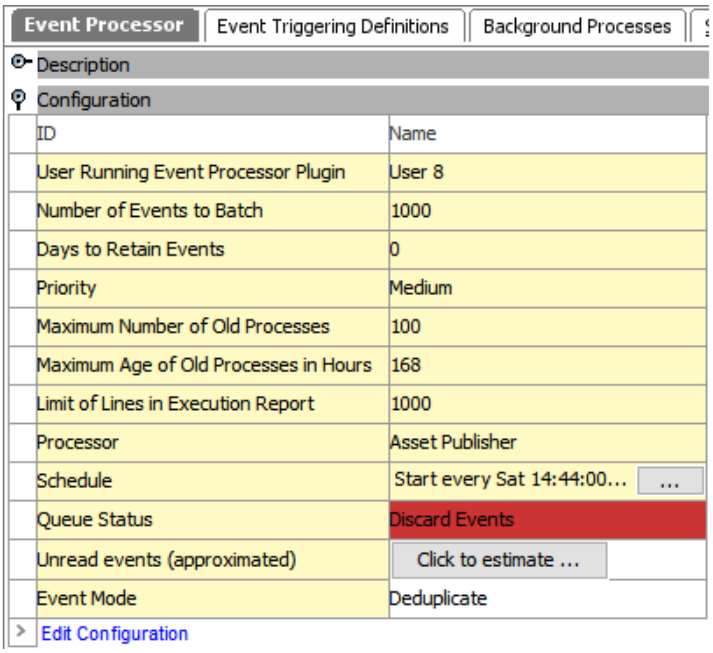
- **Type** - Read only, the object type for the event processor in this example is 'Event Processor'. The object type for your instance of STEP may be different, because the event processor object type is configured during the one-time setup tasks described in Initial Setup for Event Processors topic.
- **Last edited by** - Read only, displays the Date, Time, and User name responsible for the last edit.
- **Enabled** - Displays the current event processor state. A processor must be enabled for it to be used in STEP.
  - When enabled the parameter displays 'Yes', the Processor Status parameter automatically displays 'Running'.
  - When disabled the parameter displays 'No', the Processor Status parameter automatically displays 'Stopped'.

  For more information about event processor states and how to enable / disable, refer to the Running an Event Processor topic.
- **Processor Status** - Displays the event processor's current state.
  - Stopped: the event processor is not enabled.
  - Running: the event processor is enabled and running as intended.
  - Failed (retrying): the event processor has failed due to an error. Attempts to auto-correct are run every minute for two hours, then every ten minutes for one month. If after that time it has not been fixed, it goes to the 'Failed' state.
  - Failed: the event processor has failed due to an error and is no longer attempting to auto-correct.
- **Processing Comment** - If the event processor receives the FailAndRetryException, it goes into the ‘Failed (retrying)’ state and the Processing Comment displays a message. Displays the first and last failures, the number of retries performed, and the next scheduled retry.

Configuration Section

Details for each of the Configuration section parameters are below. To edit any of the parameters within the 'Configuration' section, click the **Edit Configuration** link, located at the bottom of the list, and the Event Processor Wizard displays. The navigation buttons in the wizard can be used to access the other steps, if necessary.





Although the Configuration section does not include access to the Error Handling and Reporting setting, it is available in the EP wizard via the 'Edit Configuration' link. For more information, refer to the EP - Error Handling and Reporting topic.

- **User Running Event Processor Plugin** - The privileges of the user selected must include the objects being processed since the selected user's privileges are applied to the event processor. Common setup is to create a separate user for each event processor to allow tracking of actions taken by each process.
- **Number of Events to Batch** - Specify the batch size. Allows multiple events to be transmitted in a single batch. Setting this number too low can result in slower processing as more background processes are required.
- **Days to Retain Events** - Common setup is to leave this at 0 since this option is not valid for an event processor; it is available for reprocessing events via an OIEP. Specify the number of days to keep events once processed.
- **Priority** - When the recommended 'One Queue' priority-based BGP execution mechanism is configured, waiting BGPs are prioritized for execution based on the priority of the BGP and the created time. Refer to the 'Priority Mechanism' section of the BGP One Queue topic in the System Setup documentation.

  The 'Queue for event processor' parameter is not available.
- **Legacy Queue for Event Processor** - This legacy option is not available when the recommended One Queue, priority-based background process (BGP) execution mechanism is configured. (Refer to the BGP One Queue topic in the System Setup documentation.)
  - During the create event processor wizard, the name of a queue is entered determining where to process data from the event processor.

- 'EVPROC' is the default, however entering the name of a new queue results in the new queue automatically being created upon completion of the wizard.

- **Maximum Number of Old Processes in Hours** - Indicates the number of ended processes the system keeps. Succeeded and ended processes are deleted when the number exceeds the specified limit. The oldest processes are deleted first. Setting this number too high may eventually degrade performance.
- **Maximum Age of Old Processes in Hours** - Specify the maximum age of ended processes that the system keeps. Ended processes are deleted when the maximum age is exceeded. Setting this number too high may eventually degrade performance.
- **Limit of Lines in Execution Report** - Specify the maximum number of lines to store from the execution report in the log. This setting impacts storage usage.
- **Processor** - Displays the processing plugin currently selected for use by the event processor. For more information, refer to the Processing Plugins topic.
- **Schedule** - Indicates the current schedule for running the event processor. 'Not scheduled' indicates the event processor is not currently scheduled to run automatically.
- **Queue Status** - By default, when a new event processor is created, events are discarded. Select **Read Events** if you are ready for the processor to apply the actions based on the events processed.

  Use the event processor editor to update the **Queue Status** as follows:

  - In System Setup, select your event processor, click the **Event Processor** tab.
  - Open the **Configuration** section.
  - In **Queue Status**, select **Read Events** if you are ready for the processor to apply the actions based on the events processed.
    - **Read Events** allows the processor to register events as they occur, based on the event processor configuration and event triggering definitions.
    - **Discard Events** ignores generated events that meet the configuration and event triggering definitions.

  > **Important:** If you are ready for the processor to apply the actions based on the events processed, make sure the event processor Status parameter is also set to Enabled, otherwise the event processor does not function. For more information refer to the 'Enable Event Processor' section of the Running an Event Processor topic.

- **Unread events (approximated)** - Displays the 'Click to estimate ...' button. Clicking the 'Click to estimate ...' button estimates the number of unread events and the button is replaced with the results and a date / time stamp. Refreshing the editor displays the 'Click to estimate ...' button again.
- **Event Mode** - select an option for the event queue:

Standard mode is the default for new configurations. Standard mode adds all events to a given queue for an object without further processing, which can include more events than necessary, resulting in duplication of processing with the same outcome, but it may process events more quickly than Deduplicate mode. Standard mode allows for backward compatibility and is recommended for these event queue configuration scenarios:

- unique object-event type combinations (a single derived event or republish event instead of multiple event triggers on attributes and references, etc.)
- business rules that complete quickly
- typically larger queue sizes (> 100k events)
- large batch sizes (approximately 10k events)

In these scenarios, the Standard mode performs better than the Deduplicate mode since Deduplicate includes the overhead required to remove redundant events.

Deduplicate mode removes events from a queue for Object-Event Type combinations that already exist on the queue within the same batch (meaning the Batch Size must be larger than 1). The Event Type being deduplicated is not the create / modify event type as displayed in the Current Event Batch dialog, but instead, can be observed by hovering over the create / modify entries in that dialog. Refer to the Event-Based Event Processor Queued Events topic for information about the 'Current Event Batch' dialog.

Deduplicate reduces redundant processing which saves time and improves performance, there is overhead required to remove redundant events in the following scenarios, so it may not run as fast as Standard mode due to analysis and removal of events when each batch is processed.

Note: Events are pruned from the queue based on the node and the event type.

Deduplicate mode is recommended for these event queue configuration scenarios:

- high duplication of events waiting in the queue for processing
- complex business rules that take a significant amount of time to complete for a batch
- downstream systems that have trouble keeping up with message processing
- typically smaller queue sizes (< 10k events)
- small batch sizes (< 10 events)

For more information, refer to the Event Mode: Deduplicate Example section below.

In the Performance Analysis Tool Activity tree (defined in the Performance Analysis documentation), logging has been added for the time spent deduplicating events when an event processor (EP) is configured with the Deduplicate Event Mode. Using this information, customers can make data-driven decisions regarding which is the best mode to use (Deduplicate or Standard), as the decision is highly dependent on the underlying use case and overall expected throughput. In some cases, the time it takes to complete the deduplication of events outweighs the potential performance gains in processing, while in other cases the processing itself is the bottleneck. Therefore, being able to compare the time spent deduplicating against the overall run time supports administrators in selecting the setting that will lead to the most optimal performance for their scenario.

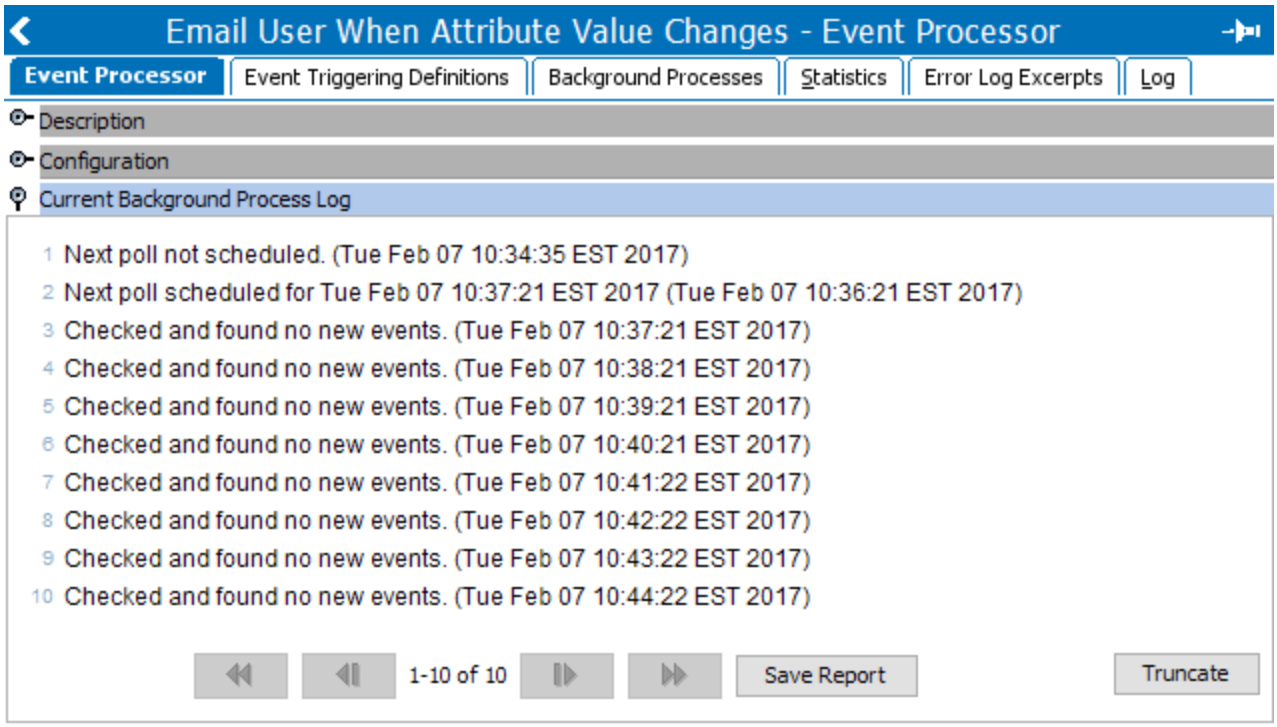
Note: When a high volume of unprocessed events is in queue (> 500k), possibly from a temporary stoppage where the events cannot be discarded, processing speed decreases due to the overhead from removing redundant events. Consider using Standard mode temporarily until the queue has a more manageable backlog to analyze and remove events.

If the queue is unlikely to have multiple similar events for objects, the typical volume is low, the business rules are simple (complete very quickly), and/or the batch sizes are large, then the Deduplicate mode overhead from attempting to remove redundant events may result in slower execution than that of Standard mode.

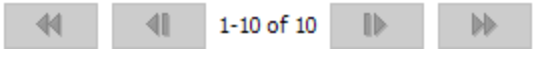
Current Background Process Log Section

The Current Background Process Log section is blank until the event processor state is enabled. Once enabled, information about when the event processor is expected to run and/or what occurred when the processor ran displays.

Using the example below, line 1 indicates the event processor was enabled, but not scheduled to run. Line 2 indicates the event processor is scheduled, and the subsequent lines indicate the processor is running per the Schedule parameter settings of 'Start every minute'.



- **Navigation** - After the first entry, the Current Background Process Log displays the following navigation buttons:



Once a log collects over 100 lines, clicking a button invokes the following actions:

navigates back one page.

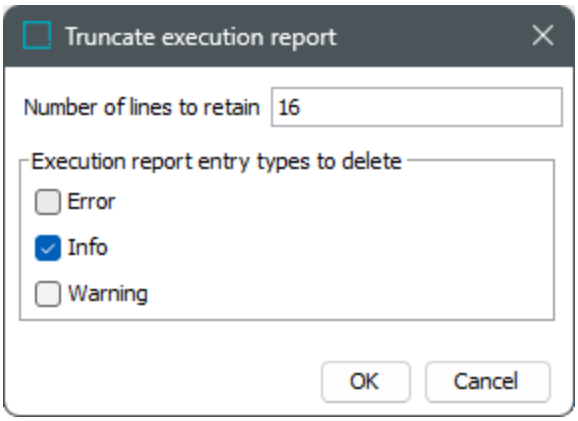
navigates to the beginning of the log.

navigates forward one page.

navigates to the end of the log.

- **Save Report** - The Current Background Process Log can be saved as an 'HTML Only' file type. To save an HTML Only version of the log, select the **Save Report** button, and the file explorer dialog for your system displays. Enter a name for the log report and click **Save**.
- **Truncate** - The Current Background Process Log can be truncated. This can be useful when logs become cluttered or only specific information is needed.

  To truncate a log, select the **Truncate** button to display the Truncate execution report dialog with the following options:



  - **Number of lines to retain** - By default, the current number of log entries is displayed, meaning all are kept. Enter the number of most recent lines to keep from the end of the log, in order to only save the last 'X' number of lines. This works in conjunction with the 'Execution report entry types to delete' option below.
  - **Execution report entry types to delete** - The entry types that can be deleted are Error, Info, and Warning. By default, 'Info' is selected, meaning only Info lines are removed based on the lines to retain. Each entry type selected is deleted from the log after selecting **OK**.

    After making the necessary selections, click **OK** and the event processor editor displays with the Current Background Process Log truncated.

Event Mode: Deduplicate Example

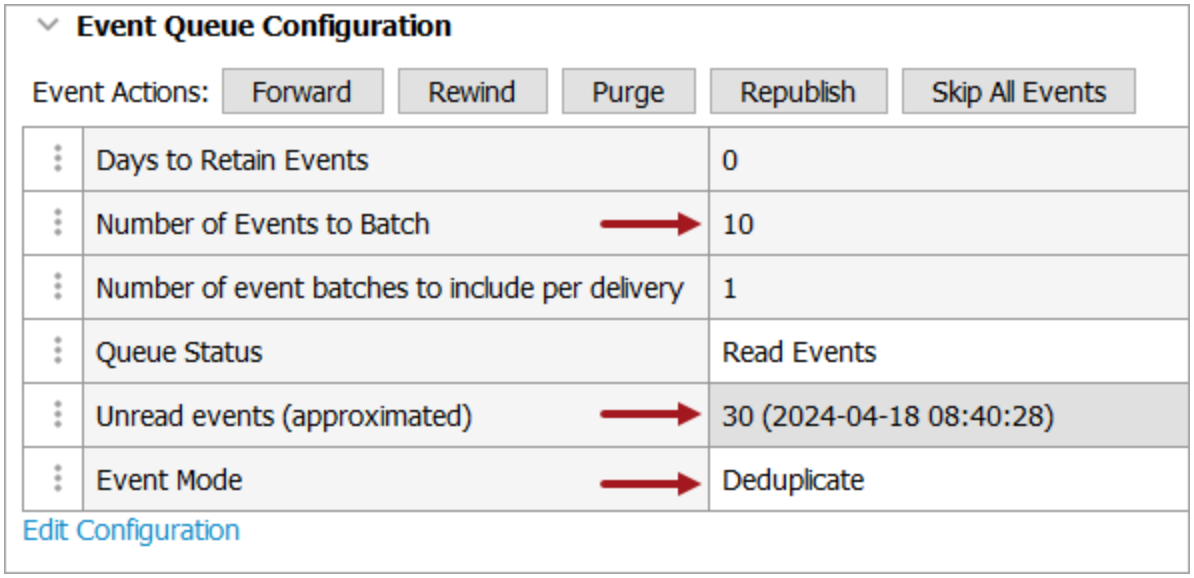
Consider a set of 10 products that are created and then each modified two times. This scenario generates three events for each product. There are a total of 30 events (10 create events and 20 modify events) as shown below.

Current Event Batch

Time of fetch: 2024-04-18 11:40:32 - Size of batch: 100

Num...	Origin	Origin Type	Event Ty...	Generated
1	Shop -6	Item	Create	2024-04-18 11:38:41
2	Shop -1	Item	Create	2024-04-18 11:38:41
3	Shop -2	Item	Create	2024-04-18 11:38:41
4	Shop -8	Item	Create	2024-04-18 11:38:42
5	Shop -7	Item	Create	2024-04-18 11:38:42
6	Shop -9	Item	Create	2024-04-18 11:38:43
7	Shop -3	Item	Create	2024-04-18 11:38:44
8	Shop -10	Item	Create	2024-04-18 11:38:44
9	Shop -4	Item	Create	2024-04-18 11:38:45
10	Shop -5	Item	Create	2024-04-18 11:38:45
11	Shop -6	Item	Modify	2024-04-18 11:39:46
12	Shop -2	Item	Modify	2024-04-18 11:39:47
13	Shop -8	Item	Modify	2024-04-18 11:39:47
14	Shop -1	Item	Modify	2024-04-18 11:39:47
15	Shop -3	Item	Modify	2024-04-18 11:39:48
16	Shop -7	Item	Modify	2024-04-18 11:39:48
17	Shop -9	Item	Modify	2024-04-18 11:39:49
18	Shop -4	Item	Modify	2024-04-18 11:39:49
19	Shop -10	Item	Modify	2024-04-18 11:39:50
20	Shop -5	Item	Modify	2024-04-18 11:39:50
21	Shop -1	Item	Modify	2024-04-18 11:40:06
22	Shop -6	Item	Modify	2024-04-18 11:40:07
23	Shop -8	Item	Modify	2024-04-18 11:40:07
24	Shop -7	Item	Modify	2024-04-18 11:40:08
25	Shop -2	Item	Modify	2024-04-18 11:40:08
26	Shop -9	Item	Modify	2024-04-18 11:40:09
27	Shop -3	Item	Modify	2024-04-18 11:40:09
28	Shop -10	Item	Modify	2024-04-18 11:40:09
29	Shop -4	Item	Modify	2024-04-18 11:40:10
30	Shop -5	Item	Modify	2024-04-18 11:40:10

The OIEP is configured to Deduplicate for the 'Event Mode' parameter with 10 for the 'Number of Events to Batch' parameter. The 30 events are already on the queue as shown in the 'Unread events (approximated)' parameter. Although this image is for an OIEP, the same Event Processor settings could be set for these properties on the Event Processor tab within the Configuration section.



While it may seem that three batches would be generated, the third batch is eliminated (deduplicated) since it would have included the same Object-Event Type combinations.

EP - Event Triggering Definitions Tab

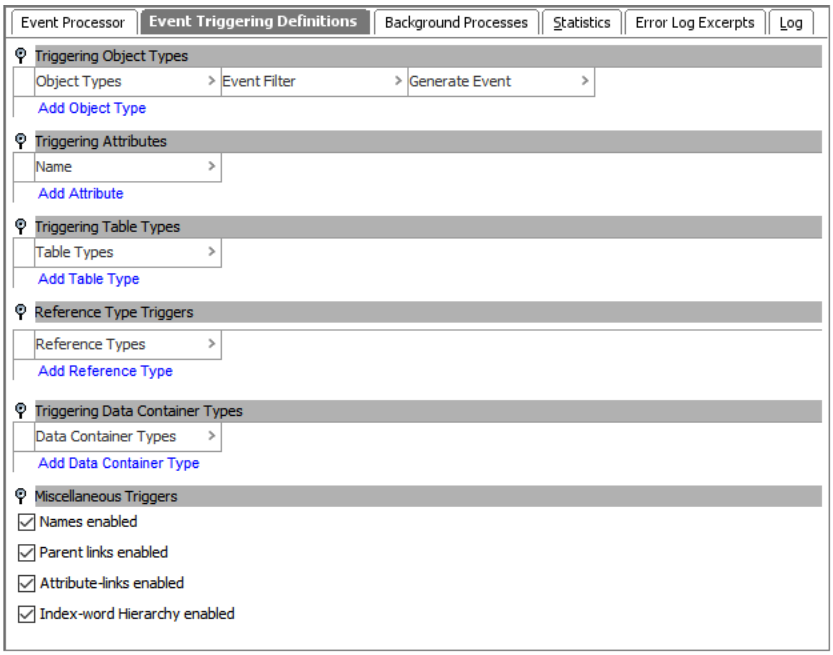
The Event Triggering Definitions Tab on an event processor contains information about the configuration to be set to trigger events as per the requirement.

Note: The functionality of the Event Triggering Definitions tab is the same for event processors (EPs) and integration endpoints (IEPs). For details about the options, refer to the **OIEP - Event-Based - Event Triggering Definitions Tab** documentation.

The Event Triggering Definitions tab is part of the event processor editor. Information about the event processor editor can be found in the Maintaining an Event Processor topic in the System Setup documentation.

Event Triggering Definitions

All event processors require trigger definitions in order to identify objects, attributes, table types, reference types, and/or miscellaneous elements that will generate an event. Use the EP editor 'Event Triggering Definitions' tab to configure trigger definitions.



Triggering object types are used to filter the data being monitored by the EP, whereas processor plugins (standard core processors) provide direction on what to do next.

Triggering Workspace Flipper

This flipper is displayed in rare cases, specifically, only if either the 'Main' or the 'Main and Approved' option was previously selected in a release where the option was available. Not all EPs allow triggering from the Main workspace due to limited use case requirements and the impact to performance. However, for some EPs, it is necessary. For information about triggering from Main for a specific EP, refer to the appropriate topic in the **Configure Event Triggering Definitions** section below.

By default, events are triggered on the Approved workspace. Derived event functionality is available for triggering events prior to approval, as defined in the Derived Events topic in the System Setup documentation.

Important: Triggering from the 'Main' or 'Main and Approved' workspace can negatively impact performance and is not generally recommended for processes with high volume data changes. However, if you choose to implement triggering from either the 'Main' or the 'Main and Approved' workspace, perform thorough testing in lower systems before running in production. An alternate approach to triggering events from the main workspace is to use **Derived Events** to trigger objects after a group of changes are made by a user or integration / import.

For EPs created prior to release 11.0, once the 'Approved' radio button is selected, the flipper is no longer available since 'Approved' is the recommended setting.

- The recommended option 'Approved' creates events when an action causes an update to the Approved workspace, generally as a result of approving an object.
- The 'Main' option creates an event when a change is made in the Main (maintenance) workspace, prior to approval.
- The 'Main and Approved' option results in events both before and after approval.

Note: To activate a change to the Triggering Workspace parameter, you must invoke the event processor with at least one event on the queue.

Configure Event Triggering Definitions

To help streamline setup for event processors using processing plugins, the information for common parameters and triggering definition setups for each of the processing plugins is covered in the following sections:

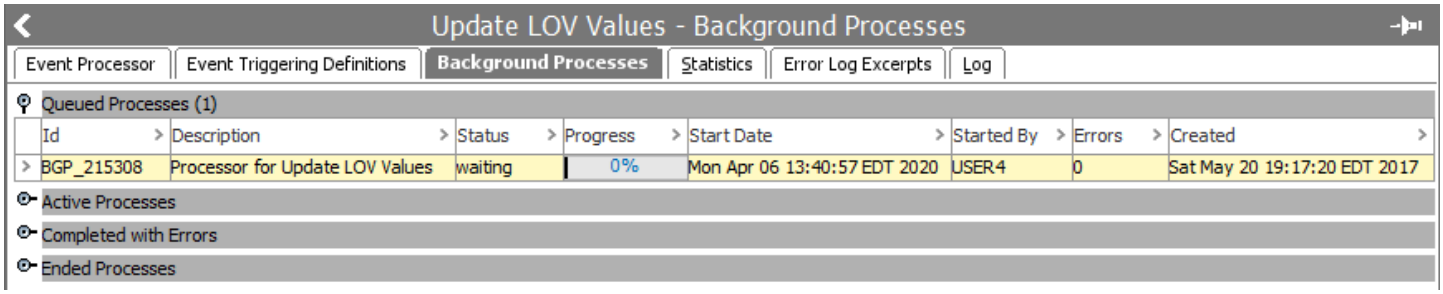
- **Asset Publisher Plugin Parameters and Triggers**
- **Asynchronous Translation Message Processor Processing Plugin Parameters and Triggers**

- **CASS Certification Report Processing Plugin Parameters and Triggers**
- **Data Sufficiency Calculator Processing Plugin Parameters and Triggers**
- **Elasticsearch Indexer Processing Plugin Parameters and Triggers**
- **Execute Business Action Processing Plugin Parameters and Triggers**
- **Execute Business Action for Event Batch Processing Plugin Parameters and Triggers**
- **Expand LOV Value Changes Processing Plugin Parameters and Triggers**
- **Experian Email Validation Processing Plugin Parameters and Triggers**
- **Historic Data Analyzer (within Historic Reporting)**
- **Historic Data Generator (within Historic Reporting)**
- **Image Cache Processing Plugin Parameters and Triggers**
- **Matching Processing Plugin Parameters and Triggers**
- **Revision Management Processing Plugin Parameters and Triggers**
- **Splitting Processor Processing Plugin Parameters and Triggers**

Important: If you are ready for the processor to apply the actions based on the events processed, verify the Queue Status parameter is also set to Read Events, otherwise the enabled event processor will not function. For more information, refer to the **Queue Status** section of the **EP - Event Processor Tab** topic.

EP - Background Processes Tab

An active event processor uses an associated background process to handle the scheduled invocation of the processor. The event processor's Background Processes tab contains information about the available processes. Hover over a BGP ID to display the background process link, click it to open the individual background process.

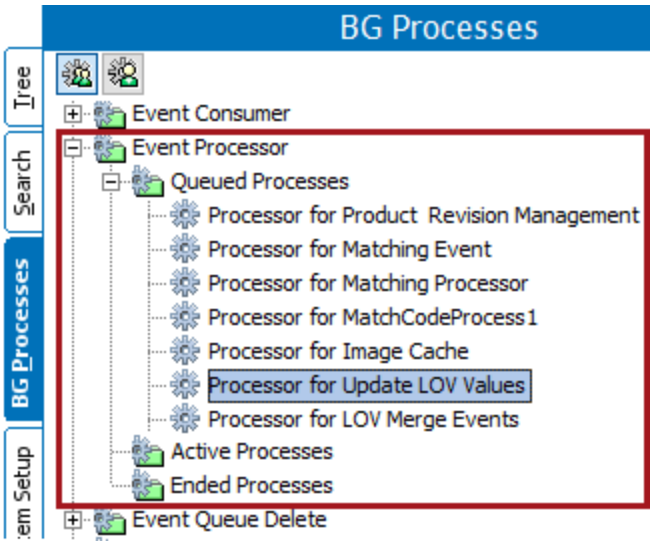


Note: The functionality of the event processor Background Processes tab is the same for integration endpoints.

The BGP information related to the selected event processor includes:

- **ID:** Provides ID of the Background Process. Hovering over it displays the background process (BGP) link. Click on the link to open the individual Import Background Process.
- **Description**: Describes the background process as specified by the user.
- **Status:** Provides the status of the background process. The Status field can possess any one of these statuses at a given time: *Waiting*, *Failed*, *Suspended*, or *Succeeded*.
- **Progress:** Displays the percentage of the BGP complete on a progress bar.
- **Start Data:** Displays the timestamp of when the Event Processor was invoked to run the BGP.
- **Started By:** Shows the user name of who initiated the background process by invoking the Event Processor.
- **Errors:** Displays the number of errors that occurred in the BGP
- **Created**: Shows the timestamp of when the queue was created for the first time.

This information is also available from the BG Processes tab under the Event Processor node when selecting a processor.



For more information, refer to the following topics:

- The event processor editor is defined in the **Maintaining an Event Processor** topic.
- Background process states are defined in the **BG Processes States** topic.
- Background processes are defined in the **Background Processes and Queues** topic.

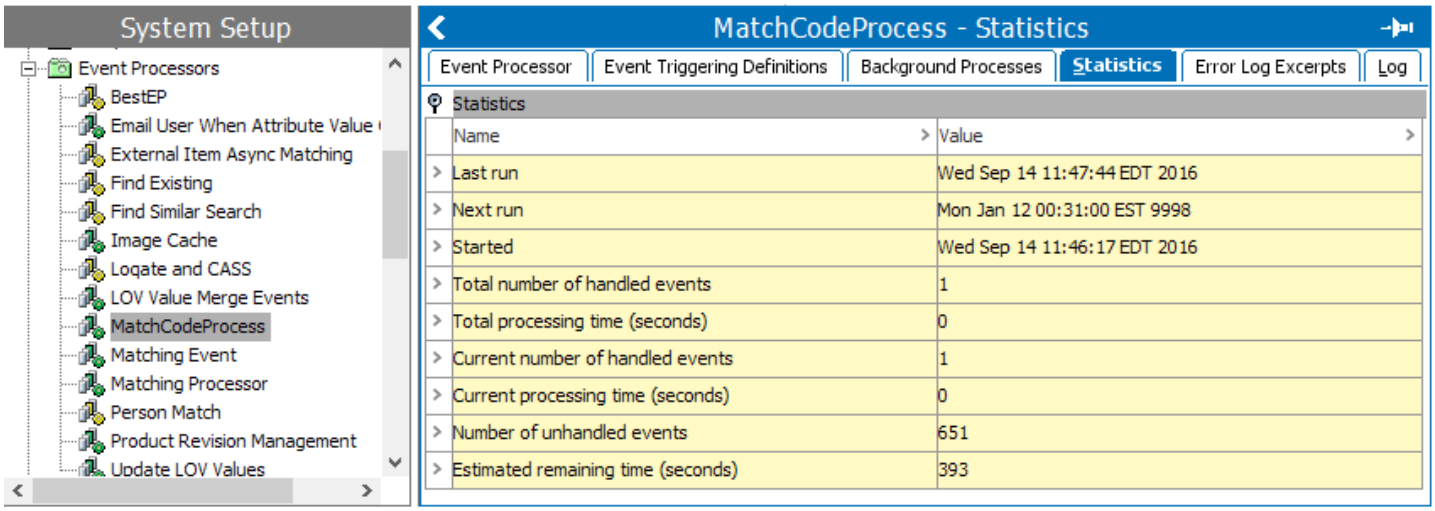
EP - Statistics Tab

The Statistics tab on an event processor provides an overview of the related background processes with the ability to click and display details about the number of requests handled, run times, and wait times. The information in the Statistics tab can be used to monitor the Event Processor.

The Statistics tab is part of the event processor editor. Information about the event processor editor can be found in the Maintaining an Event Processor topic in the System Setup documentation.

Statistic data includes Name and Value field for:

- Last run
- Next run
- Started
- Total number of handled events
- Total processing time (seconds)
- Current number of handled events
- Current processing time (seconds)
- Number of unhandled events
- Estimated remaining time (seconds)



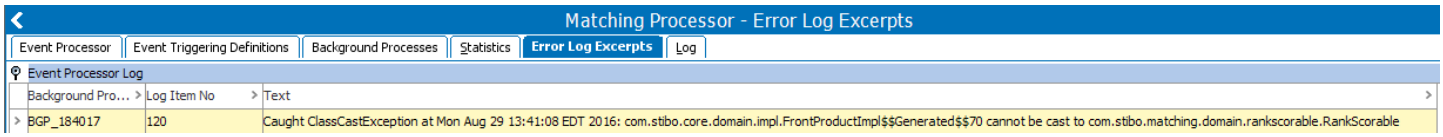
EP - Error Log Excerpts Tab

The Error Log Excerpts tab on an event processor shows data from the main Java log file related to failed background processes with Log Level > 'Info'.

The Event Log Excerpts tab is part of the event processor editor. Information about the event processor editor can be found in the Maintaining an Event Processor topic in the System Setup documentation.

Event Processor Log Flipper

In this flipper, a user can click on a hyperlink to a failed background process and correct the cause of the failed background process.



- **Background Process**: Displays the ID of a Background process throwing the error. Clicking on the ID redirects the user to the Background process.
- **Log Item No**: Displays the Log Item No
- **Text**: Displays a brief text specifying an error message. For example: Caught IndexOutOfBoundsException at Tue Mar 14 10:44:08 CET 2017: Index: 0, Size: 0 "Failed to add 1 files to delivery due to Failed to create directory: Failed to create directory: "

Note: The functionality of the Error Log Excerpts tab is the same for event processors and integration endpoints. For more information, refer to **Handling Failed OIEP Background Processes** topic in the **Data Exchange** documentation.

EP - Log Tab

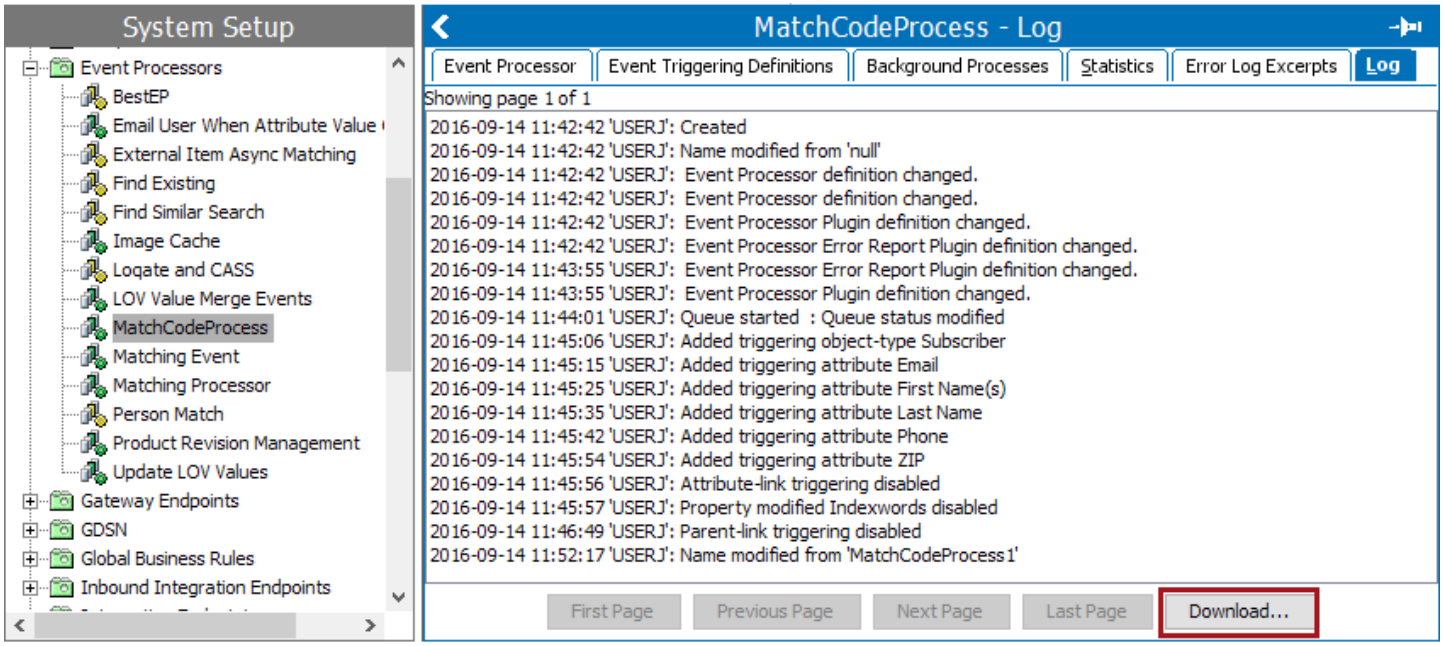
The Log tab on an event processor provides information about changes to the Event Processor configuration.

The Log tab is part of the event processor editor. Information about the event processor editor can be found in the Maintaining an Event Processor topic in the System Setup documentation.

Logs

Information included on the Log tab are timestamps, ID of the user who performed the action, and a brief description of the changes done on the event processor.

Click the Download button to download the log information.



Monitoring an Event Processor via External System

Event processors can be monitored from external systems using Monitoring Sensors.

For each event processor created in STEP, a Monitoring Sensor is automatically created. Monitoring Sensors allow external systems to query the status of individual event processors via HTTP, without authentication. In the following sample URLs, substitute your own system URL and event processor ID to access your own event processor.

A Monitoring Sensor can return the following information:

1. **Simple traffic light response** returns OK, WARNING, CRITICAL, or UNKNOWN for event processors via:

   ```
   http://[System URL]/admin/monitoring/EventProcessorStatus-[event processor ID]/status
   ```

2. **Nagios friendly response** returns detailed statistics in Nagios friendly format for event processors via:

   ```
   http://[System URL]/admin/monitoring/EventProcessorStatus-[event processor ID]/nagios
   ```

3. **Full detailed XML response** returns XML with detailed statistics for event processors via:

   ```
   http://[System URL]/admin/monitoring/EventProcessorStatus-[event processor ID]/xml
   ```

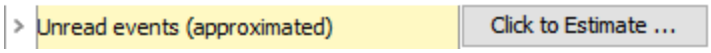
Event-Based Event Processor Queued Events

As events are found that meet the criteria set in the event processor configuration and event triggering definitions, an estimate and details are available for review in System Setup.

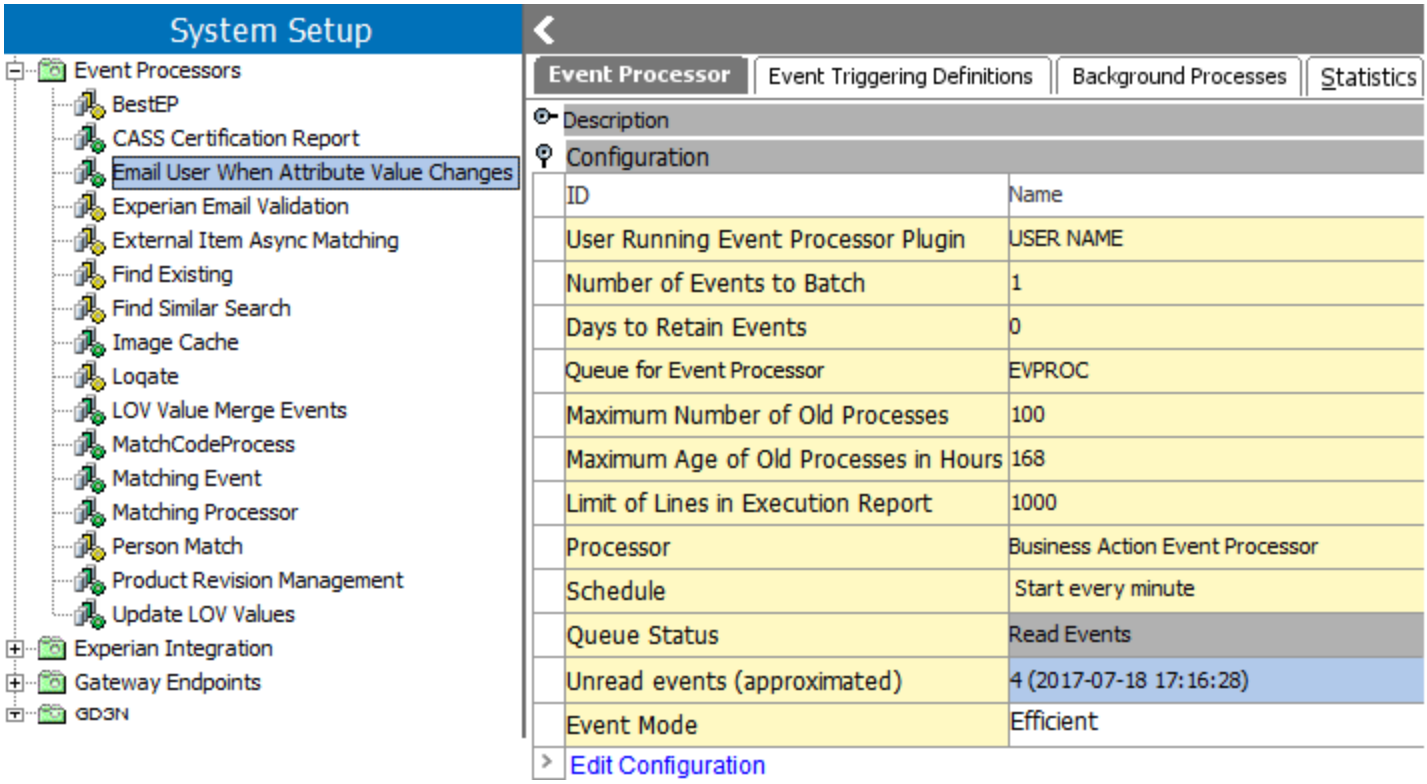
Estimate Unread Events

An estimate of the current number of unread events in the Event Queue Configuration area 'Unread events (approximated)' parameter.

On the OIEP's Configuration tab, click the 'Click to estimate' button to display the data.



The 'Click to estimate' button is replaced with the number of events and the time of the estimate.

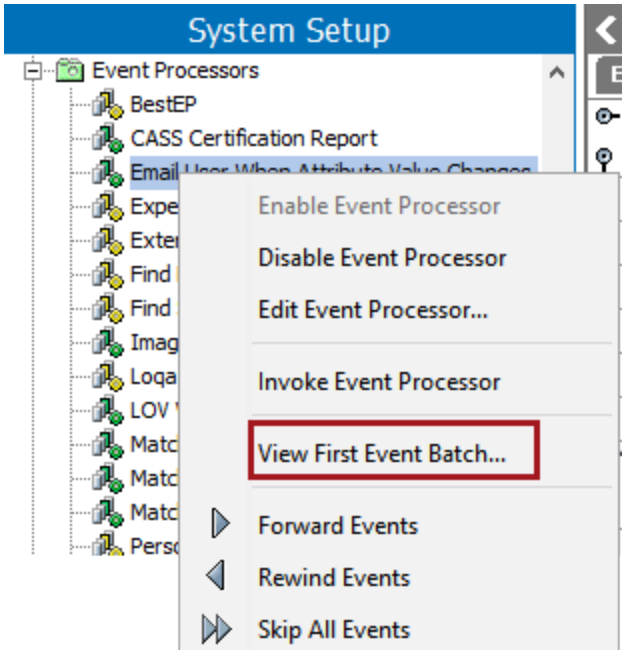


Using the forward, rewind, purge, republish, or skip all events options cause the number of unread events on the queue to change. For more information, refer to the Event-Based OIEP Event Actions topic.

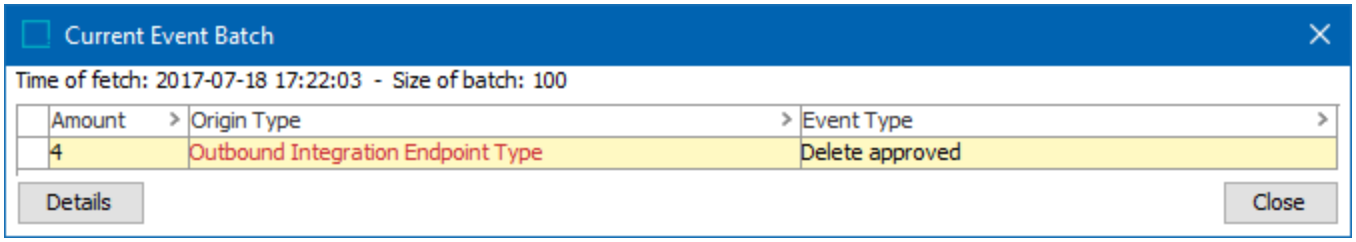
View First Event Batch

This option allows you to view more than just a count of the events.

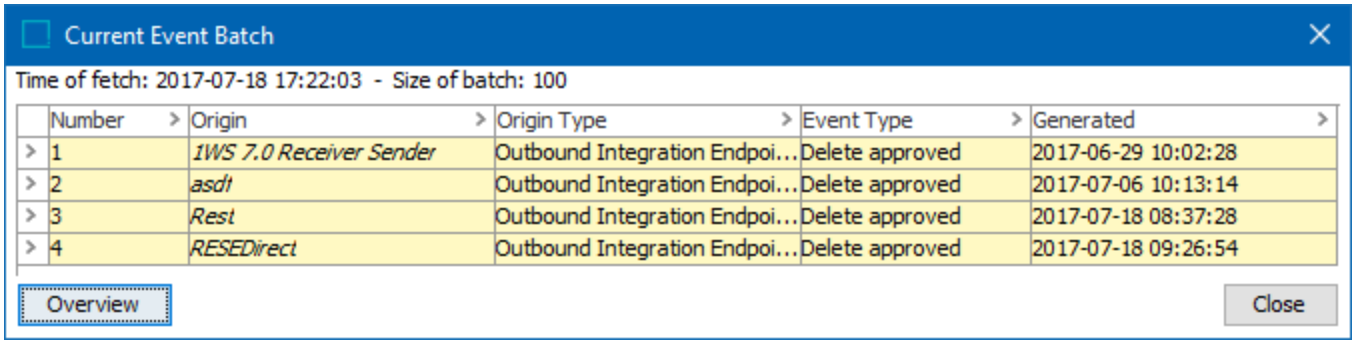
1. Right-click the event processor and select **View First Event Batch**.



2. The Current Event Batch dialog displays the first 100 unread events on the queue. Hover over the Event Type column text for the actual event types being deduplicated if the Event Mode parameter is set to Deduplicate, as discussed in the EP - Event Processor Tab topic.



3. For more information about the events, click the **Details** button. The Origin column includes a link to the object being reported by the event.



4. Click the **Overview** button to return to the previous view.

Event Queues

The Event Queues node on the System Setup tab can be used to create, modify, and schedule export events from STEP to a local file system. An event queue extracts the data messages and a stylesheet is used to render the messages as static HTML that can be viewed in a browser. The configuration of an event queue can allow for data or assets to be exported, and actions to be automatically performed.

Note: An event queue definition can be exported as comments and submitted to an external source control system for comparison purposes. For details, refer to the **Configuration Management** documentation.

The types of queues are available for outbound information include:

- **Event Queue** legacy functionality for data messages

  While manually creating a data event queue is allowed, improved functionality for exporting data messages is available in an outbound integration endpoint (OIEP). The event queue for an event-based OIEP is created automatically when creating the OIEP. For more information, refer to the **Queue for Endpoint Processes** section of the **OIEP - Configuration Section** topic in the **Data Exchange** documentation.

  For information on a manually created event queue, refer to the **Creating a New Event Queue** topic and the **Maintaining Event Queues** topic.

- **AssetPush Event Queue** and sidecar for assets

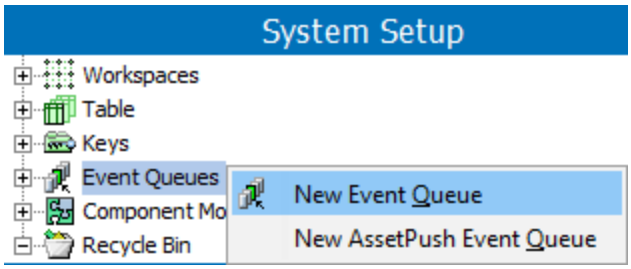
  An event queue for Asset Push must be created manually as defined in the **Creating and Maintaining Asset Push Event Queues** topic of the **Digital Assets** documentation.

Creating a New Event Queue

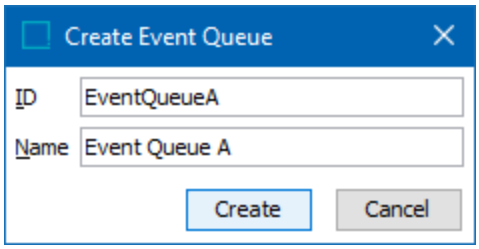
A manually created event queue includes templates for a variety of object types.

Important: The functionality of this legacy feature is limited. Using an OIEP is preferred, as defined in the **Creating an Outbound Integration Endpoint** topic in the **Data Exchange** documentation.

1. In System Setup, right-click the Event Queues node and select the New Event Queue option.

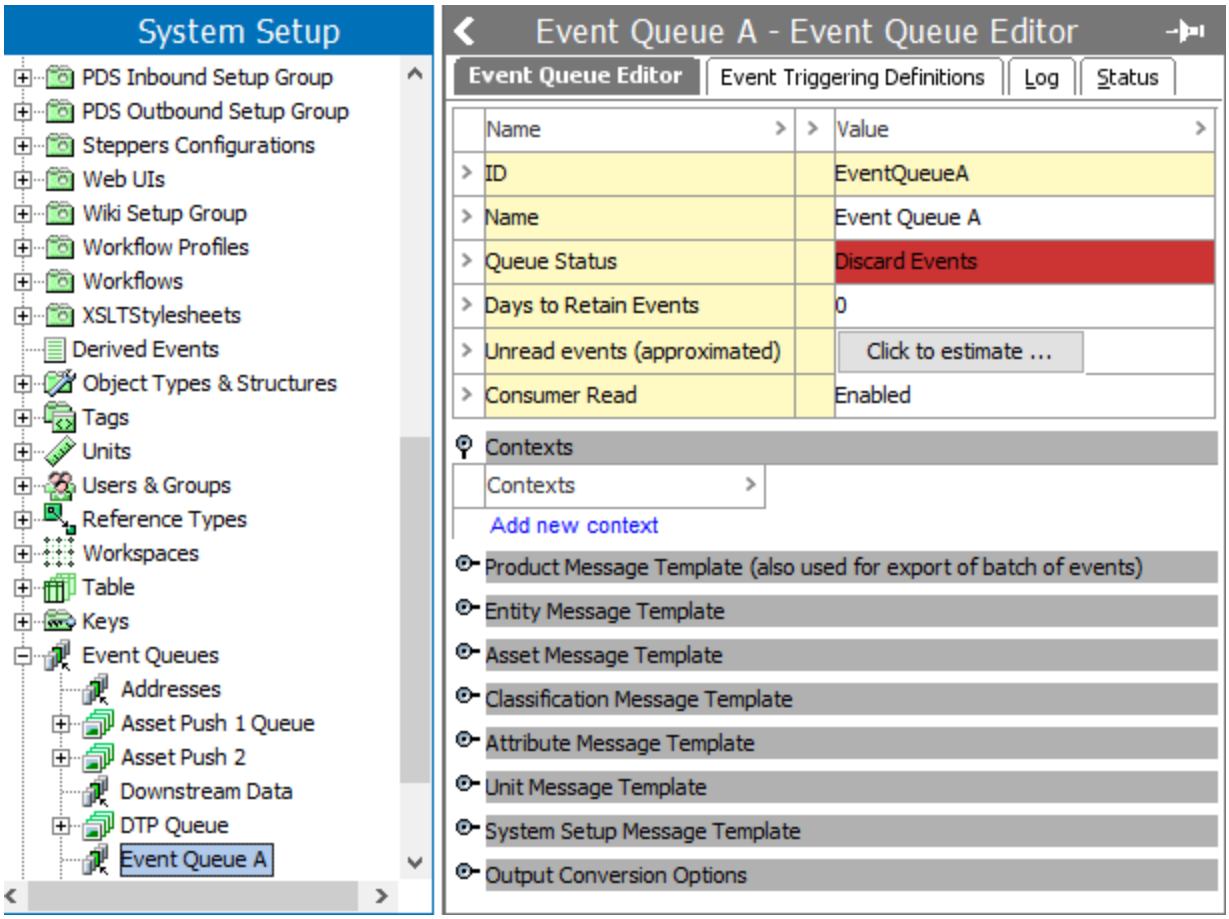


2. Add an ID and a name and click the **Create** button to save the event queue.



   The queue is displayed below the Event Queues node.

3. Select the new queue and on the Event Queue Editor tab, edit the parameters as defined below.

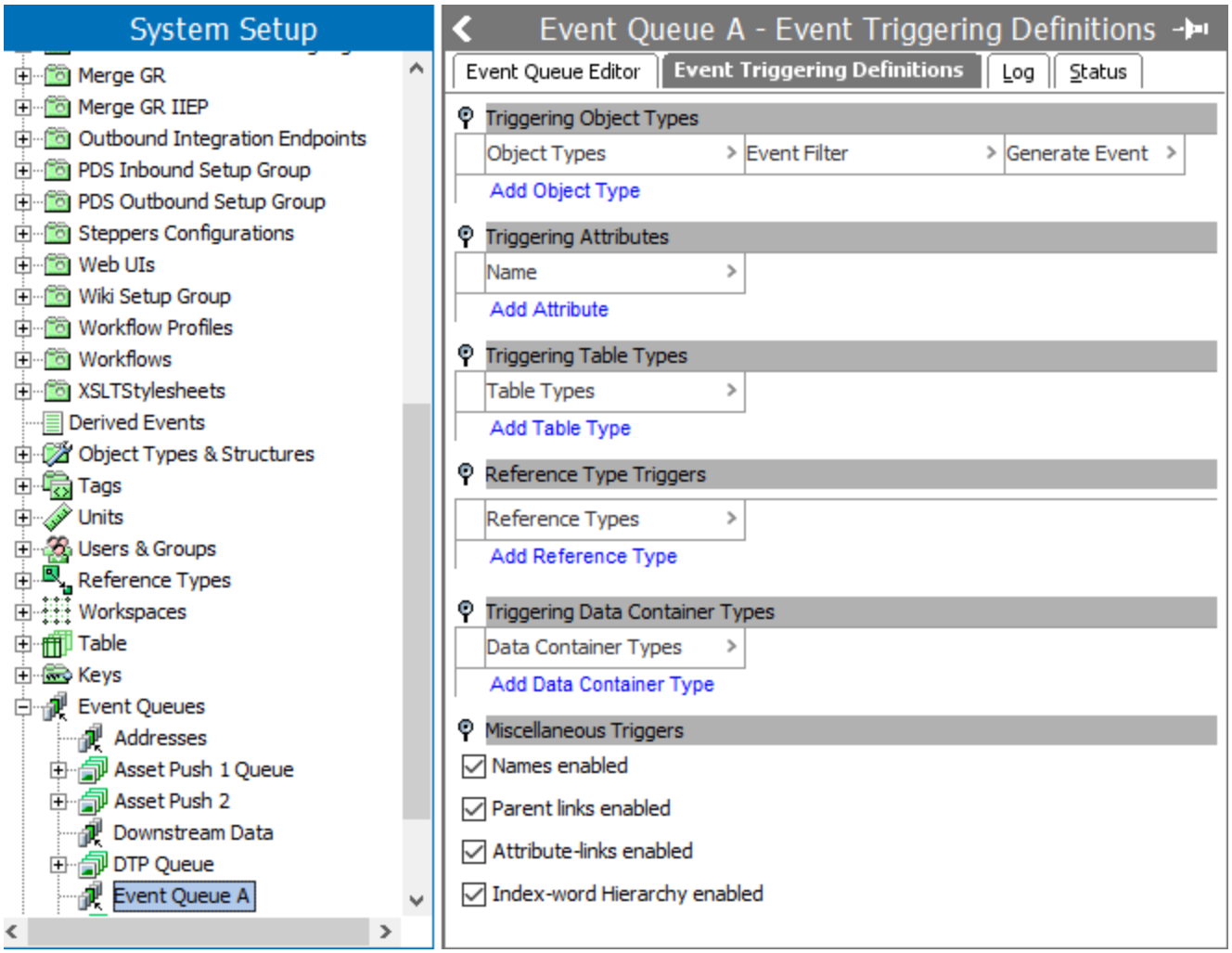


- For details on the **Queue Status** parameter, refer to the **Event-Based OIEP Status and Queue Status** topic in the **Data Exchange** documentation.
- For details on the **Days to Retain Events** parameter, refer to the **Event-Based OIEP Event Actions** topic in the **Data Exchange** documentation.
- For details on the **Unread event (approximated)** parameters, refer to the **Event-Based OIEP Queued Events** topic in the **Data Exchange** documentation.
- For the **Consumer Read** parameter, **Disabled** (default) means processed events are held and are not delivered to their final destination. This setting stops events from queuing, for example, when the location that receives the deliveries is experiencing problems such as a full disk. **Enabled** means processed events can be delivered to their final destination.

Note: The Event Consumer can be created and edited via the right-click menu when selecting the event queue as defined in the **Create or Edit Event Consumer** topic.

- Make additional changes as necessary for the **Contexts** flipper, the various **Template** flippers, and the **Output Conversion Options** flipper.

4. On the Event Triggering Definitions tab, edit the parameters as defined in the **OIEP - Event-Based - Event Triggering Definitions Tab** topic of the **Data Exchange** documentation.



5. To set the desired queue action, complete queue configuration as defined in the **Maintaining Event Queues** topic.

Maintaining Event Queues

Maintaining an event queue includes defining the actions it should perform and then running the event queue on a schedule.

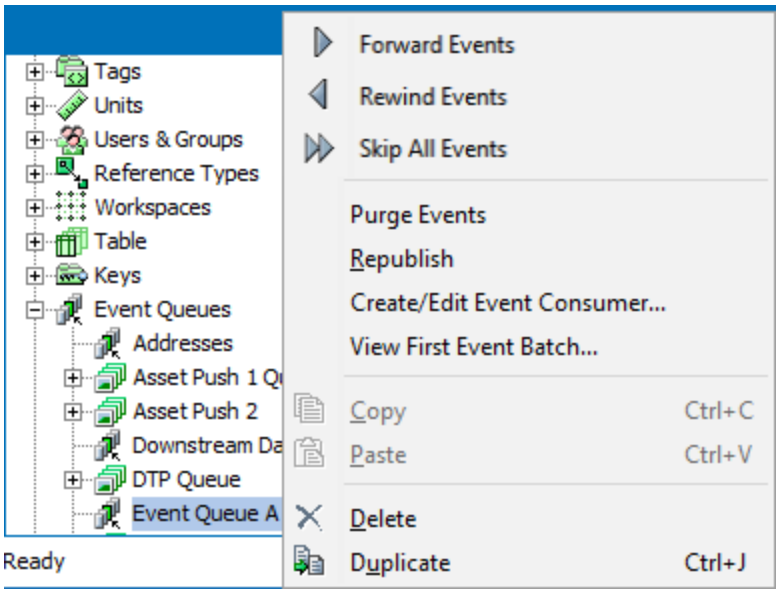
Queue Status and Consumer Read Settings

The action of the event queue is determined by a combination of the 'Queue Status' and 'Consumer Read' parameters, as defined in the table below.

Queue Status	Consumer Read	Description
Read Events	Enabled	Active - Data is delivered to downstream systems.
Read Events	Disabled	Paused - The feed is temporarily disabled. Generated events continue to be read and queued, and are retained within STEP. Messages are not delivered to the downstream system until the Consumer Read setting is changed to ‘Enabled’.
Discard Events	Disabled	Inactive - No new events are processed and no data is delivered downstream.
Discard Events	Enabled	Transition - Allows the queue to process queued events, but does not generate any new events since new events are being handled by a different queue. Not commonly used but can be employed when one queue will take over from another, or prior to running a bulk update process when data should not be delivered downstream.

Running an Event Queue

The right-click menu of an event queue includes the following options.



For information on the Forward Events, Rewind Events, Skip All Events, Purge Events, and Republish options, refer to the topic **Event-Based OIEP Event Actions** in the **Data Exchange** documentation.

For information on the Create/Edit Event Consumer option, refer to the **Create or Edit Event Consumer** topic.

For information on the View First Event Batch option, which displays events from approved objects that were triggered, refer to the topic **Event-Based OIEP Queued Events** in the **Data Exchange** documentation.

Create or Edit Event Consumer

Once an event queue exists, an event consumer is required to define where the data will be delivered via a background process.

Important: The functionality of this legacy feature is limited. Using an OIEP is preferred, as defined in the **Creating an Outbound Integration Endpoint** topic in the **Data Exchange** documentation.

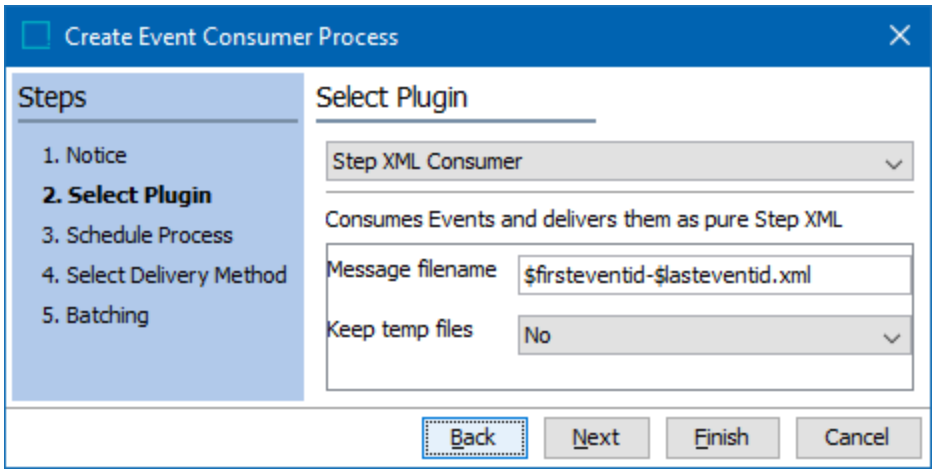
Prerequisites

Complete the steps defined in the following topics before creating an event consumer:

1. Creating a New Event Queue
2. Maintaining Event Queues

Creating or Editing an Event Consumer

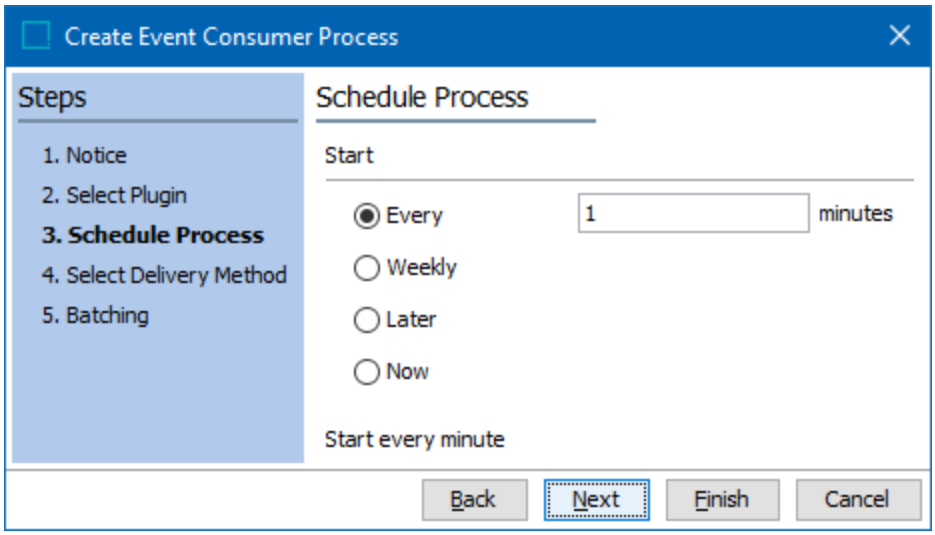
1. In System Setup, right-click an event queue and select the 'Create/Edit Event Consumer...' option to display the Create Event Consumer Process wizard.
2. On the **Notice** step, the message indicates if you are creating a new event consumer or editing an existing one, click the **Next** button.
3. On the **Select Plugin** step, choose a plugin from the dropdown and complete the additionally required parameters, then click the **Next** button.



Note: Hover over a parameter label to display information on the required data.

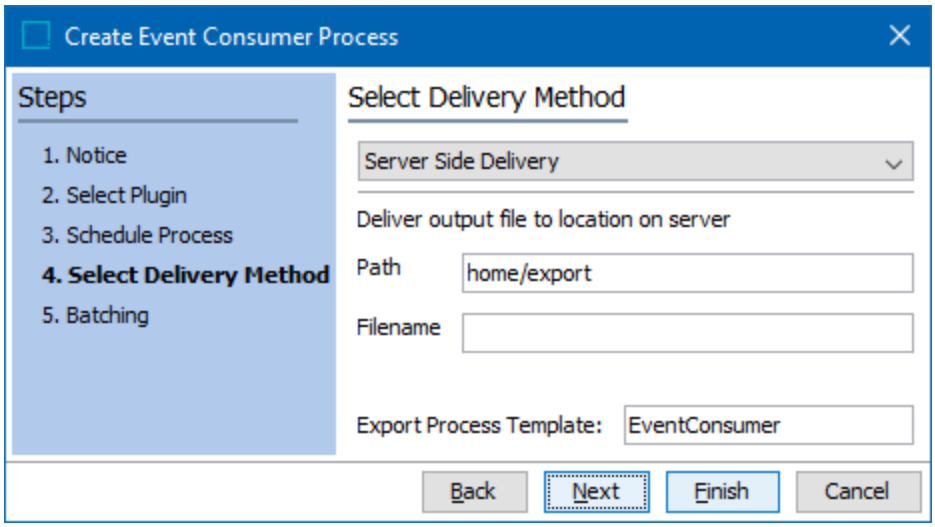
- **Step XML Consumer** (default) delivers events as STEPXML. For more information on this format, refer to the **STEPXML Format** topic in the **Data Exchange** documentation.
- **Demo Consumer (Firefox)** uses a consumed event queue with a specific Firefox demo plugin to deliver XML that can be rendered by the Firefox browser.

4. On the **Schedule Process** step, set the schedule as defined in **Scheduled Data Export - Schedule Process** topic in the **Data Exchange** documentation, then click the **Next** button.

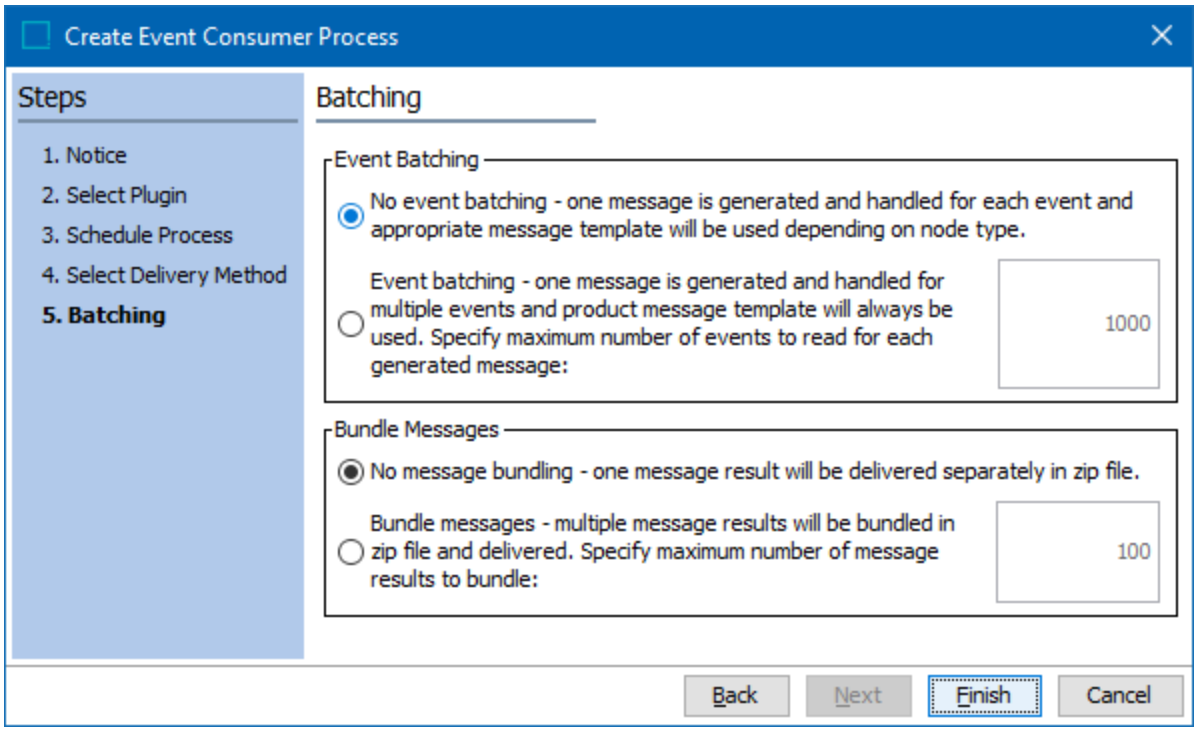


Important: Consider the time zone of the application server compared to that of the workbench (the client) where the schedule is created or viewed. When scheduling a job, the local time zone is displayed in the workbench, but the time zone of the server is used to run the background process. Although displayed, the time zone of the client is not included in the instruction to the server to run the job. This can cause confusion about when the job will run since the scheduled time is not automatically converted to accommodate potential differences in time zones.

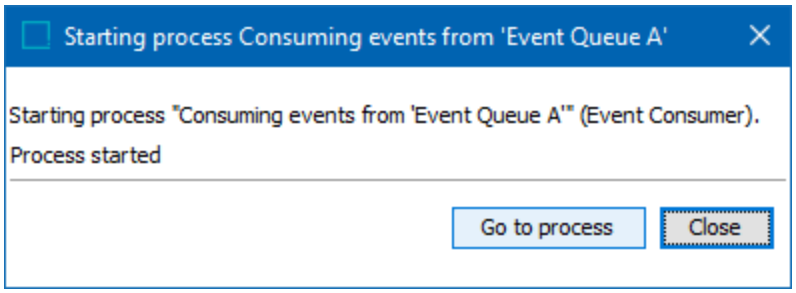
5. On the **Select Delivery Method** step, choose a method from the dropdown and complete the additionally required parameters as defined in the **Export Manager - Select Delivery Method** topic in the **Data Exchange** documentation, then click the **Next** button.



6. On the **Batching** step, select an option as defined in **OIEP - Event-Based - Choose Data Source** topic in the **Data Exchange** documentation, then click the **Finish** button to start the background process.



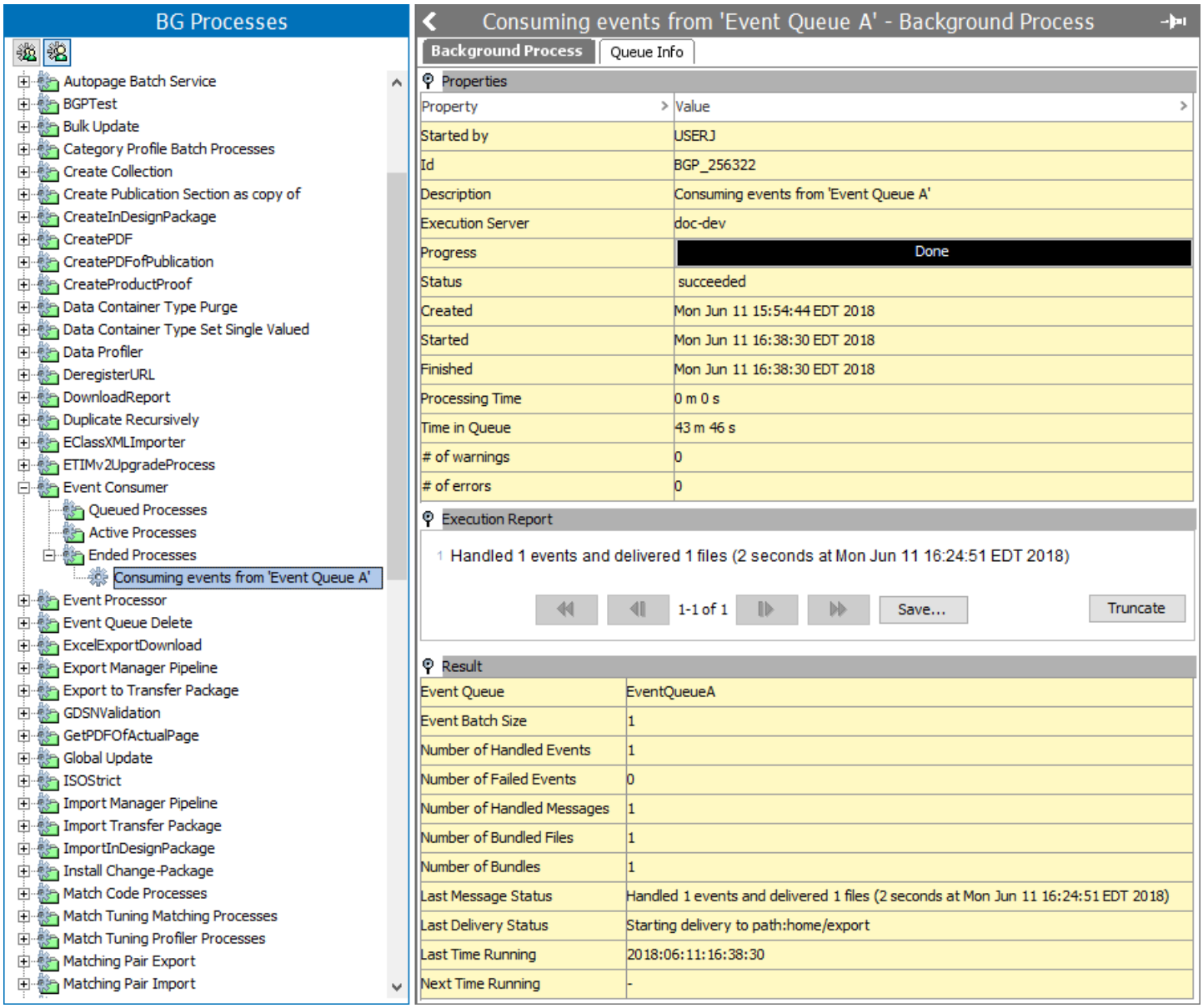
7. On the 'Starting process Consuming events from '[eventqueue]' dialog, make a selection.



- **Go to process** displays the background process on the BG Processes tab under the 'Event Consumer' node.
- **Close** starts the background and closes the 'Starting process...' dialog.

Output

The background process editor as shown below, displays details about the progress, success, or failure of the BGP. The Result flipper includes the location of the output based on the Delivery Method step selection.


BG Processes
Autopage Batch Service
BGPTest
Bulk Update
Category Profile Batch Processes
Create Collection
Create Publication Section as copy of
CreateInDesignPackage
CreatePDF
CreatePDFofPublication
CreateProductProof
Data Container Type Purge
Data Container Type Set Single Valued
Data Profiler
DeregisterURL
DownloadReport
Duplicate Recursively
EClassXMLImporter
ETIMv2UpgradeProcess
Event Consumer
Queued Processes
Active Processes
Ended Processes
Consuming events from 'Event Queue A'
Event Processor
Event Queue Delete
ExcelExportDownload
Export Manager Pipeline
Export to Transfer Package
GDSNValidation
GetPDFOfActualPage
Global Update
ISOStrict
Import Manager Pipeline
Import Transfer Package
ImportInDesignPackage
Install Change-Package
Match Code Processes
Match Tuning Matching Processes
Match Tuning Profiler Processes
Matching Pair Export
Matching Pair Import
Consuming events from 'Event Queue A' - Background Process
Background Process
Queue Info
Properties
Property
Value
Started by
USERJ
Id
BGP_256322
Description
Consuming events from 'Event Queue A'
Execution Server
doc-dev
Progress
Done
Status
succeeded
Created
Mon Jun 11 15:54:44 EDT 2018
Started
Mon Jun 11 16:38:30 EDT 2018
Finished
Mon Jun 11 16:38:30 EDT 2018
Processing Time
0 m 0 s
Time in Queue
43 m 46 s
# of warnings
0
# of errors
0
Execution Report
1 Handled 1 events and delivered 1 files (2 seconds at Mon Jun 11 16:24:51 EDT 2018)
1-1 of 1
Save...
Truncate
Result
Event Queue
EventQueueA
Event Batch Size
1
Number of Handled Events
1
Number of Failed Events
0
Number of Handled Messages
1
Number of Bundled Files
1
Number of Bundles
1
Last Message Status
Handled 1 events and delivered 1 files (2 seconds at Mon Jun 11 16:24:51 EDT 2018)
Last Delivery Status
Starting delivery to path:home/export
Last Time Running
2018:06:11:16:38:30
Next Time Running
-

Lock-free Schema Change

Certain system operations (i.e., GUI updates, data import) can corrupt data by deleting unintended data and creating inconsistencies if they are run at the same time a different user is updating the database. Because of this, systems running a Cassandra database use **Lock-free Schema Change (LFSC)** functionality. Systems running an Oracle database, by default, use Single-Update Mode (SUM)—documented in the Single-Update Mode topic. However, as described in the 'Enabling the LFSC Functionality' section at the end of this topic, there is an option to run LFSC if using Oracle.

LFSC works by dividing the schema change up into several parts. This is an example of how it works and what happens for an attribute change:

1. Make a new attribute in the background with the wanted definition.
2. Copy all present (not historic) values from the old attribute to the new attribute.
3. Modify the new (still unused copy) to suit the new definition.
4. Swap the IDs of the new and the old attributes.
5. Delete the old present values NOT including the attribute or the historic values.

Engaging the LFSC Functionality

The following operations use LFSC functionality:

- Deleting a workspace, as defined in the Maintaining Workspaces topic
- Adding or deleting dimension dependencies, as defined in the Dimension Dependent Attributes topic
- Changing externally maintained on attributes, as defined in the Externally Maintained Attributes topic
- Changing attributes to use or not to use LOV, as defined in the Editing Validation Rules topic
- Changing attributes to or from being Full Text Indexable, as defined in the Search Functionality topic in the Getting Started documentation
- Changing attributes to or from being multi valued, as defined in the Validation Rules topic
- Activating or deactivating unique keys, as defined in the Activating and Deactivating Keys topic
- Changing reference types to or from being externally maintained, as defined in the Maintaining a Reference Type topic
- Changing reference types to or from being multi valued, as defined in the Maintaining a Reference Type topic
- Changing product to classification link types to or from being externally maintained, as defined in the Maintaining a Product to Classification Link Type topic

- Changing or moving product to classification link types (for example, when you move one type to another type), as defined in the Maintaining a Product to Classification Link Type topic
- Changing product to classification link types to or from being multi valued, as defined in the Maintaining a Product to Classification Link Type topic
- Merging LOVs (unless neither LOV is in use by an attribute), as defined in the Merging LOVs topic
- Removing object types, as defined in the Deleting an Object Type topic
- Unlinking object types, as defined in the Unlinking Object Types topic
- Changing the revisability setting of an entity object type, as defined in the Revisability on Entity Object Type topic
- Changing the validity of a data container type for an entity type, as defined in the Setting Up Data Container Types in Workbench topic
- Changing data container types to or from being multi valued, as defined in the Setting Up Data Container Types in Workbench topic

Note: All changes previously requiring SUM have been implemented with LFSC with one exception. It is not possible with LFSC to change the Owns Product Links setting on a classification object type.

Using / Switching to LFSC: Considerations

In addition to the information above, there are multiple things that must be considered before using LFSC by default (Cassandra) or switching to and using LFSC (Oracle):

- LFSC runs in a background process (BGP), and it is VITAL that this process is allowed to finish. If it fails, it must be resumed or deleted in order to get cleaned up again.
  - You can monitor the 'Schema Change' background process.
- If you are unable to do anything else in the workbench or Web UI after manually initiating an LFSC (i.e., the UI appears unresponsive), and the Reading / Writing Data pop-up displays, close out the session you started the process in and create a new session.
- Changes made via LFSC do not retain the revision history.
- It can take longer to complete an LFSC operation than a SUM update.

Customers with huge amounts of data can benefit from LFSC, because on those systems with LFSC enabled, it is often very hard to get into SUM. When in SUM, it can block the system for long periods of time.

It is important to consider all implications when deciding to use LFSC.

Enabling the LFSC Functionality

Oracle database systems running In-Memory can opt to use LFSC over SUM. No action is needed for Cassandra systems.

For on-premise or SaaS systems, create an issue in the Stibo Systems Service Portal for assistance.

Metrics

Metrics evaluate data and return an integer between 1 and 100. The returned integer, known as a 'metric score', can be used in the profiling of objects and is vital for generating data policies.

Several different metric types are available:

- Completeness Metrics
- Value Metrics
- Business Function Metrics
- Aggregator Metrics
- PDX Channel Metric
- Attribute Comparison Metric
- Attribute Value Analysis Metric
- Conditional Attribute Value Metric
- Number of Referenced Target Object Metrics

In addition to information about the different metric types, this section also covers initial setup of metrics in STEP, creating and editing metrics, and information about viewing the metrics in Web UI and workbench.

Aggregator Metrics

An aggregator metric allows users to combine scores from multiple metrics. By default, the aggregator metric returns an average score based on these combined scores; however, by adding a business function to an aggregator metric, users are able to obtain scores based on other variables, e.g., if one metric is weighted heavier than another metric within the aggregator metric, the score would reflect the difference based on the weight of each metric.

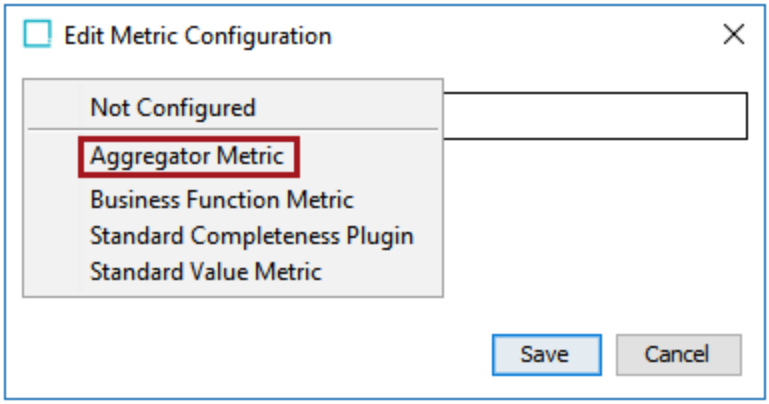
Aggregator Metric Configuration

Before metrics can be created, a Setup Group must be configured to hold them. For information on configuring a setup group for metrics, refer to the **Initial Setup for Metrics** topic in the **Metrics** documentation.

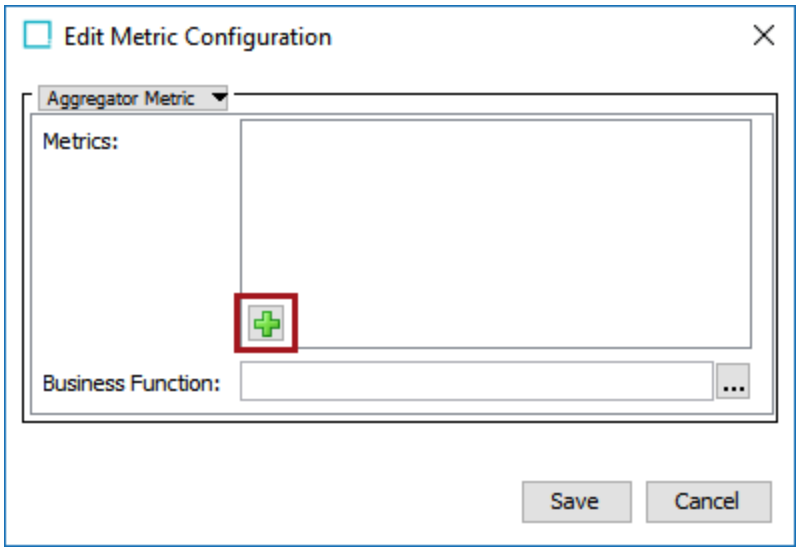
For information on creating a metric, refer to the **Creating and Editing Metrics** topic in the **Metrics** documentation.

To configure an aggregator metric:

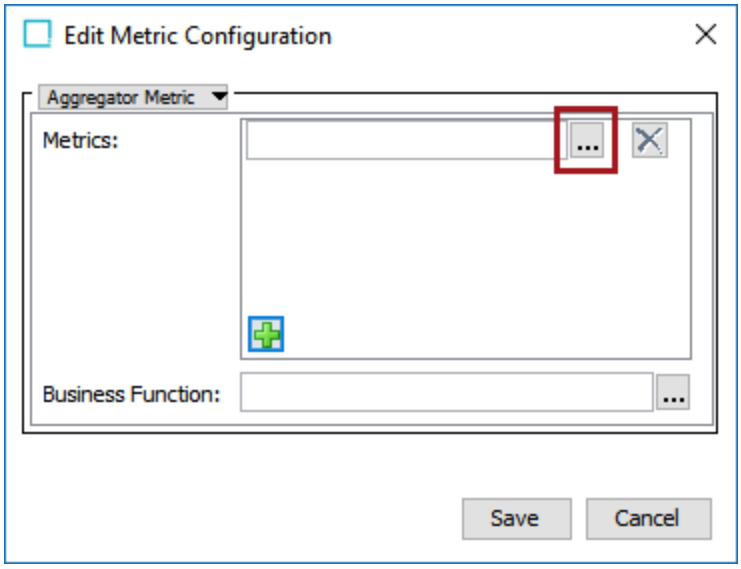
1. From the Edit Metric Configuration wizard, select 'Aggregator Metric.'



2. Click the green plus sign.

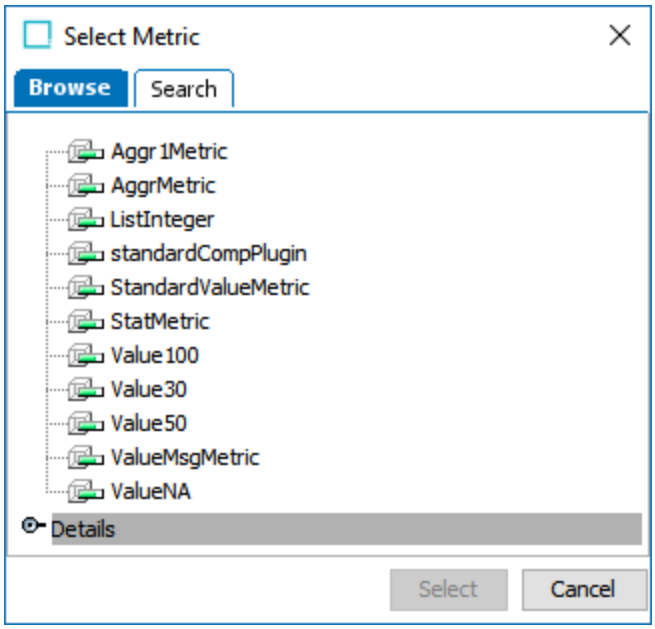


3. Click the ellipsis button.

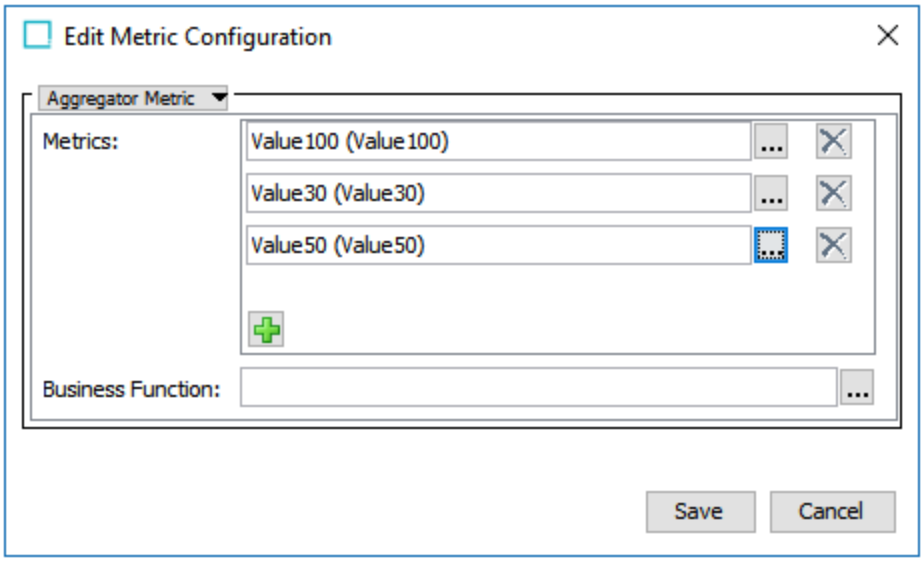


4. Select the metric you want to include in the aggregator metric and click 'Select.'

Note: Only one metric can be selected at a time. After a metric is selected, the green plus button must be clicked on again to add another metric.



In the image below, three metrics have been selected from the available metric list.

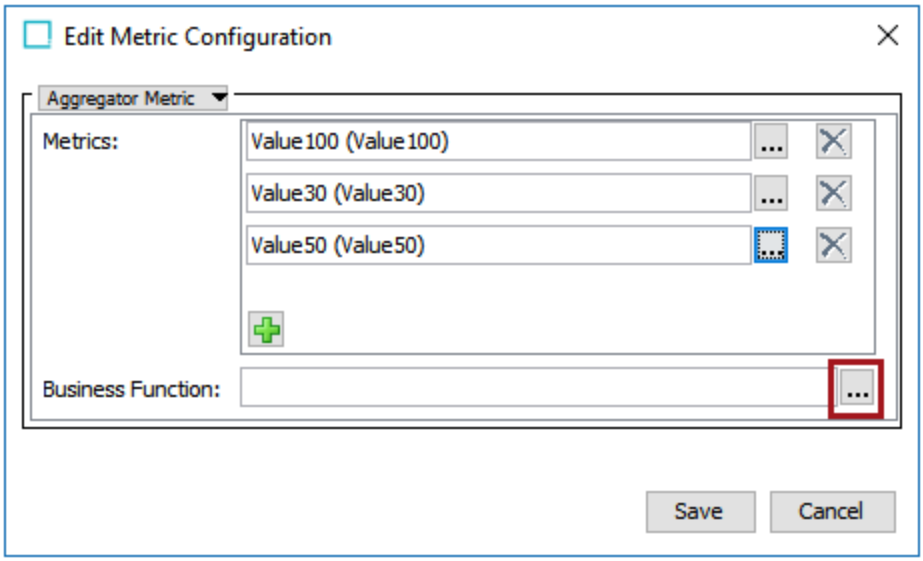


Adding a business function to an aggregator metric

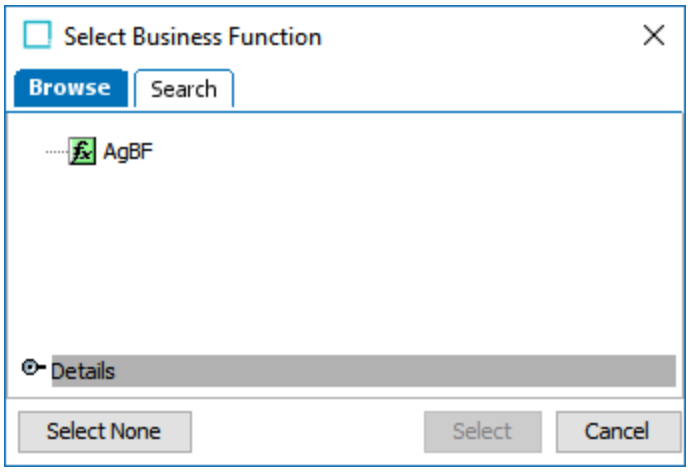
Although optional, the purpose of adding a business function to an aggregator metric is to return a score that is not the average score of the configured metrics. If no business function is selected, the returned score will be the average score of the configured metrics included in the aggregator metric.

To add a business function to an aggregator metric:

1. Click on the business function ellipsis.



2. Select a business function and click the 'Select' button.

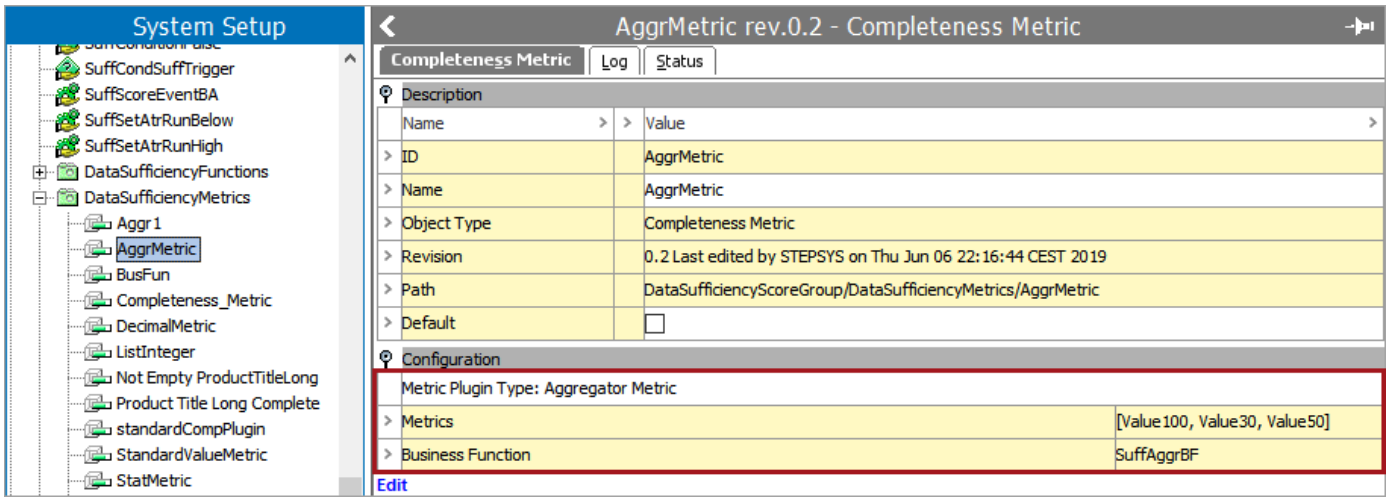


3. Click 'Save' to close the 'Edit Metric Configuration' wizard.

The aggregator metric is configured and ready for use.

Note: To use a business function with an aggregator metric, the input parameter type must be set to 'List<MetricResult>' and the return type must be an integer. Business functions without these configuration settings will not be available as a valid option within the Select Business Function window. For more information on business functions, refer to the **Business Functions** topic in the **Functions** documentation.

With the configured metric selected, the name of the metric plugin type (in this case, 'Aggregator Metric'), the metrics included in the aggregator metric, and the name of the selected business function will be listed under the Configuration flipper.


System Setup
SuffCondSuffTrigger
SuffScoreEventBA
SuffSetAtrRunBelow
SuffSetAtrRunHigh
DataSufficiencyFunctions
DataSufficiencyMetrics
Aggr1
AggrMetric
BusFun
Completeness_Metric
DecimalMetric
ListInteger
Not Empty ProductTitleLong
Product Title Long Complete
standardCompPlugin
StandardValueMetric
StatMetric
AggrMetric rev.0.2 - Completeness Metric
Completeness Metric
Log
Status
Description
Name
Value
ID
AggrMetric
Name
AggrMetric
Object Type
Completeness Metric
Revision
0.2 Last edited by STEPSYS on Thu Jun 06 22:16:44 CEST 2019
Path
DataSufficiencyScoreGroup/DataSufficiencyMetrics/AggrMetric
Default
Configuration
Metric Plugin Type: Aggregator Metric
Metrics
[Value100, Value30, Value50]
Business Function
SuffAggrBF
Edit

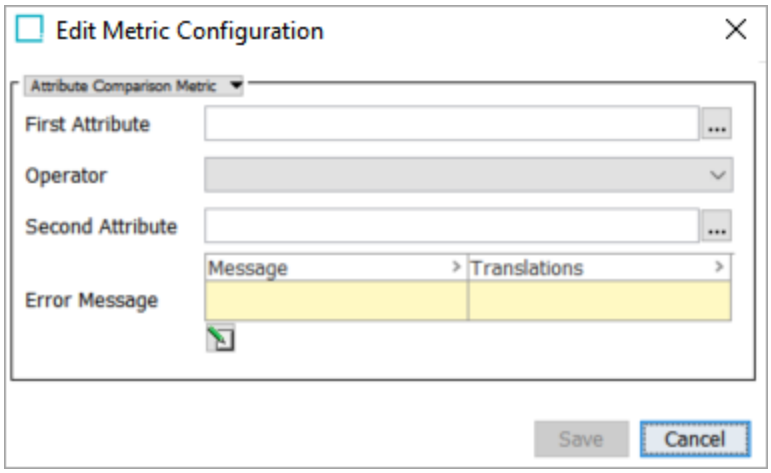
Attribute Comparison Metric

The Attribute Comparison Metric compares the values of two selected attributes based on an operator selected by the user, and returns a score of '100' (true) or '0' (false). Users are able to create an error message for instances when the metric returns a score of '0'; this message is meant to detail the reason for the '0' score and can have multiple translations.

Important: Metrics are used in conjunction with sufficiencies to determine the quality and completeness of a product's data. While this topic covers the functionality and configuration of the Attribute Comparison Metric, it is important that users are also familiar with sufficiencies and how they are combined with metrics. Information regarding sufficiencies can be found in the **Sufficiency Configuration Type** topic.

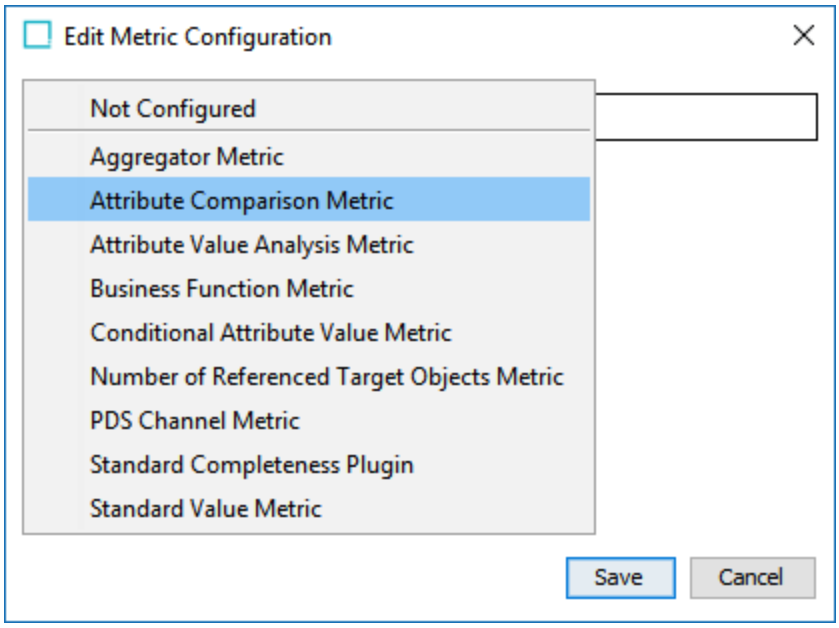
Prerequisites

Before metrics can be created, a Setup Group must be configured. For information on configuring a setup group for metrics, refer to the **Initial Setup for Metrics** topic in the **Metrics** documentation. For information on creating a metric, refer to the **Creating and Editing Metrics** topic in the **Metrics** documentation.



Attribute Comparison Metric configuration

1. From the Edit Metric Configuration wizard, select 'Attribute Comparison Metric.'



2. With the Attribute Comparison Metric selected, click the ellipsis buttons (...) to select the attributes that you want to compare and select an operator from the 'Operator' dropdown list.

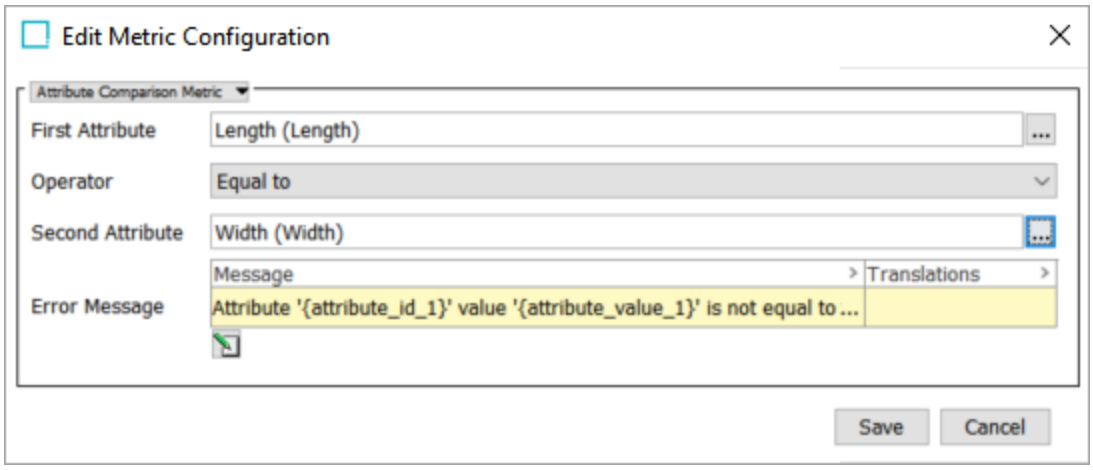
   Once an operator is selected from the 'Operator' dropdown list, a default error message will appear in the 'Error Message' text field, based on the selected operator.

   Operator options include:

   - Equal to
   - Not Equal to
   - Contained in
   - Greater than
   - Less than

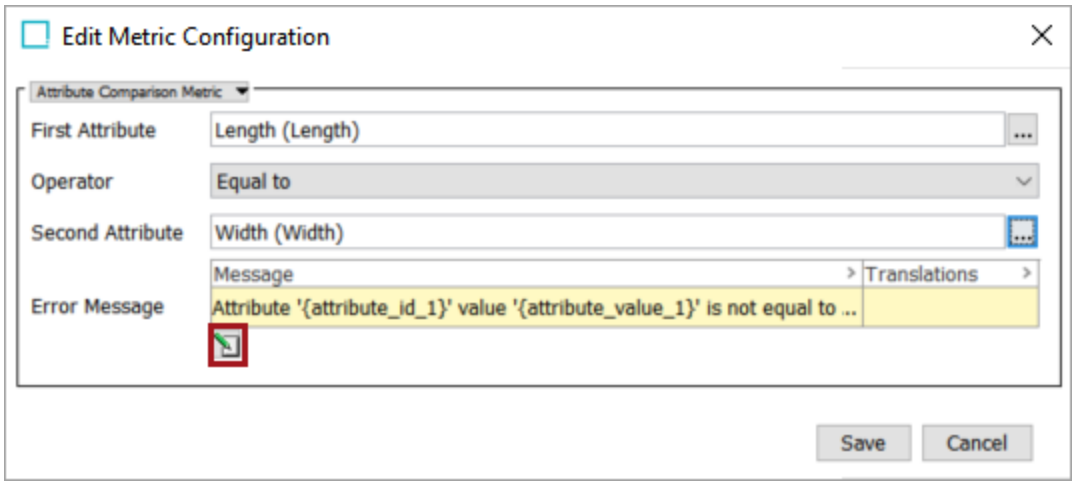
   Note: If the first attribute and/or second attribute has a value that is not a number, the 'Greater than' and 'Less than' operators will not be available.

   In the example below, the user has selected 'Length' for the first attribute, 'Width' for the second attribute, and 'Equal to' for the operator. If the value for the first attribute is equal to the value for the second attribute, then the returned score will be '100' (true). If the value for the first attribute is not equal to the value of the second attribute, then the returned score will be '0' (false), and will be accompanied with a message, as displayed in the 'Error Message' text field.



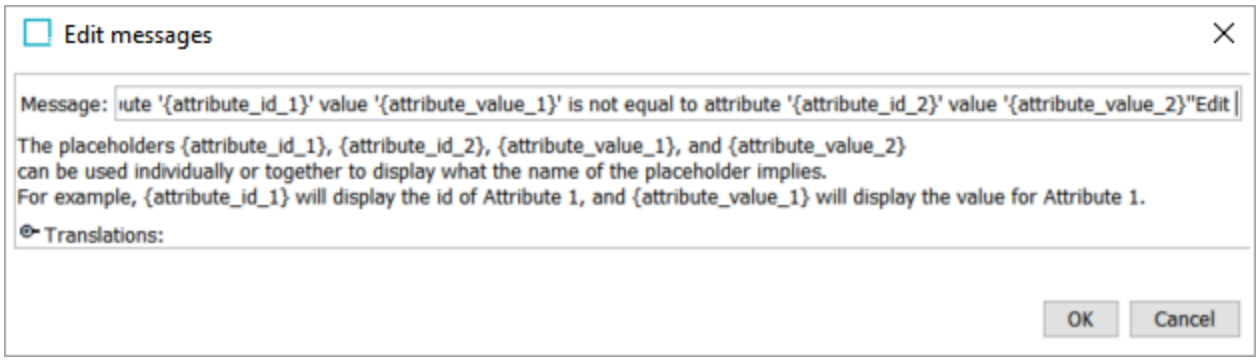
Note: If the user selects an attribute that is not valid for a product, the metric will be considered non-applicable for that product and no data quality information will be produced when the Sufficiency Data Calculator event processor is run.

3. To edit the error message and/or add additional translations, click on the 'Error Message' editor button.

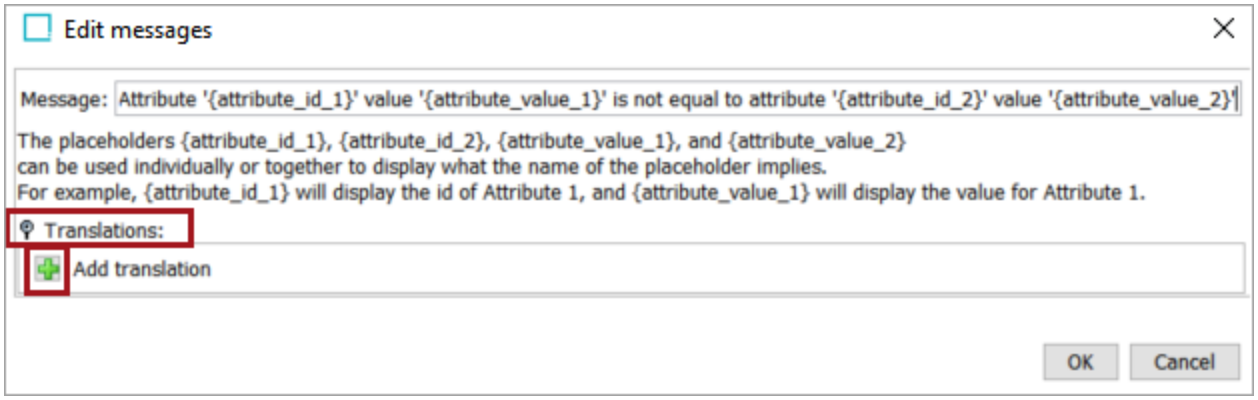


The 'Edit messages' window appears. Note that the 'Message' text field is editable. Descriptive text below the text field describes in detail how the placeholders included in the error message work in order to create an error message. Although the default error message (or something similar) is suggested, users are able to edit the error message, depending on their individual needs.

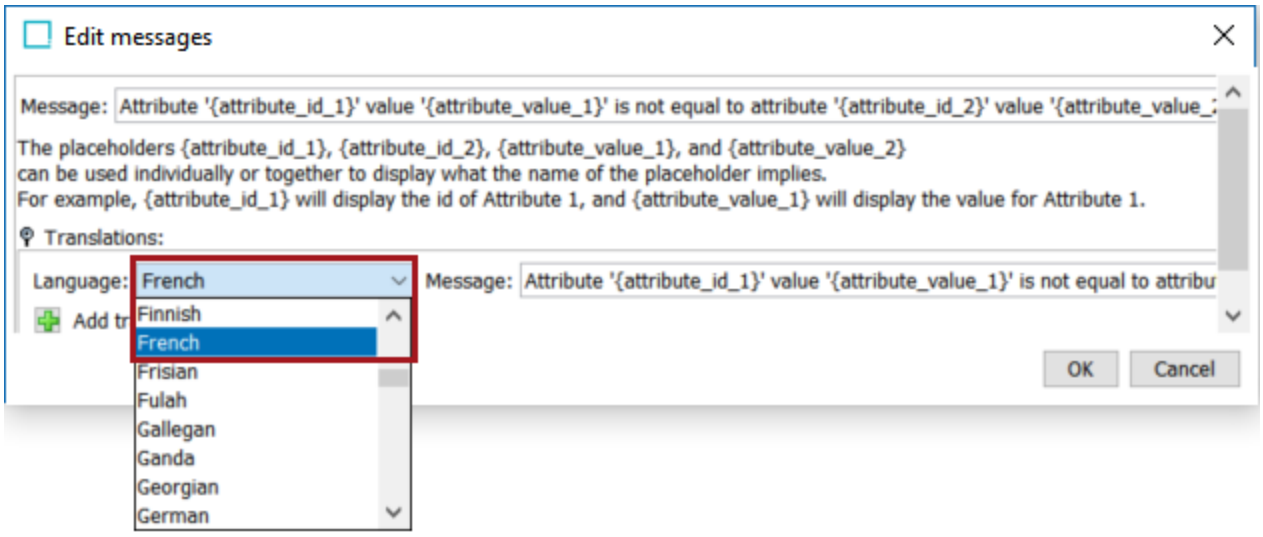
Note: Although the error message can be edited by the user, the placeholders themselves (attribute_id and attribute_value) cannot be edited. If the placeholders are edited, the user will receive a validation error message when attempting to save the edited message. When the metric is run, placeholders are replaced by the 'real values,' e.g., 'attribute_id' would be replaced with the name of the attribute that the metric is evaluating.



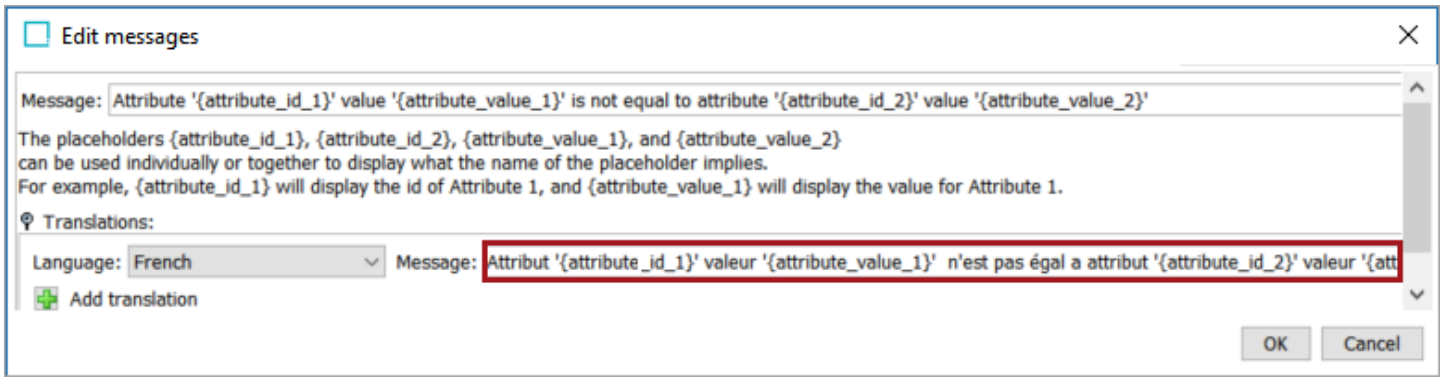
4. Select the 'Translations' flipper and click the green plus sign located next to 'Add translation.'



5. Click on the arrow located in the 'Language' dropdown menu; in the example below, the user has opened the dropdown menu and selected 'French.'



6. Once a language is selected, edit the message to reflect the language specified for translation.

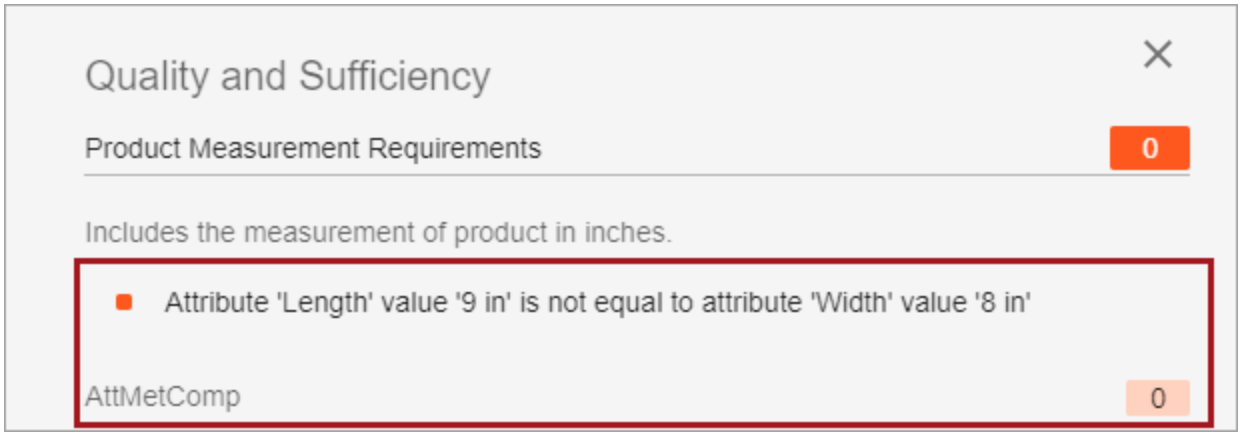


7. Click the green plus sign to add another translation or 'OK' to close the 'Edit messages' window.
8. Click 'Save' to close the Edit Metric Configuration wizard.

The metric is saved.

Note: Translation error messages are displayed by using locales; they are not context-dependant. For more information about locales, refer to the **Localization** topic in the **Administrative Portal** documentation. For more information about localized messages, refer to the **Localized Messages for JavaScript Business Rules** topic in the **Business Actions** documentation.

Once the metric is added to a sufficiency and the sufficiency is run, the results are displayed in the sufficiency panel within the Web UI. In the example below, the Attribute Comparison Metric (for this example, titled 'AttMetComp') has been added to the sufficiency 'Product Measurement Requirements,' and returned a score of '0' because the attribute 'Length' value (9 in) is not equal to the attribute "Width' value (8 in), as detailed in the returned message.

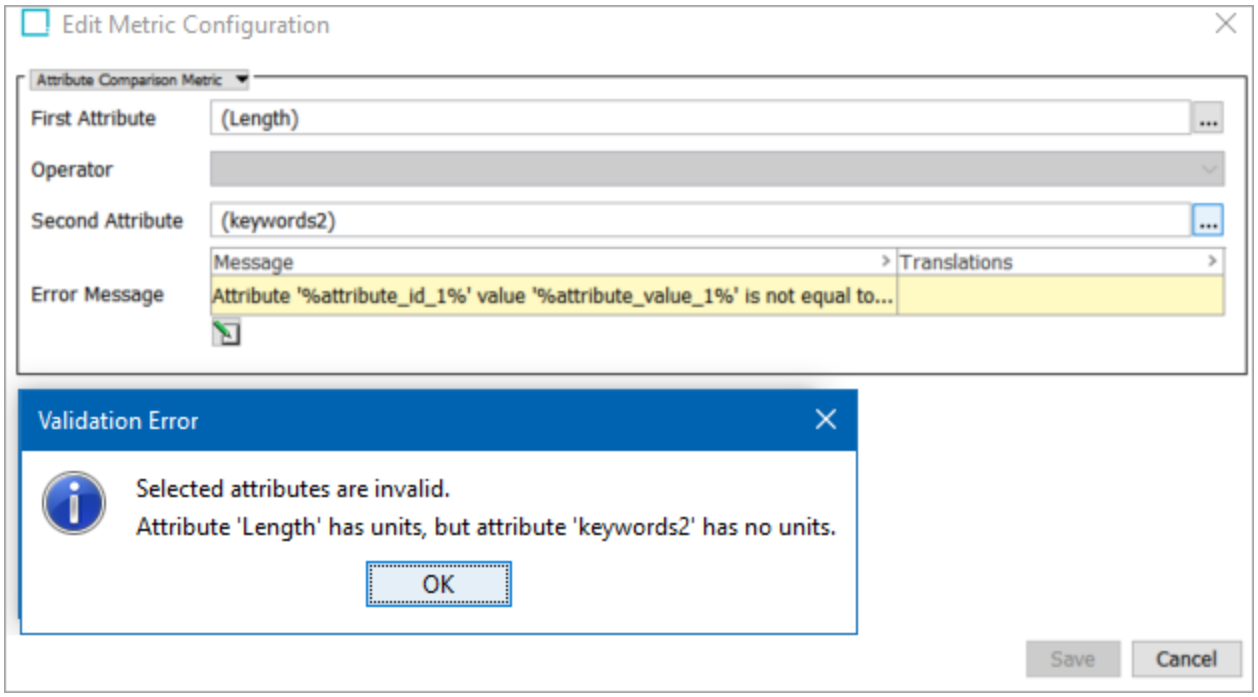


Validation Errors

In certain instances, validation errors can occur, depending on the attributes selected for comparison. A validation error (accompanied by an error message) will occur if:

- The selected attributes have the same ID.
- One selected attribute is multivalued and the other selected attribute is not multivalued.
- One selected attribute includes a unit and the other selected does not include a unit of measure.

In the example below, the first attribute 'Length' has units, whereas the second attribute 'keywords2' does not have units. Because of the incompatibility, a validation error occurs, with an error message that describes the reason for the error.



The following instances will also produce validation errors. However, these errors will not appear until the metric is run. The error message will appear in the Background Process Log of the Data Sufficiency Calculator event processor.

- Both selected attributes have units, but one of the units does not have a set default unit, and no unit information is provided for the attribute value by the user (in the product).
- Both selected attributes have units, but the units do not have the same base unit.
- Both selected attributes have units, but one or both of the selected attributes do not have a base unit conversion rule.

For more information regarding units, including base units and conversion rules, refer to the **Units** topic in the **System Setup** documentation.

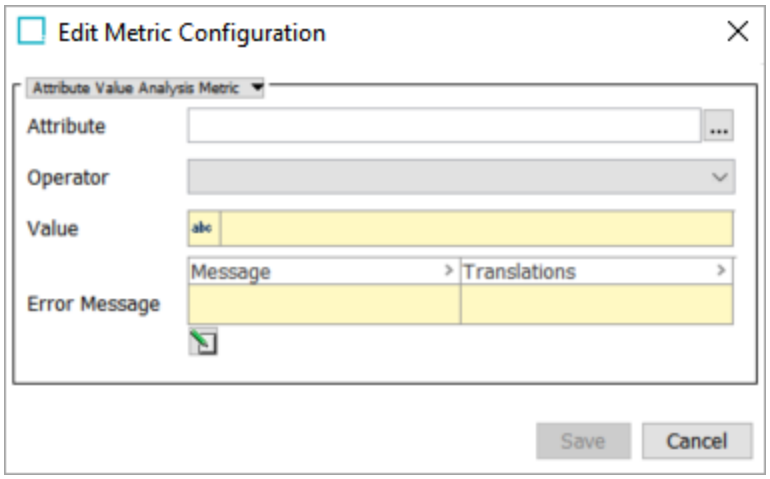
Attribute Value Analysis Metric

The Attribute Value Analysis Metric analyzes the value of a selected attribute based on an operator selected by the user, and returns a score of '100' (true) or '0' (false). Users are able to create an error message for instances when the metric returns a score of '0'; this message is meant to detail the reason for the '0' score and can have multiple translations.

Important: Metrics are used in conjunction with sufficiencies to determine the quality and completeness of a product's data. While this topic covers the functionality and configuration of the Attribute Comparison Metric, it is important that users are also familiar with sufficiencies and how they are combined with metrics; information regarding sufficiencies can be found in the **Sufficiency Configuration Type** documentation.

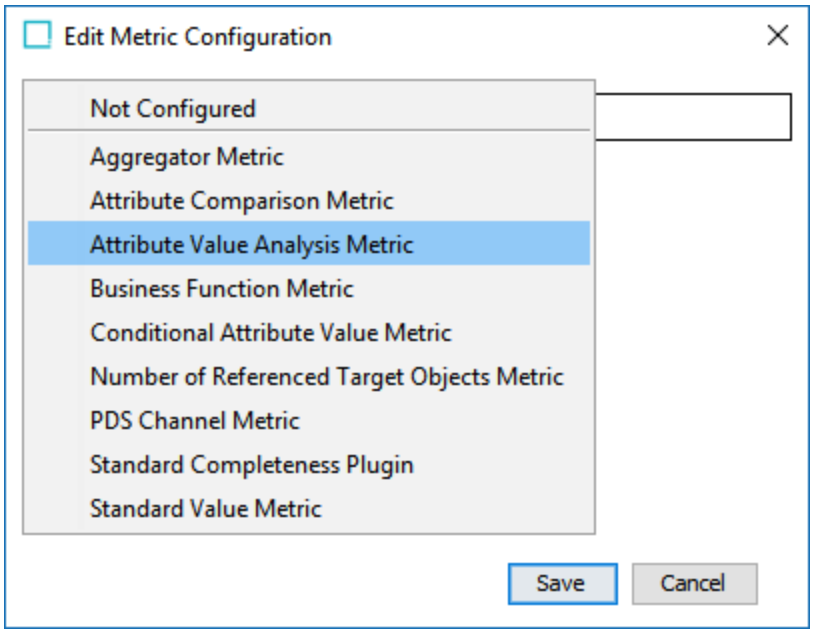
Prerequisites

Before metrics can be created, a Setup Group must be configured to hold them. For information on configuring a setup group for metrics, refer to the **Initial Setup for Metrics** topic in the **Metrics** documentation. For information on creating a metric, refer to the **Creating and Editing Metrics** topic in the **Metrics** documentation.



Attribute Value Analysis Metric configuration

1. From the Edit Metric Configuration wizard, select 'Attribute Value Analysis Metric.'



2. With the Attribute Analysis Metric selected, click the ellipsis button (...) to select the attribute that you want to analyze, select an operator from the 'Operator' dropdown list, and input a value into the 'Value' text field.

   Once an operator is selected from the 'Operator' dropdown list, a default error message will appear in the 'Error Message' text field, based on the selected operator.

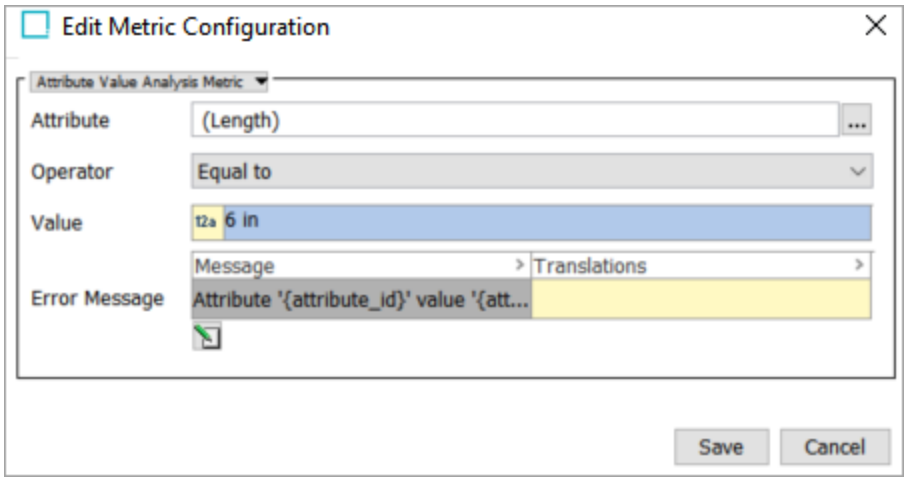
   Operator options include:

   - Is empty
   - Is not empty
   - Equal to
   - Not Equal to
   - Contains
   - Regular expression
   - Greater than
   - Less than
   - Length is equal to
   - Length is greater than
   - Length is less than

   Note: If the attribute selected has a validation base type that does not allow for numbers, the 'Greater than' and 'Less than' operator options will not be available. If 'Is empty' or 'Is not empty' is selected as an operator, the 'Value' text field will be disabled.

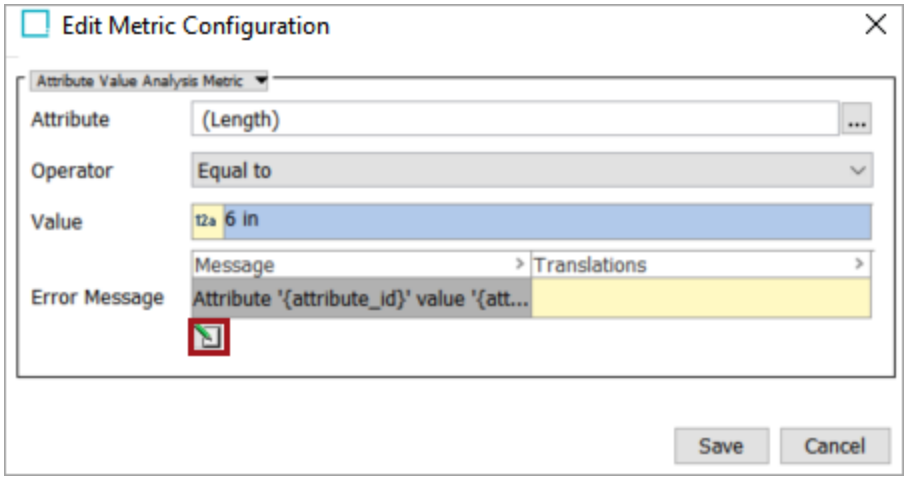
In the example below, the user has selected 'Length' for the attribute and 'Equal to' for the operator. The user wants to know if the value of the 'Length' attribute is equal to '6 in.' If it is, then the returned score will be '100' (true). If it is not, then the returned score will be '0' (false), and this score will be accompanied with a message, as displayed in the 'Error Message' text field.

Note: In this example, the Value text field includes a validation base type of 'Numeric Text' (displayed as '12a'). The validation base type displayed in the Value text field is dependent on the validation base type of the attribute selected by the user for analysis. For information regarding validation base types, refer to the **Base Unit ID, Name, and Value Aspects** topic in the **Outbound Map Data** documentation.



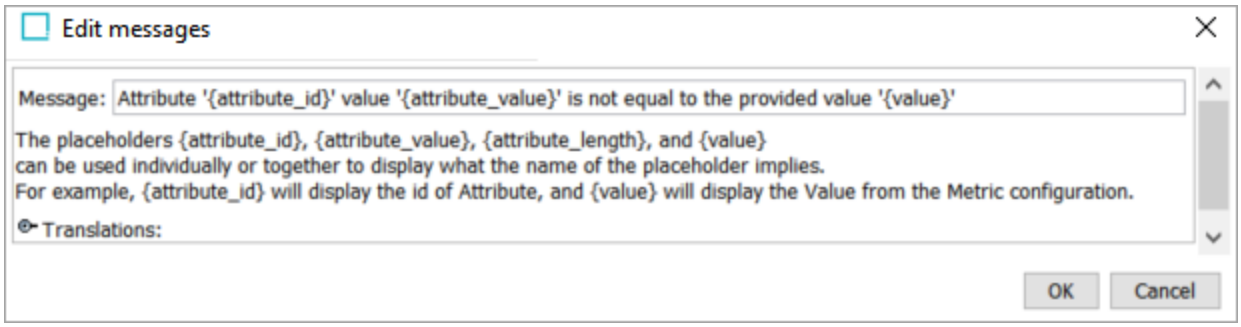
Note: If the user selects an attribute that is not valid for a product, the metric will be considered non-applicable for that product and no data quality information will be produced when the Sufficiency Data Calculator event processor is run.

3. To edit the error message and/or add additional translations, click on the 'Error Message' editor button.

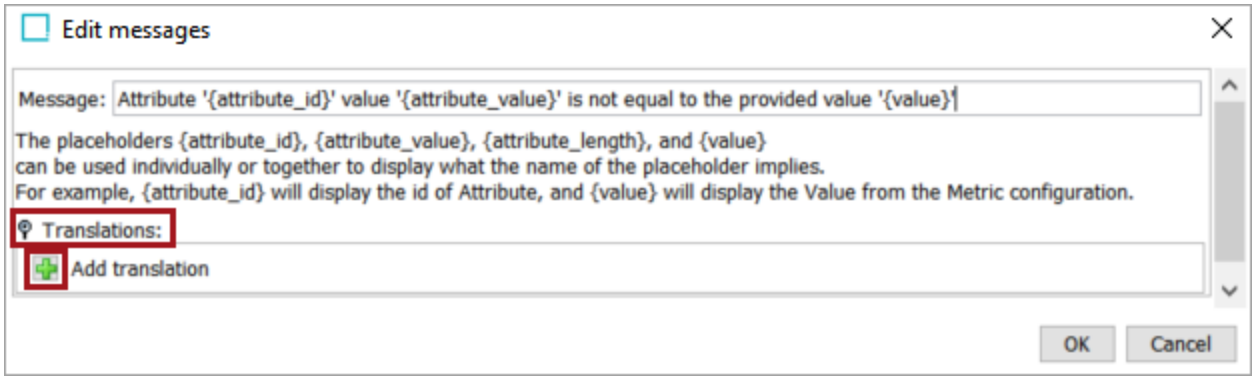


The 'Edit messages' window appears. Note that the 'Message' text field is editable. Descriptive text below the text field describes in detail how the placeholders included in the error message work in order to create an error message. Although the default error message (or something similar) is suggested, users are able to edit the error message, depending on their individual needs.

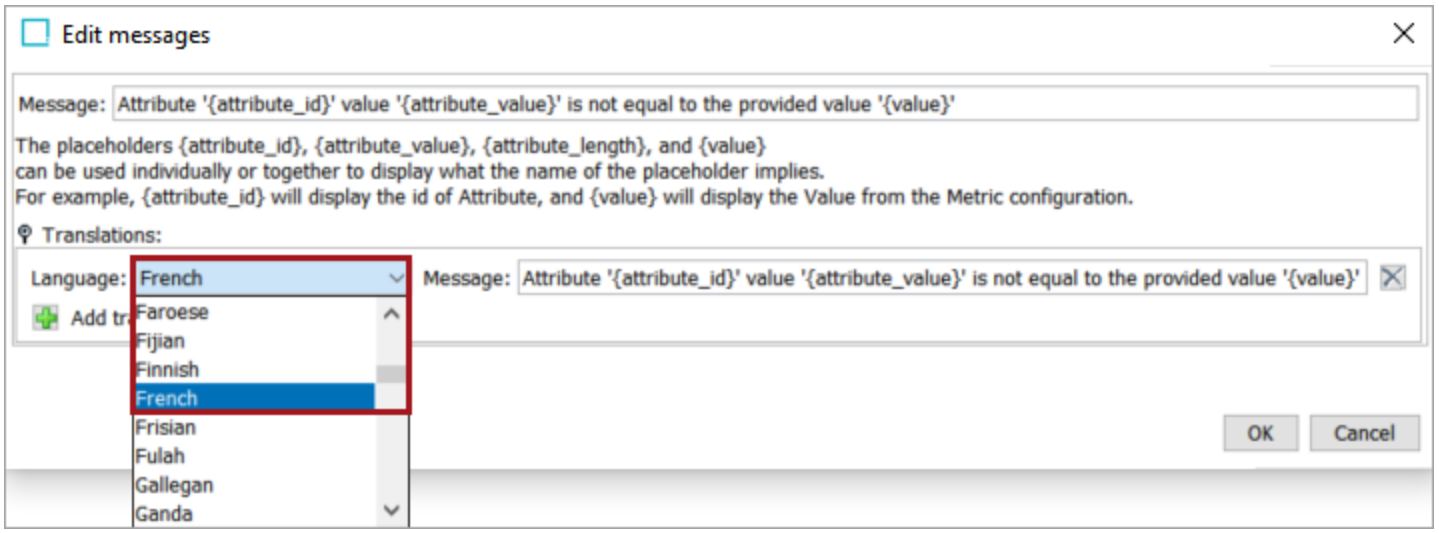
Note: Although the error message can be edited by the user, the placeholders themselves (attribute_id, attribute_value) cannot be edited. If the placeholders are edited, the user will receive a validation error message when attempting to save the edited message. When the metric is run, placeholders are replaced by the ' real values,' e.g., 'attribute_id' would be replaced with the name of the attribute that the metric is evaluating.



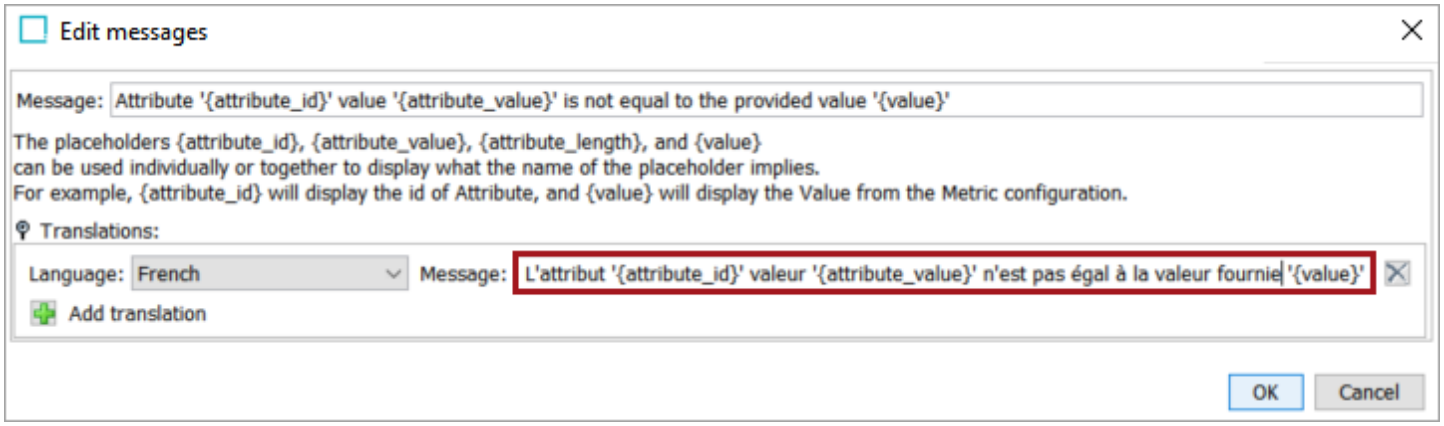
4. Select the 'Translations' flipper and click the green plus sign located next to 'Add translation.'



5. Click on the arrow located in the 'Language' dropdown menu; in the example below, the user has opened the dropdown menu and selected 'French.'



6. Once a language is selected, edit the message to reflect the language specified for translation.

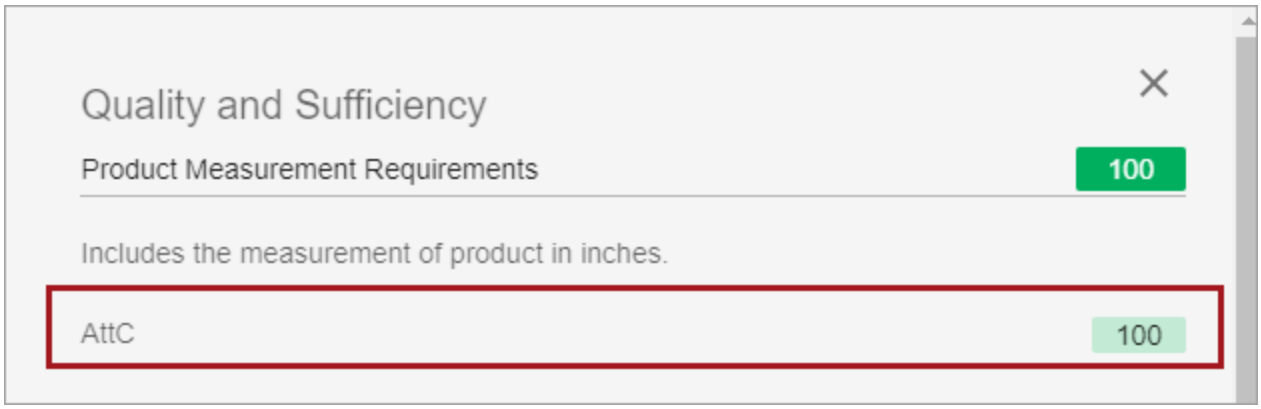


7. Click the green plus sign to add another translation or 'OK' to close the 'Edit messages' window.
8. Click 'Save' to close the Edit Metric Configuration wizard.

The metric is saved.

Note: The localized error messages are displayed by using locales; they are not context-dependent. For more information about locales, refer to the **Localization** topic in the **Administrative Portal** documentation. For more information about localized messages, refer to the **Localized Messages for JavaScript Business Rules** topic in the **Business Actions** documentation.

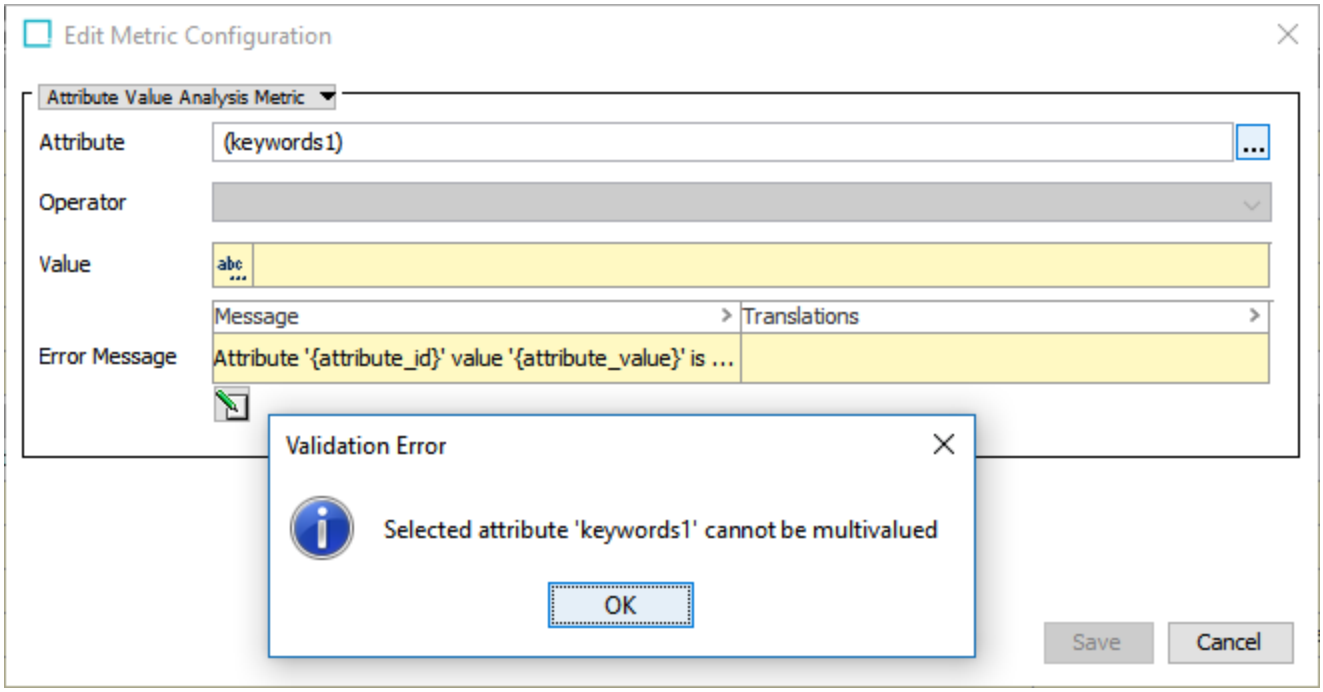
Once the metric is added to a sufficiency and the sufficiency is run, the results are displayed in the sufficiency panel within the Web UI. In the example below, the Attribute Value Analysis Metric (titled 'AttC') has been added to the sufficiency 'Product Measurement Requirements,' and returned a score of '100' because the attribute 'Length' value is equal to '6 in,' which was the value input into the metric. Because the returned score is '100' and not '0,' there is no accompanying error message.



Validation Errors

In certain instances validation errors can occur, depending on the attribute selected for analysis. A validation error (accompanied by an error message) will occur if:

- The provided value is not valid based on the selected attribute validation base type.
- The selected attribute is multivalued.



The following instances will also produce validation errors. However, these errors will not appear until the metric is run. The error message will appear in the Background Process Log of the Data Sufficiency Calculator event processor.

- The selected attribute has a unit but the value provided by the user in the metric configuration has no unit.
- The selected attribute has no unit but the value provided by the user in the metric configuration has a unit.
- The selected attribute and the value provided by the user in the metric configuration have different base unit conversion rules.
- The selected attribute's unit and/or the value's unit provided by the user in the metric configuration has no base unit conversion rule.

For more information regarding units, including base units and conversion rules, refer to the **Units** topic in the **System Setup** documentation.

Business Function Metrics

Business Function metrics use JavaScript business functions to evaluate data and return metric scores, and depending on the JavaScript, messages that provide more detailed information about the returned scores.

For information on business functions, refer to the **Business Functions** topic of the **Business Rules** documentation.

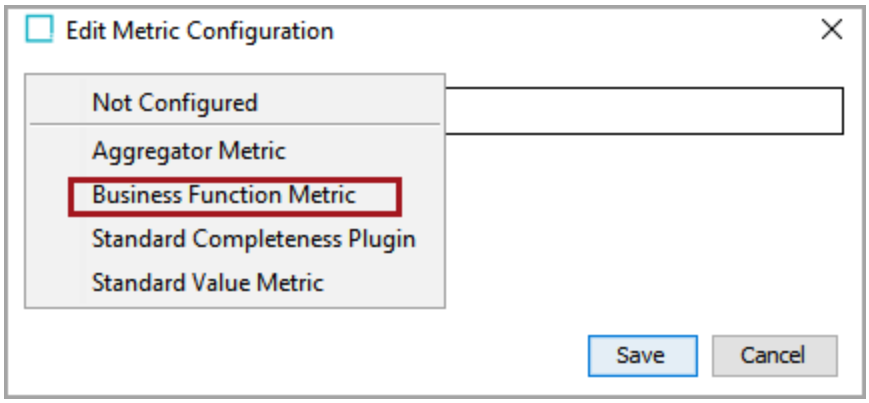
Business Function Metric Configuration

Before metrics can be created, a Setup Group must be configured to hold the metrics. For information on configuring a setup group for metrics, refer to the **Initial Setup for Metrics** topic in the **Metrics** documentation.

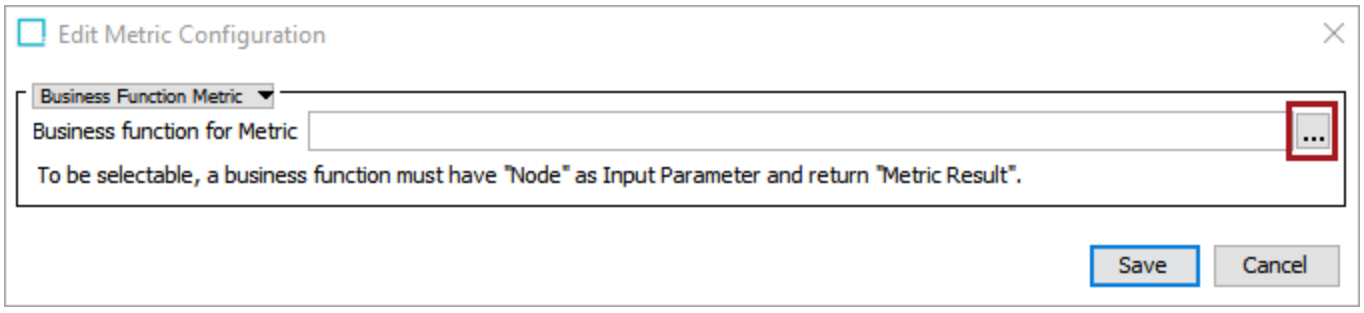
For information on creating a metric, refer to the **Creating and Editing Metrics** topic in the **Metrics** documentation.

To configure a business function metric:

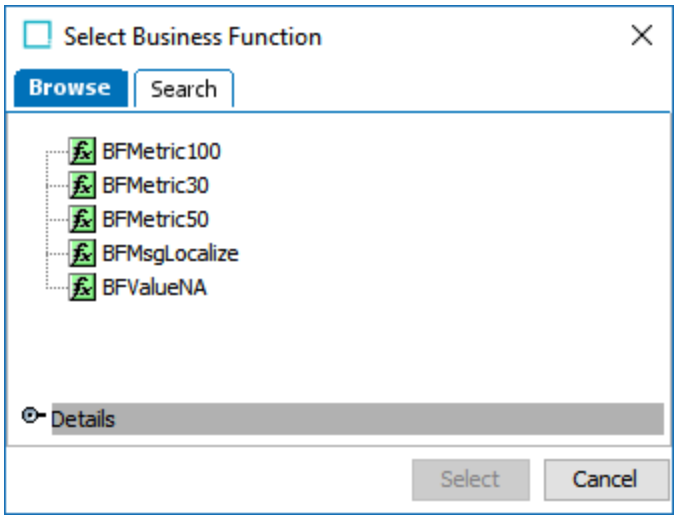
1. From the Edit Metric Configuration wizard, select 'Business Function Metric.'



2. Click the ellipsis button (...) by the **Business function for Metric** parameter.



3. Select the business function to include as part of the business function metric. To search for a specific business function, click the 'Search' tab and enter the search criteria.



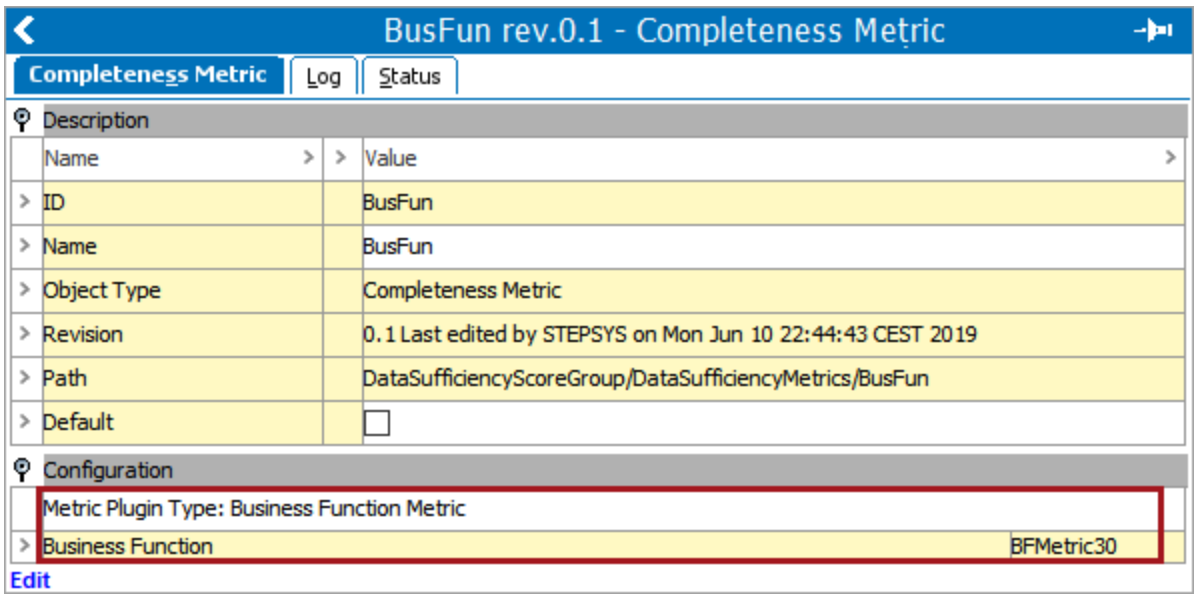
Note: For a business function to be selectable for a business function metric, it must have 'Node' as the input and 'MetricBusinessFunctionResult' as the return type.

4. Click 'Save' to close the 'Edit Metric Configuration' wizard.

The business function metric is configured and ready for use.

Important: The MetricBusinessFunctionResult of a JavaScript business function must be instantiated directly in the business function. It cannot be instantiated by a JavaScript library.

With the configured metric selected, the name of the metric plugin type (in this case, 'Business Function Metric') and the name of the selected business function will be listed under the Configuration flipper.



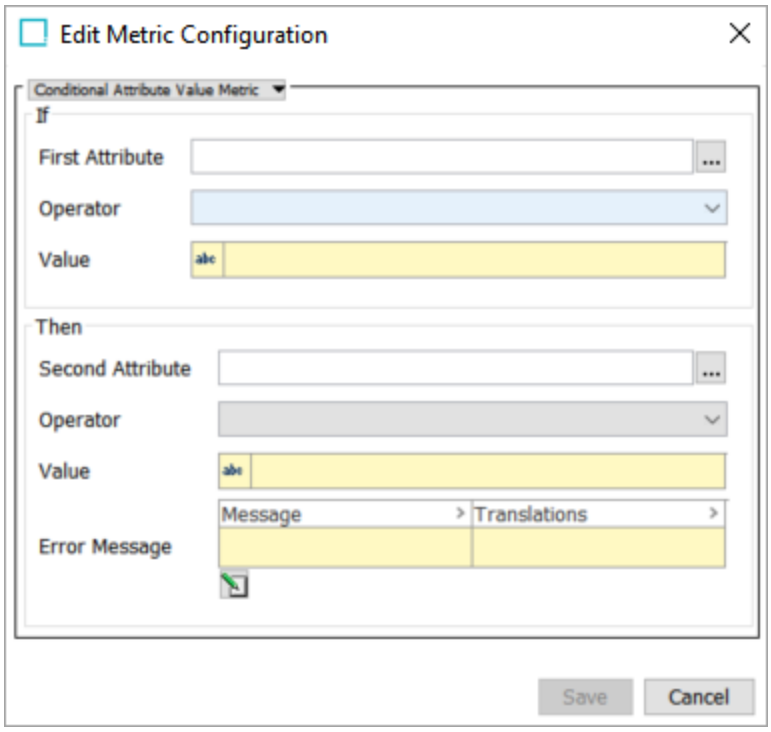
Conditional Attribute Value Metric

The Conditional Attribute Value Metric evaluates the value of a selected attribute based on an operator, and if that evaluation returns as true, then the metric will proceed and evaluate the value of another selected attribute based on an operator. The results of the evaluation (based on the selected operator for the second attribute) are either a '100' (true) or '0' (false).

Important: Metrics are used in conjunction with sufficiencies to determine the quality and completeness of a product's data. While this topic covers the functionality and configuration of the Conditional Attribute Value Metric, it is important that users are also familiar with sufficiencies and how they are combined with metrics. Information regarding sufficiencies can be found in the **Sufficiency Configuration Type** topic.

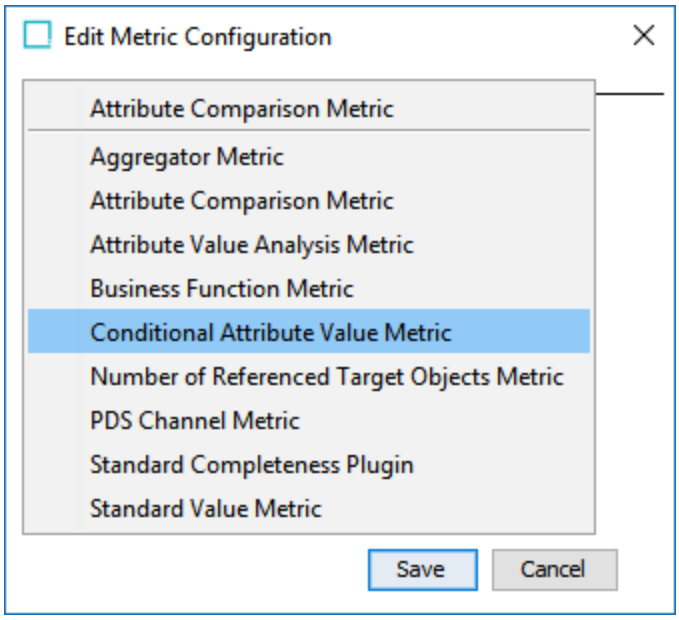
Prerequisites

Before metrics can be created, a Setup Group must be configured to hold them. For information on configuring a Setup Group for metrics, refer to the **Initial Setup for Metrics** topic in the **Metrics** documentation. For information on creating a metric, refer to the **Creating and Editing Metrics** topic in the **Metrics** documentation.



Conditional Attribute Value Metric configuration

1. From the Edit Metric Configuration wizard, select 'Conditional Attribute Value Metric.'



2. With the Conditional Attribute Value Metric selected, in the 'If' section of the metric, click the ellipsis button to select the first attribute, select an operator from the operator dropdown menu, and input a value into the 'Value' text field. Repeat these actions for the parameters within the 'Then' section of the metric.

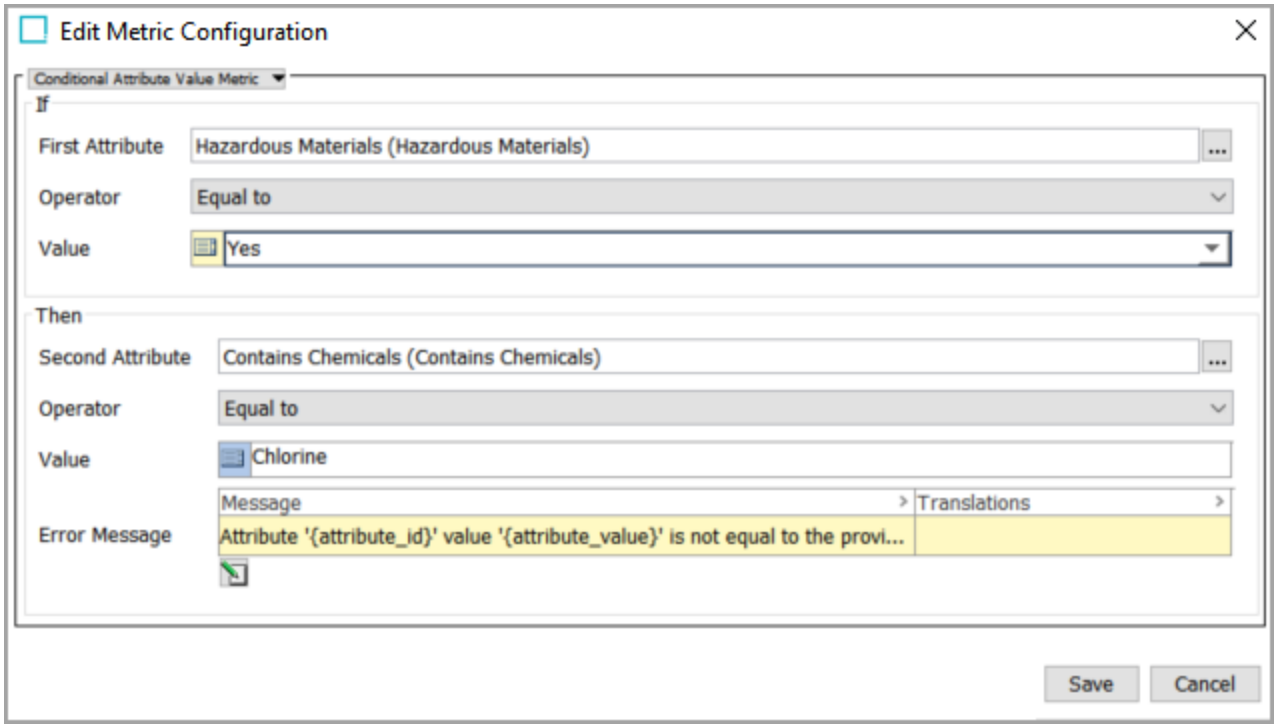
   Once an operator is selected from the 'Operator' dropdown list, a default error message will appear in the 'Error Message' text field, based on the selected operator.

   Operator options include:

   - Is empty
   - Is not empty
   - Equal to
   - Not equal to
   - Contains
   - Regular expression
   - Greater than
   - Less than
   - Length is equal to
   - Length is greater than
   - Length is less than

   Note: If the attribute selected has a validation base type that does not allow for numbers, the 'Greater than' and 'Less than' operator options will not be available. If 'Is empty' or 'Is not empty' is selected as an operator, the Value text field will be disabled.

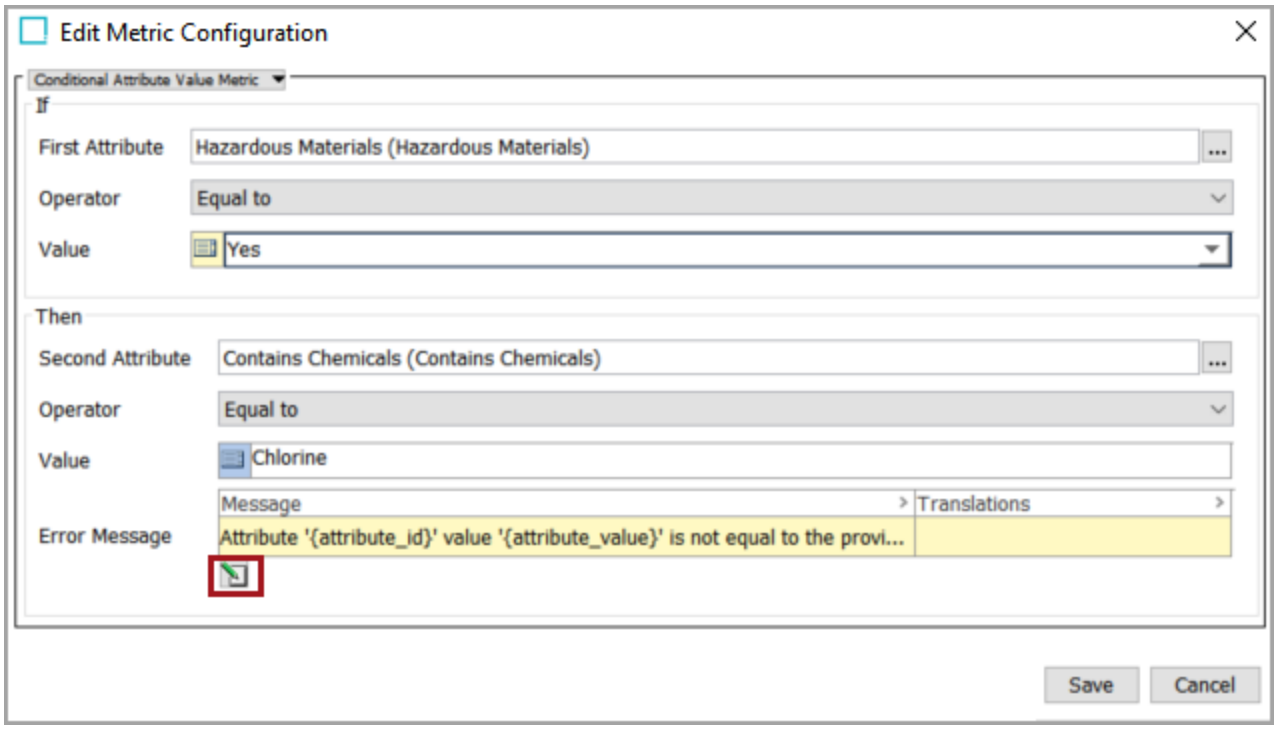
In the example below, in the 'If' section of the metric, the user has selected the attribute 'Hazardous Materials' for the first attribute, 'Equal to' for the operator, and input 'Yes' in the 'Value' text field. In the 'Then' section of the metric, the user has selected 'Contains Chemicals' for the second attribute, 'Contains' for the operator, and input 'Chlorine' in the 'Value' text field.



When run, this metric will first check the attribute value for 'Hazardous Materials;' if the value is equal to 'Yes,' it will then check the value for the attribute 'Contains Chemicals.' If the attribute value contains the word 'Chlorine,' a score of '100' will be returned. If the word 'Chlorine' is not present in the attribute value, it will return a score of '0' and display a message in the 'Message Preview' text field based on the 'Equal to' operator. If the first attribute 'Hazardous Materials' is not equal to 'Yes,' then the metric will not check the value for the second attribute.

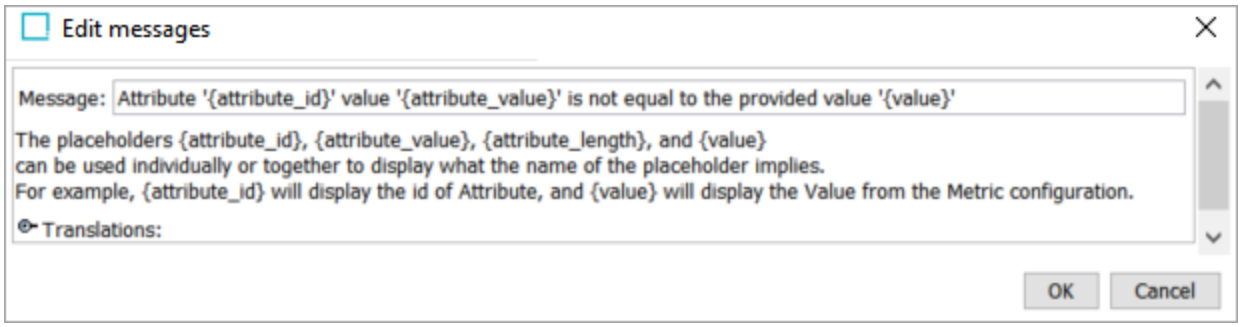
Note: If the user selects an attribute that is not valid for a product, the metric will be considered non-applicable for that product and no data quality information will be produced when the Sufficiency Data Calculator event processor is run.

3. To edit the error message and/or add additional translations, click on the Error Message editor button.

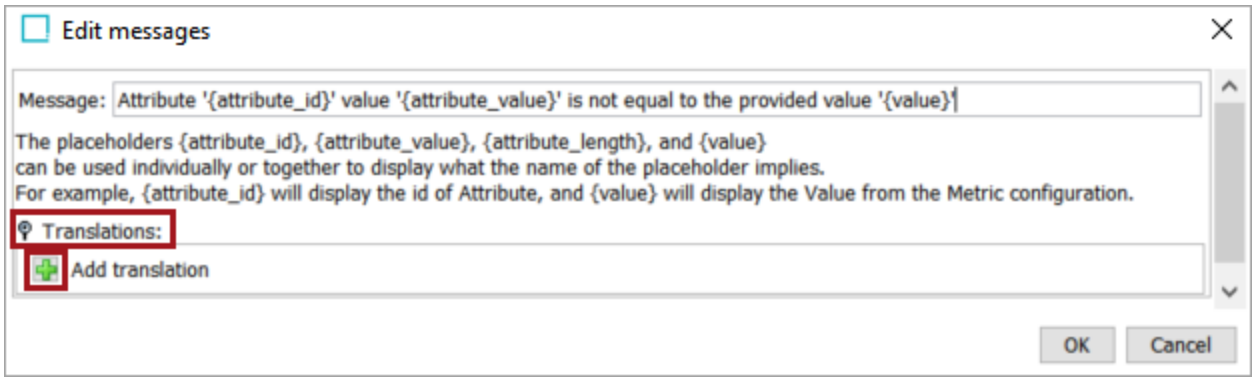


The 'Edit messages' window appears. Note that the 'Message' text field is editable. Descriptive text below the text field details how the placeholders included in the error message work in order to create an error message. Although the default error message (or something similar) is suggested, users are able to edit all or part of the error message, depending on their individual needs.

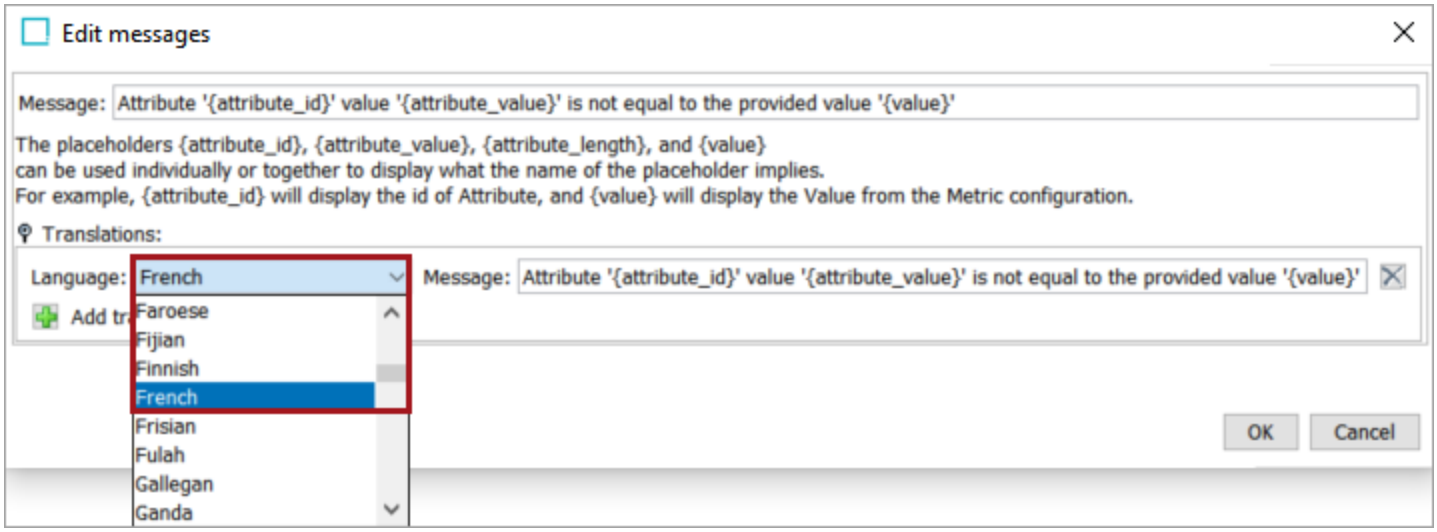
Note: Although the error message can be edited by the user, the placeholders themselves (e.g., attribute_id, attribute_value) cannot be edited. If the placeholders are edited, the user will receive a validation error message when attempting to save the edited message. When the metric is run, placeholders are replaced by the ' real values,' e.g., 'attribute_id' would be replaced with the name of the attribute that the metric is evaluating.



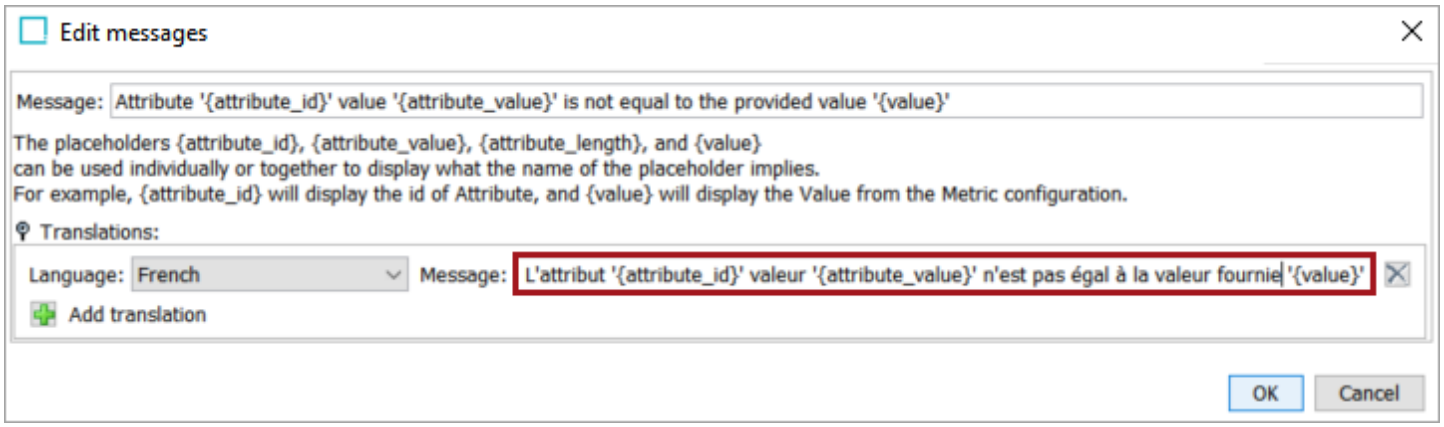
4. Select the 'Translations' flipper and click the green plus sign located next to 'Add translation.'



5. Click on the arrow located in the 'Language' dropdown menu; in the example below, the user has opened the dropdown menu and selected 'French.'



6. Once a language is selected, edit the message to reflect the language specified for translation.

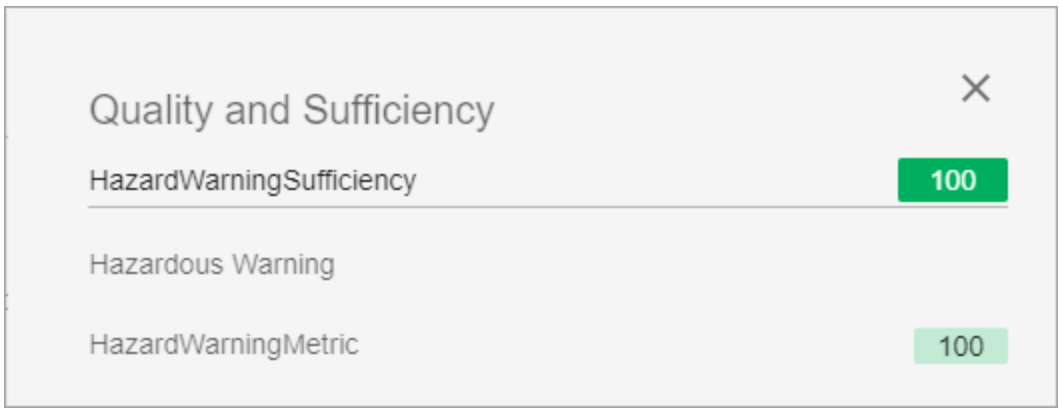


7. Click the green plus sign to add another translation or 'OK' to close the 'Edit messages' window.
8. Click 'Save' to close the Edit Metric Configuration wizard.

The metric is saved.

Note: The localized error messages are displayed by using locales; they are not context-dependent. For more information about locales, refer to the **Localization** topic in the **Administrative Portal** documentation. For more information about localized messages, refer to the **Localized Messages for JavaScript Business Rules** topic in the **Business Actions** documentation.

Once the metric is added to a sufficiency and the sufficiency is run, the results are displayed in the sufficiency panel within the Web UI. In the example below, the Conditional Attribute Value Metric (titled 'HazardWarningMetric') has been added to the sufficiency 'HazardWarningSufficiency,' and returned a score of '100' because the attribute 'Hazardous Materials' value is equal to 'Yes' and the attribute 'Contains Chemical' value is equal to 'Chlorine.' Because the returned score is '100' and not '0,' there is no accompanying error message.

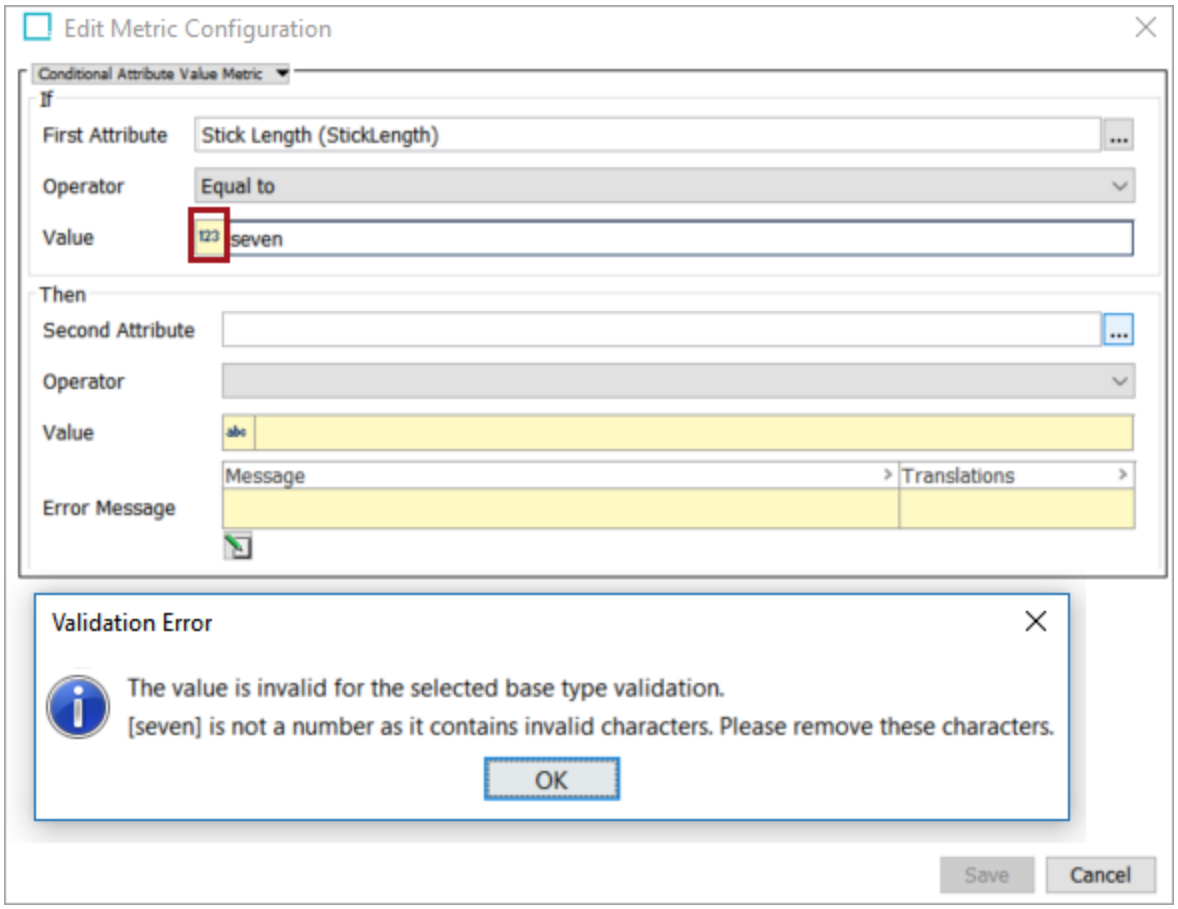


Validation Errors

In certain instances, validation errors can occur as a result of the attributes selected for analysis. A validation error (accompanied by an error message) will occur if:

- The provided value is not valid based on the selected attribute validation base type.
- The selected attribute is multivalued.

In the example below, the user has input the word 'seven' into the 'Value' text field, but because the attribute selected for analysis has a number validation base type (identified by the highlighted '123'), the provided value must contain numbers only. Because of the incompatibility, a validation error occurs, with an error message that describes the reason for the error.



The following instances will also produce validation errors. However, these errors will not appear until the metric is run. The error message will appear in the Background Process Log of the Data Sufficiency Calculator event processor.

- A selected attribute has a unit but the value provided by the user in the metric configuration has no unit.
- A selected attribute has no unit but the value provided by the user in the metric configuration has a unit.
- A selected attribute and the value provided by the user in the metric configuration have different base unit conversion rules.
- A selected attribute's unit and/or the value's unit provided by the user in the metric configuration has no base unit conversion rule.

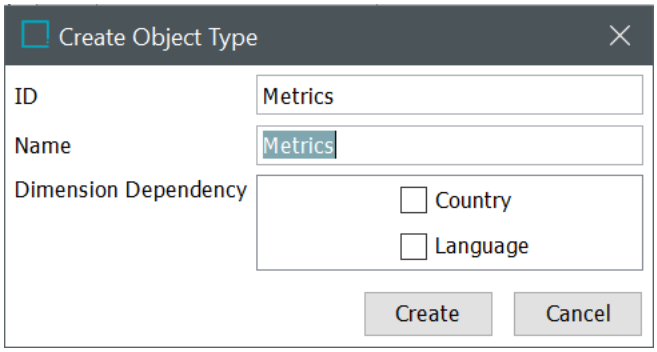
For more information regarding units, including base units and conversion rules, refer to the **Units** topic in the **System Setup** documentation.

Initial Setup for Metrics

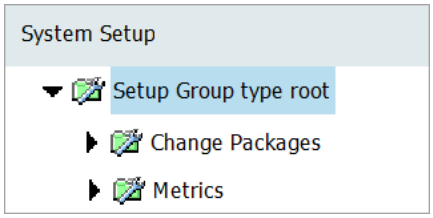
Before metrics can be created, a Setup Group must be configured to hold them.

Note: A Setup Group is required if the user wants to migrate completeness scores to a Description attribute. For more information, refer to the Migrating Completeness Scores to Description Attributes topic of the Data Profiling documentation.

1. In **System Setup**, expand **Object Types & Structures**.
2. Right-click **Setup Group type root**, and then choose **New Object Type**.
3. Enter an **ID**, and a **Name** such as 'Metrics,' and then click **Create**.

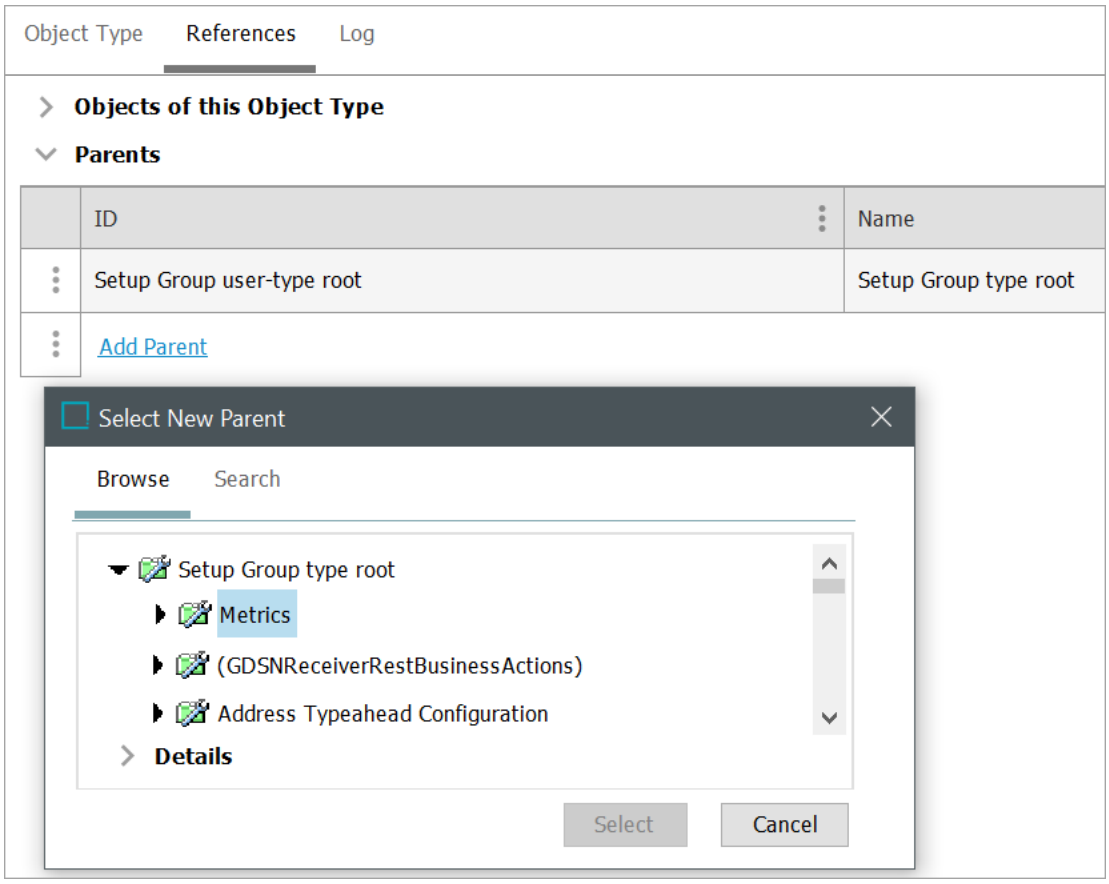


The **Setup Group** appears as a child below **Setup Group type root**.



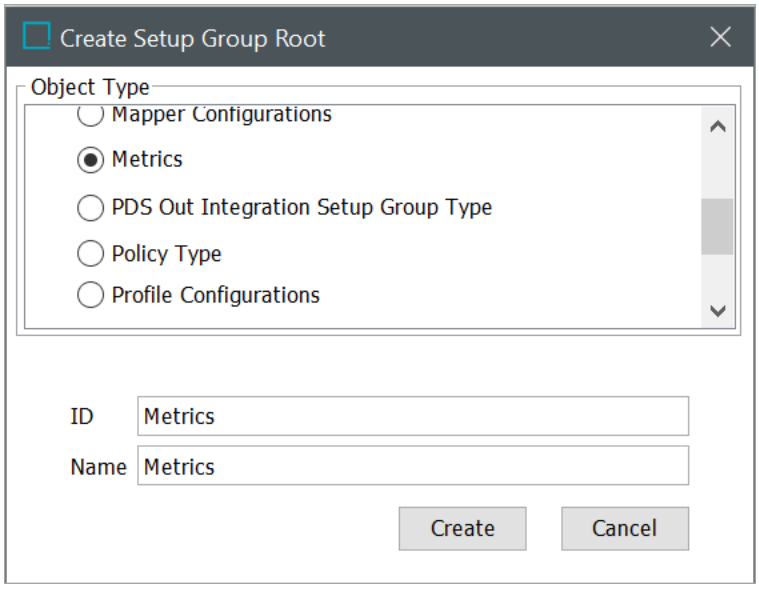
Next, you have to link the Metric object type to a the Setup Group.

4. In **Object Types & Structures**, expand **Basic Object Types**, then select **Completeness Metric**.
5. On the **References** tab, click **Add Parent**.
6. In the **Select New Parent** dialog, select the Setup Group just created, then click **Select** to make it a valid parent.



Next, create an instance of the Metric object.

7. On the **System Setup** tab, click **Maintain**, mouse over **Insert**, and then select **Setup Group Root**.
8. In the **Create Setup Group Root** dialog, select the new object type.



9. Enter an **ID** and a **Name**, then click **Create**.

A Setup Group is created as a node in the System Setup hierarchy, and you can start creating metrics.

For more information about creating metrics, refer to the Creating and Editing Metrics topic.

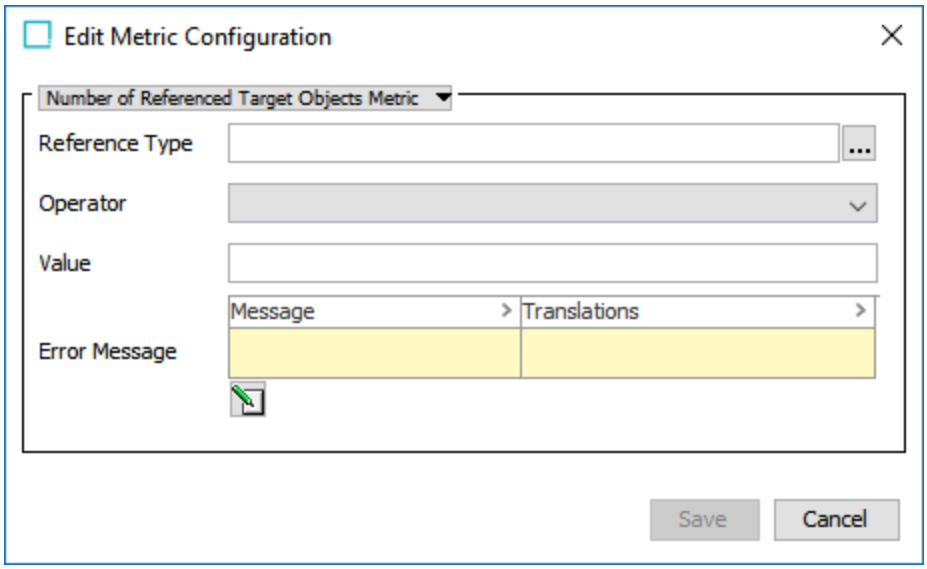
Number of Referenced Target Objects Metric

The Number of Referenced Target Objects Metric detects the number of target objects of a selected reference type for a given product, and based on an operator selected by the user, returns either a score of '100' (true) or '0' (false). Users are able to create an error message for instances when the metric returns a score of '0;' this message is meant to detail the reason for the '0' score and can have multiple translations. For more information on reference types, refer to the **Reference Types** topic in the **Reference and Link Types** documentation.

Important: Metrics are used in conjunction with sufficiencies to determine the quality and completeness of a product's data. While this topic covers the functionality and configuration of the Number of Referenced Target Object Metrics, it is important that users are also familiar with sufficiencies and how they are combined with metrics; information regarding sufficiencies can be found in the **Sufficiency Configuration Type** documentation.

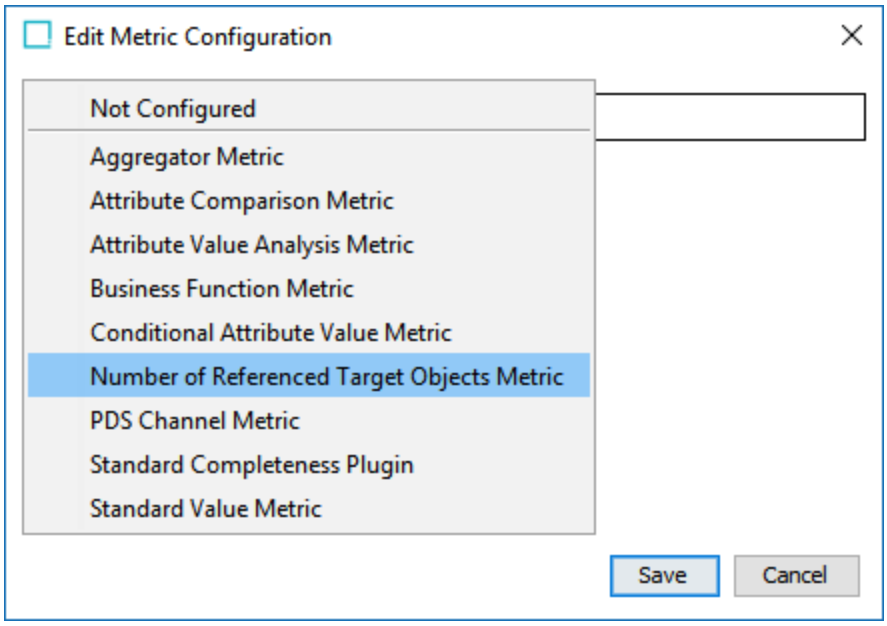
Prerequisites

Before metrics can be created, a Setup Group must be configured to hold them. For information on configuring a setup group for metrics, refer to the **Initial Setup for Metrics** topic in the **Metrics** documentation. For information on creating a metric, refer to the **Creating and Editing Metrics** topic in the **Metrics** documentation.



Number of Referenced Target Objects Metric Configuration

1. From the Edit Metric Configuration wizard, select 'Number of Referenced Target Objects Metric.'

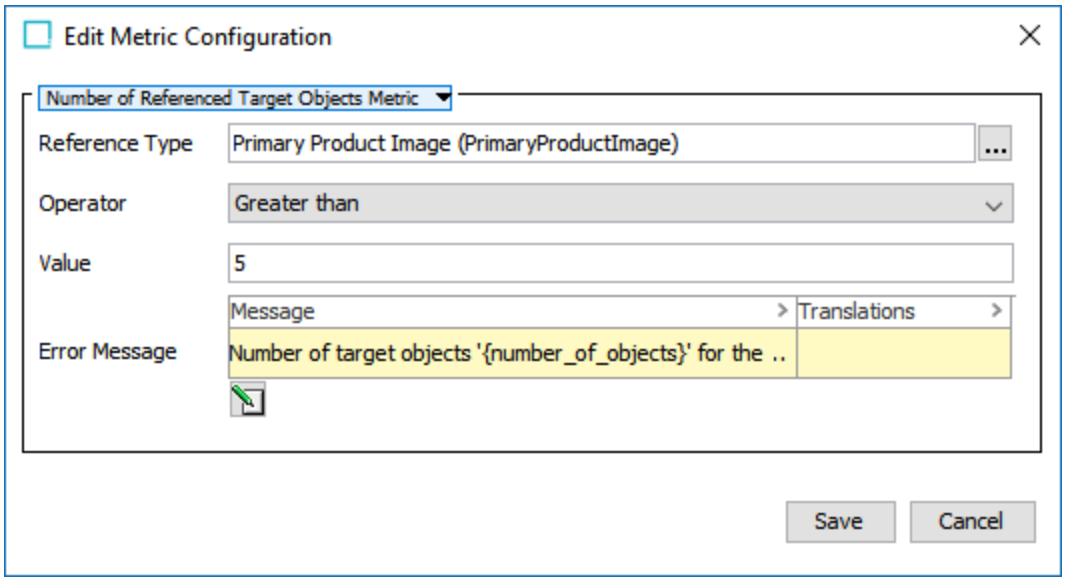


2. With the Number of Referenced Target Objects Metric selected, click the ellipsis button (...) to select the reference type that you want to evaluate, select an operator from the 'Operator' dropdown list, and input a numerical value into the 'Value' field. Once an operator is selected from the 'Operator' dropdown list, a default error message will appear in the 'Error Message' text field, based on the selected operator.

   Operator options include:

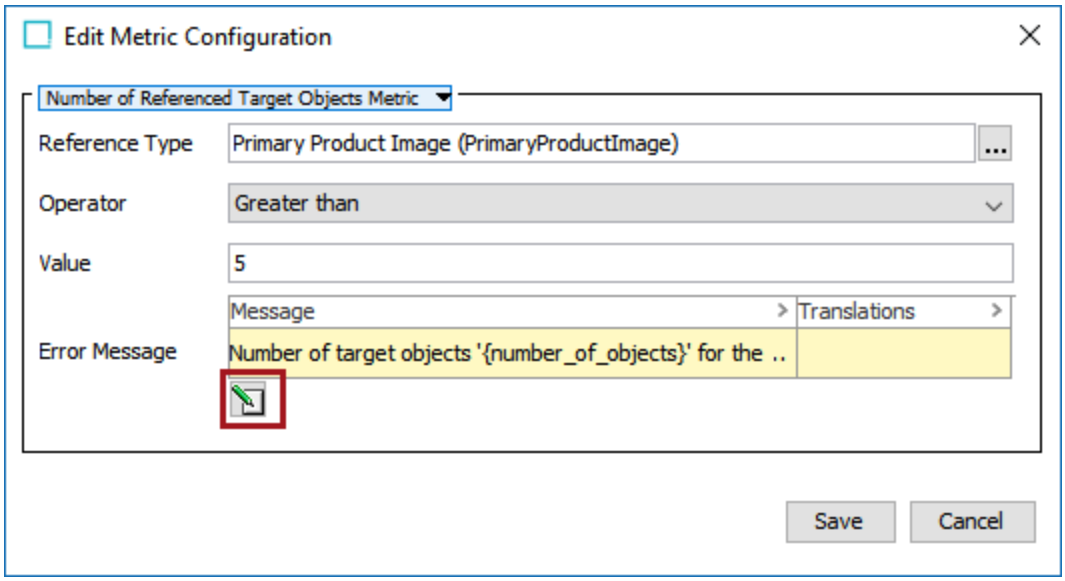
   - Equal to
   - Not Equal to
   - Greater than
   - Less than

   In the example below, the user has configured the metric to determine whether a product has more than '5' Primary Product Image references. If the product does have more than five product image references, the metric will return a score of '100' (true). If there are five or less primary product image references, the metric will return a score of '0' (false), and will be accompanied with a message, as displayed in the 'Error Message' text field.

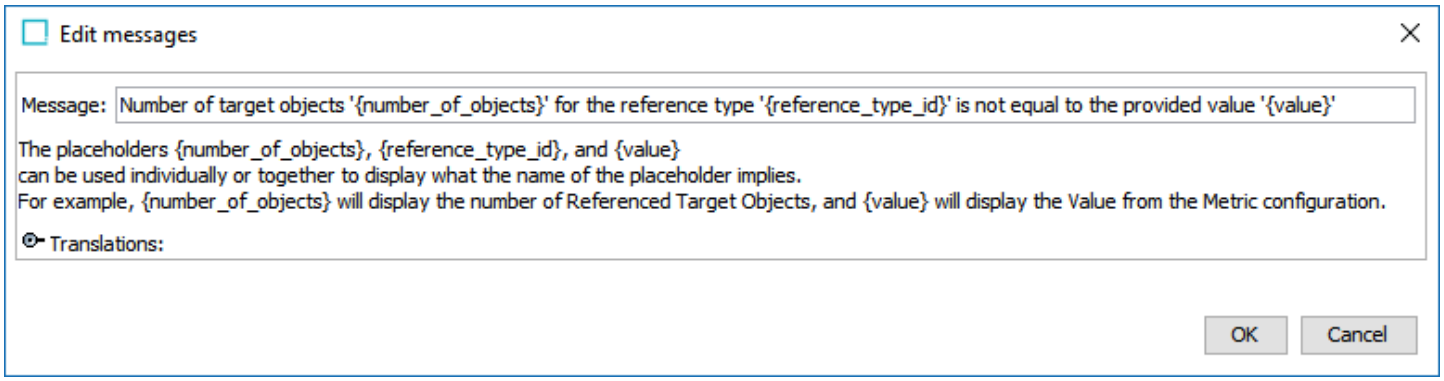


Note: If the user selects a reference type that is not valid for a product, the metric will be considered non-applicable for that product and no data quality information will be produced when the Sufficiency Data Calculator event processor is run. Additionally, only integers are valid for the 'Value' field; non-integer characters input into the 'Value' field will result in a validation error when the user attempts to save the metric.

3. To edit the error message and/or add additional translations, click on the 'Error Message' editor button.

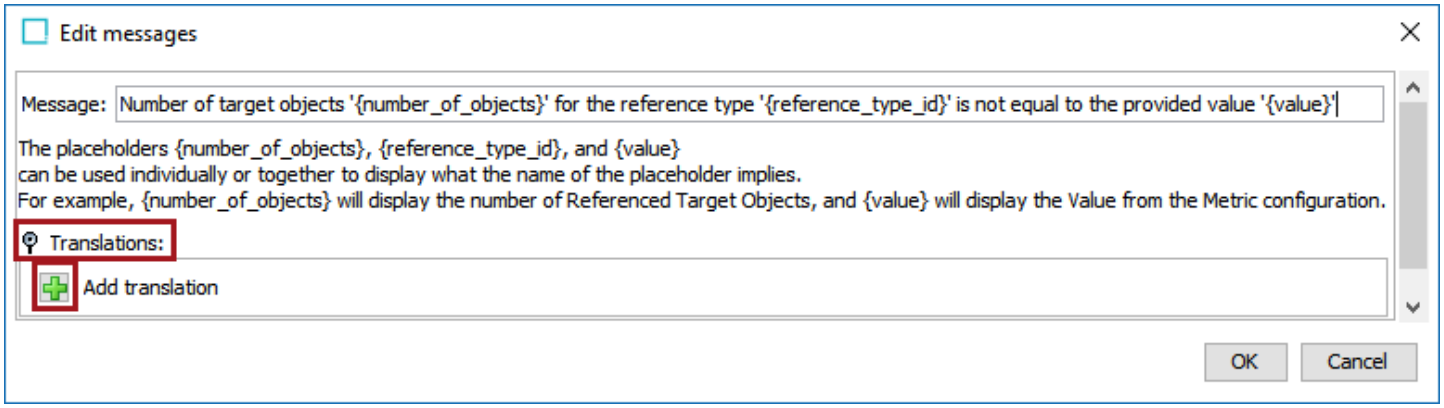


The 'Edit messages' window appears. Note that the 'Message' text field is editable. Descriptive text below the text field details how the placeholders included in the error message work in order to create an error message. Although the default error message (or something similar) is suggested, users are able to edit all or part of the error message, depending on their individual needs.

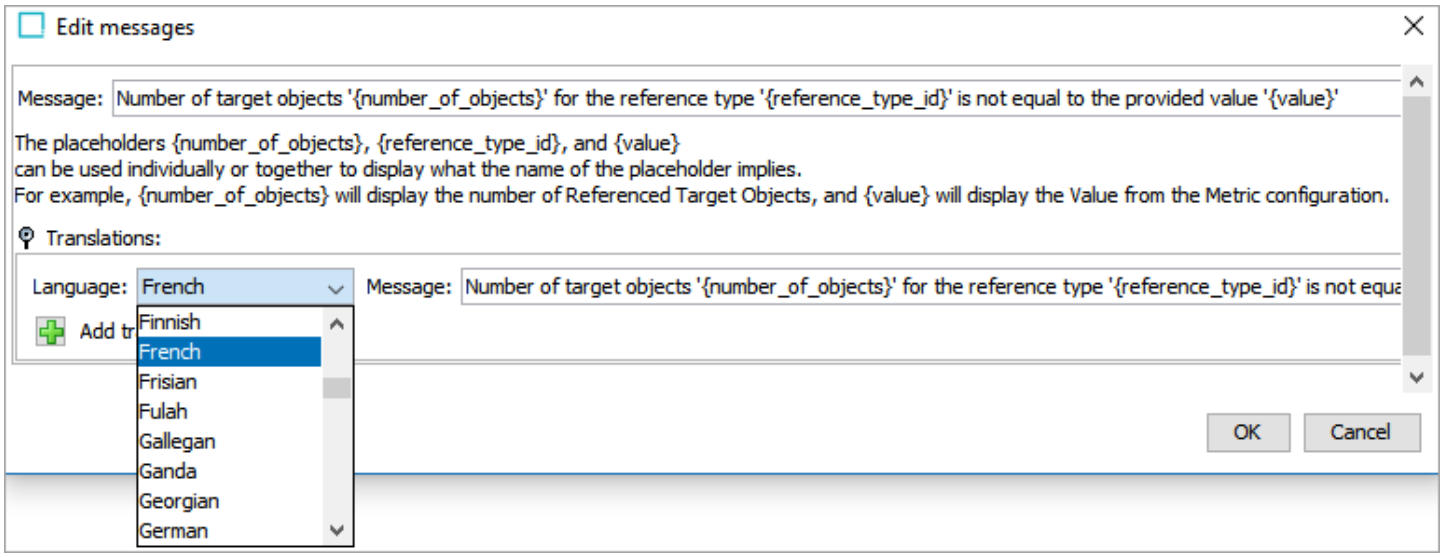


Note: Although the error message can be edited by the user, the placeholders themselves (e.g., number_of_objects) cannot be edited. If the placeholders are edited, the user will receive a validation error message when attempting to save the edited message. When the metric is run, placeholders are replaced by the 'real values,' e.g., 'number_of_objects' would be replaced with the number input into the Value field (in the example above, '5').

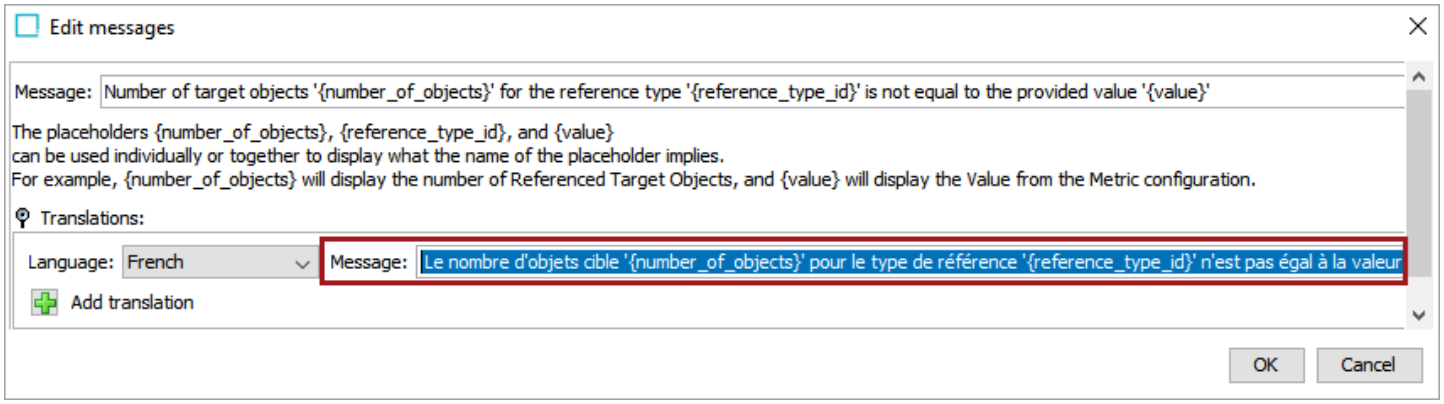
4. Select the 'Translations' flipper and click the green plus sign located next to 'Add translation.'



5. Click on the arrow located in the 'Language' dropdown menu; in the example below, the user has opened the dropdown menu and selected 'French.'



6. Once a language is selected, edit the message to reflect the language specified for translation.

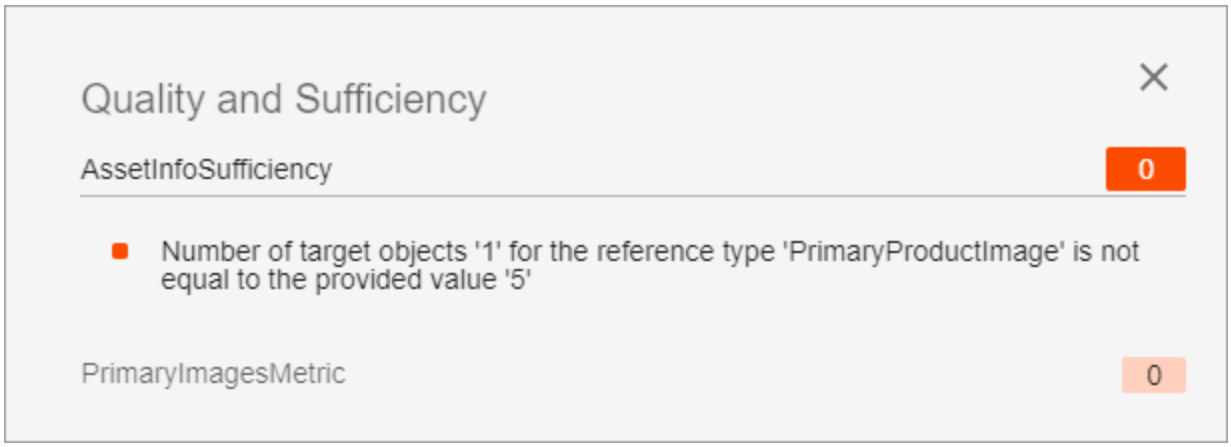


7. Click the green plus sign to add another translation or 'OK' to close the 'Edit messages' window.
8. Click 'Save' to close the Edit Metric Configuration wizard.

The metric is saved.

Note: Translation error messages are displayed by using locales; they are not context-dependant. For more information about locales, refer to the **Localization** topic in the **Administrative Portal** documentation. For more information about localized messages, refer to the **Localized Messages for JavaScript Business Rules** topic in the **Business Actions** documentation.

Once the metric is added to a sufficiency and the sufficiency is run, the results are displayed in the sufficiency panel within the Web UI. In the example below, the Referenced Target Object Metric (for this example, titled 'PrimaryImagesMetric') has been added to the sufficiency 'AssetInfoSufficiency,' and returned a score of '0' along with an error message that details the reason for the returned score.


Quality and Sufficiency
AssetInfoSufficiency
0
Number of target objects '1' for the reference type 'PrimaryProductImage' is not equal to the provided value '5'
PrimaryImagesMetric
0

PDX Channel Metric

The PDX (Product Data Exchange) Channel Metric gives users the ability to measure the quality and completeness of a product's data compared to the data standard of a retail channel in PDX. By obtaining this information, users are able to determine whether the product is ready to be syndicated to the retail channel before actually submitting the product for syndication.

To view the data produced by the PDX Channel Metric in the sufficiency panel in the Web UI, the add-on component 'PDX-sufficiency-link' must be installed on your system. For on-premises systems, instructions for installing components can be found in the 'SPOT Program' topic in the System Administration documentation found in 'Downloadable Documentation'. For Stibo Systems SaaS environments, contact Stibo Systems Support.

To use the PDX Channel Metric, the following PDX license must also be enabled.

- X.Adapter.ProductDataSyndication

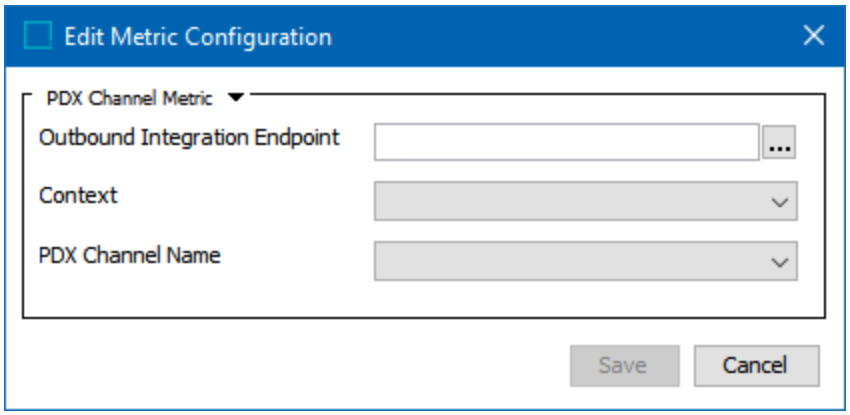
Contact Stibo Systems to enable the license for your system.

Important: Metrics are used in conjunction with sufficiencies to determine the quality and completeness of a product's data. While this topic covers the functionality and configuration of the PDX Channel Metric, it is important that users are also familiar with sufficiencies and how they are combined with metrics; information regarding sufficiencies can be found in the **Sufficiency Configuration Type** topic.

Prerequisites

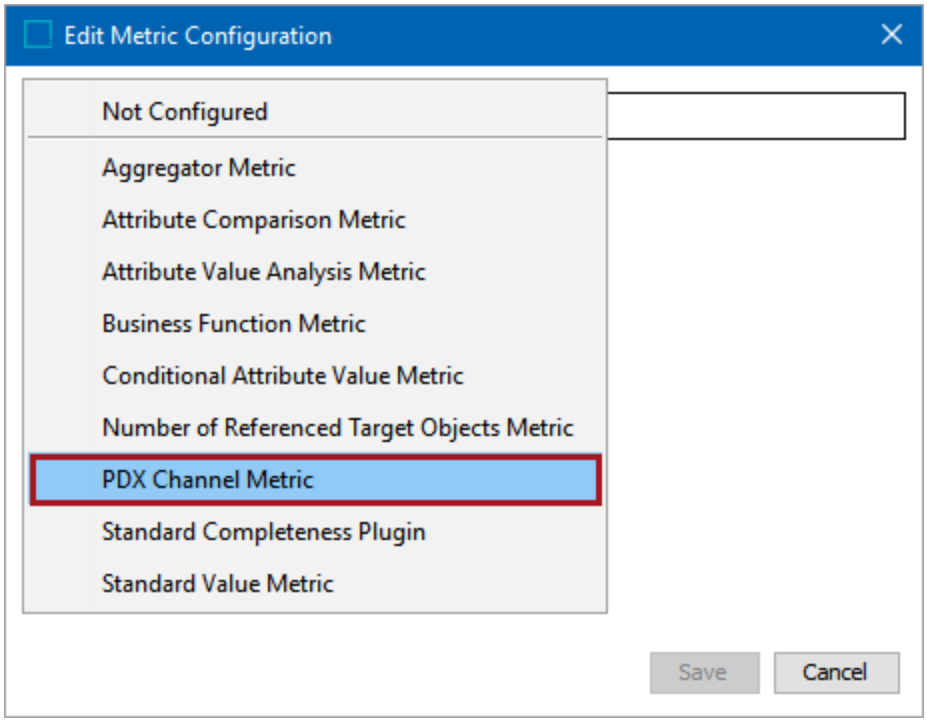
Before metrics can be created, a Setup Group must be configured. For information on configuring a Setup Group for metrics, refer to the **Initial Setup for Metrics** topic in the **Metrics** documentation. For information on creating a metric, refer to the **Creating and Editing Metrics** topic in the **Metrics** documentation.

Prior to configuring a PDX Channel Metric, a PDX Outbound Integration Endpoint (OIEP) must be configured. The relation between the PDX Channel Metric and the PDX OIEP is explained in further detail in step 5 of this topic. For information on configuring a PDX OIEP, refer to the Setting Up the PDX OIEP topic in the Data Integration documentation.

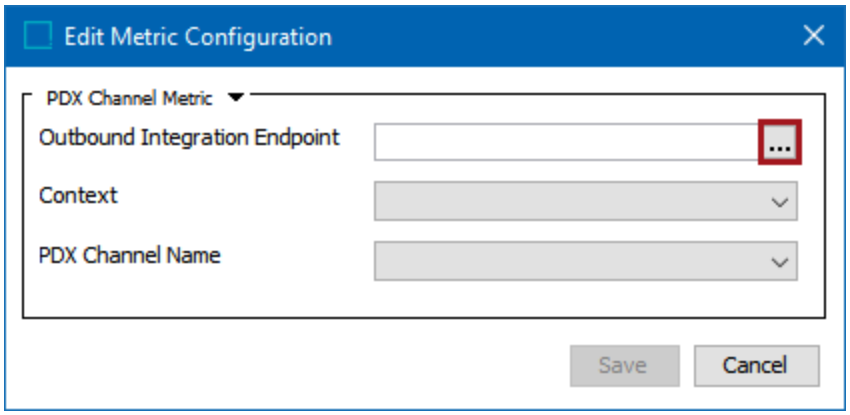


PDX Channel Metric configuration

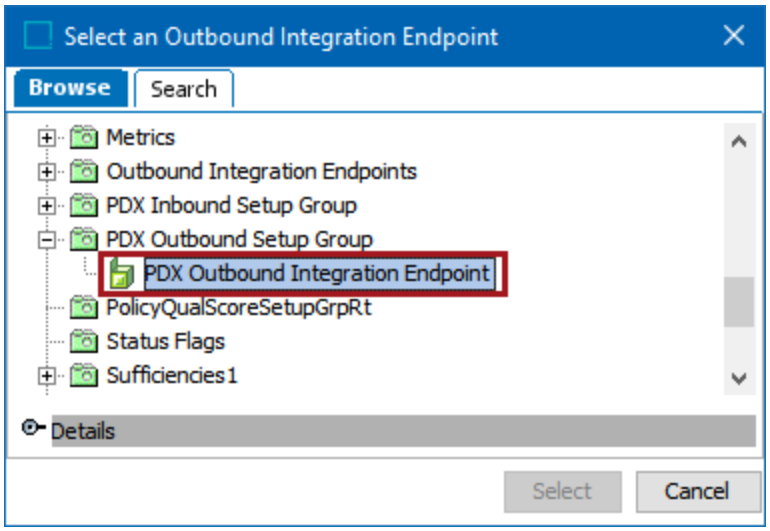
1. From the Edit Metric Configuration wizard, select 'PDX Channel Metric.'



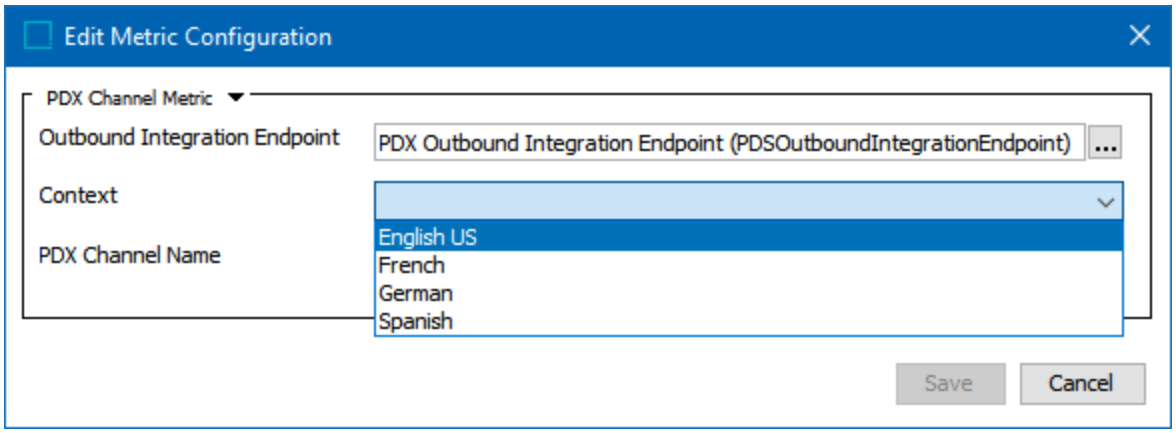
2. With the PDX Channel Metric selected, click the ellipsis button (...) located next to the Outbound Integration Endpoint.



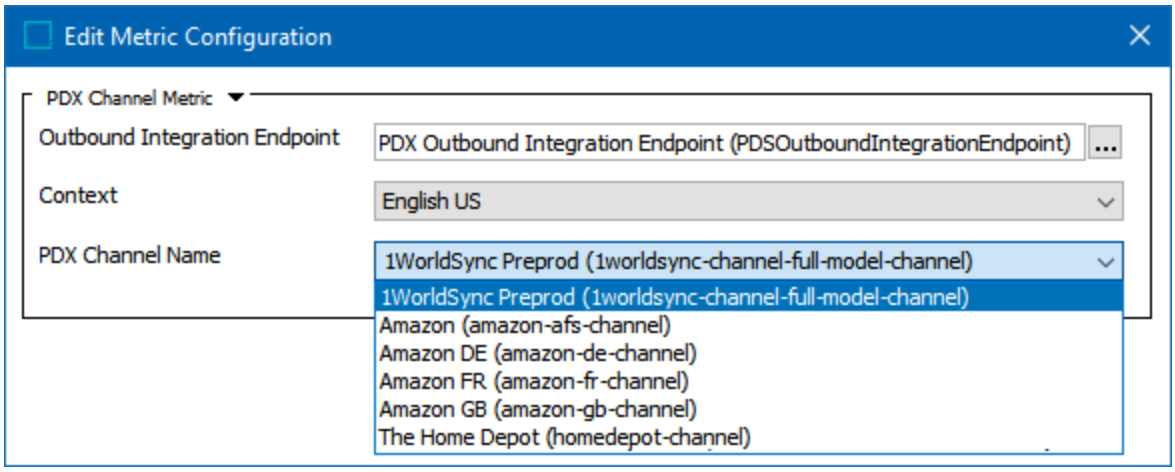
3. Select the PDX Outbound Integration Endpoint you would like to use for this metric and click 'Select.' In this example, 'PDX Outbound Integration Endpoint' has been selected.



4. From the Context dropdown list, select the context that you would like to use for the metric. In the example below, the user has selected 'English US.'



5. From the PDX Channel Name dropdown list, select the PDX channel name that you would like to use for the metric. In the example below, the user has selected the '1WorldSync PreProd' channel.

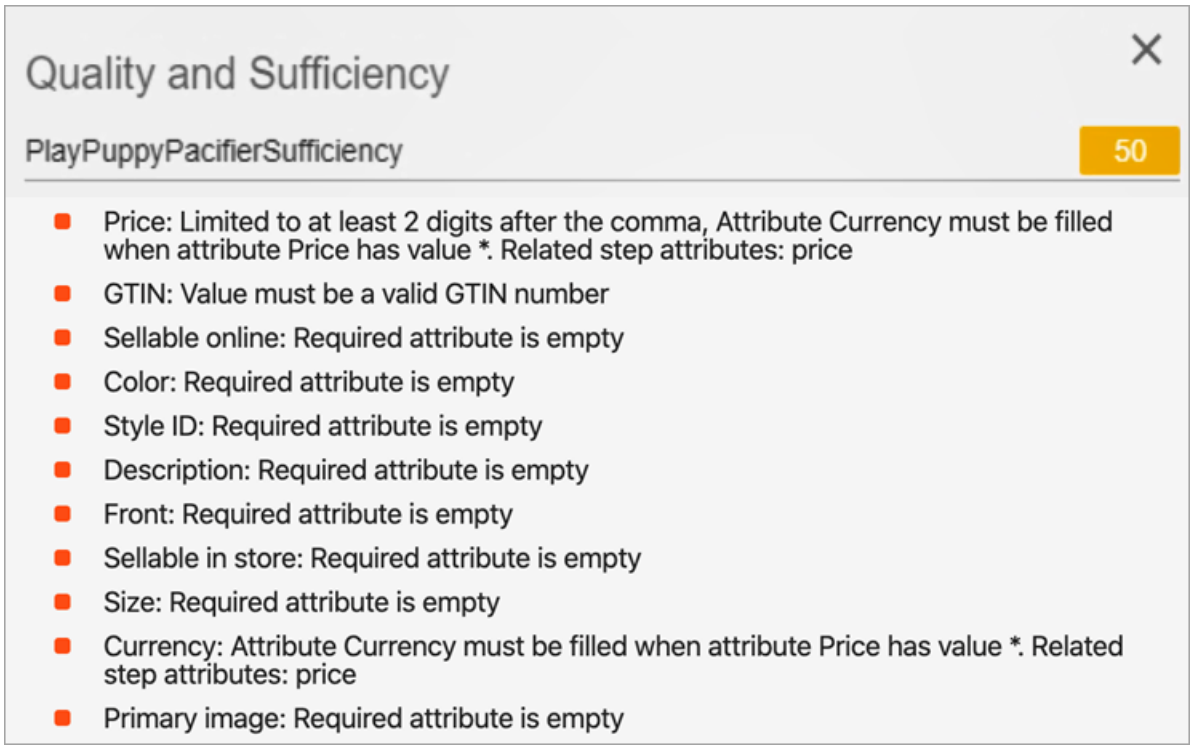


Note: Available context options are dependent on the 'Contexts' setting in the PDX OIEP configuration. Available PDX channels are determined within the PDX system, e.g., any channels available in the PDX system will be included in the 'PDX Channel Name' dropdown menu as a selectable option. For more information on configuring the PDX Outbound Integration Endpoint, refer to the Setting Up the PDX OIEP topic in the Data Integration documentation. For more information regarding channel options within PDX, contact your PDX representative.

6. Click 'Save' to close the Edit Metric Configuration wizard.

The PDX Channel Metric is saved.

Once the metric is run within a sufficiency, the results are displayed in the sufficiency panel within the Web UI. In the example below, the PDX Channel Metric has returned details regarding several attributes that are missing mandatory values, have incorrect formatting of values, etc., based on the requirements of the selected channel. With this information, users can provide values for the mandatory attributes and run the sufficiency again to re-assess the metric results.


Quality and Sufficiency
PlayPuppyPacifierSufficiency
50
Price: Limited to at least 2 digits after the comma, Attribute Currency must be filled when attribute Price has value *. Related step attributes: price
GTIN: Value must be a valid GTIN number
Sellable online: Required attribute is empty
Color: Required attribute is empty
Style ID: Required attribute is empty
Description: Required attribute is empty
Front: Required attribute is empty
Sellable in store: Required attribute is empty
Size: Required attribute is empty
Currency: Attribute Currency must be filled when attribute Price has value *. Related step attributes: price
Primary image: Required attribute is empty

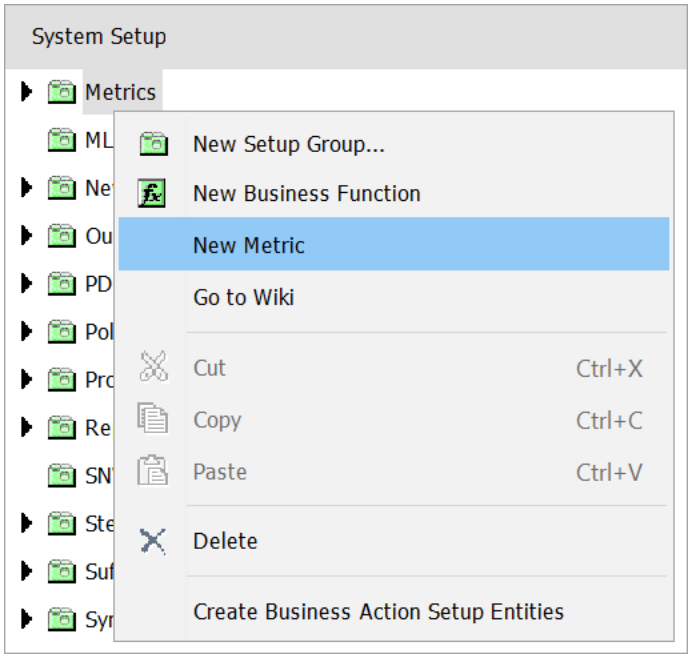
Creating and Editing Metrics

Once initial setup is complete, metrics can be created.

For more information on initial setup steps, refer to the Initial Setup for Metrics topic.

Creating a Metric Object

1. In **System Setup**, right-click the **Setup Group Root** that holds metrics, and then click **New Metric**.

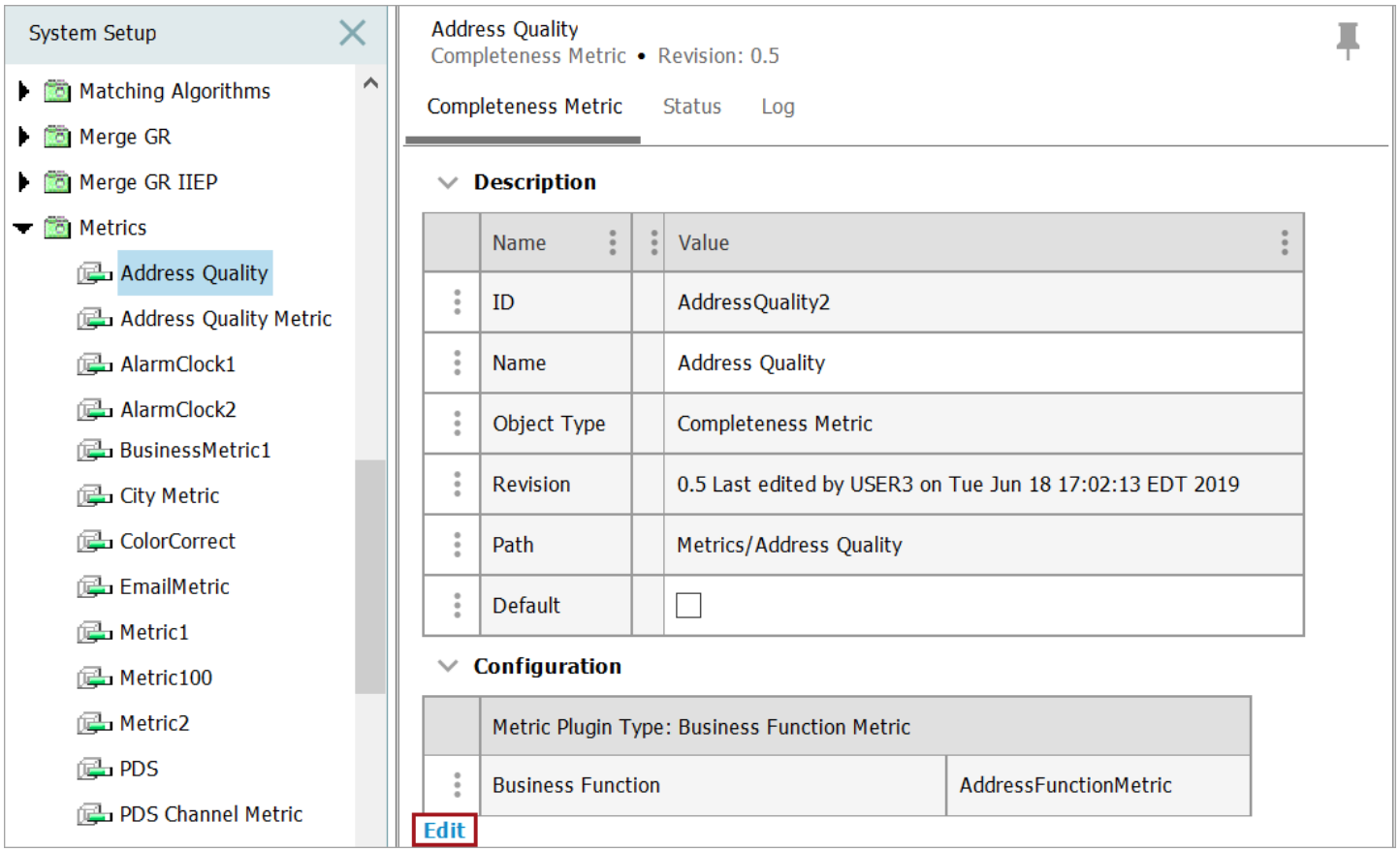


2. Enter an **ID** and a **Name** for the metric, and then click create. The metric is added as a child below the selected **Setup Group Root**.

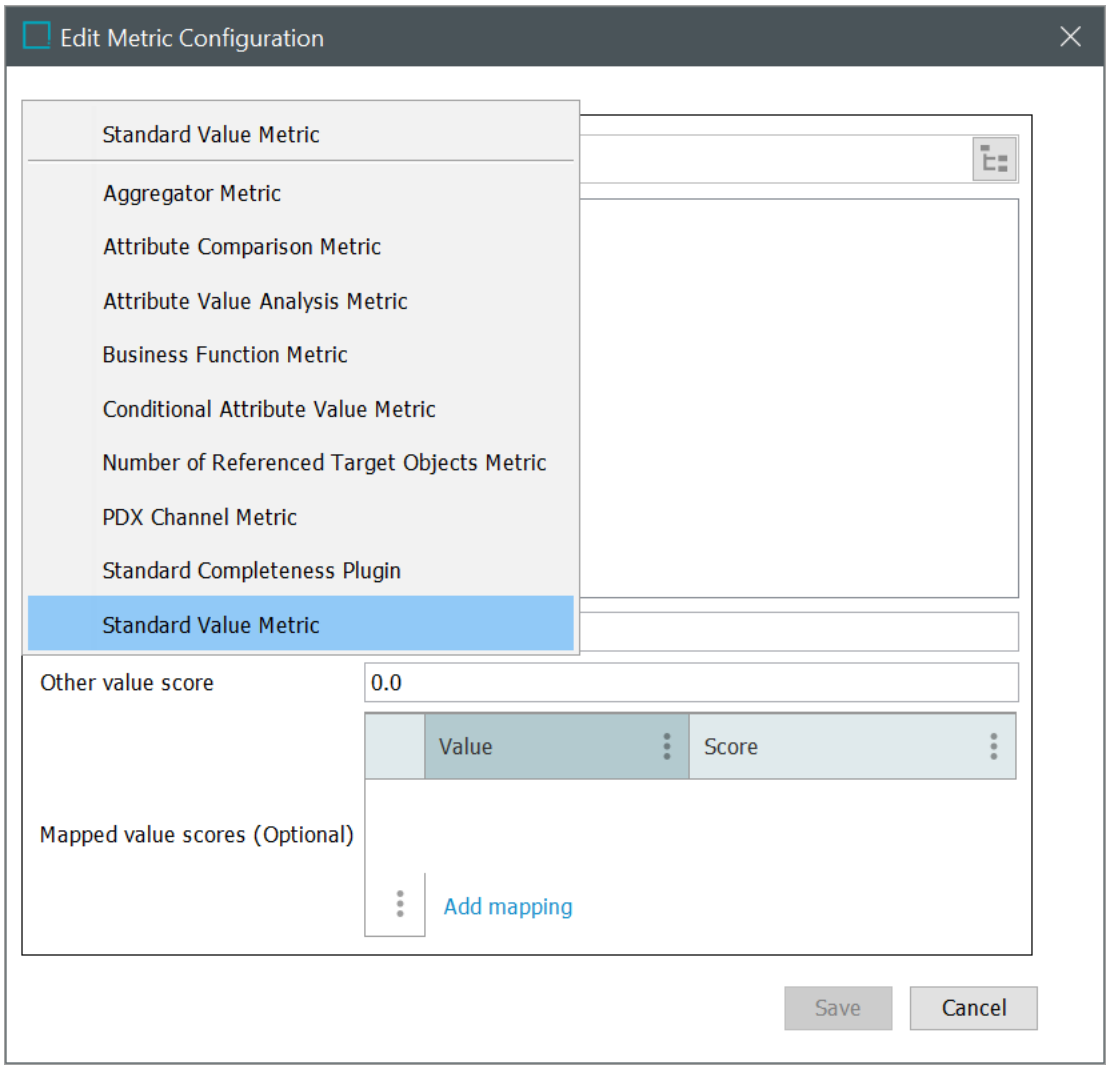
Configuring a Metric

Once the metric object has been created, a metric type must be specified and configured.

1. Select the metric that you just created, and then, on the **Metric** tab, click **Edit**.



2. In the **Edit Metric Configuration** editor, select the relevant metric type from the dropdown. Each metric type requires different configuration steps.



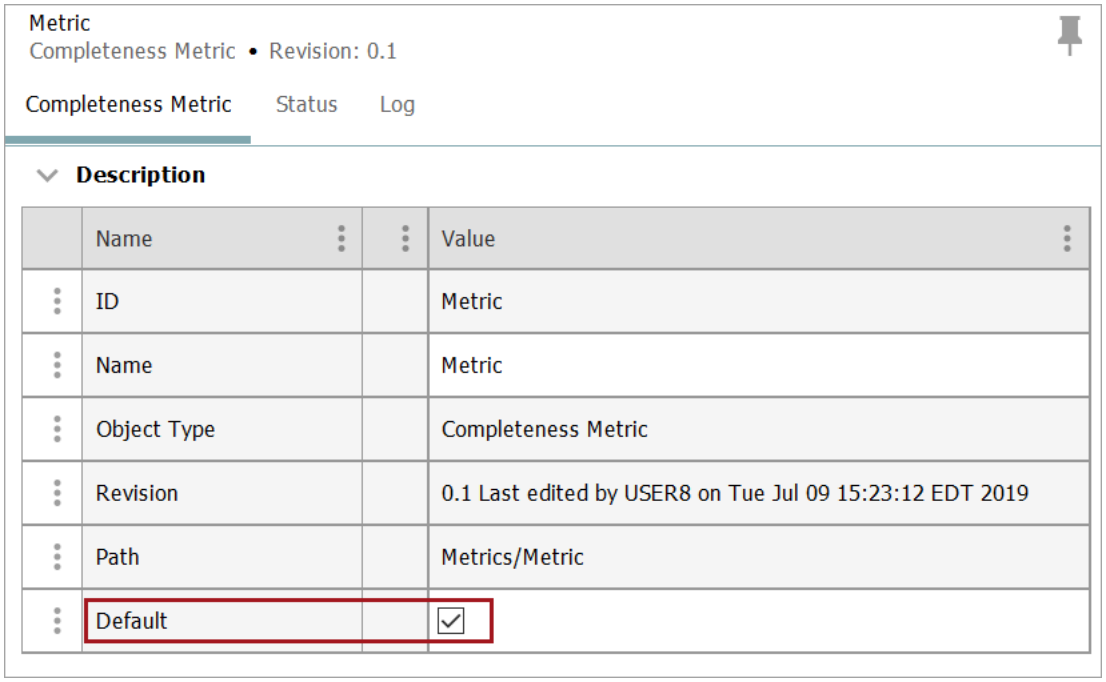
Options include:

- Aggregator Metric
- Attribute Comparison Metric
- Attribute Value Analysis Metric
- Business Function Metric
- Conditional Attribute Value Metric
- Number of Referenced Target Objects Metric
- PDX Channel Metric
- Standard Completeness Plugin
- Standard Value Metric

Set a Default Metric

When a metric is set as the default metric, the completeness meter shown on an object's editor tab displays the value from the default metric.

1. In **System Setup**, expand the **Setup Group Root** that holds metrics, and then select the metric you want to apply as default.
2. On the **Metric** tab, in the **Description** area, select **Default**.



Completeness Metrics

Completeness metrics define what data is considered when evaluating the completeness of an object. STEP allows the use of multiple completeness metrics simultaneously. This is useful, for example, if multiple channel specific completeness measurements are required. An attribute can be created to hold completeness scores for a specific completeness metric, thus offering a means to display different completeness measurements for the same object. Additionally, multiple metrics can use the same completeness score attribute.

Note: A completeness metric does not have to be an attribute with associated completeness scores. In these cases, all data objects (attributes and references) are part of the completeness calculation and have an equal score.

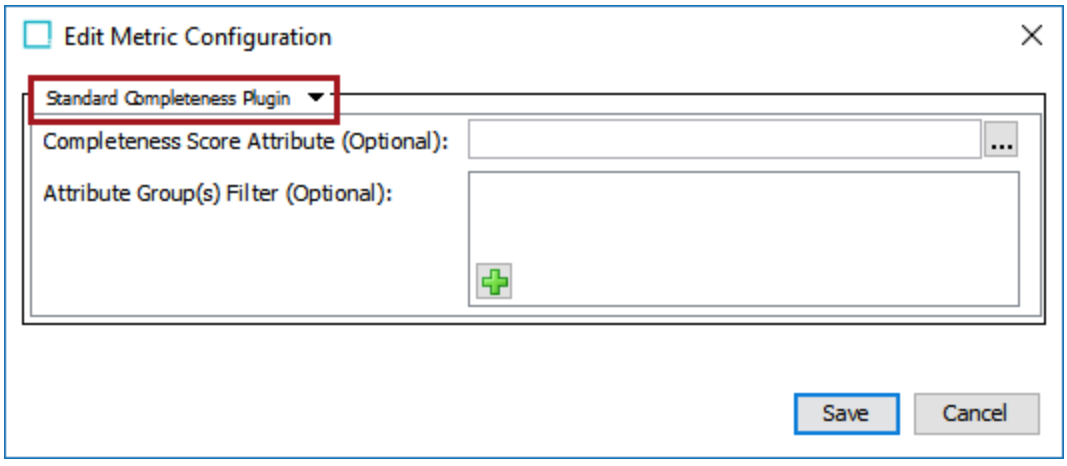
Configuration

1. Optionally, when creating a completeness metric, create an attribute that can hold the completeness score values.

   Note that if you want to migrate legacy completeness values stored in a special system attribute to a Description attribute, the attribute must meet a series of requirements. For more information, refer to the **Migrating Completeness Scores to Description Attributes** section of the **Data Profiling** documentation.

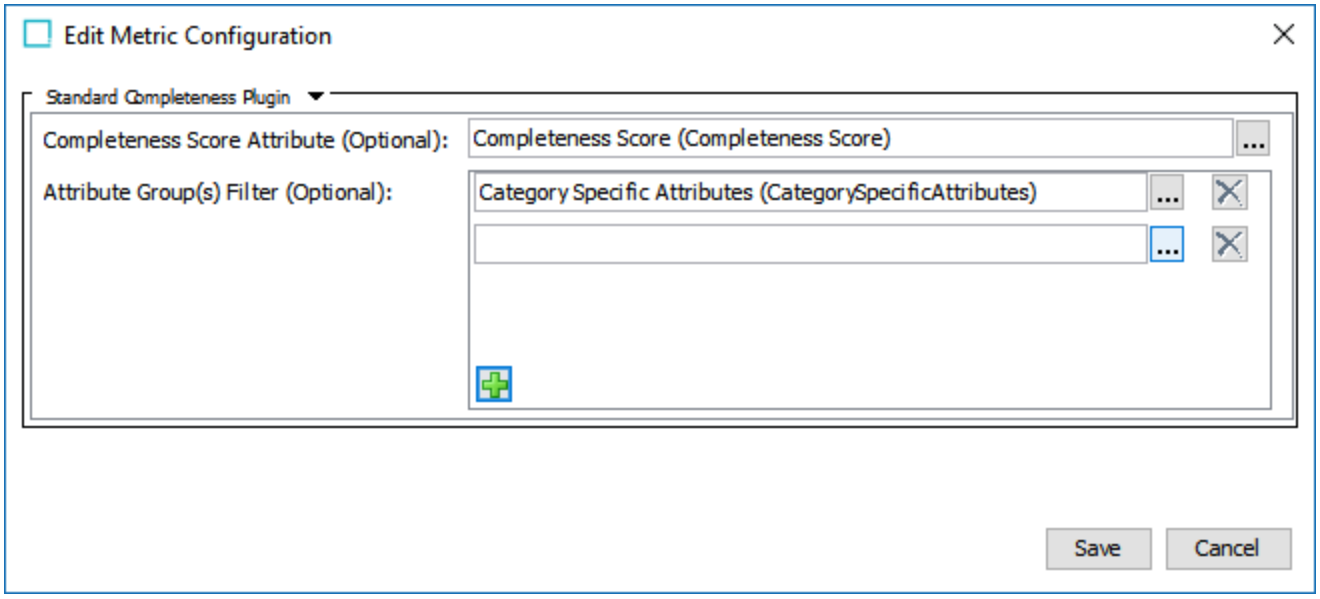
   If an attribute is not going to be used for migrating completeness scores, it does not have to meet these requirements.

2. To configure a completeness metric, open the editor for the desired metric object, and from the dropdown select **Standard Completeness Plugin**.



3. The **Completeness Score Attribute** field allows you to select which attribute will hold the completeness scores for the completeness metric, if applicable. If nothing is specified, all elements of the object that could contribute to the overall object completeness score will, and they are all weighed evenly.

The Attribute Group(s) Filter specifies which attributes and references / links should be considered in the completeness calculation.



The Completeness Plugin provides the following options:

Selection	Description
No attribute or attribute groups are selected	All data objects (attributes and references) are part of the completeness calculation, and they have an equal score.
An attribute is selected	Only completeness scores from the selected attribute are used for the completeness calculation.
One or more attribute groups are selected	Only completeness scores from data objects in the selected attribute group(s) are used for the completeness calculation, and they have an equal score.
An attribute and one or more attribute groups are selected	Only the completeness score from the selected attribute is used for the completeness calculation.

4. Select 'Save,' and the metric is ready to be used in a data profile.

On the **Completeness Metric** tab, in the **Configuration** area, you can view the configuration settings.

Configuration	
Completeness Metric Plugin Type: Standard Completeness Plugin	
Completeness Score Attribute (Optional)	Completeness Score
Attribute Group(s) Filter (Optional)	[Category Specific Attributes]

Edit

Note: If data containers should be considered for an entity's completeness score, the completeness metric must use default settings.

Migrating Completeness Scores to Description Attributes

Completeness scores are stored in a standard Description attribute. This means that all values can be stored as STEPXML and that completeness score setups can be moved easily between systems.

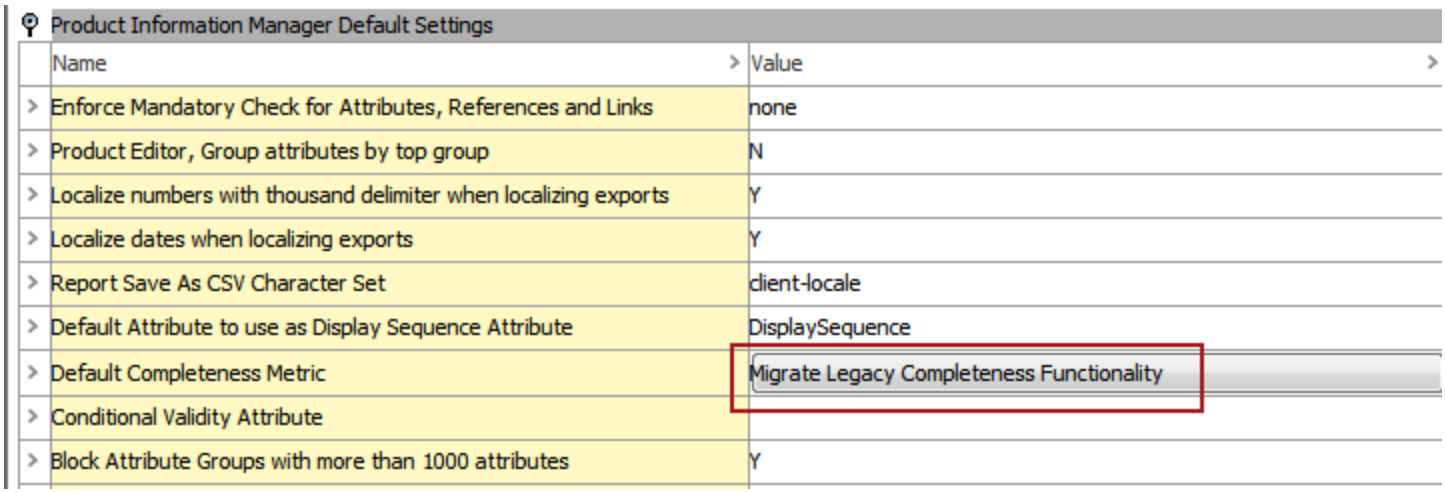
Before STEP 7.4, completeness score values were stored in a special system attribute. To migrate values from the system attribute to a Description attribute, use the **Migrate legacy completeness functionality** in **Users & Groups**.

Migrate Completeness Scores

The following describes the steps involved in migrating completeness scores to a Description attribute:

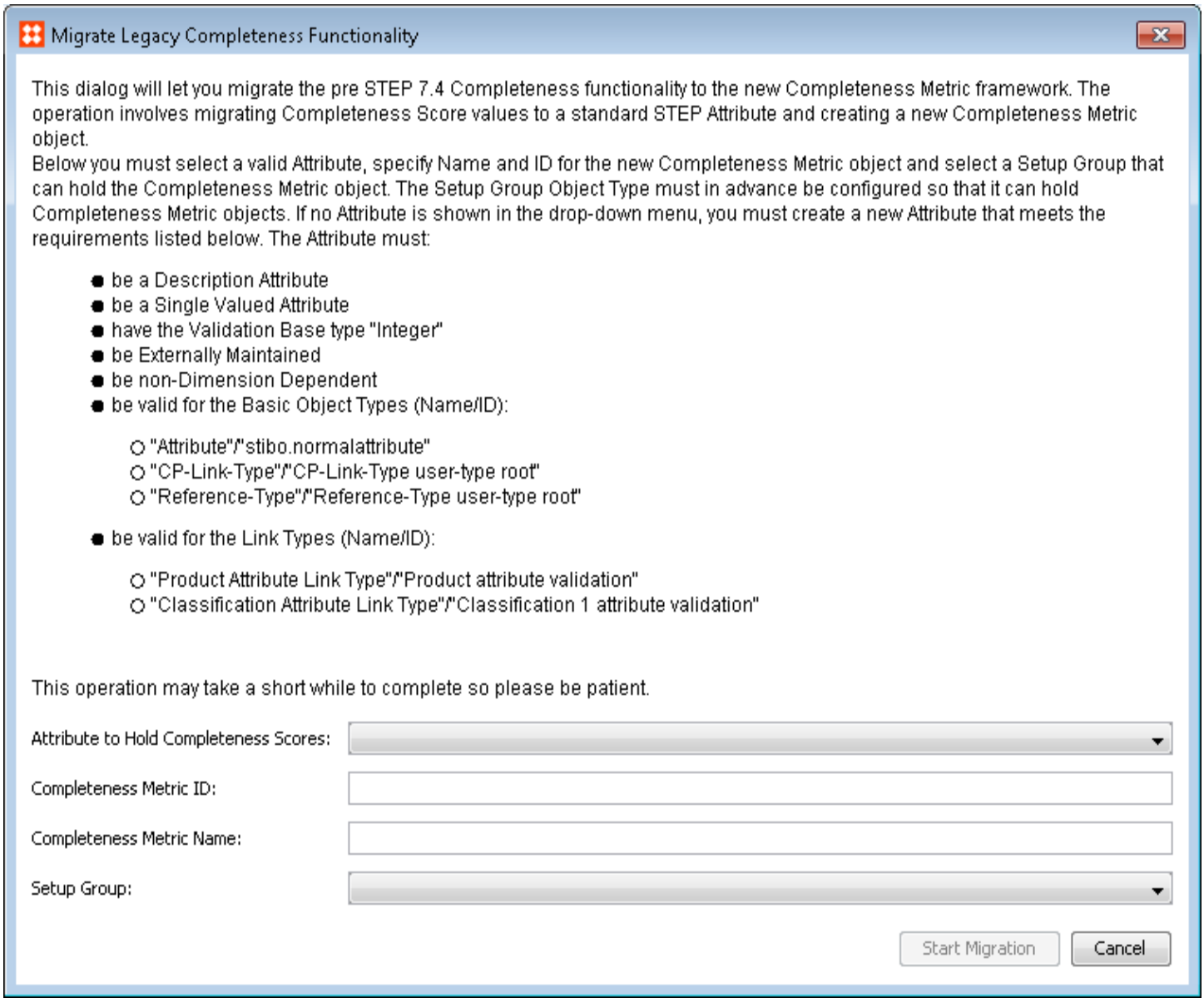
1. Create an attribute that can hold the completeness score values. The attribute must meet the following requirements:
    - It must be a Description attribute.
    - It must be a Single valued attribute.
    - It must have the Validation base type Integer.
    - It must be externally maintained.
    - It must not be dimension dependent.
    - It must be valid for the basic object type Attribute/stibo.normalattribute.
    - It must be valid for the basic object type CP-Link-Type/CP-Link-Type user-type root.
    - It must be valid for the basic object type Reference-Type/Reference-Type user-type root.
    - It must be valid for the link type Product Attribute Link Type/Product attribute validation.
    - It must be valid for the link type Classification Attribute Link Type/Classification 1 attribute validation.

    For information on how to set validity on an attribute, refer to the **Setting Validity of Description Attributes** section of the **System Setup** documentation.
2. In **System Setup**, click **Users & Groups**.
3. In the **Product Information Manager Default Settings** area, click the **Migrate Legacy Completeness Functionality** button.



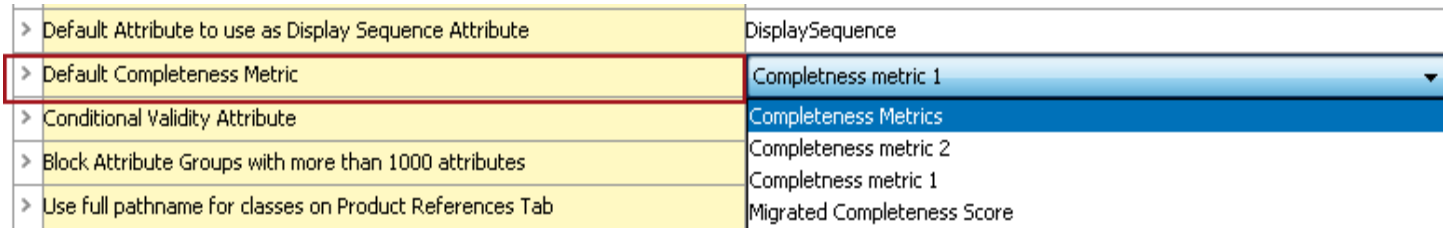
4. In the **Migrate Legacy Completeness Functionality** dialog, select the attribute created in Step 1 to hold the completeness scores. In order to progress with migration, an attribute must be created first.

   During the migration process, a Completeness Metric object is created, and an **ID** and a **Name** must be specified for the object. Select a **Setup Group** to hold the Completeness Metric.



The migration is not performed as a background process, so the dialog stays open until the migration has completed.

The migration is a one-time process and the **Migrate Legacy Completeness Score** button is not available after the migration has been completed. Instead, select the default completeness metric from a drop-down list.

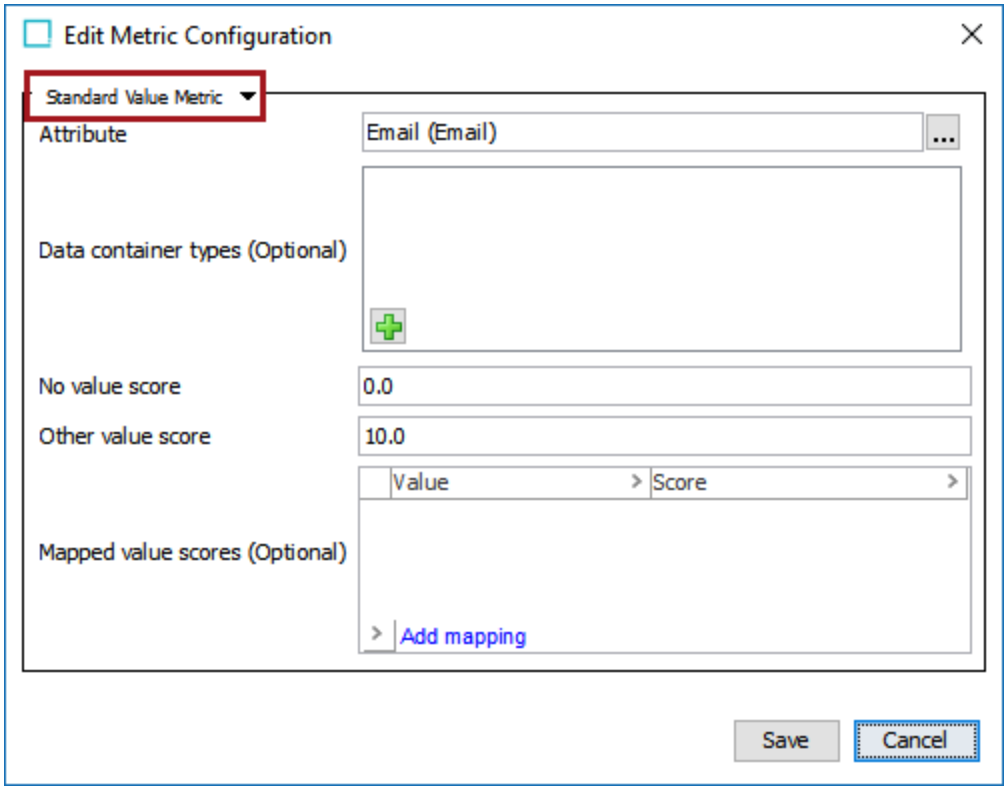


Value Metrics

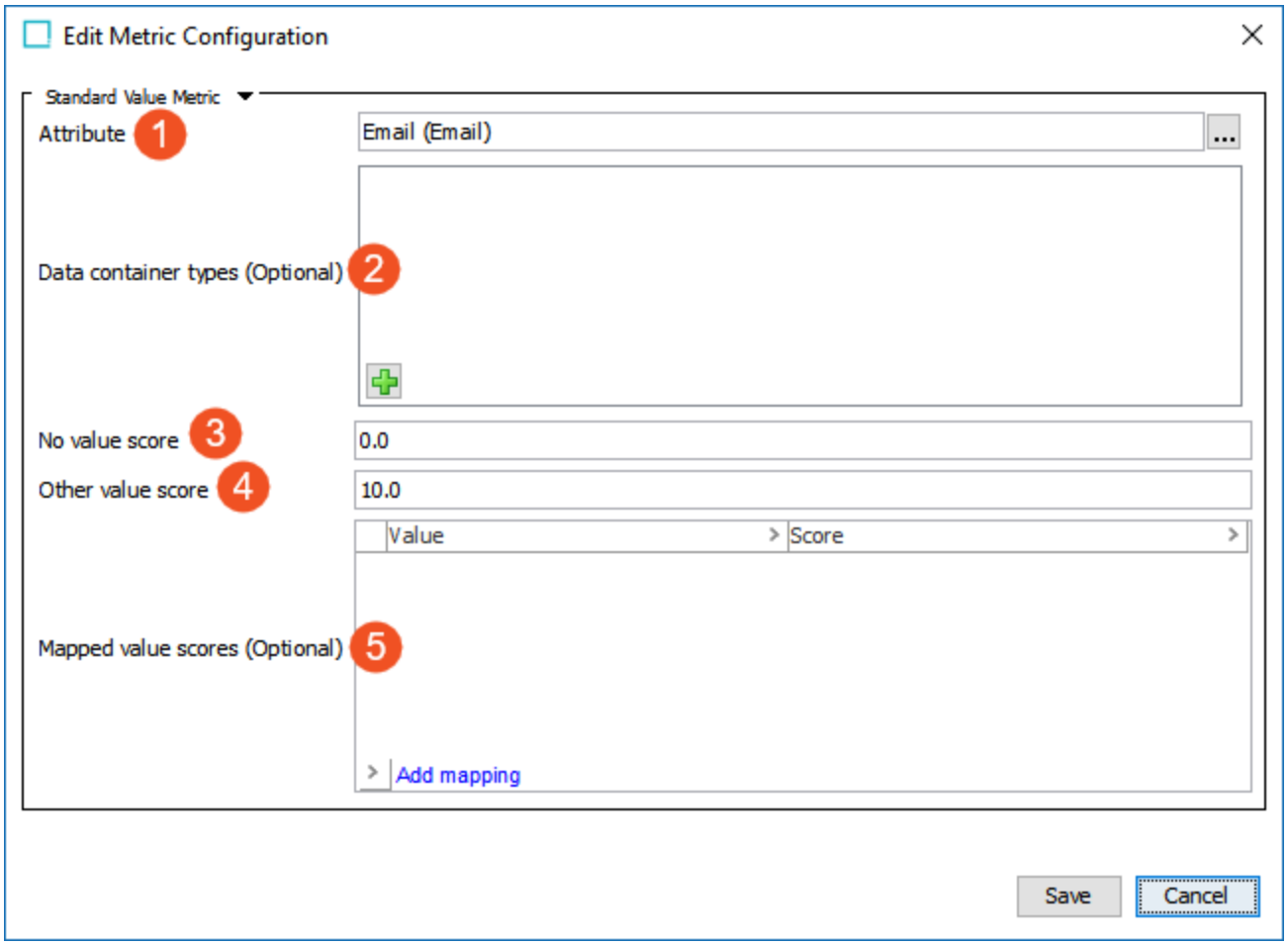
A value metric evaluates an attribute value and generates a metric score based on the result.

Configuration

To configure a value metric, open the editor for the desired metric object, and from the dropdown select **Standard Value Metric**.



A number of configuration options are available for value metrics.



1. **Attribute** - In this field, select the attribute to evaluate.

> **Note:** The chosen attribute must be single value only, and must either be a simple numeric value, a text value, an LOV value, or a calculated value. Attempting to configure an attribute that does not comply with these requirements will result in an error.

2. **Data container types (Optional)** - If desired, a data container type can be included in the evaluation.
3. **No value score** - If there is no value for this attribute, then it returns the specified point value.
4. **Other value score** - If there are any values besides those listed in the **Mapped value scores** parameter, it will return this score.
5. **Mapped value scores (Optional)** - This field allows for mapping specific values to specific scores.

Select 'Save,' and the metric is ready to be used in a data profile or with data policies. To create a policy, start with the configuration of a dataset definition, as described in the **Creating a Dataset Definition** topic of this documentation.

On the **Completeness Metric** tab, in the **Configuration** area, you can view the configuration settings.

Configuration	
Metric Plugin Type: Standard Value Metric	
Data quality Score Attribute (Required)	Email
Data container types (Optional)	[]
No value score	0.0
Other value score	10.0
Value scores	[]

Edit

Business Function Metrics

Business Function metrics use JavaScript business functions to evaluate data and return metric scores, and depending on the JavaScript, messages that provide more detailed information about the returned scores.

For information on business functions, refer to the **Business Functions** topic of the **Business Rules** documentation.

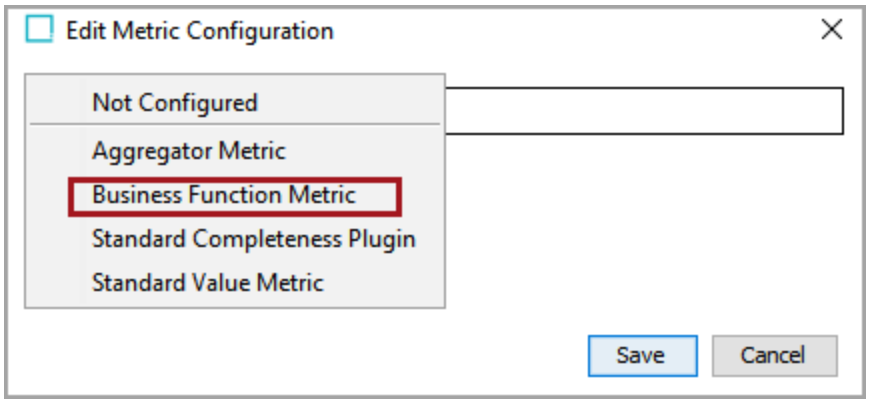
Business Function Metric Configuration

Before metrics can be created, a Setup Group must be configured to hold the metrics. For information on configuring a setup group for metrics, refer to the **Initial Setup for Metrics** topic in the **Metrics** documentation.

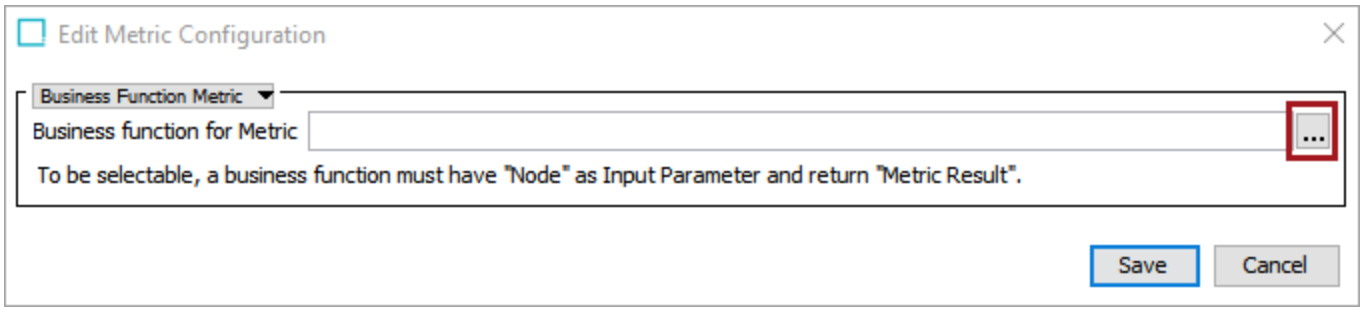
For information on creating a metric, refer to the **Creating and Editing Metrics** topic in the **Metrics** documentation.

To configure a business function metric:

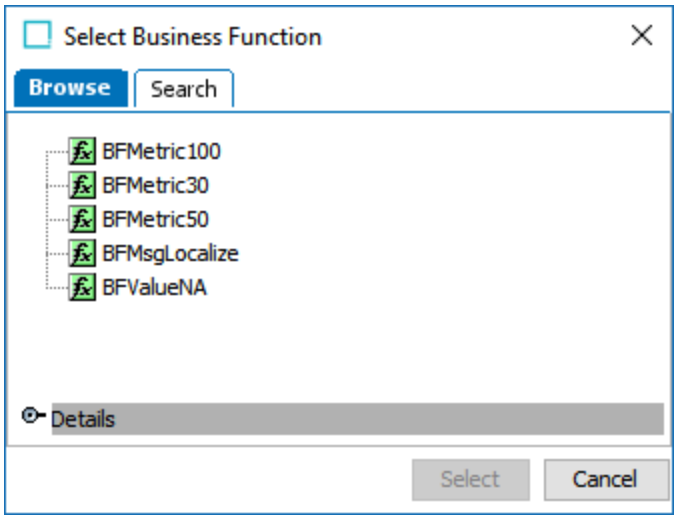
1. From the Edit Metric Configuration wizard, select 'Business Function Metric.'



2. Click the ellipsis button (...) by the **Business function for Metric** parameter.



3. Select the business function to include as part of the business function metric. To search for a specific business function, click the 'Search' tab and enter the search criteria.



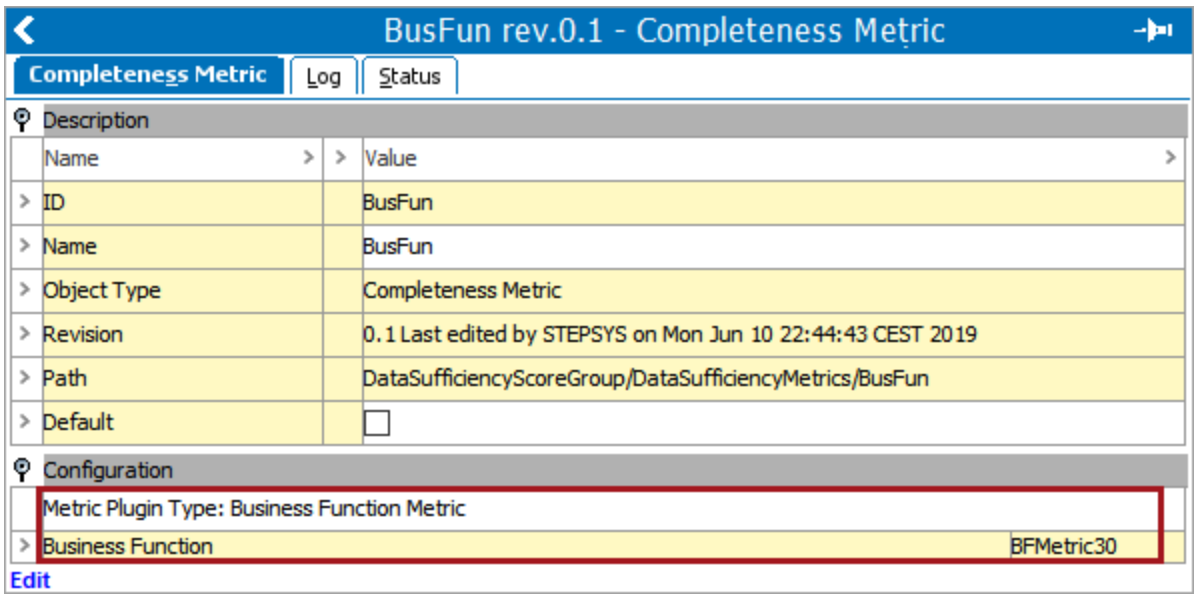
Note: For a business function to be selectable for a business function metric, it must have 'Node' as the input and 'MetricBusinessFunctionResult' as the return type.

4. Click 'Save' to close the 'Edit Metric Configuration' wizard.

The business function metric is configured and ready for use.

Important: The MetricBusinessFunctionResult of a JavaScript business function must be instantiated directly in the business function. It cannot be instantiated by a JavaScript library.

With the configured metric selected, the name of the metric plugin type (in this case, 'Business Function Metric') and the name of the selected business function will be listed under the Configuration flipper.



Aggregator Metrics

An aggregator metric allows users to combine scores from multiple metrics. By default, the aggregator metric returns an average score based on these combined scores; however, by adding a business function to an aggregator metric, users are able to obtain scores based on other variables, e.g., if one metric is weighted heavier than another metric within the aggregator metric, the score would reflect the difference based on the weight of each metric.

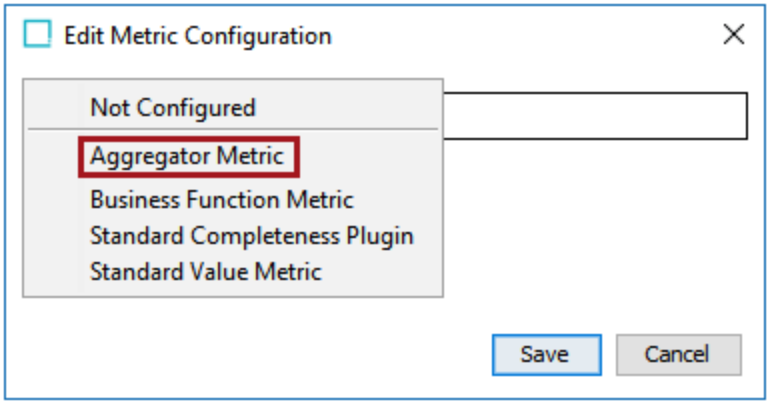
Aggregator Metric Configuration

Before metrics can be created, a Setup Group must be configured to hold them. For information on configuring a setup group for metrics, refer to the **Initial Setup for Metrics** topic in the **Metrics** documentation.

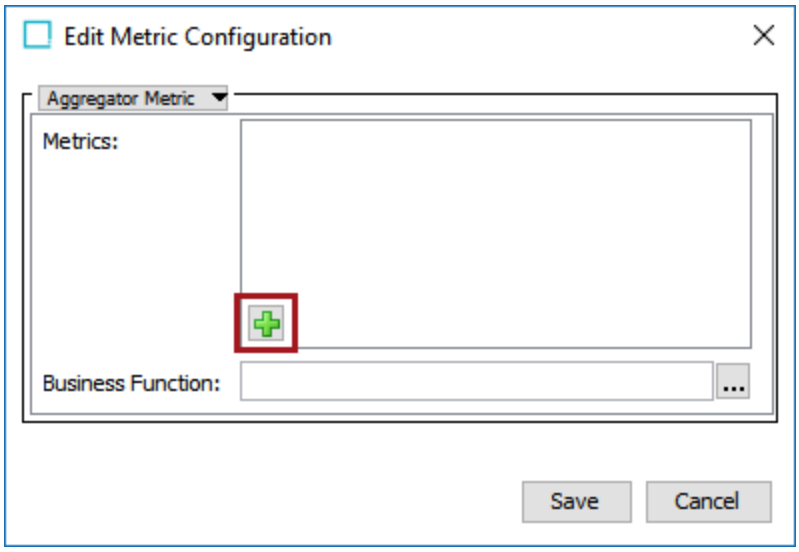
For information on creating a metric, refer to the **Creating and Editing Metrics** topic in the **Metrics** documentation.

To configure an aggregator metric:

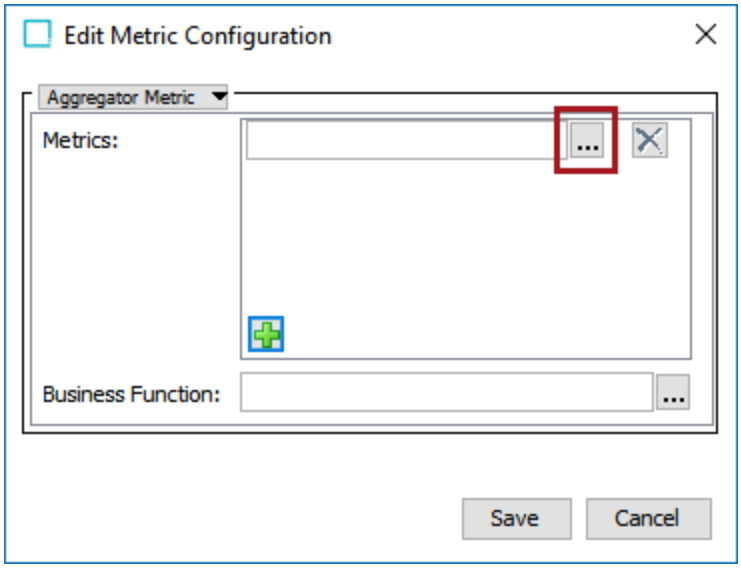
1. From the Edit Metric Configuration wizard, select 'Aggregator Metric.'



2. Click the green plus sign.

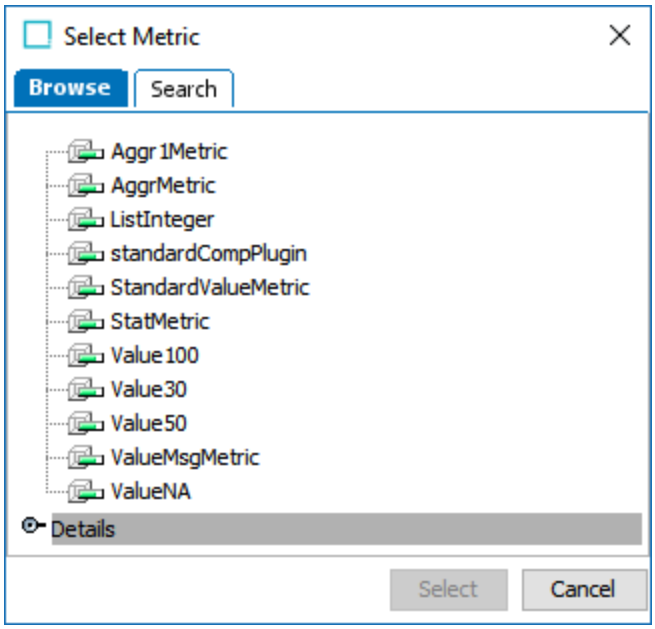


3. Click the ellipsis button.

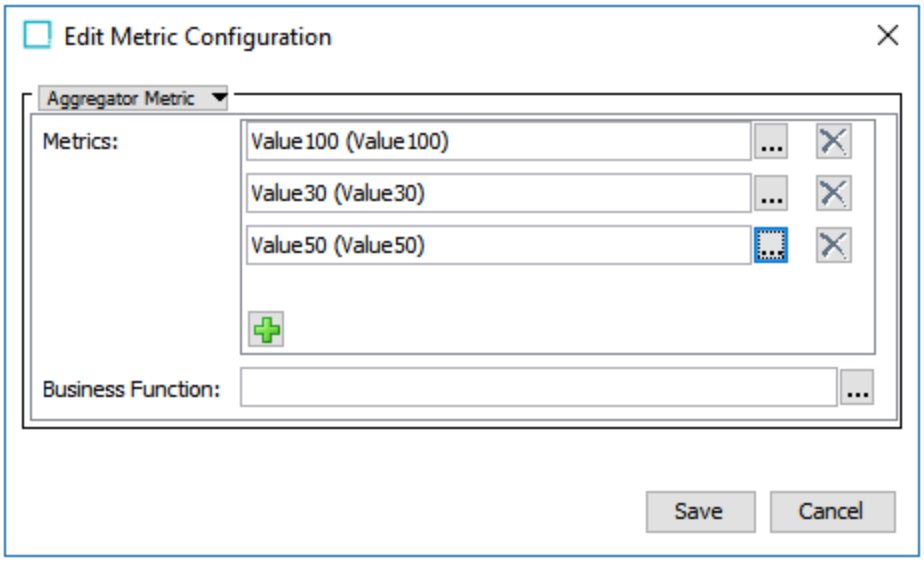


4. Select the metric you want to include in the aggregator metric and click 'Select.'

Note: Only one metric can be selected at a time. After a metric is selected, the green plus button must be clicked on again to add another metric.



In the image below, three metrics have been selected from the available metric list.

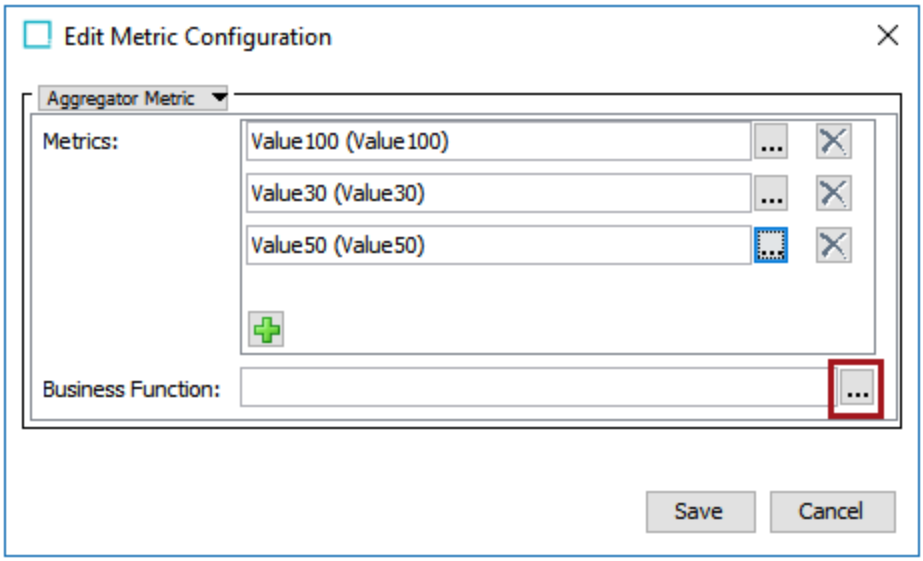


Adding a business function to an aggregator metric

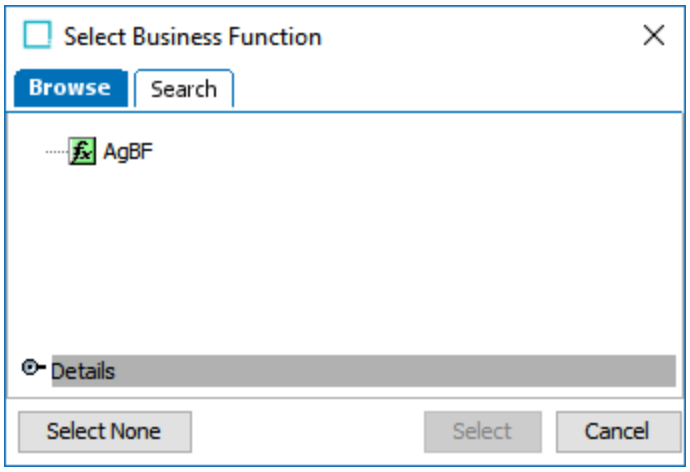
Although optional, the purpose of adding a business function to an aggregator metric is to return a score that is not the average score of the configured metrics. If no business function is selected, the returned score will be the average score of the configured metrics included in the aggregator metric.

To add a business function to an aggregator metric:

1. Click on the business function ellipsis.



2. Select a business function and click the 'Select' button.

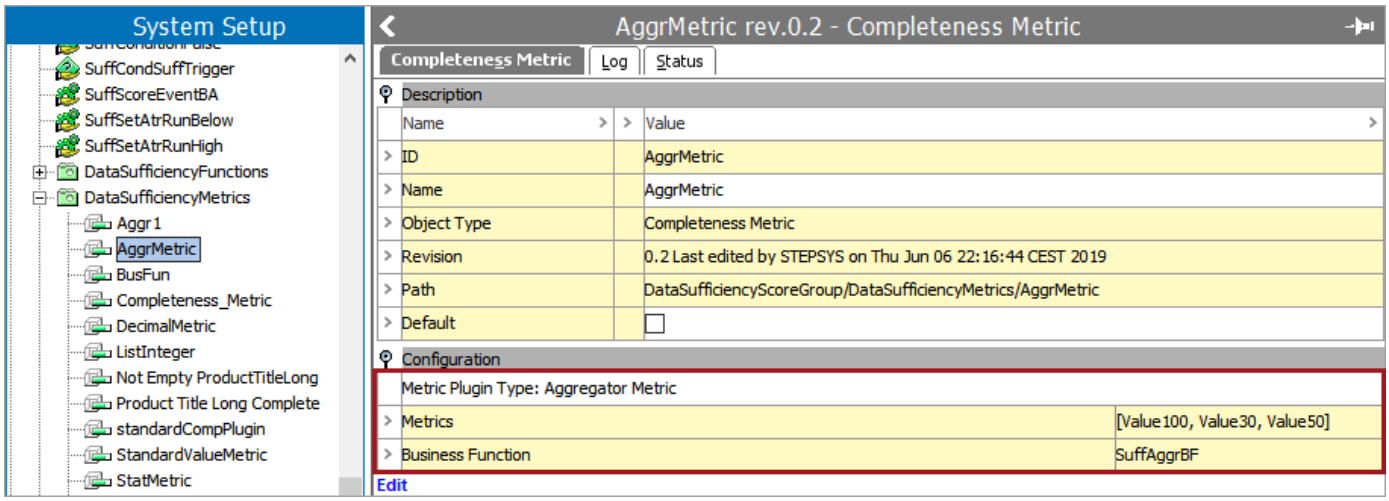


3. Click 'Save' to close the 'Edit Metric Configuration' wizard.

The aggregator metric is configured and ready for use.

Note: To use a business function with an aggregator metric, the input parameter type must be set to 'List<MetricResult>' and the return type must be an integer. Business functions without these configuration settings will not be available as a valid option within the Select Business Function window. For more information on business functions, refer to the **Business Functions** topic in the **Functions** documentation.

With the configured metric selected, the name of the metric plugin type (in this case, 'Aggregator Metric'), the metrics included in the aggregator metric, and the name of the selected business function will be listed under the Configuration flipper.


System Setup
SuffCondSuffTrigger
SuffScoreEventBA
SuffSetAtrRunBelow
SuffSetAtrRunHigh
DataSufficiencyFunctions
DataSufficiencyMetrics
Aggr1
AggrMetric
BusFun
Completeness_Metric
DecimalMetric
ListInteger
Not Empty ProductTitleLong
Product Title Long Complete
standardCompPlugin
StandardValueMetric
StatMetric
AggrMetric rev.0.2 - Completeness Metric
Completeness Metric
Log
Status
Description
Name
Value
ID
AggrMetric
Name
AggrMetric
Object Type
Completeness Metric
Revision
0.2 Last edited by STEPSYS on Thu Jun 06 22:16:44 CEST 2019
Path
DataSufficiencyScoreGroup/DataSufficiencyMetrics/AggrMetric
Default
Configuration
Metric Plugin Type: Aggregator Metric
Metrics
[Value100, Value30, Value50]
Business Function
SuffAggrBF
Edit

Metric Visualization

Metric score indicators provide information about the data quality of objects. For completeness metrics, this overall score is calculated based on completeness scores that you set for individual attributes, reference types, data containers, and product to classification link types. While it is possible to calculate a quality percentage without settings scores for these individual data objects, it is recommended to do so, as you can weigh them based on relevance or outright omit those that should not apply to the overall quality percentage.

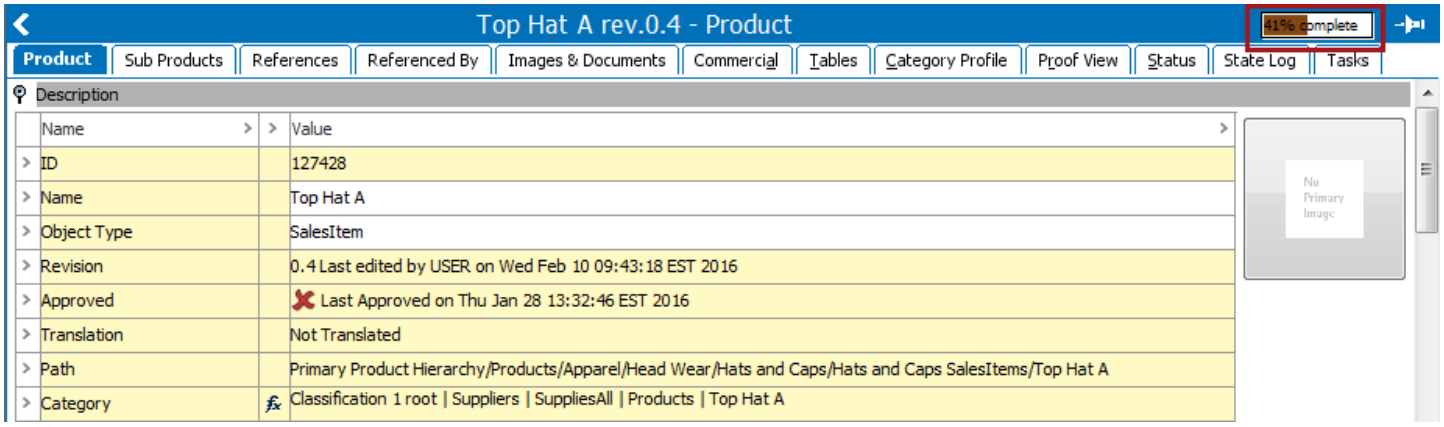
For value and function metrics, this score is a simple reflection of the resulting metric score.

Note: This functionality is not available on product overrides.

View Quality Scores

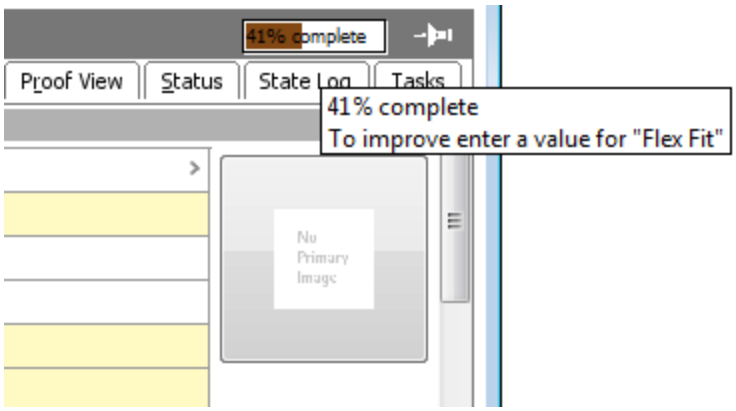
1. In the **Tree** tab, expand the applicable Hierarchy, and then locate the relevant object.
2. Click the main object tab or the **References** tab. The **Completeness Meter** in the upper right corner displays the current status of the object expressed as a percentage.

Note: If using a completeness metric and no indicator appears, it is likely that no completeness scores have been set for the data valid for the object.



Important: Steps 3 and 4 are only available for completeness metrics.

3. Hover the mouse over the **Completeness Meter** to view a text describing what you can do to improve the quality percentage.



4. To get a more detailed view of how the quality percentage for the selected object is calculated, double-click the **Completeness Meter**. A **Completeness Info** window appears, which displays all attributes, data containers, and referenced objects that contribute to the quality percentage and how they are weighted.

Completeness Info

Completeness Info

Completeness Metric: Completeness Metric B (Completeness Metric B)
Object 65.08% Complete

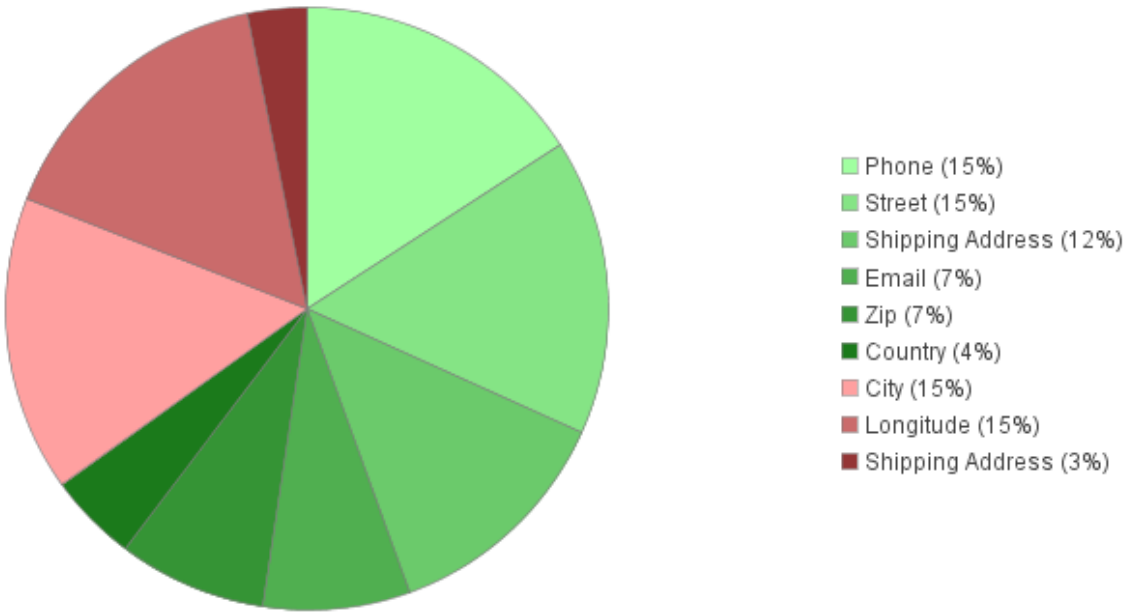
Weights - Unpopulated Data - 34.92% collapse

- 15.87% City
- 15.87% Longitude
- 3.17% Shipping Address (of possible 15.87%)

Weights - Populated Data - 65.08% collapse

- 15.87% Phone
- 15.87% Street
- 12.7% Shipping Address (of possible 15.87%)
- 7.94% Email
- 7.94% Zip
- 4.76% Country

Scored Attributes / References / Data Containers



OK

Metric score indicators are also available in Web UI. Refer to the **Metric Visualization in Web UI** section of the **System Setup** documentation.

User Privileges

The quality of an object is always calculated and displayed as if the user had privileges to view and edit all relevant data. However, hints are only provided for data that the user is allowed to edit.

Additionally, this functionality is only accessible to users with the appropriate privileges. For more information, refer to the **Setup Actions and Error Descriptions** section of the **System Setup** documentation.

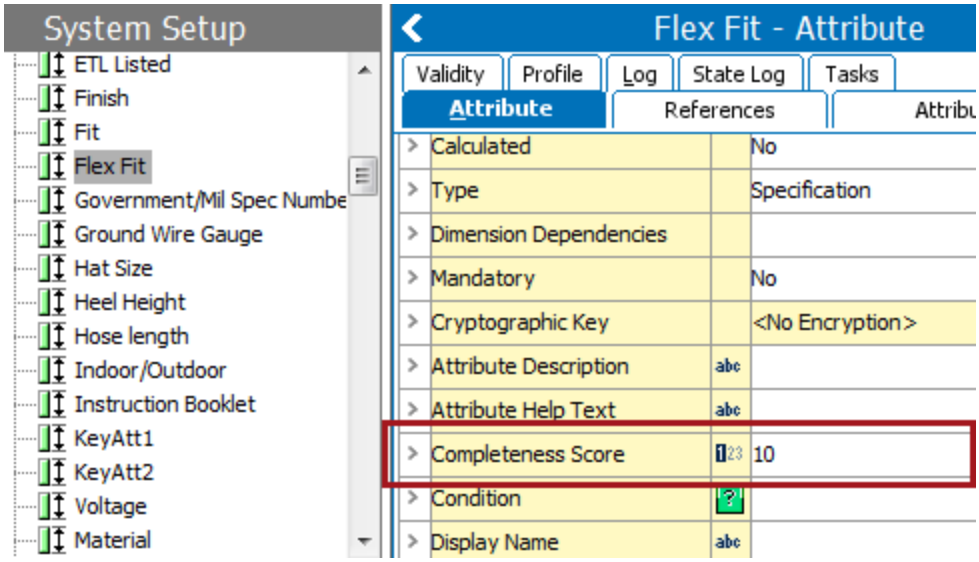
Define Completeness Scores

For a typical completeness metric setup, in order to view object quality information, completeness scores must be configured on all relevant attributes, references, data containers, and product to classification link types. This score determines how much to weigh an element of the object when factoring the object's quality percentage.

Note: For product reference types, images and document reference types, and product to classification link types, the scores are defined on the individual type's main editor.

Important: The below features and configuration steps are only relevant to completeness metrics.

1. In **System Setup** expand **Reference Types** or **Attribute Groups**, and then locate the relevant reference type / attribute.
2. In the **Completeness Score** field, under the **Description** section, enter the preferred score. Scores must be integers.



Note: You cannot specify scores for calculated attributes.

Alternatively, when setting the score on the link between a product or classification and a specification attribute, the completeness score of an attribute can be specified on the actual object in the **Tree**.

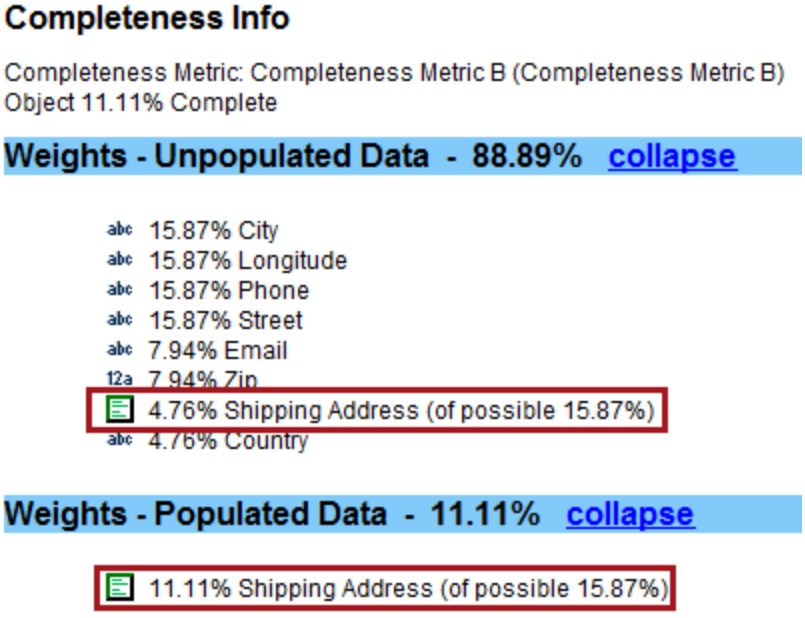
1. In the **Tree**, expand the applicable hierarchy, and then locate the desired object.
2. On the **References** tab, go to **Linked Attributes** and then click the flipper icon to expand the table.
3. In the **Completeness Score** column, enter the preferred score(s) for the relevant attribute links.

Linked Attributes from Product Hierarchy

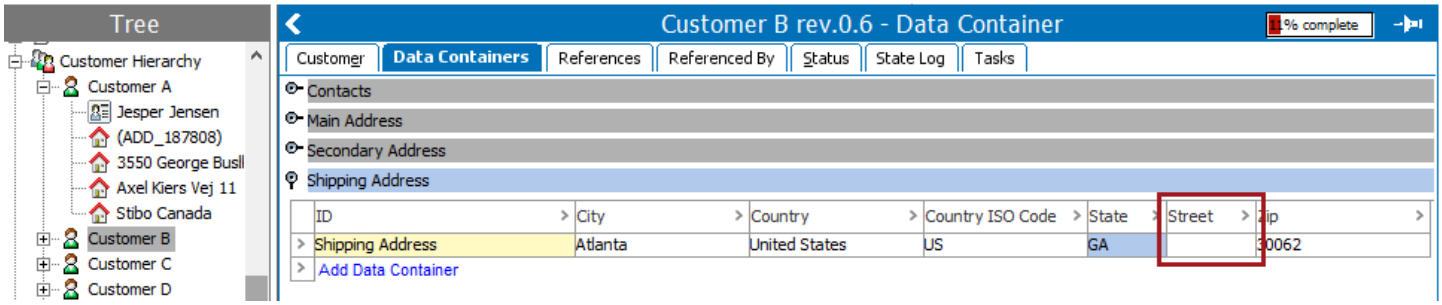
DisplaySequence	ID	Name	Completeness Score
	DescriptionWeb	Description, Web	
2	DescSource	Description Source	
2	DescTarg	Description Target	
	Disc Dimensions	Disc Dimensions	10

Setting Completeness Scores for Data Containers

Unlike other data objects that contribute to the object's quality percentage, a data container can be incomplete itself, making it possible to contribute only a fraction of its maximum score. The weight of the total possible score of the data container is set on the data container type (just like for attributes and reference types). Any values absent from the individual attributes that comprise the data container are reflected in its score. Additionally, the attributes within a data container can have their own varying scores. In a sense, a data container has its own quality percentage, and contributes either 100% of its score to the object's quality percentage, or, if one or more attributes within are missing values, it contributes a fraction of its total possible score.



In the above example, the data container 'Shipping Address' can contribute a total of 15.87% completeness to the object's overall quality percentage. However, because it has attributes with missing values, it is only contributing 11.11% completeness; roughly 70% of its maximum score.

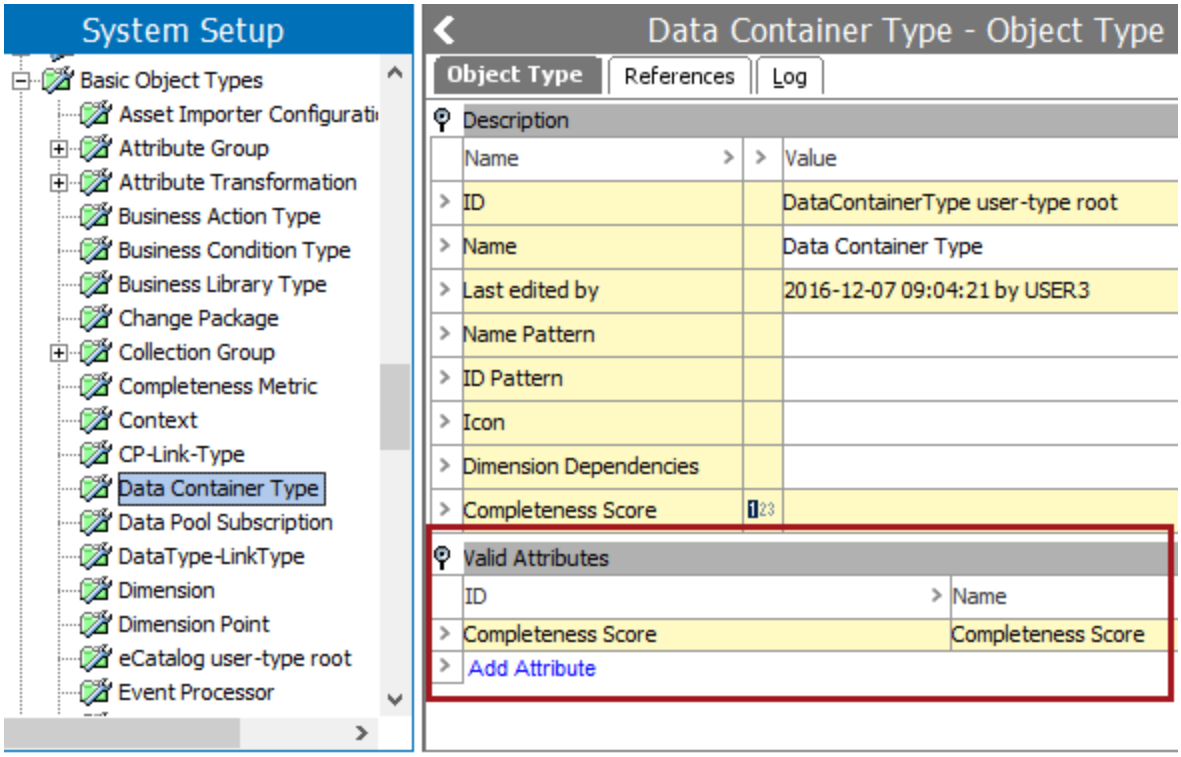


In the data container itself (pictured above), the attribute 'Street' is missing a value, which explains why the data container is not contributing 100% of its score. Had all six attributes been weighted with a neutral score, each would contribute roughly 17% to the data container's score. However, based on the completeness breakdown, we know that the attribute 'State' is responsible for roughly 30% of the score. This is because 'State' has a higher weighted score than some of the other attributes.

Note: If a second 'Shipping Address' instance were added, its attributes would be factored in with those of the existing 'Shipping Address' when calculating the score, as they are both held within the same data container.

As with all attributes, the scores for attributes that comprise a data container are defined on the Completeness Score metadata field found on the attributes. The maximum score for the data container itself is defined by the same field on the data container type (in this example, 'Shipping Address').

Before completeness scores can be applied to data containers, however, ensure that the Completeness Score attribute is valid for the Data Container Type object type.



Export Completeness Values

Completeness values can be exported to Excel and CSV.

Important: The below features and configuration steps are only relevant to completeness metrics.

1. Create a calculated attribute and enter the function "completeness()" in the Value template.

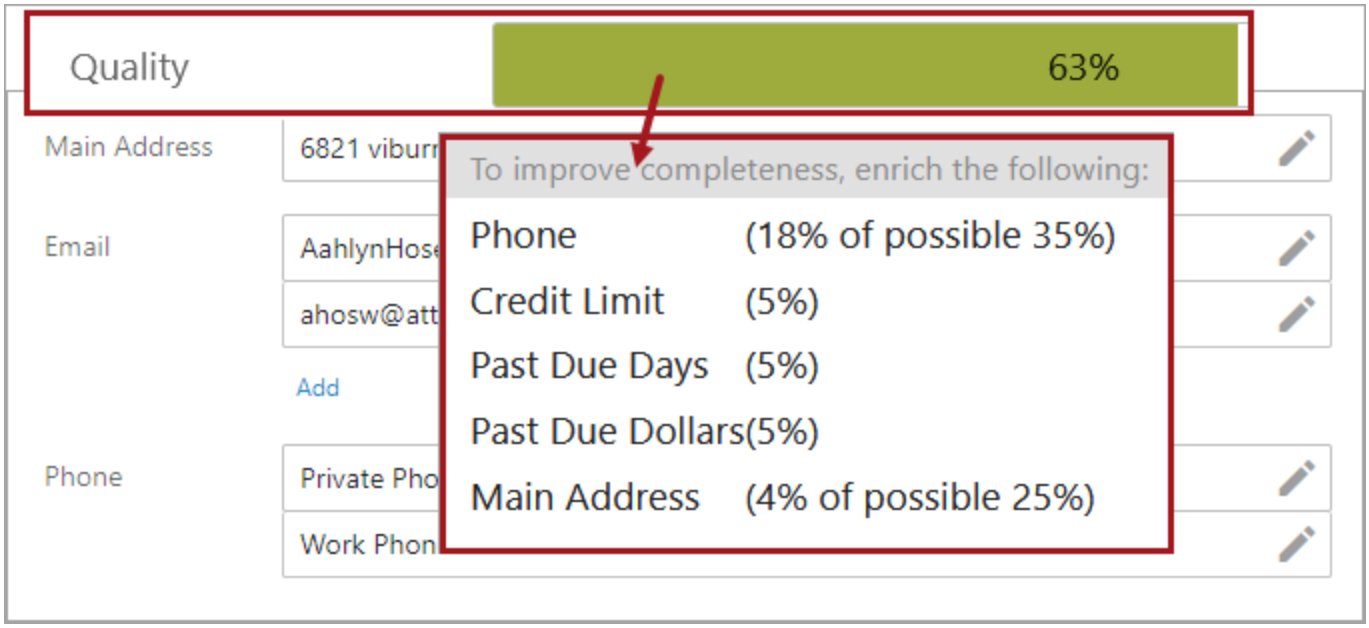
   For more information, refer to the **Calculated Attributes** section of the **System Setup** documentation.

2. From the **File** menu, hover over **Export** and then click **Data...**.
3. In **Step 4 - Map Data** of the Export Manager wizard, add **Select Attribute** to columns. The **Select Attribute or Attribute Group** dialog is displayed. Search or browse for the desired calculated attribute.
4. Select the calculated attribute, check **Force calculation**, and then continue with the export.

   For more information, refer to the **Creating a Data Export** section of the **Export Manager** documentation.

Metric Visualization in Web UI

Metric score indicators are available on Node Details component pages, allowing users to view the quality of the data currently selected node in Web UI. Like in workbench, object quality is represented by a completeness meter. Additionally, clicking on the meter will provide text describing what you can do to improve the quality percentage.



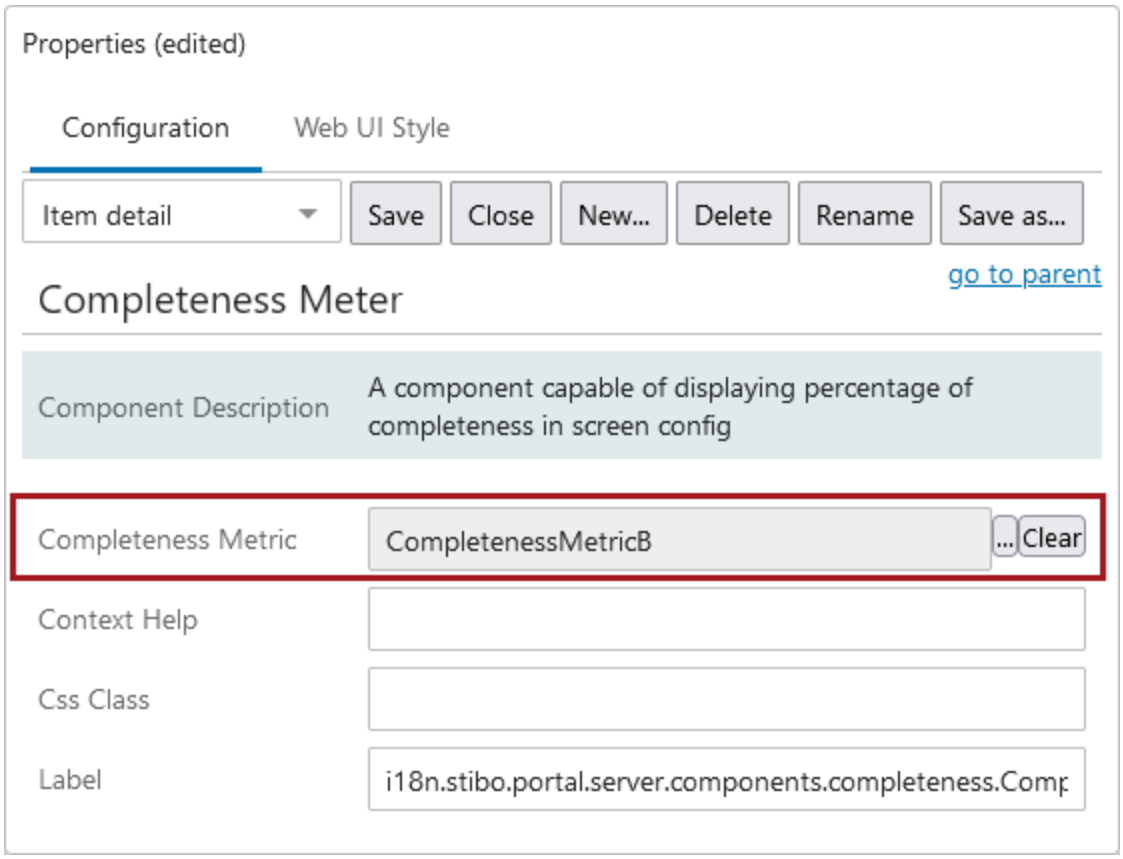
Note: Attributes are displayed according to their completeness scores, with the attribute with the highest completeness score displayed at the top and those with lower scores listed subsequently. In cases where multiple attributes share the same completeness score, they are listed alphabetically.

Adding the Completeness Meter Component

1. In design mode, navigate to Node Editor properties.
2. Under Child Components, click **Add**.
3. In the 'Add component' window that appears, select 'Completeness Meter,' and click **Add**.
4. Click **Save**.

Configuring the Completeness Meter Component

1. Navigate to the Completeness Meter properties.
2. In the Completeness Metric field, click the ellipsis button (...), and select the desired completeness metric from the node selector. This selection will determine which completeness metric to use when evaluating the data on the object.

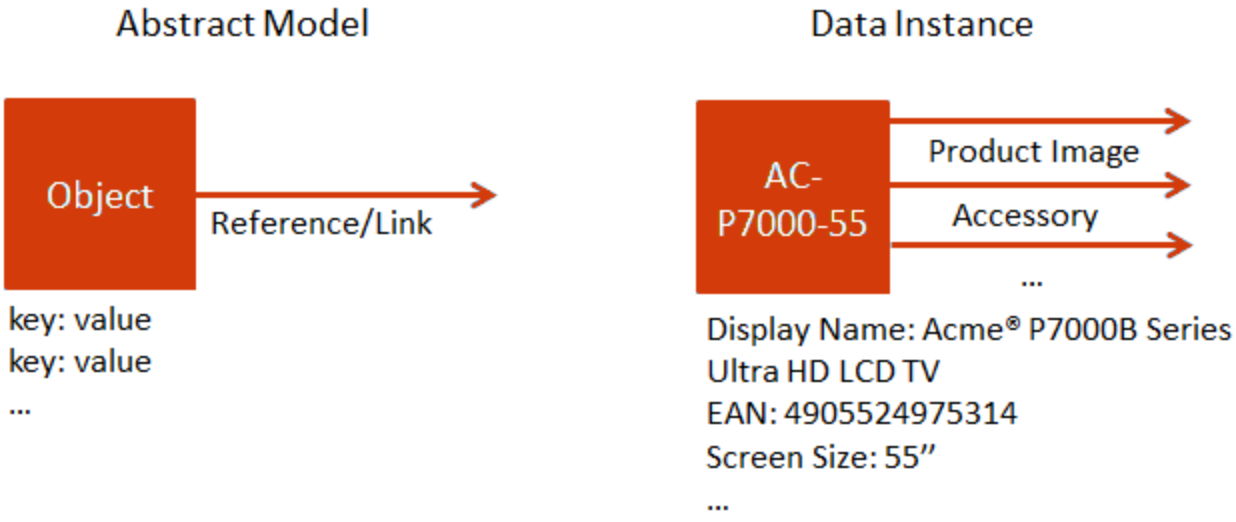

Properties (edited)
Configuration
Web UI Style
Item detail
Save
Close
New...
Delete
Rename
Save as...
go to parent
Completeness Meter
Component Description
A component capable of displaying percentage of completeness in screen config
Completeness Metric
CompletenessMetricB
...
Clear
Context Help
Css Class
Label
i18n.stibo.portal.server.components.completeness.Comp

3. Click **Save**.

Object Types and Structures

In a traditional relational database model, with concepts such as tables, columns, and rows to form a normalized data model, STEP uses the concept of objects to achieve the same goal.

In a STEP system, all entered items are modeled as objects with properties; the properties being metadata like IDs, attributes with values, and references / links to other objects.



Object Types allow a user to define the type of system or product data that can be stored in a node. Grouping items with similar characteristics in a node enables a user to identify a required item more easily. This object model is used throughout STEP and applies to objects themselves, configurations, attribute definitions, and reference type definitions.

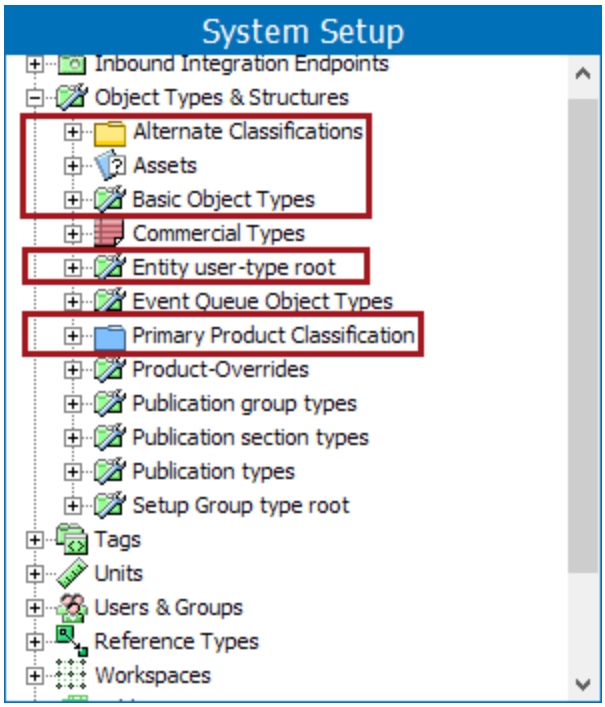
Object Type Facts in STEP

- All objects in a STEP system are instances of an 'Object Type' that constrains the behavior of the instances. For example, via the object type, a user decides which attributes and references should be legal for the instantiated objects.
- STEP comes with a number of predefined, but still is to some degree configurable, object types for modeling configuration objects like attributes. However, it is up to the system designer to determine data modeling, to define the required object types, and apply the desired behavior.
- The user defined object types that are listed below, are super types / node types used for modeling data.

Super Type / Node Type	Explanation	User-Defined Object Type Example	Instance Example
Products	Super type for modeling product data	• SKU • Sales Item • Supplier Item	AC-P70900-55 HD TV
Entities	Super type for modeling non-product data	• Supplier • Address • Customer • Location	• Joe Smith • World Trade Holdings
Assets	Super type for modeling digital data	• User Manual • Bill of Materials • Product Image • Situation Image	AC-P7000-ee User Manual
Classification	Super type for modeling product and asset classification hierarchies	• Web Category • Asset Folder	Televisions
Publications	Super type for modeling hierarchies and objects used for print publishing solutions.	• Flier • Magazine • Pamphlet	Winter Sale Catalog

Object Type Location in STEP

Object Types are maintained on the **System Setup** tab under the **Object Types & Structures** node.



There are two kinds of object types:

Object Type kind	Description
Basic Object Type / System Setup Object Type	A Basic Object Type is applied to nodes that are used for structuring the *system data*. There are many Basic Object Types including: • Attribute Group • Context • Dimension • User When an object of any basic object type is created, the relevant object type is automatically applied. New basic object types cannot be created. For the complete list of basic object types and more information, refer to the **Basic Object Types** section.
Non-Basic Object Type / Tree Object Type	A non-basic object type applies to nodes that are used for structuring the product data hierarchies including: • Alternate Classifications

Object Type kind	Description
	• Primary Product Classification • Assets (images and documents) • Entities • Product-Overrides • Publication types, publication section types, publication group types When creating an object of these types you must manually apply the relevant object type. For more information, refer to the **Object Types** section.

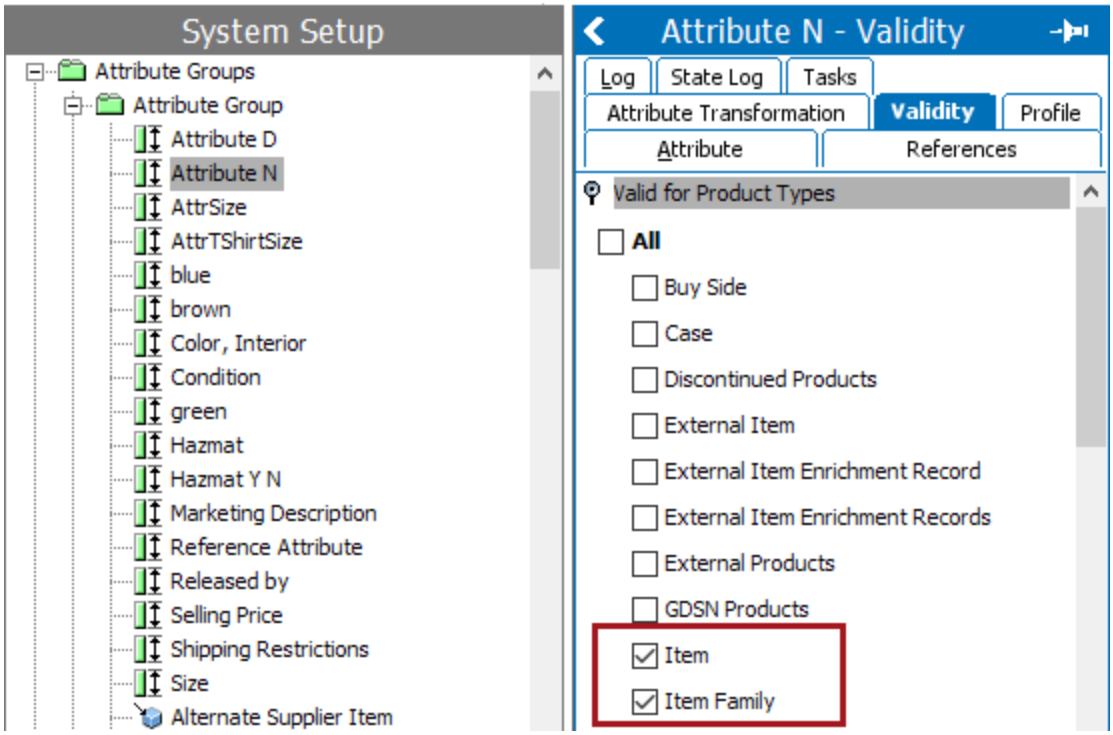
Attributes Valid for Object Types

An attribute is a characteristic or a detailed piece of information related to a particular object, or a relation between objects, such as references / links.

- Attributes can be made globally-valid for all objects of a specific object type. Description attributes can be applied to all object types, and will appear on all instances of the object type, as an editable field, no matter where in the hierarchy the object type is instantiated.
- A description attribute made valid for an object type will appear as a field in **Description**. Description attributes can be made valid for all user-defined object types, the majority of the predefined basic types and for user-defined reference and link types.
- Specification attributes can only be made valid for product object types and can thus only have values for product object type instances.

Setting Validity

To set the validity, go to the desired attribute > select the validity tab > choose required object types to give the validity as shown.



For more information, refer to the **Description Attributes** topic.

Autogenerate Using Name Pattern and ID Pattern

All data and configuration objects in STEP have an ID. The ID cannot be omitted, it cannot be changed, and since it serves to identify an object, it will always be the same across all Contexts and Workspaces.

IDs alone, however, are not unique identifiers in STEP because they are not unique across super types or node types. Thus, you cannot have two products with the same ID, even when they are of different Object Types, but you ***can*** have a product, a classification, an asset, an attribute, and an LOV that all have the same ID.

Because IDs cannot be changed, care should be taken when assigning them, especially for objects that are likely to have their data and metadata changed routinely. It is also advisable to avoid any spaces in IDs.

It is possible to have IDs automatically generated for objects of specific object types and this feature should be used for:

- Objects that are created often.
- Objects that are created by end users
- Objects whose names / core properties are likely to change over time, and the name of the product does not hold much importance in identifying the product.

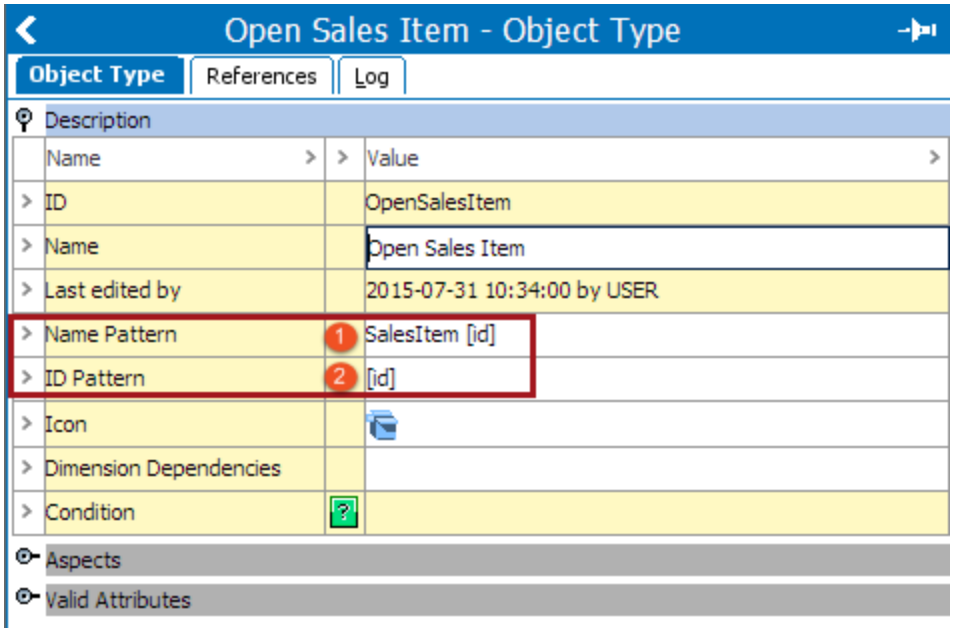
For example, an auto ID Pattern is generally used when the products are created automatically, either by import or from an upstream system. This could be the case if there is a legacy system where the products were originated and subsequently introduced to STEP. To create the products in STEP, an auto ID Pattern may be used.

Defining the Name and ID Pattern

The Name and ID of a node can be autogenerated by entering a template pattern. An Object Type with a Name Pattern and/or ID Pattern will cause the system to present to the user the resulting pattern when a new node of that Object Type is created manually.

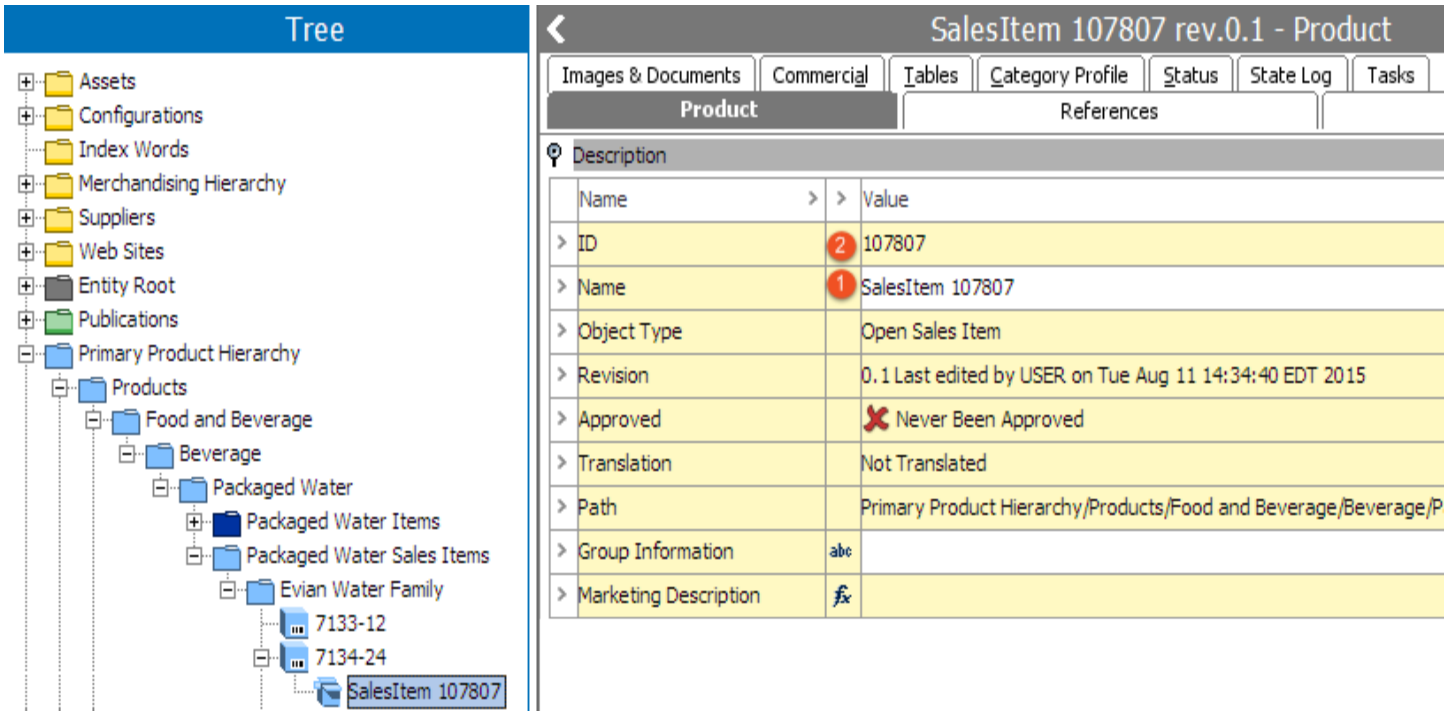
- Static text entered in the Object Type's Name Pattern or ID Pattern will be displayed in the Name or ID field when a new node is created.
- A unique incremental counter automatically displays the next available number in a sequence when the tag '[id]' is used. This counter is extremely advantageous when used in an ID Pattern, because it guarantees a unique ID every time a new node of that Object Type is created.
- Name Patterns and ID patterns typically consist of both an incremental counter and static text. Static text may be entered before or after the [id], or both. Examples: *ATTR_[id]*, *[id]_FAM*, and *PROD_[id]_LINE*.
- Similar to the [id] tag functionality, IDs can be autogenerated using a universally unique identifier (UUID) generator by using the tag '[uuid]'. Users should be aware that a UUID takes up 36 characters out of the maximum 40 characters that a STEP ID can contain, so it either needs to be used alone or with a four character prefix and/or suffix.
- Only the standard ASCII printable characters in the range of 32-126 are allowed.
- ID Patterns are far more commonly used than Name Patterns.

To specify an ID / Name Pattern, select the Object Type in System Setup below the Object Types and Structures, and enter the desired pattern in the field ‘ID Pattern’ or ‘Name Pattern’. As illustrated below, a new node of the Object Type 'Product' has a pattern of 'SalesItem [id]' for the Name field and [id] or [uuid] for the ID field.

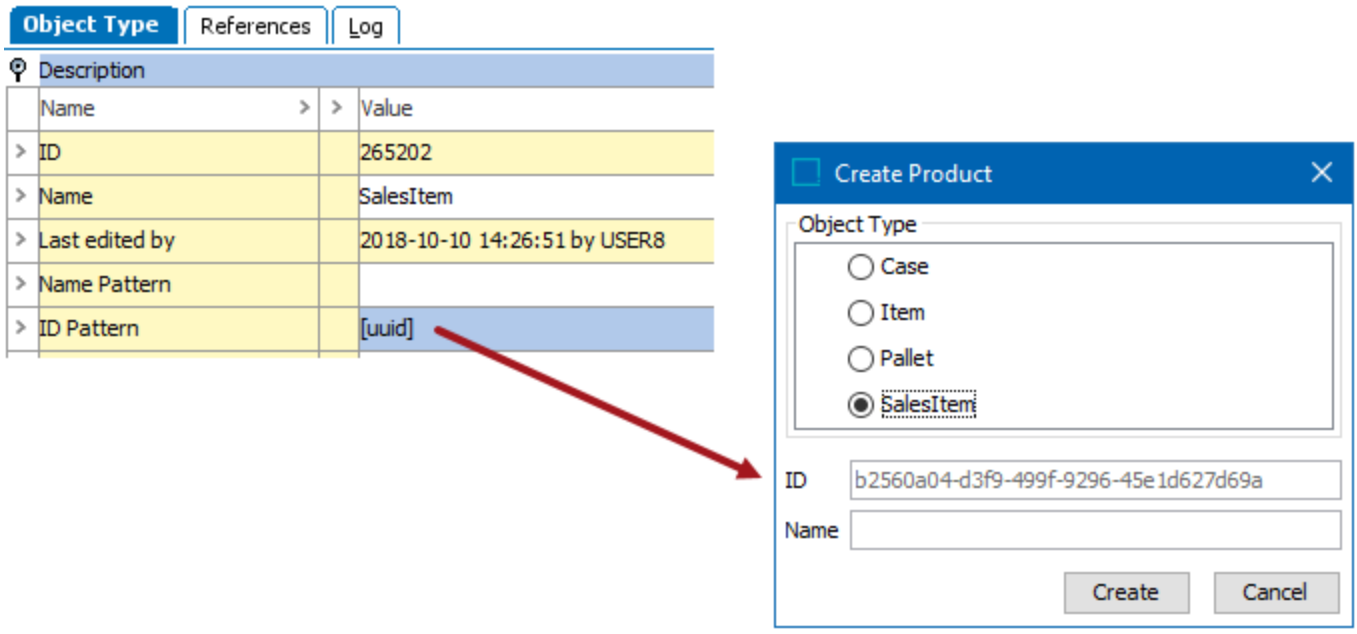


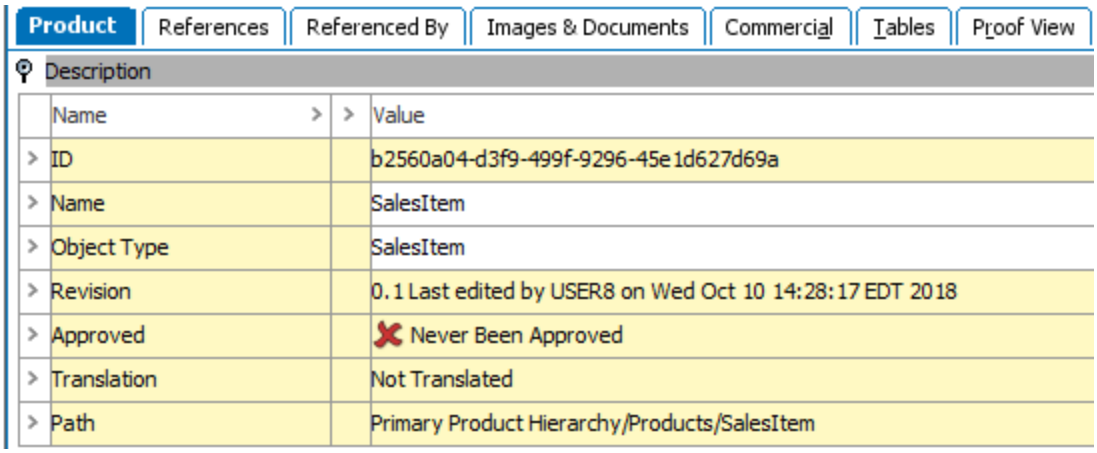
When a new node is created on the Tree for the Open Sales Item Object Type:

- The Name is 'SalesItem 107807' because in this case 107807 is the next unique number available to STEP Workbench.
- When both the Name Pattern and ID Pattern are specified, the ID number is the same as that for the Name. The counter does not increment just because the same tag [id] was used in both Pattern fields.



Below is an example using the [uuid] tag:





Some important factors to keep in mind when using autogenerated IDs and Names:

1. When an ID Pattern has been specified for an Object Type, it is not possible to manually override the ID. Objects with user defined IDs can however still be created via data imports. This should generally be avoided, since mixing user defined and autogenerated IDs will almost certainly eventually lead to errors.
2. When manually creating a node where the Object Type has an entry for the Name Pattern, the autogenerated Name is presented as a suggestion and can be changed.
3. There is no guarantee that the generated ID is not already used by an existing object. This might happen if IDs are being generated both automatically and manually via an import.

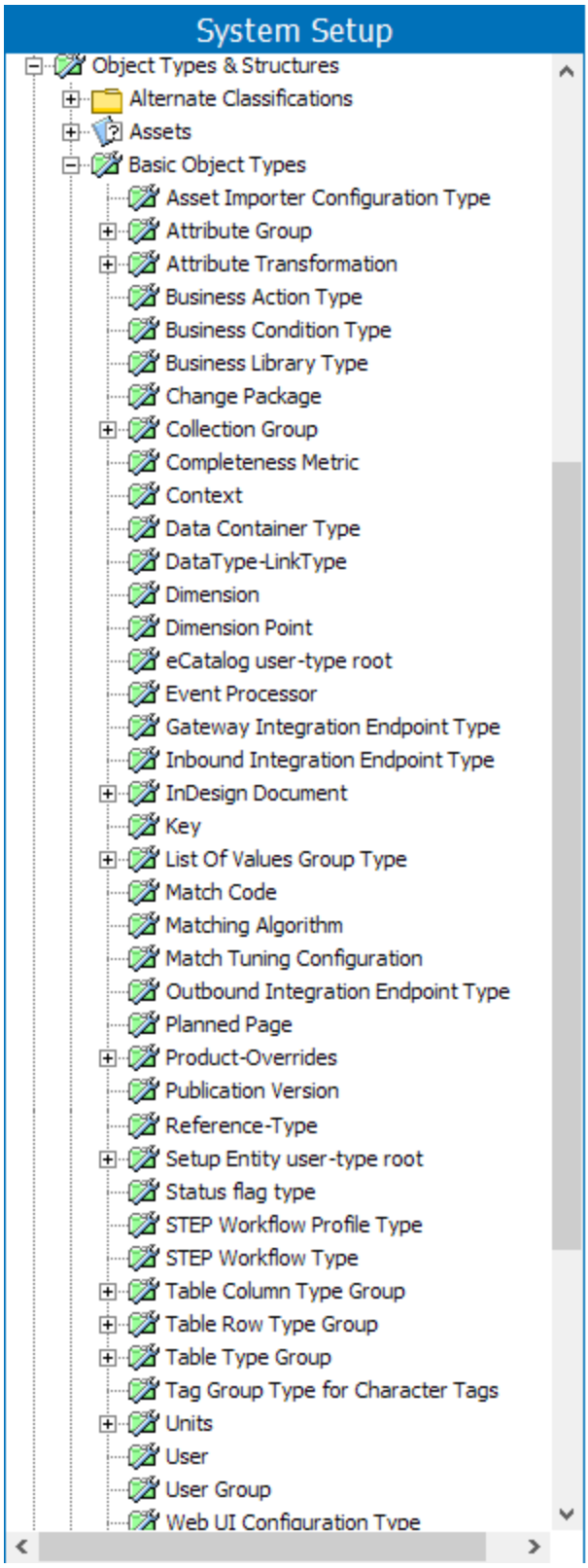
Basic Object Types

A basic object type is a node used for structuring the system data, for example, attributes, contexts, users, tables, etc. They are also called predefined object types and structures.

Whenever an object is created using a basic object type, the relevant object type is automatically applied. A user can define the automatic ID pattern and name pattern for the basic objects.

Basic object types cannot be manually created, however, when additional components are purchased and added to STEP, additional basic object types may display.

Basic objects are viewed under System Setup > Object Types and Structures > Basic Object Types. Below is one example of basic object types in a STEP instance.



Note: Basic object types cannot be deleted.

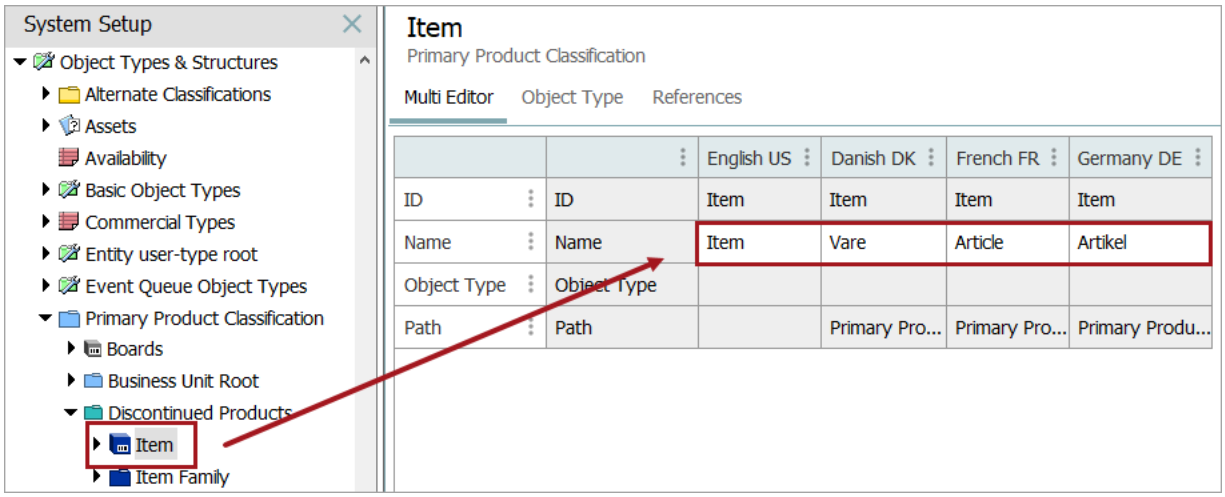
Basic object types are used while creating the setup roots. For more information, refer to the **Setup Group** topics in this documentation.

Object Type Dimension Dependencies

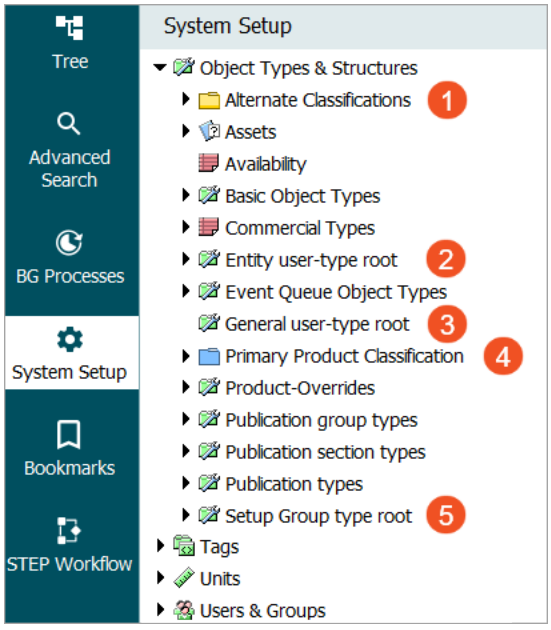
Dimension dependency can be added to Object Types to control whether the object name or the object type name can be displayed differently based on language.

Setting an Object Type Name to be Language Dimension Dependent

The name of the object type in the **System Setup tab** can be different based on configuring the language dimension dependency on the root object type levels. For example, if the object type is called 'Item' in English, setting language dimension dependency will allow the object type to be named as 'Artikel' in German context and 'Article' in French context.



Set the language dependency on the root object type level options listed below:



1. 'Alternate Classifications' hold the classification object types. Set the dimension dependency at the 'Classification 1 user-type root' level.
2. 'Entity user-type root' holds the entity object types. Set the dimension dependency at the for the 'Entity user-type root' level.
3. For object types below 'Assets' and 'Basic Object Types', search for 'General user-type root' using the Advanced Search and set the dimension dependency at the 'General user-type root' level.

   Note: Setting the language dependency at the 'Assets' level or for the objects under 'Basic Object Types' will change the name of the object not the object type name.

4. 'Primary Product Classification' holds the product object types. Set dimension dependencies at the 'Product user-type root' level.

   Note: Setting the language dimension dependency at the 'Product user-type root' level will affect all child object types below the root level, so any new product object type (not objects) that is created in the System Setup tab will need to have the Name defined in each context.

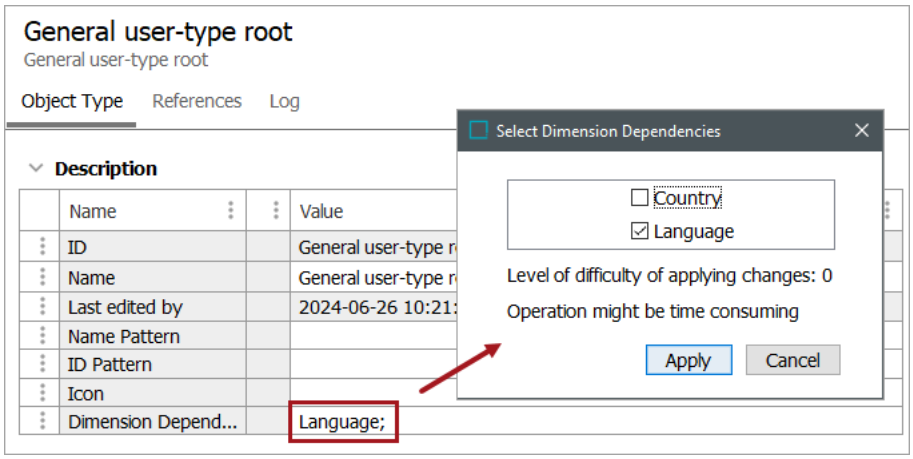
5. 'Setup Group type root' holds the setup group object types. Set the dimension dependency at the 'Setup Group user-type root' level.

Important: Changing the dimension dependencies at the root object type level requires single update mode or Lock Free Schema Change mode, therefore it is recommended to do this operation outside of business hours. Refer to the Single-Update Mode or the Lock-free Schema Change topic.

Adding a Dependency

To add a dependency on an object type name:

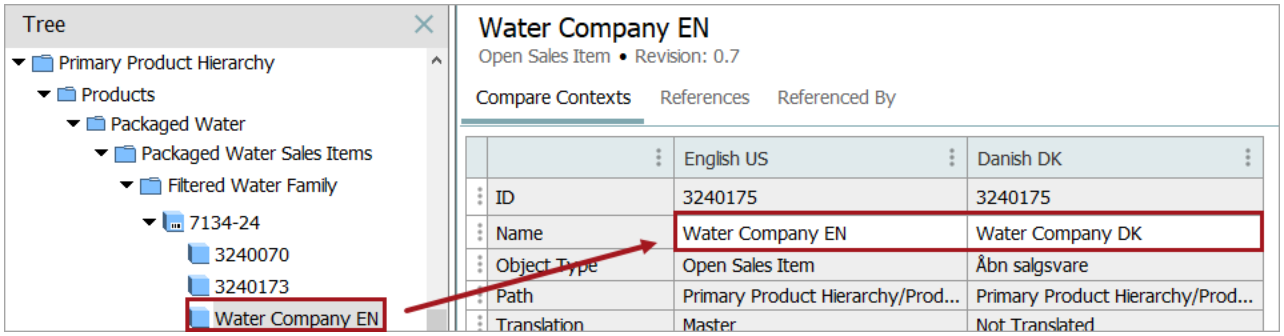
1. Navigate to the System Setup tab and expand the Object Types & Structures node.
2. Select the root object type and navigate to the Object Type tab.
3. Click the ellipsis button (...) in the Dimension Dependencies field and check the applicable dependencies from the options. Click **Apply** to save.



Setting an Object Name to be Language Dimension Dependent

Setting an object name as dimension dependent means that the node of that particular object type in the **Tree tab** can have a different name depending upon the context. An example may be if you have the same product line in two countries but they are called by different names. A prerequisite for changing the object name for each context is that the parent object type must have a dimension dependency selected.

For example, if the object type 'Open Sales Item' depends upon the language dimension, then the name field of a node of that object type in the Tree tab may be translated into different languages. This means translation of the names will support a local language view of the database.



For more information, refer to the Maintaining Dimension Dependent Object Types topic.

Object Type Icons

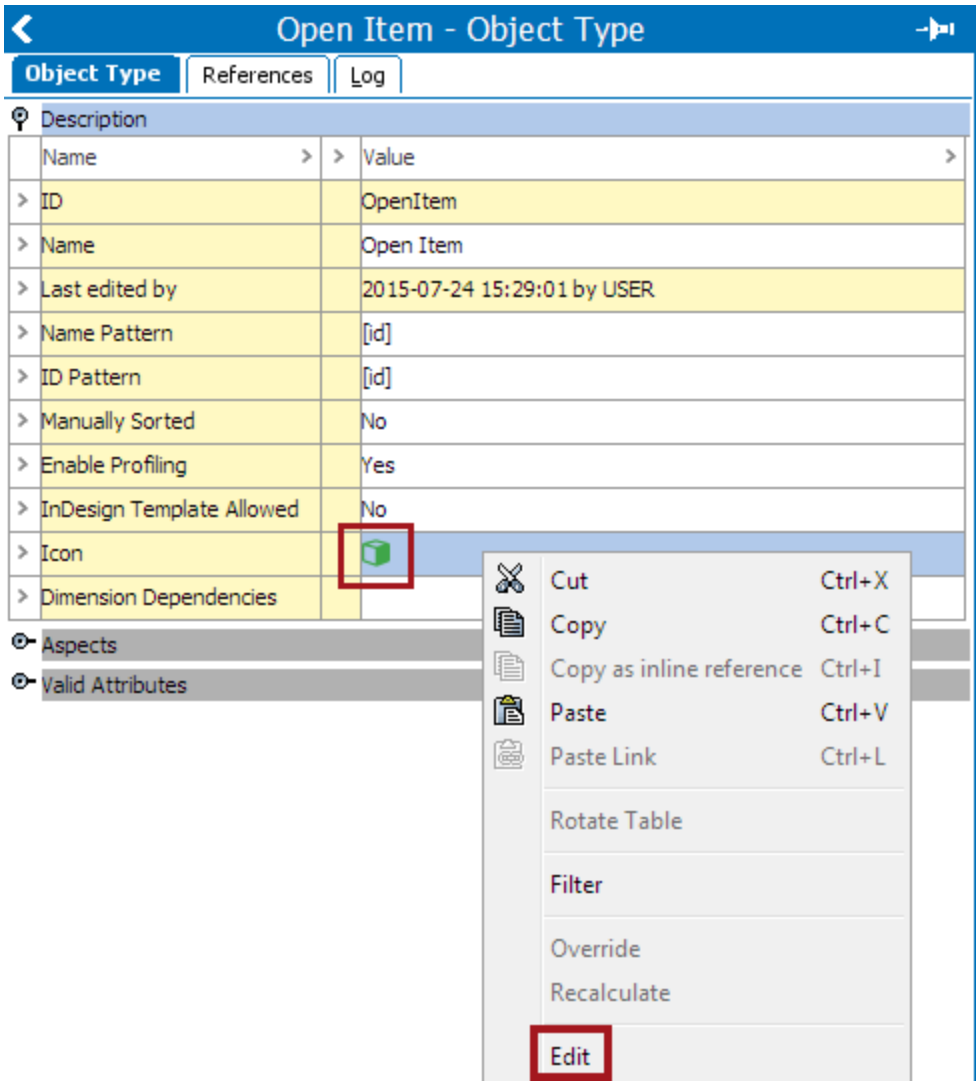
All objects in STEP, both system-specific and user-created, have an icon assigned to them. These icons allow users to easily differentiate between different object types when navigating in the Tree tab. STEP provides a series of default icons for system-specific object types (like Primary Product Hierarchy and the Classification root node, for example) and then a series of icons that can be assigned to user-created object types. STEP also supports creation and assignment of custom icons that users create outside of STEP.

Note: If the 'Icon' field on a given object type is empty, the icon that displays for that object type is the system-assigned default icon. If an icon displays in the 'Icon' field, the icon has been changed from the default at some point.

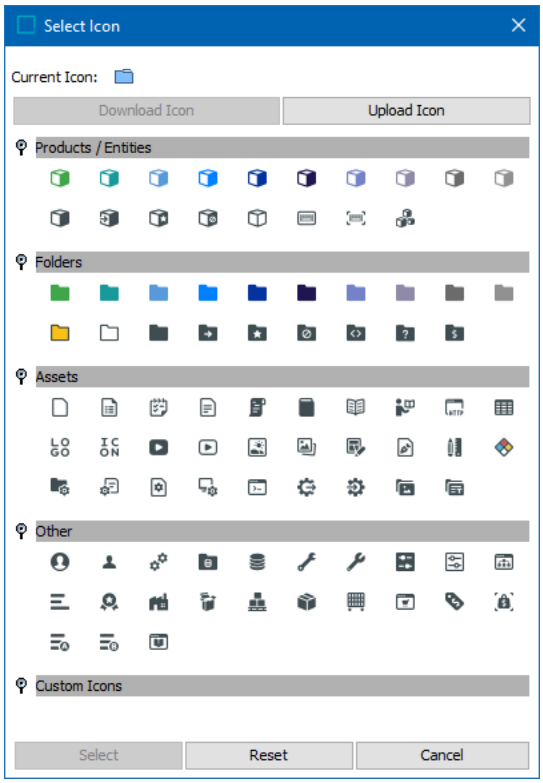
Editing an Object Type Icon

To make changes to an icon assigned to a given object type, take the following steps:

1. On the System Setup tab, under the 'Object Types & Structures' node, select the 'Icon' field of any listed object type (make sure the field is highlighted blue), right-click, and then select the **Edit** option at the bottom of the dropdown that displays.



2. The 'Select Icon' dialog displays.



The 'Select Icon' dialog displays all icons available to be assigned to object types. The dialog provides reference information for users and enables users to take certain actions.

Current Icon: Displays the icon for the selected object type. To download the icon assigned to the current object type, users must first highlight it by clicking the icon that displays.

Download icon: Once an icon is selected, users click this button to bring the selected icon image file onto their own system in order to customize the icon. Users may download both the icon currently assigned to the selected object type, or any of the grouped icons displayed in the 'Select Icon' dialog.

Upload icon: Users click this button to load a custom icon from an external source directly into STEP. Once uploaded, the icon will appear in the list of grouped icons under 'Custom icons.'

Product / Entities: Icons displayed under this collapsible header are well-suited for assignment to user-created product and entity object types.

Folders: Icons displayed under this collapsible header are well-suited for assignment to parent object types.

Assets: Icons displayed under this collapsible header are well-suited for assignment to asset object types.

Other: Icons displayed under this collapsible header can be assigned to other common elements within STEP that are not object types. Users, settings, and configurations are examples.

Custom icons: Icons displayed under this collapsible header are custom icons, or icons that were made outside of STEP and uploaded. Icons that display in this group may be custom icons that are already assigned to an object type, or custom icons that have not yet been assigned to any object type. Any icons uploaded to STEP using the 'Upload icon' button will display in this section.

Select: Click this button to assign the selected icon to an object type. This button is, effectively, the 'Assign' button, and completes the task of assigning an icon to an object type.

Reset: Click this button to revert the icon assigned to the selected object type to the system-designated default icon.

Cancel: Closes the 'Select Icon' dialog.

3. When the 'Select' button is clicked, the icon assignment is made. The 'Select Icon' dialog closes and the selected icon immediately displays on the object type in the Tree tab.

Though the core STEP-specific icons, like the blue folder icon for 'Primary Product Hierarchy' for example, can be changed, it is recommended that they be left either unaltered or modified only slightly. The reason for this is that changing them may cause conflicts or ambiguities with the descriptions and / or screenshots in the online help.

Creating Custom Object Type Icons

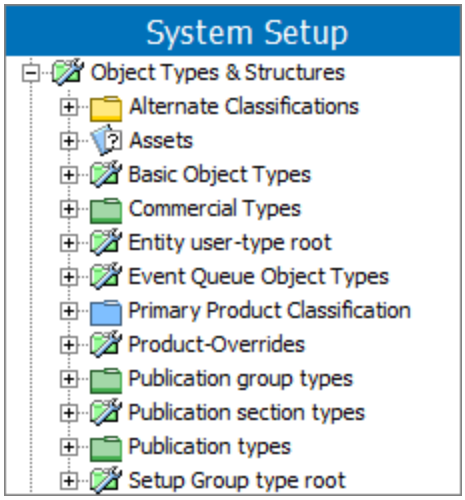
STEP supports users' ability to either modify existing icons or create new ones. When making new icons, Stibo recommends admin users (or responsible design departments) adhere to the following guidance to ensure custom icons display correctly throughout the STEP Workbench and Web UI:

- **Use SVG images**. SVG images are straightforward to create, manage, and maintain, and can be reduced and enlarged without an impact on the image's resolution. All icons provided with STEP are SVG images.
- **Create square icons**. When creating custom icons, make sure the icon fits roughly into a square shape. Icons that are wider than they are tall, for instance, will result in an icon that displays poorly.
- **Avoid red, yellow, and green**. These colors are highly associated with error handling messages in STEP and the Web UI. To avoid potential confusion with custom icons, consider using different colors.
- **Follow Google's Material Design**. STEP icons have been designed in adherence to the design principles defined in Google's Material Design, which is a design system developed by designers and engineers at Google. To ensure visual consistency with all non-custom STEP-provided object type icons, it is recommended that icon designers align with the precepts of material design.
- **Consider simple icons**. To enhance the STEP implementation's accessibility for visually impaired users, consider simple shapes when creating icons.
- **Consider color contrast**. To better ensure your icons display well, consider how the icon's color compares with the color of the background against which the icon will display. If the colors are too similar, the icon may not be obvious.

Important: Because SVG files are uniquely capable of carrying harmful scripts that can damage systems, it is recommended that users create new SVG icons rather than select them from a search of the internet.

Maintaining Object Types

- All nodes are of a specific Object type.
- An Object Type specifies the characteristics of a group of nodes in the database structure.
- Object Types can be created, deleted, linked and/or unlinked and edited.
- Object Types are maintained in System Setup under **Object Types & Structures**.



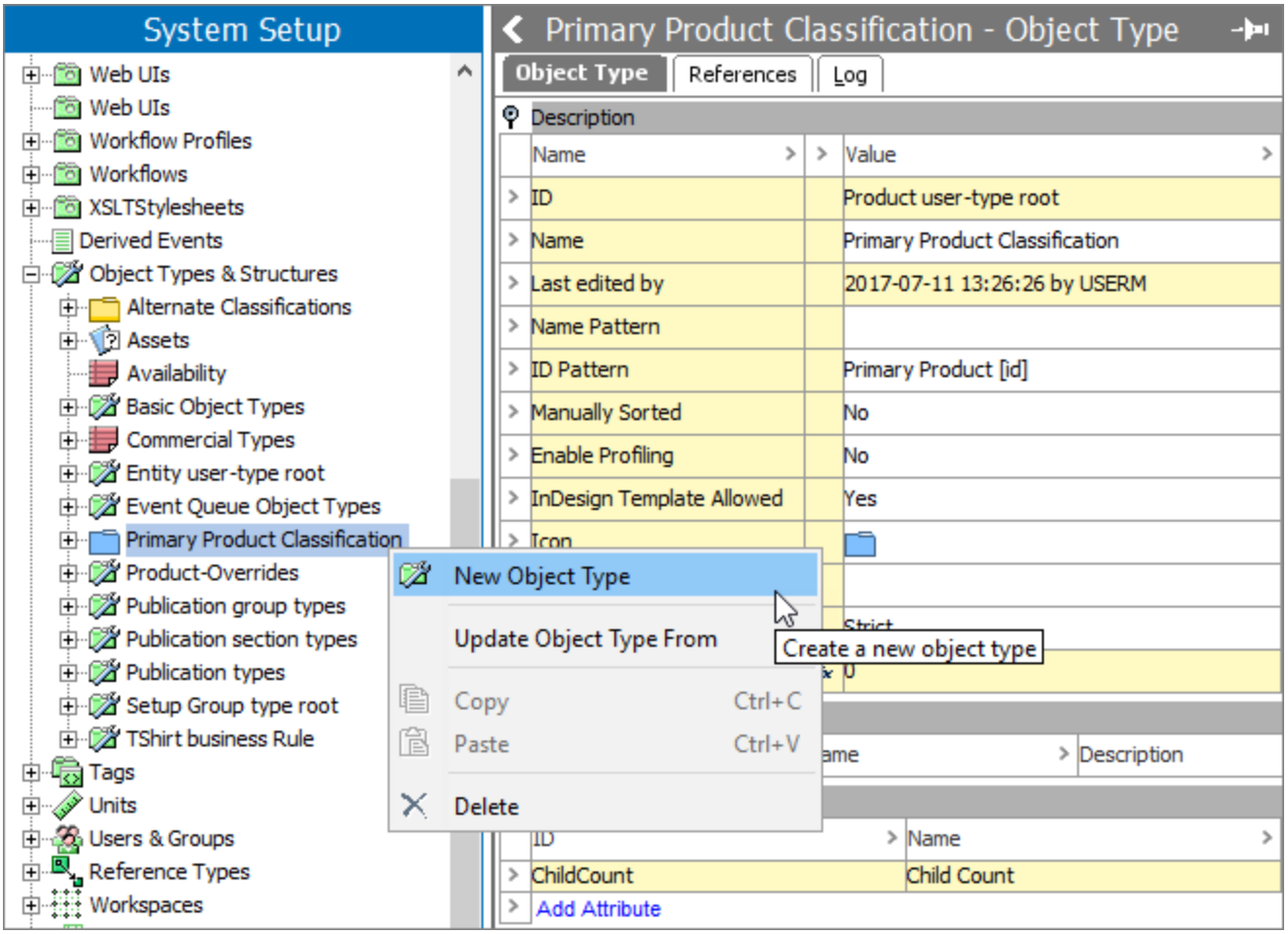
Creating an Object Type

The following standard root object types cannot be deleted: Assets, Classifications, Entities, Products. All new user defined object types must be defined below these.

New object types are created via the parent object type menu as shown in the steps below. As with all STEP objects, the new object types must be given an ID and a display name.

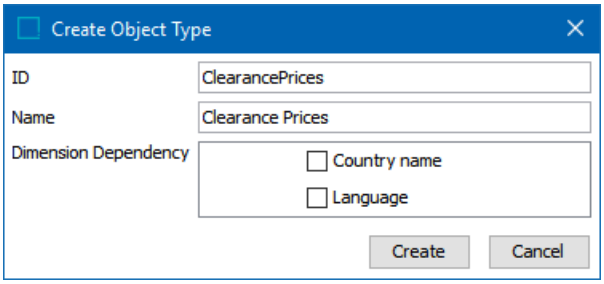
Create an Object Type

1. Go to **System Setup** > Expand **Object Types & Structures** > Select **the relevant standard object type** > Right-click **the relevant standard object type** > Click the **New Object Type** selection.



Note: Standard objects (provided automatically in STEP) can be easily identified in the workbench, because their ID will contain 'user-type root' (as shown in the example above).

2. The Create Object Type dialog will display.



> **Note:** If the Product root object type has an ID Pattern enabled, then the ID will display auto populated, and not editable. For more information refer to the **Autogenerate Using Name Pattern and ID Pattern** topic within this guide.

3. Enter an **ID** for the new object type. If ID and Name should be identical, press either the Enter or Tab keys to move the cursor to the **Name** parameter and automatically display the ID value. Otherwise, enter a name within the Name parameter.

> **Note:** The following restrictions apply to the ID for all objects:
>
> - Maximum 40 characters.
> - Only the standard ASCII printable characters in the range of 32-126 are allowed.

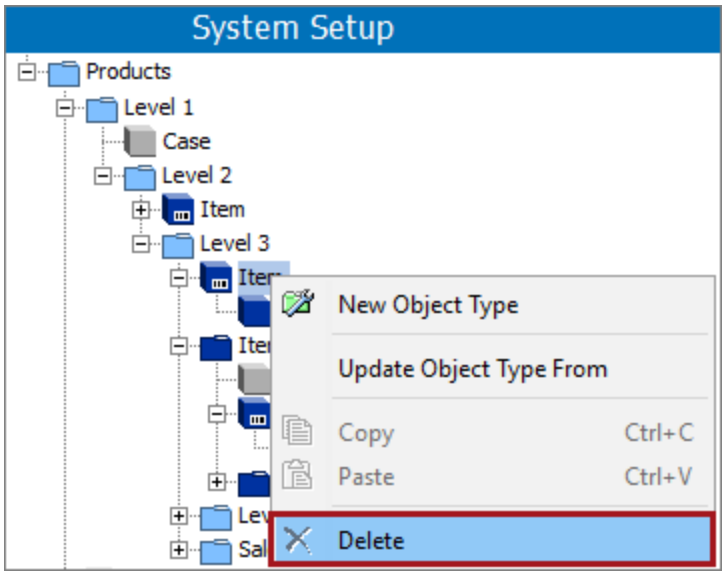
4. If necessary, select one or more dimension dependencies. For more information, refer to the **Maintaining Dimension Dependent Object Types** topic.
5. Click the **Create** button, and the Object Type Editor will display with the newly created object type. The new object type will also be in the list of options when creating a new object of this type.
6. On the Object Type editor, References tab, use the Parents flipper to define which object types can hold the newly created object type. For more information, refer to the **Object Type Hierarchy** topic.
7. A desired hierarchy of objects can now be created using the new object type, and instantiating the objects in the Tree Tab. For more information, refer to the **Object Types and Structures** section of this guide.

Deleting an Object Type

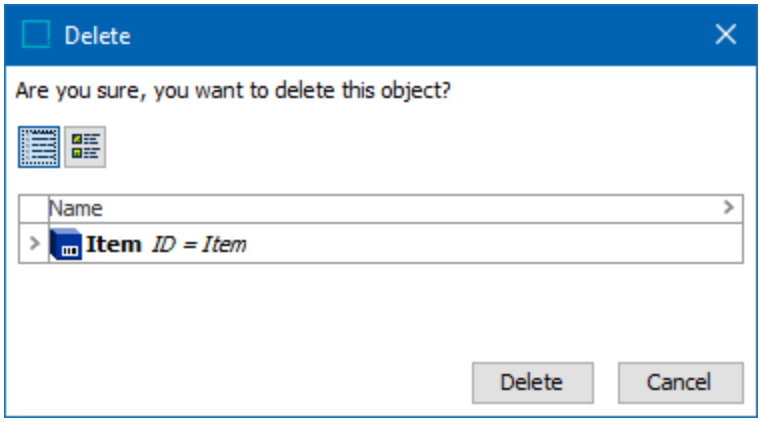
Deleting an object type requires special handling. For Oracle databases, this action requires single-update mode (SUM), as defined in the Single-Update Mode topic. For Cassandra databases, this action uses Lock-free Schema Change (LFSC) functionality, as defined in the Lock-free Schema Change topic.

Below are the steps to delete an object type, that does not have children, in System Setup.

1. Go to **System Setup** > Expand **Object Types & Structures** > Select the **object type to delete** > Right-click the **object type to delete** > Select **Delete** from the menu.

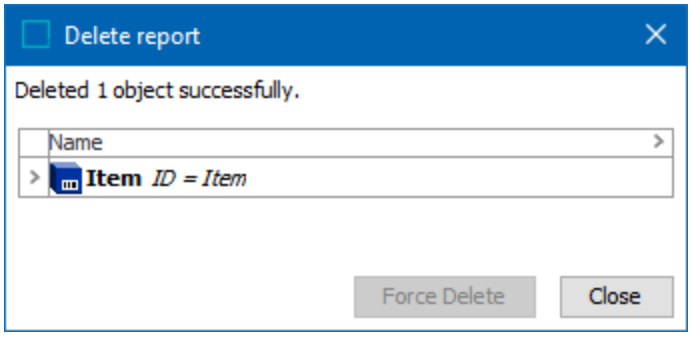


2. The Delete dialog will display asking you to confirm the deletion.

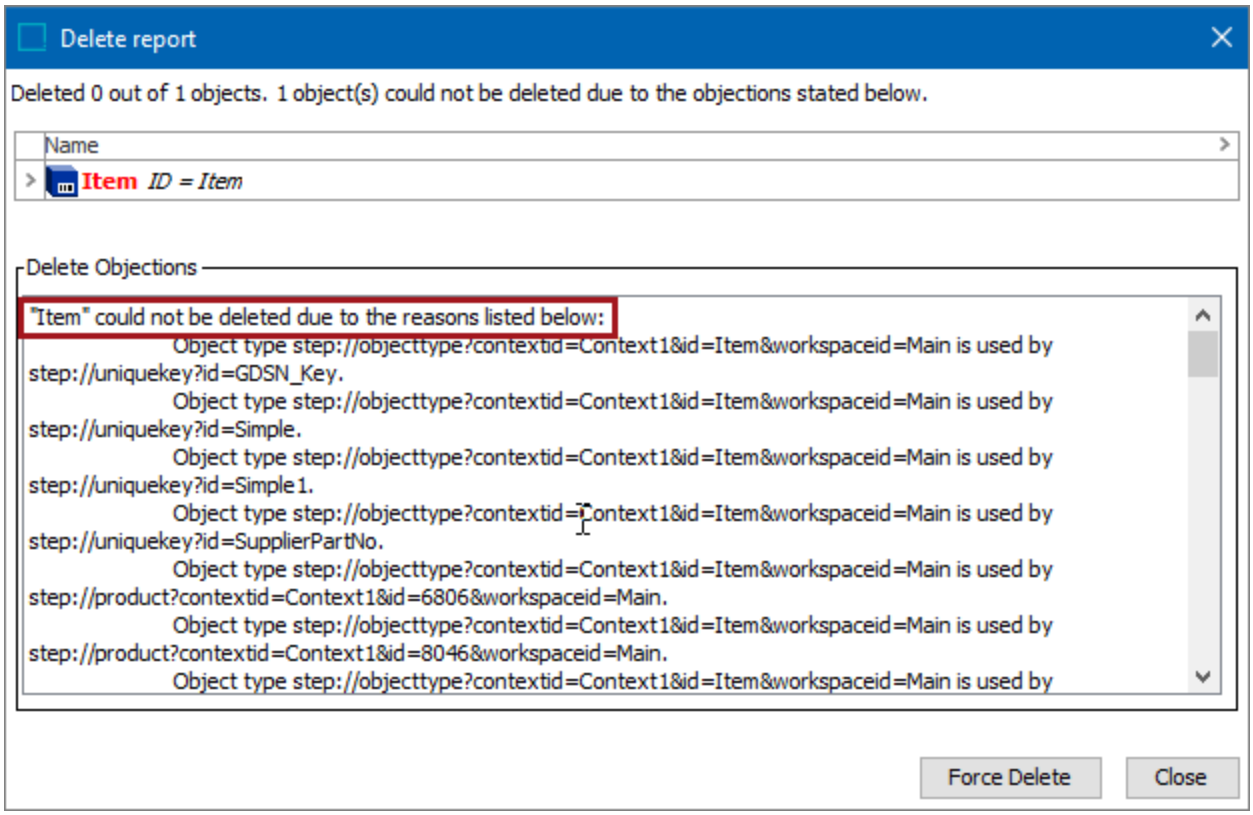


3. Click the **Delete** button, and the Delete report dialog will display.

If the object is successfully deleted, then the Delete report will display as shown below, and the object type is removed from the list of options displayed when creating a new object of that type.

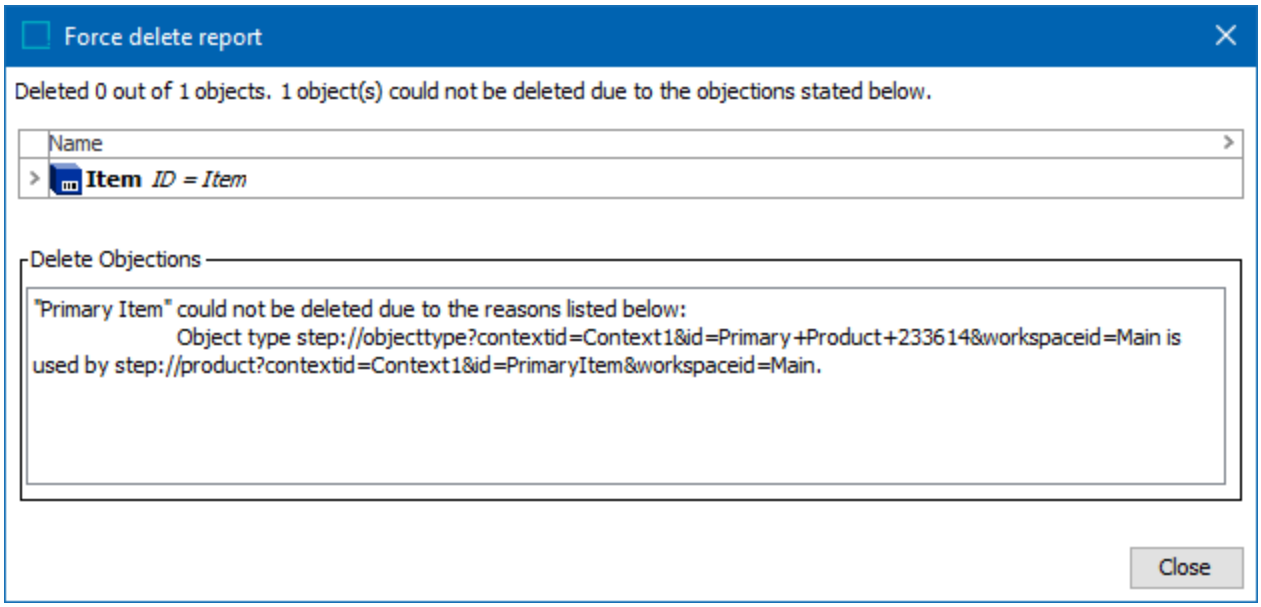


If the object is not successfully deleted, then the Delete report will display with Delete Objections as shown below.



Clicking the **Force Delete** button will result in the Force delete report displaying. However, an object type that is used (instantiated in the tree), or has child object types, cannot be deleted.

Clicking the **Force Delete** button when the object type being deleted is used (instantiated in the tree) or has a child, then the Force delete report dialog will display as shown below.

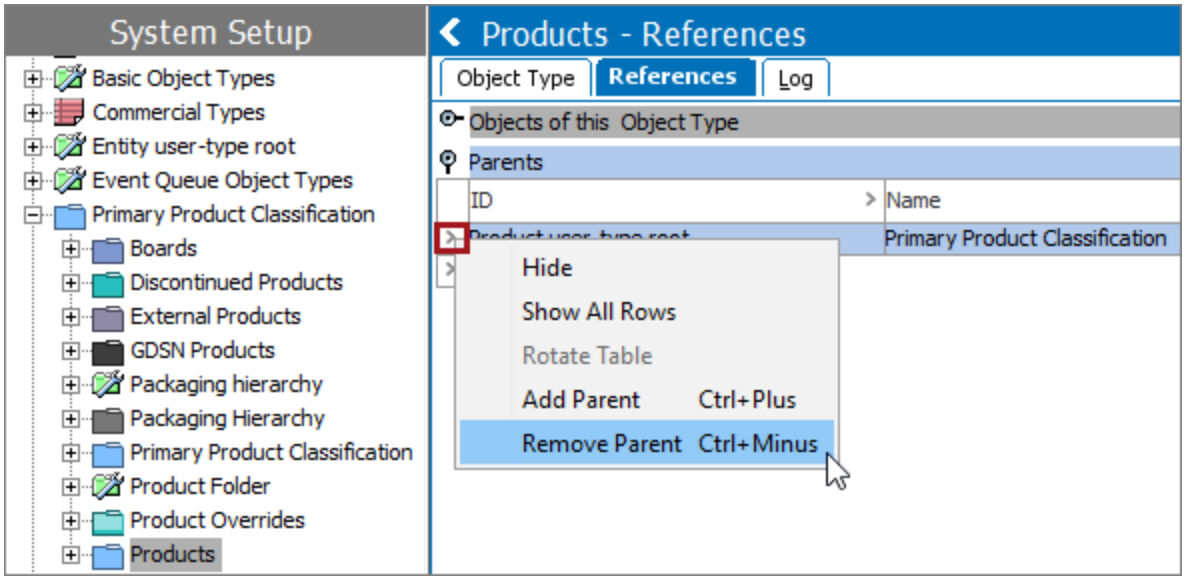

Force delete report
Deleted 0 out of 1 objects. 1 object(s) could not be deleted due to the objections stated below.
Name
Item ID = Item
Delete Objections
"Primary Item" could not be deleted due to the reasons listed below:
Object type step://objecttype?contextid=Context1&id=Primary+Product+233614&workspaceid=Main is used by step://product?contextid=Context1&id=PrimaryItem&workspaceid=Main.
Close

Unlinking Object Types

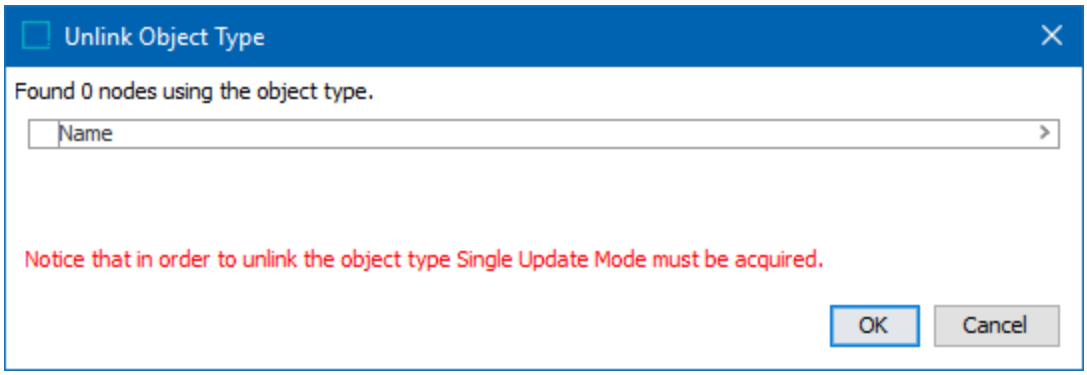
Unlinking an object type requires the object maintains at least one parent, all children must be removed from parents of this parent type in all Workspaces. This action requires special handling. For Oracle databases, this action requires single-update mode (SUM), as defined in the Single-Update Mode topic. For Cassandra databases, this action uses Lock-free Schema Change (LFSC) functionality, as defined in the Lock-free Schema Change topic.

Below are the steps to unlink an object type in System Setup.

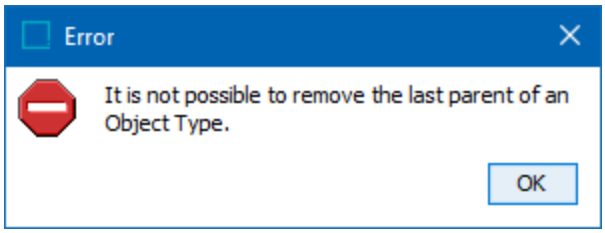
1. Go to **System Setup** > Expand **Object Types & Structures** > Select **a relevant object type** and the **Object Type Editor** will display.
2. Click the **References** tab.
3. Expand the **Parents** flipper, right-click the row '>,' and click the **Remove Parent** menu option (as shown below).



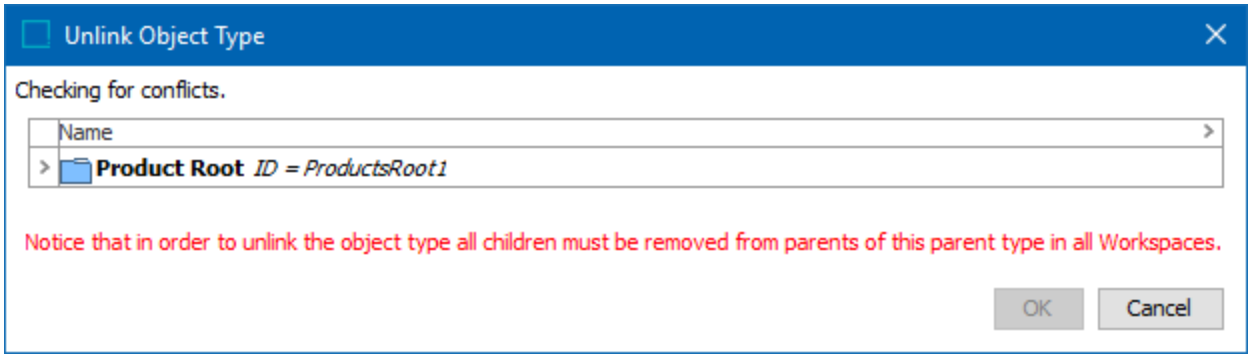
4. If more than one parent exists, and no children exist, then the Unlink Object Type dialog will display as shown below. Click the **OK** button and the Object Type Editor will display with the parent removed. Click the **Cancel** button to display the Object Type Editor with no changes.



If only one parent exists, then the Error dialog will display as shown below, because at least one parent must exist in the object type hierarchy (the last parent cannot be removed). Click the **OK** button to return to the Object Type Editor.



If children of the parent being removed are instantiated, the Unlink Object Type dialog will display with conflicts (as shown below). The instantiated children listed as conflicts must be moved to a valid parent (or deleted) before the parent can be unlinked. Click the **Cancel** button to return to the Object Type Editor. Once the conflicting children are removed, repeat the steps above to unlink the object type.



Updating Object Types from Another Object Type

An object type can be updated with the same Attribute Validity, Reference Types Validity, Object Type Parent Links and Object Type Child Links based on another object type. When the new object type has been updated in this way, it gets the same Validity settings on Attributes and Reference Types and Object Type Structure as the original object type.

Important: Existing settings on the object type are not removed / overwritten, but rather the original object type settings are added to the updated object types existing settings.

An example of this is when you have products that are obsolete, and you would like to save the obsolete product information for future reference, yet easily distinguish them from the active products. You could create a new obsolete products object type, save it in a different hierarchy, and update the obsolete products object type with the validation settings from the active products object type.

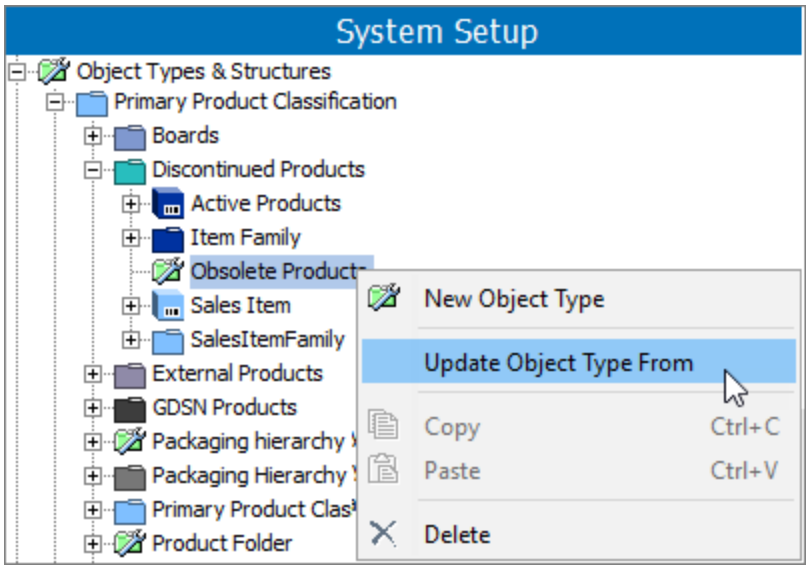
This concept could also be used for Onboarding products, so that there would be a temporary object type being assigned until the product is enriched and ready to be published, at which time its object type would be changed to the actual object type. This would defend against publishing incomplete data to downstream systems until the product is properly enriched.

Note: Dimension dependency will not be updated from the source object type, if needed then it should be done manually. For more information, refer to the **Maintaining Dimensions and Dimension Points** topic within the **Dimensions, Dimension Points, and Contexts** section of the **System Setup**.

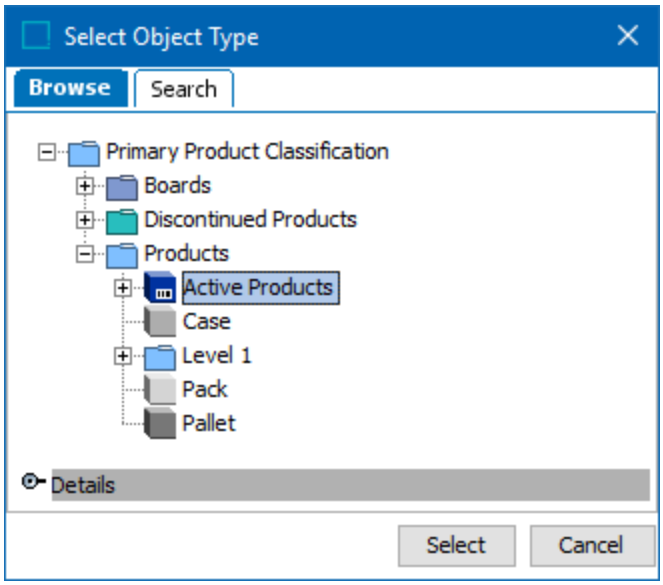
Steps to Update an Object Type from Another Object Type

Below are the steps to update an object types Attribute Validity, Reference Types Validity, Object Type Parent Links and Object Type Child Links from another object type.

1. Go to **System Setup** > Expand **Object Types and Structures** > Select the **relevant object type to be updated from another object type**. For this example, the 'Obsolete Products' object type is selected.
2. Right-Click the **relevant object type to be updated from another object type** > Click the **Update Object Type from** menu option.

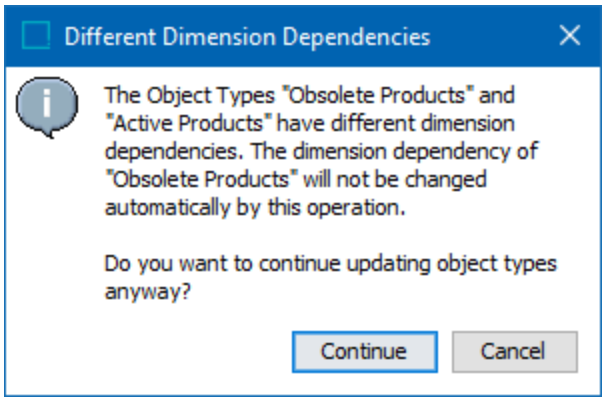


3. The Select Object Type dialog will display. Use the Browse or Search tabs to find the **object type with the validity settings that need to be applied**. For this example, the 'Active Products' object type is selected.

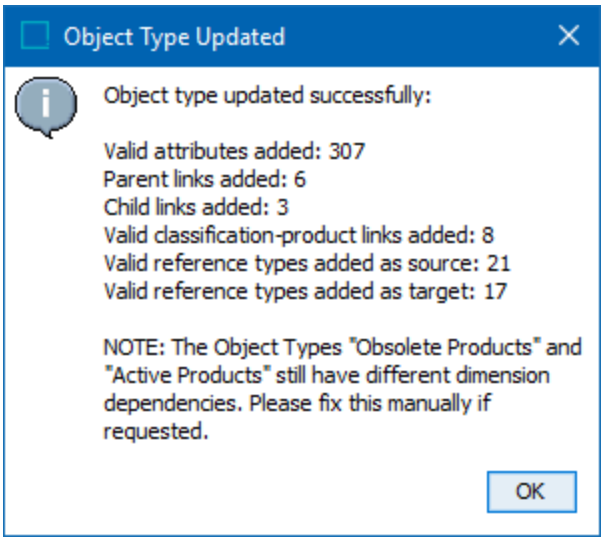


4. Click the **Select** button.

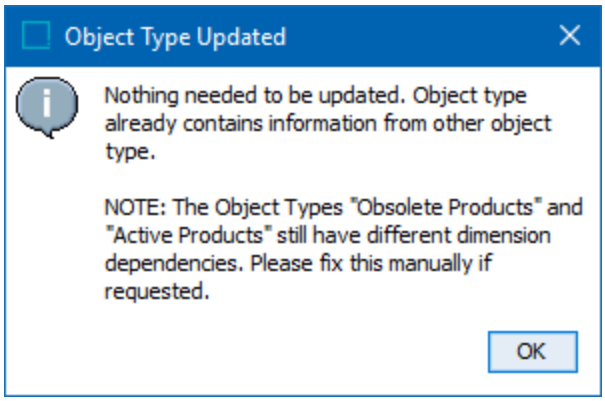
   If the object types have different dimension dependencies then the Different Dimension Dependencies dialog will display as shown below. Click the **Continue** button to continue. Click the **Cancel** button to cancel and return to the workbench.



5. The Object Type Updated status dialog will display indicating how the selected object type was updated by listing the number of:
    - Valid Attributes added
    - Parent links added
    - Child links added
    - Valid classification-product links added
    - Reference Types added as Source
    - Reference Types added as Target



If the object types already match, then the Object Type Updated dialog will display with 'Nothing needed to be updated. Object type already contains information from other object type.' as shown below.



Once the object types is updated, optionally verify the updated object type results by comparing the Object Type and References tabs for each object type and/or look for the 'Updated from object type with ID...' text within the Log tab of the newly updated object type.

Maintaining Dimension Dependent Object Types

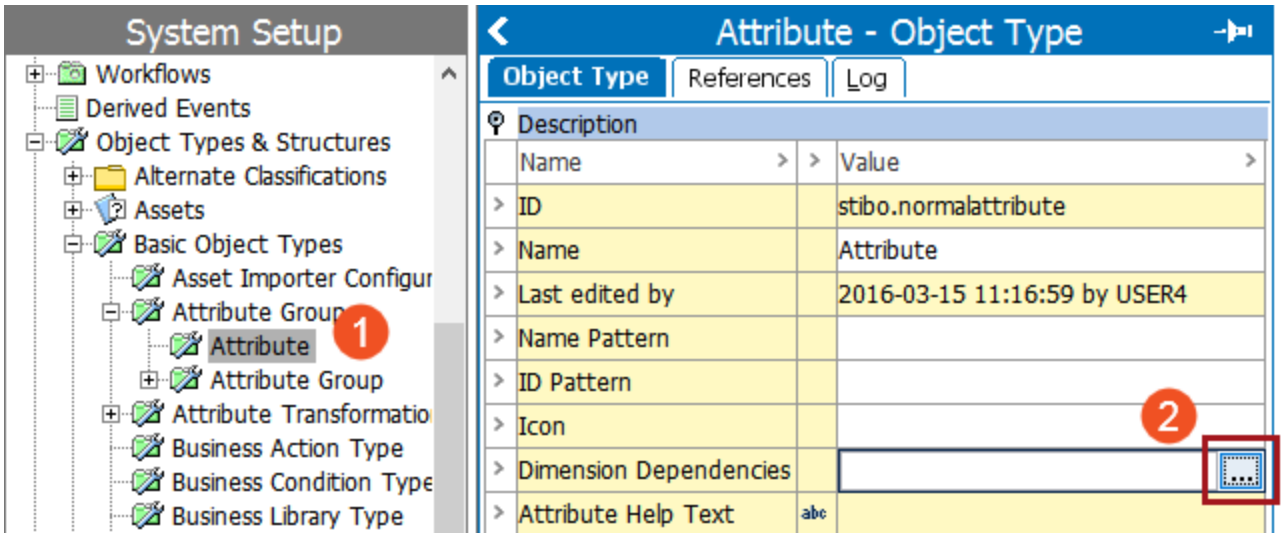
Dimension dependency is set for objects on their respective object types in System Setup. Almost all object types in STEP (both basic and non-basic) can be made dimension dependent so that their names will display in different languages in different contexts.

- **Basic object types**: Including attribute groups, attributes, contexts, dimensions, users, and more (located under Object Types & Structures > Basic Object Types)
- **Non-basic object types:** Including alternate classifications, primary product classifications, assets, reference types, LOVs, entities, commercial types, product-overrides, publication object types, and more

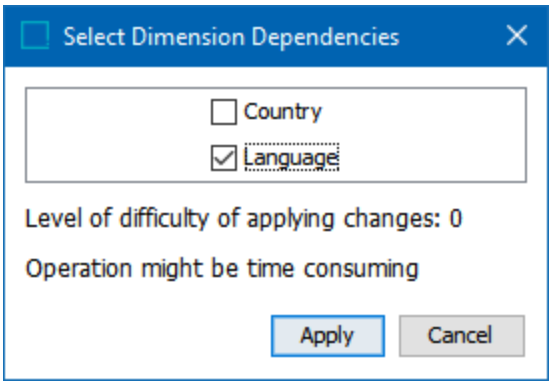
Making an Object Type Dimension Dependent

The following example uses the Attribute object type (located under Object Types & Structures > Basic Object Types > Attribute) to show how to make an object type dimension dependent in STEP. The same steps apply for any object type, and as such, directions will not be provided for every object type.

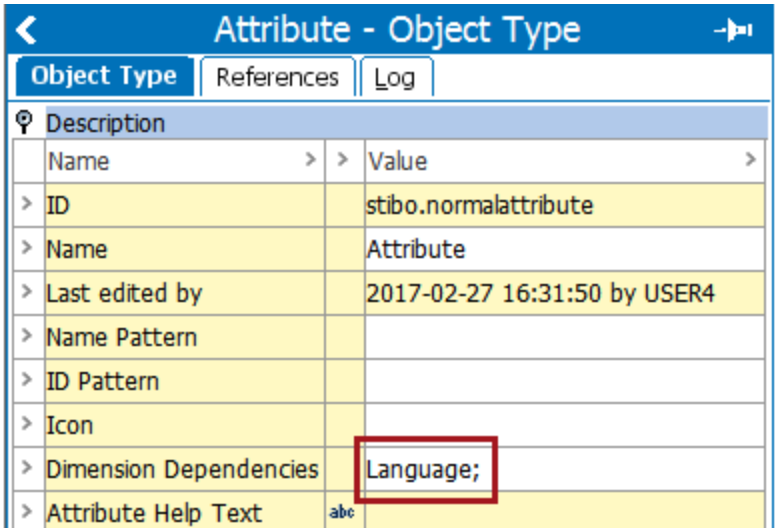
1. Go to System Setup, and navigate to object type that you would like to make dimension dependent.
2. On the **Object Type** tab, double-click in the **Dimension Dependencies** field, then click the ellipsis button (...).



3. In the Select Dimension Dependencies dialog box that displays, check the box(es) for the relevant dimension (s), then click the **Apply** button.



4. The object type is now dimension dependent, and the STEP names of any object using this object type are now dimension dependent.

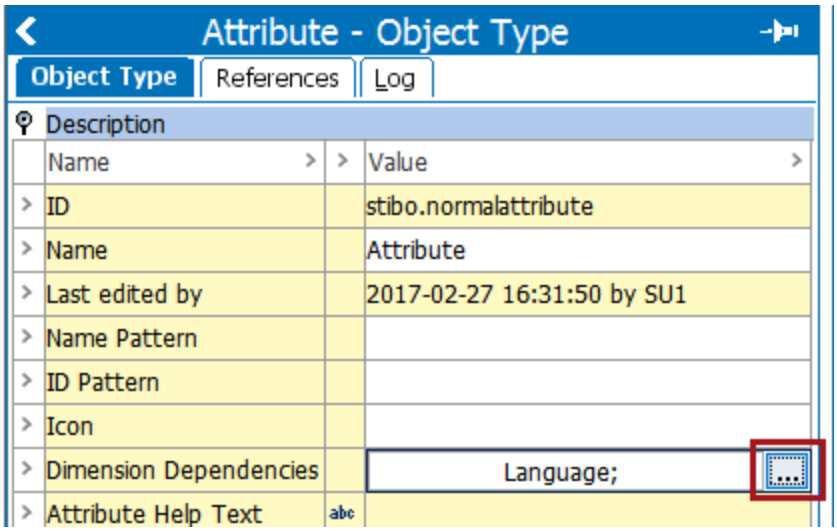


Removing Dimension Dependency from an Object Type

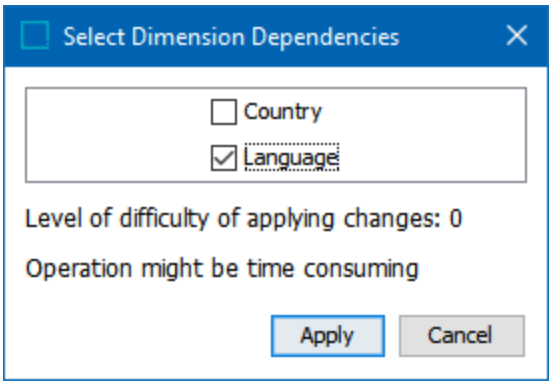
Dimension dependency is removed from an object in a near-identical fashion that it is applied.

Note: The dimension dependency should normally not be changed. Be aware of possible conflicts if a dimension dependency is removed.

1. Navigate to the relevant object type in System Setup.
2. Double-click in the **Dimension Dependencies** field, then click the ellipsis button (...).

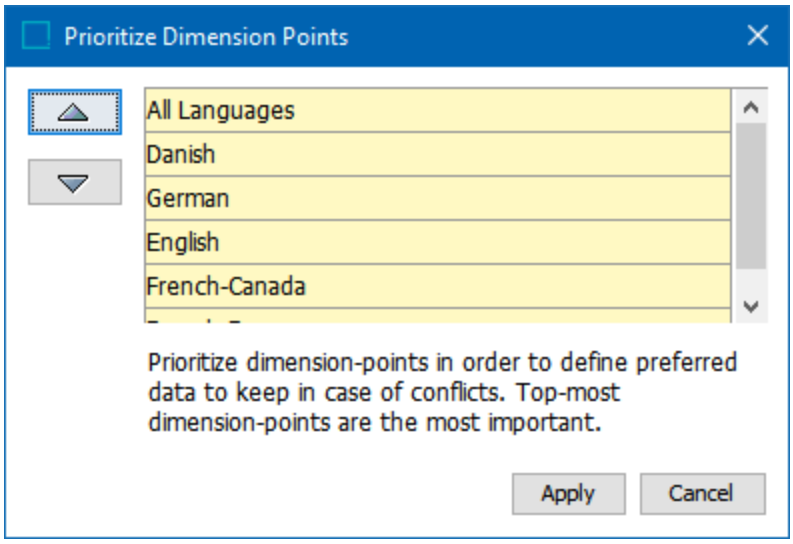


3. In the **Select Dimension Dependencies** dialog that displays, uncheck the box(es) for the relevant dimension(s), then click the **Apply** button.



Note: The dialog box indicates the complexity of removing the dimensions. If values exist in multiple dimensions and dimension points, it can be time consuming to remove the dimension dependency. Difficulty 0-5 indicates the complexity of the operation, where a difficulty of 5 is a very complex operation. Also, the system may require special handling, stalling other users from making updates / changes. For Oracle databases, this action requires single-update mode (SUM), as defined in the Single-Update Mode topic. For Cassandra databases, this action uses Lock-free Schema Change (LFSC) functionality, as defined in the Lock-free Schema Change topic.

4. If there is a conflict when removing a dimension dependency, a dialog box displays where you must specify the sequence of the dimension points for the system to use to remove the dimension dependency. Use the **Up** button and **Down** button to specify the priority.



The priority is used to specify from which dimension point values should be kept when removing the dimension dependency. This means that if a value exists in the dimension point with highest priority, then this value will be kept. Otherwise, the system will look at the dimension points with lower priority to find a value to keep.

- Click the **Apply** button to remove the dimension dependency from the object type.

MIME Types

A MIME type (Multipurpose Internet Mail Extension) is a standard identifier used to indicate the type of data that a file contains. In STEP, they can only be assigned to asset object types.

Specifying a MIME type allows internet applications to recognize and read the content of an asset object type, and enables automatic assignment of imported assets as images, applications, or documents.

Additional MIME types exist and can be found by searching the internet. However, STEP does not support all file formats, even if there is a MIME type available for it.

The table below contains a list of most file types accepted by STEP, as well as the MIME types the file types are associated with. Those most commonly used are listed in the table below.

File Type	Definition	MIME Type
.ai	Adobe Illustrator	application/illustrator
.doc	Microsoft Word (pre-2007)	application/msword
.docx	Microsoft Word (2007 and beyond)	application/msword
.arj	ARJ archive	application/octet-stream
.cab	Windows Cabinet Archive	application/octet-stream
.pack	UNIX Pack Compressed Data	application/octet-stream
.pdf	Adobe Acrobat PDF	application/pdf
.eps	Encapsulated PostScript application	application/postscript
.ps	Query PostScript application	application/postscript
.ps	ExitServer PostScript application	application/postscript
.ps	Resource PostScript application	application/postscript

File Type	Definition	MIME Type
.ps	PostScript application	application/postscript
.xls	Microsoft Excel (pre-2007)	application/vnd.ms-excel
.xlsx	Microsoft Excel (2007 and beyond)	application/vnd.ms-excel
.ppt	Microsoft PowerPoint	application/vnd.ms-powerpoint
.qxd	Quark (QuarkXPress document)	application/vnd.Quark.QuarkXPress
.qxp	Quark (QuarkXPress project)	application/vnd.Quark.QuarkXPress
.hqx	BinHex (Macintosh BinHex archive)	application/x-binhex
.bz	BZip (BZip compressed data)	application/x-bzip
.bz2	BZip2 (BZip2 compressed data)	application/x-bzip
.z	Compress (UNIX compressed data)	application/x-compress
.ttf	TTF (Windows TrueType Font)	application/x-font-ttf
.gz	GZip (GNU Zip compressed data)	application/x-gzip
.indd	InDesign file	application/x-indesign
.lzh	LXH (LZH compressed data)	application/x-lzh
.wmf	WMF (Windows Metafile image)	application/x-msmetafile
.rar	RAR (Roshal archive)	application/x-rar

File Type	Definition	MIME Type
.swf	Macromedia Flash File Format	application/x-shockwave-flash
.sit	StuffIt (Macintosh StuffIt archive)	application/x-sit
.hlp	Help (Windows Help document)	application/x-winhelp
.xml	XML (Extensible Markup Language document)	application/xml
.zip	ZIP	application/zip
.au	AU (Sun Microsystems audio)	audio/basic
.mid	MIDI (Musical Instrument Digital Interface audio)	audio/x-midi
.wma	WMA (Windows Media Audio)	audio/x-ms-wma
.ra	Real (Real Audio File)	audio/x-pn-realaudio
.wav	WAV (Waveform Audio File Format)	audio/x-wav
.bmp	BMP (OS/2 Bitmap image)	image/bmp
.bmp	Windows Bitmap image	image/bmp
.dib	DIB (Device-Independent bitmap image)	image/bmp
.cgm	CGM (Computer Graphics Metafile image)	image/cgm
.fax	Fax (G3 Fax image)	image/g3fax
.gif	GIF (Graphics Interchange Format 87a image)	image/gif

File Type	Definition	MIME Type
.gif	GIF (Graphics Interchange Format 89a image)	image/gif
.gif	GIF (Graphics Interchange Format image)	image/gif
.jpeg	JPEG or JFIF image	image/jpeg
.jpg	JPEG or JFIF image	image/jpg
.mpo	Multi Picture Object	image/mpo
.png	PNG (Portable Network Graphics Image)	image/png
.svg	SVG (Scalable Vector Graphics image)	image/svg+xml
.tif	TIF (Tag Image File Format image)	image/tif
.tiff	TIF (Tag Image File Format image)	image/tiff
.webp	WebP image; Google file format	image/webp
.ras	RAS (Sun Raster image)	image/x-cmu-raster
.ico	Icon (Windows Icon image)	image/x-icon
.pct	PICT (Macintosh Icon image)	image/x-pict
.pam	PAM (Portable Anymap image)	image/x-portable-anymap
.pbm	PBM (Portable Bitmap image)	image/x-portable-bitmap
.pgm	PGM (Portable Gray Map	image/x-portable-grapmap

File Type	Definition	MIME Type
	image)	
.ppm	PPM (Portable Pixmap image)	image/x-portable-pixmap
.psd	PSD (Adobe Photoshop image)	image/x-psd
.html	HTML (Hyper Text Markup Language)	text/html
.rtf	RTF (Rich Text Format document)	text/rtf
NA	Text (Western European character set)	Text/ plain;charset=ISO-8859-1
NA	Text (US ASCII character set)	Text/plain;charset=us-ascii
NA	Textual data using the UTF-8 format	Text/plain; charset=UTF-8
.avi	AVI (Audio Visual Interleave video) Covers most Windows-compatible formats including .avi and .divx	video/avi
.mp4	MP4	video/mp4
.m2v	MPEG (Moving Picture Experts Group video)	video/mpeg
.mpg	MPEG (MPEG-1 video with multiplexed audio)	video/mpeg
.ogv	OGV (OGV video media file)	video/ogg
.mov	MOV (QuickTime	video/quicktime

File Type	Definition	MIME Type
	multimedia file format)	
.mov	QuickTime (Apple QuickTime video)	video/quicktime
.qt	QuickTime (Apple QuickTime video)	video/quicktime
.webm	WEBM audiovisual media file	video/webm
.asf	ASF (Advance Systems Format video)	video/x-ms/asf
.wmv	WMV (Windows Media Video)	video/x-ms-wmv

When setting the MIME type for an asset object type, there may be use cases, dependent on the requirements, where all imported assets, regardless of file type, must be either a 'text,' 'image,' 'application,' or 'audio' asset object type. In those cases, when setting the MIME type, use the asterisk (*) MIME type as shown below.

Definition	MIME Type
All application assets	application/*
All image assets of unspecified type	image/*
All text documents	text/*
All audio assets	audio/*

Important: Caution should be used when importing **SVG Image** files as they can contain harmful scripts if images from unknown sources are loaded.

If imported assets of a specific file type have a MIME type that is not recognized in STEP, or for which STEP is auto-assigning an incorrect file extension, admin users can apply a property in the sharedconfig.properties file that instructs STEP which file extension to assign to the asset based on the MIME type of the imported asset. The property is:

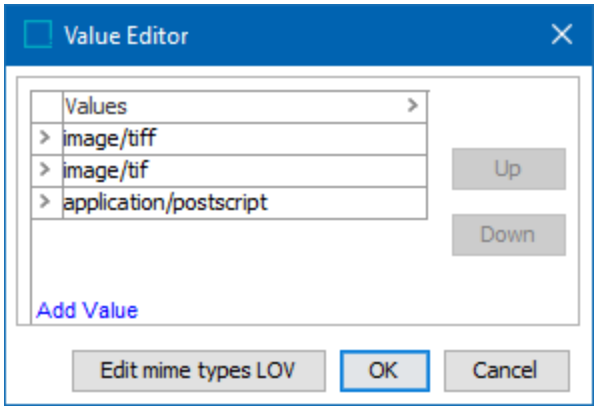
```
DocumentContent.ExtensionToMimeType.[extension] = [mimetype]
```

For instance, if an imported Shockwave-Flash file must have the file extension '.flv' assigned to the end of it, the property would be written like this:

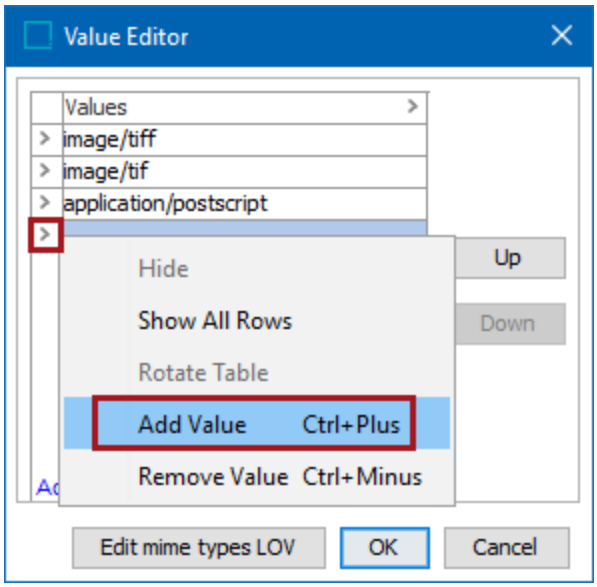
```
DocumentContent.ExtensionToMimeType.flv = application/x-shockwave-flash
```

Setting MIME Types for Object Types

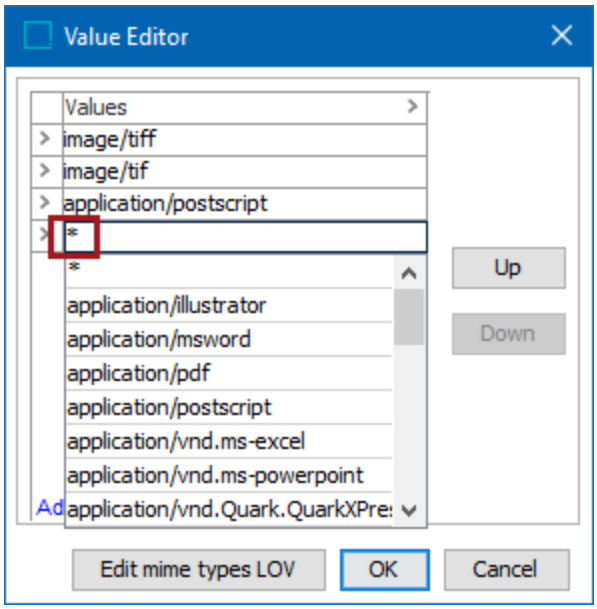
1. Go to **System Setup** > Select **Object Types & Structures** > **Assets** > select an **Image** or **Document Object Type**. (MIME types are not valid for any other object types.) The corresponding editor will display.
2. Double-click in the **MIME Types** field to display the **Value Editor** dialog.



3. Click the **>** button and select **Add Value** from the list.



4. Click the blank row and type * to display the list of available MIME Types, select a value and press **Enter**.

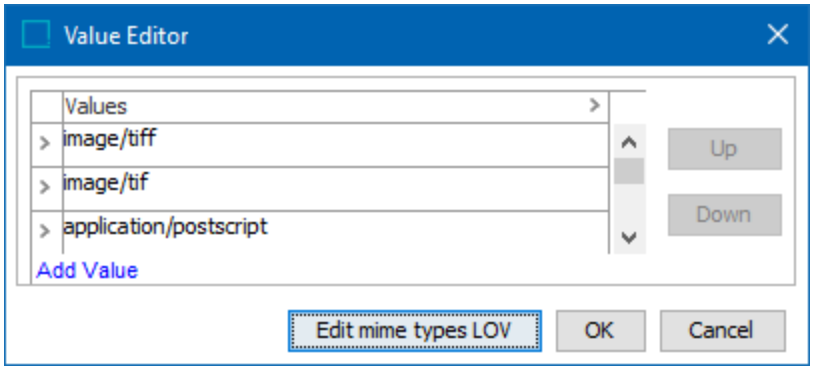


5. Repeat steps 3 and 4 to select more MIME Types.
6. Click **OK** to display the Object Type Editor assigned MIME Type(s).

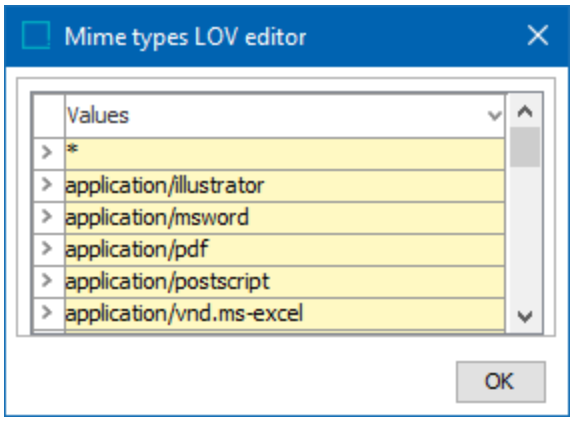
   When importing an image or a document, it is automatically assigned the Object Type with the specific MIME Type.

Editing MIME Types LOV

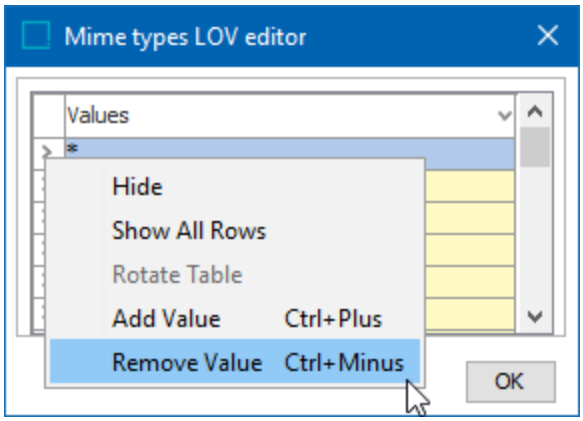
1. In Value Editor click on the 'Edit MIME types LOV' button.



2. The Mime types LOV editor dialog will display allowing the MIME list of values to be managed.



3. Navigate to an existing MIME type to be edited, and click the **>** button to display a menu as shown below.

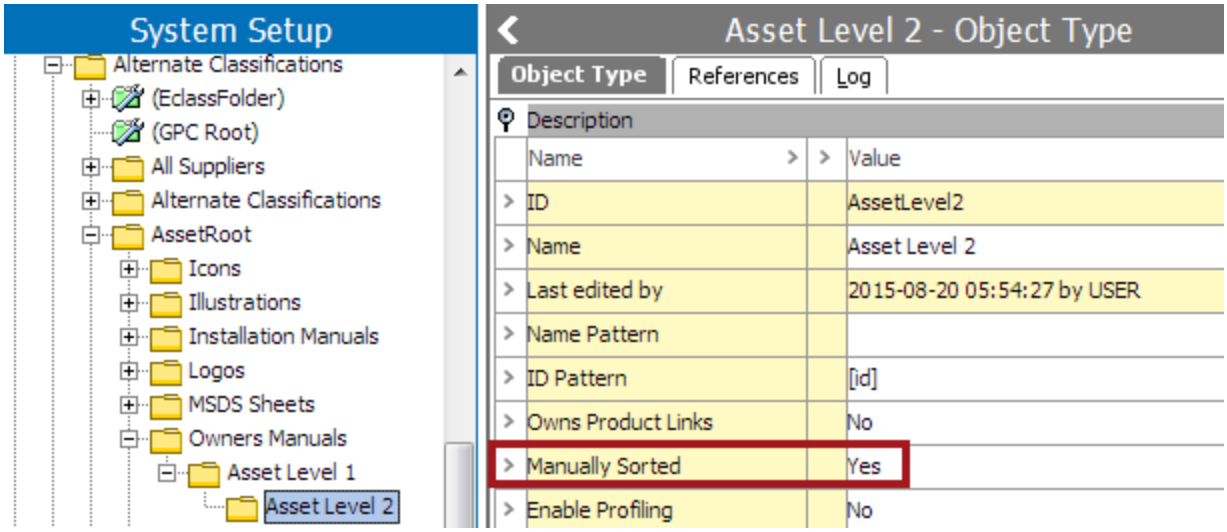


- Click Hide to no longer display a MIME type.
- Click Show All Rows to display all existing MIME types.
- Click Remove Value to delete the MIME type.

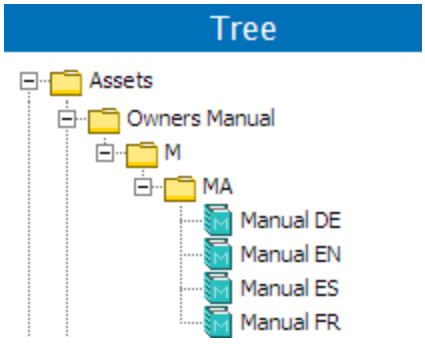
Modifying Manually Sorted

In the Tree, objects in the Alternate Classifications hierarchy, Primary Product Classification hierarchy, and Publication hierarchy sort alphabetically by default. This setting can be modified.

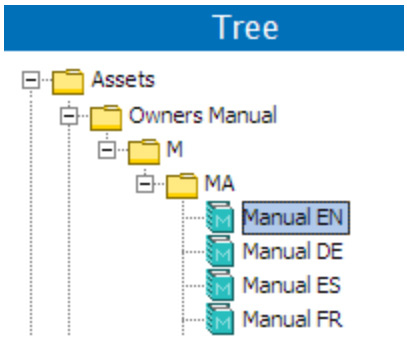
1. Go to **System Setup** > Select an **Alternate Classification, Primary Product Classification or Publication to be edited** > Select the **Object Type** tab on the editor and view the **Manually Sorted** parameter.



2. Set the **Manually Sorted** field:
   - **No** means that child nodes of this object, that are holding this current object type, are ordered alphabetically in the Tree. Their sequence cannot be manually changed by a user.



   - **Yes** means that child nodes of this object, that are holding this current object type, can have their sequence manually changed in the tree hierarchy. This can be done by dragging an object to another position.



Note: In Web UI, the Sequence view on a Node list allows for the manual sorting of objects and classifications. For more information refer to the Node List Component topic in the Web User Interfaces documentation.

Object Types

An object type specifies the characteristics of a group of nodes in the database structure. All nodes are of a specific object type. Whenever a Classification, Product, or Images & Documents object is created, you must manually apply the relevant object type.

Note: Description attributes applied on an object type will appear on all objects of this object type.

The logs on all of the respective object types shows the changes made on them.

Object Type	Definition	Example
Classification	Defines the structure of the Classification hierarchy	• Classification 1 user type root 'Application' • Classification level 1 'Furniture' • Classification level 2 'Office'
Product	Defines the structure of the Product hierarchy.	• Product Group 'Chairs' • Product Family 'Office chairs' • Product 'Acme chair 907098'
Asset	Defines the available types of Assets.	• Image • Document • Default document • Video • Audio • Import Manager configuration • Export Manager configuration
Entities	Defines the structure of the Entity hierarchy.	• Customers • Addresses

Object Type	Definition	Example
Publications	Defines the structure of the Publication hierarchy. Includes publication object types, publication group types, and publication sections.	• Printed Catalogs • Printed Sale Fliers
Basic Object Types	Defines structuring the system data **Note:** Basic objects cannot be edited, nor can new objects be added.	• Attributes • Contexts • Users

Object Type Hierarchy

The Object Type hierarchy defines the relationship (parent - child) between the Object Types. The Object Type hierarchy will also specify the possible depth of a Product or a Classification hierarchy, for example, the number of possible 'levels' before you reach an Object Type with no 'child' Object Type.

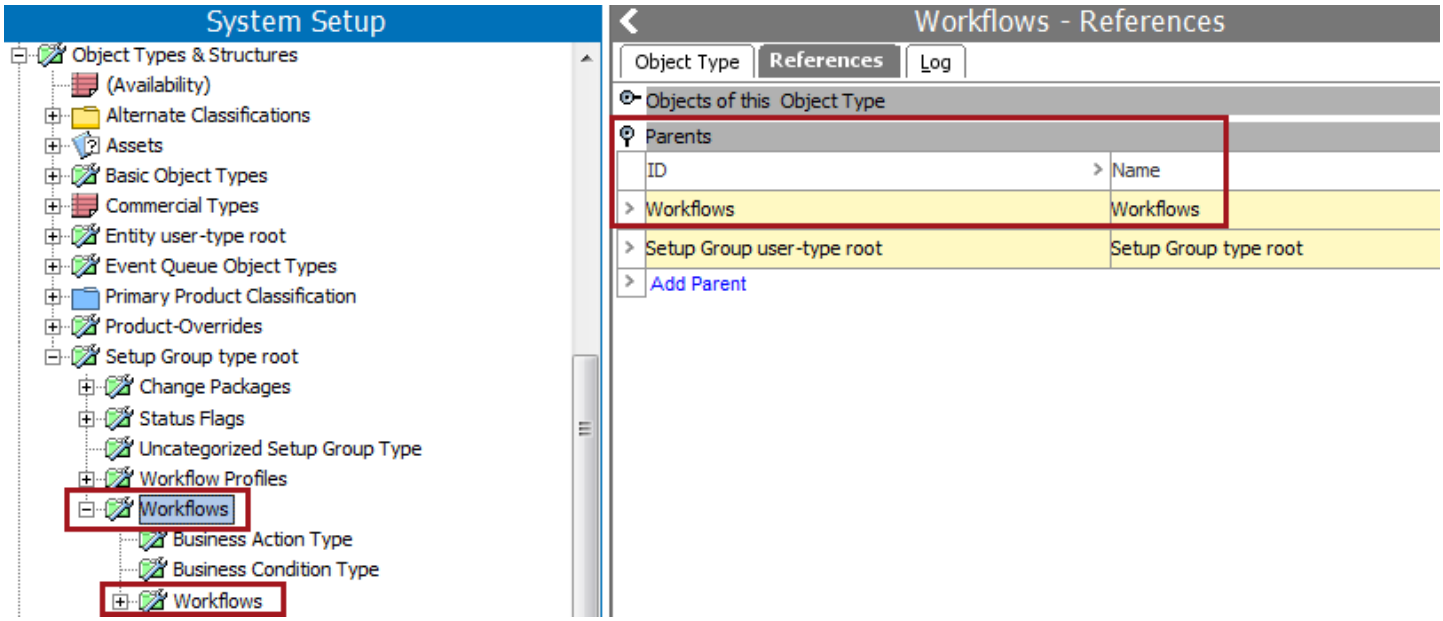
Child nodes of such Object Types are also referred to as 'leaf' nodes in the hierarchies.

The unique structure of each Product or Classification hierarchy is defined by an Object Type hierarchy.

Note: It is important to understand that the construction of the Object Type hierarchies is primarily a one-time setup operation. Once the Object Type hierarchies are established, any changes must be thoughtfully considered as such changes may have serious effects on your global database structure.

The 'labeling' of each node in a Product or Classification hierarchy with a specific Object Type is also used to group a set of nodes that share similar characteristics.

The Object Type hierarchies can be recursive, meaning that a 'child' can be its own 'parent'. This allows further division of the same types of objects within a single folder. In this case, there is no limit to the depth of a Product or Classification hierarchy that includes nodes from such a recursive Object Type hierarchy. To make an Object Type recursive, on the References tab, add the Object Type as its own parent.



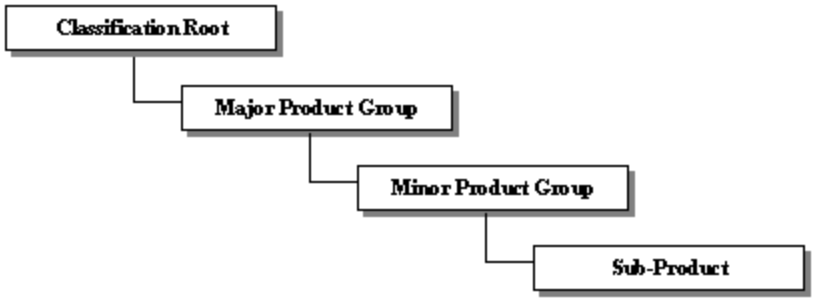
Classification Hierarchy Structures

The two hierarchy structures that may be defined are:

- Classification hierarchy
- Product hierarchy

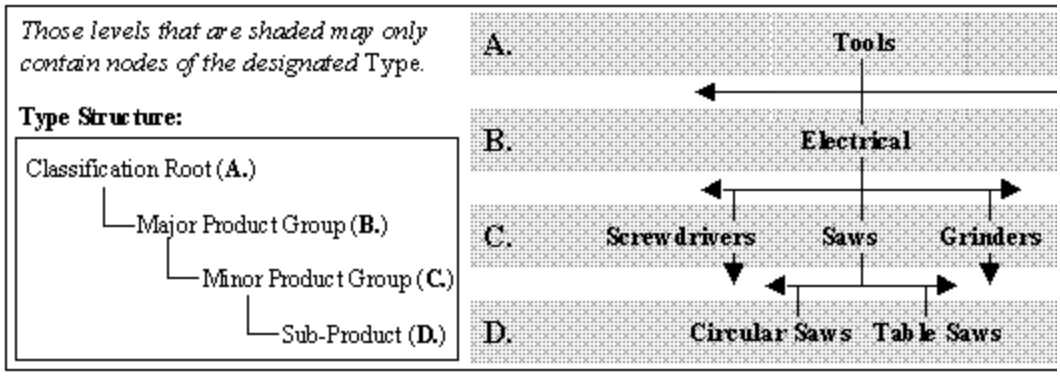
Note: There is no hierarchy that can be created for assets and entities.

The following examples of object type structures define the hierarchy structures of two different classifications 1) where the object type designated the level and 2) where nodes of different object type reside in the same level.

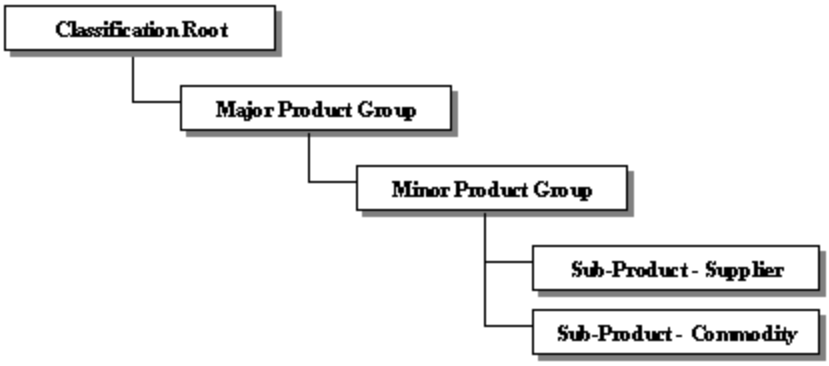


In this example, only a **Major Product Group** may be a child of a **Classification Root**, a **Minor Product Group** may only be a child of a **Major Product Group**, etc. As defined by this structure, it is not possible to create a **Sub-Product** under the **Classification Root**. Any nodes of the object type **Sub-Product** automatically become leaf nodes, because the object type structure does not allow any nodes of any object type to be created under **Sub-Product**.

Now that the object type structure is defined, the following hierarchy is possible:



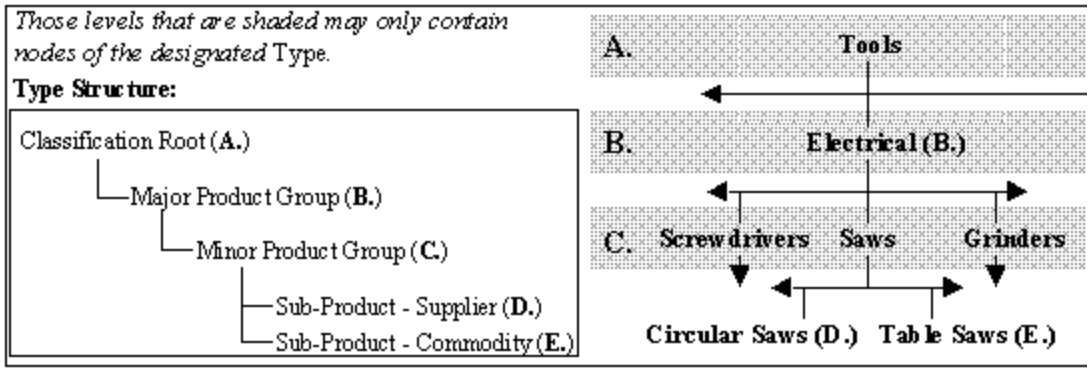
The first example illustrates a simple structure where each object type defines a level in the hierarchy. To build on this illustration, the second example shows it is also possible to create an object type structure in which a parent object type may have multiple children.



In this example, the object type structure allows a child node of the object type **Minor Product Group** to be created under a **Major Product Group** node. However, two (2) different object type may be created under a **Minor Product Group** node: **Sub Product - Supplier** and **Sub-Product - Commodity**.

This shows how nodes within the same level may be of multiple object type. Therefore, object type do not necessarily represent 'levels' within a hierarchy. Also, both of these object type are leaf nodes, as neither allows any children to be created beneath them.

Using this structure, the following a hierarchy is possible:



The example above illustrates that there can be nodes of different object type within the same level in a hierarchy:

- Circular Saws is of the object type **Sub-Product - Supplier**
- Table Saws is of the object type **Sub-Product - Commodity**

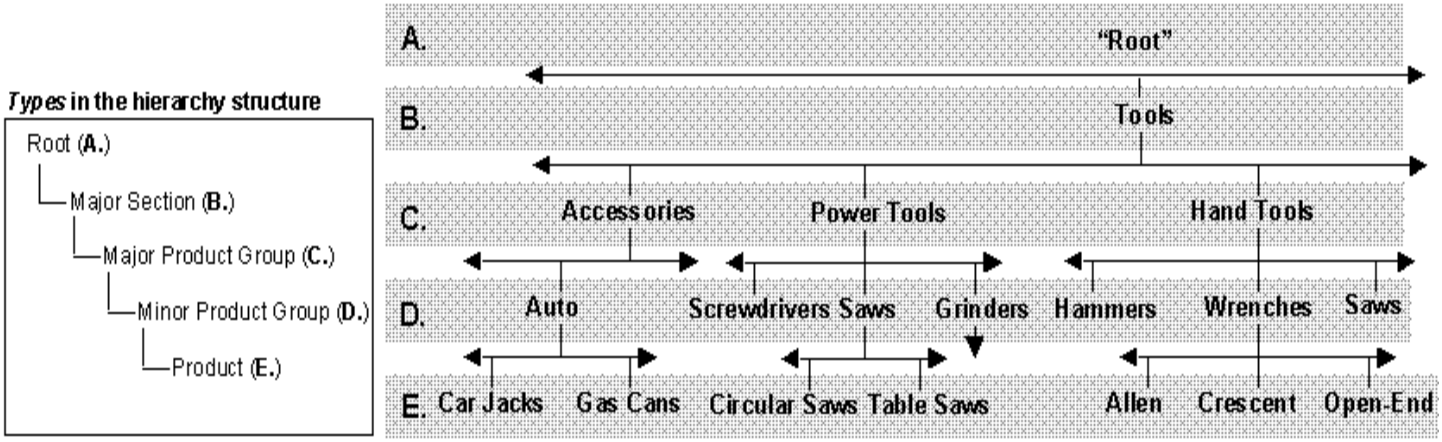
Fixed Hierarchy Structure

Each hierarchy created in the database is defined with a specific structure in mind. Each hierarchy node within each level is assigned an Object Type. The manner in which the hierarchy is structured determines what Object Types that can be assigned to the nodes in each level.

For example, the diagram below shows a fixed (rigid) hierarchy, where all Products have been categorized into four levels (not counting the top or root level). This structure means that all Products, regardless of what type of Product, must fall into this four-tier categorization.

In this example, all the nodes in each level of the hierarchy will have the same Object Type. The overall effect of this type of setup is that each level has been assigned a different Object Type. So, any hierarchy node residing in the specified gray area is of the Object Type that has been assigned to that level.

In this example, the 'Screwdrivers' node is of the Object Type called 'Minor Product Group' and the 'Table Saws' node has been given 'Product' as its Object Type. In the hierarchy structure, then, the setup is such that there is a fixed number of levels, and that at each level there is only one 'child' Object Type. For example, the only child of 'Major Product Group' is the one called 'Minor Product Group'.

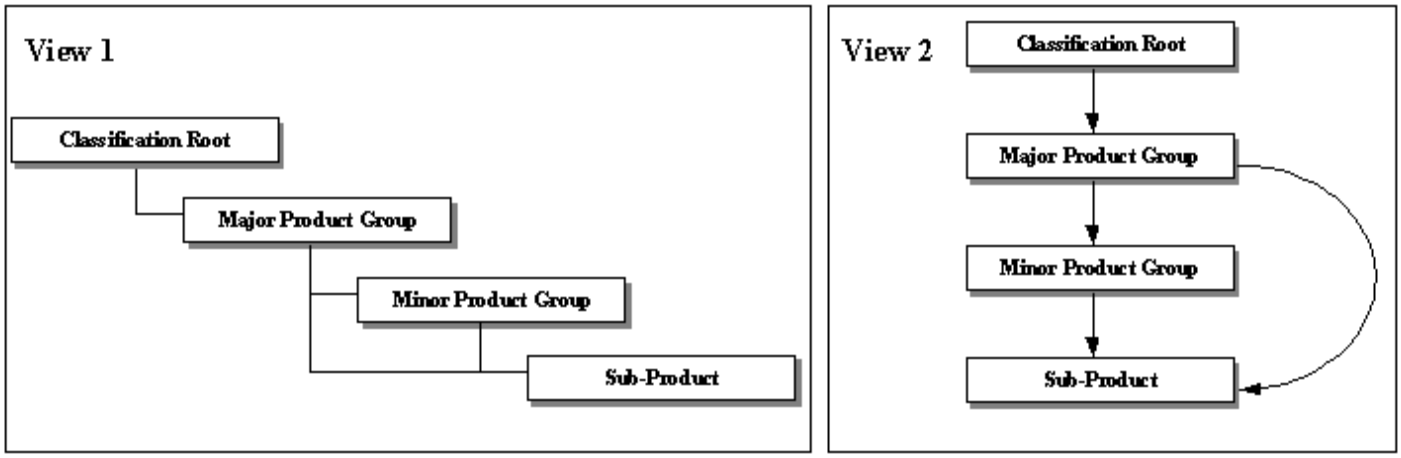


For information, refer to the Flexible Hierarchy Structure section.

Variation in Hierarchy Depths

In some instances, the depth of the hierarchy may vary. Not all hierarchies are suited to a formal type of structure discussed in the **Fixed Hierarchy Structure** topic in this documentation. Some groups of Products do not require four levels. There may be so few Products in certain groupings that three levels of hierarchy are preferred. Therefore, the structure of the hierarchy needs to be flexible enough to accommodate this.

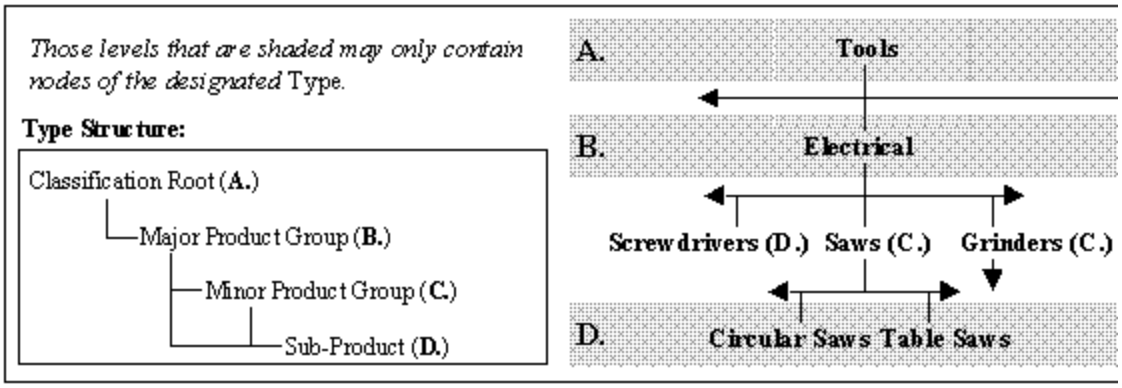
For example, the leaf nodes are of the same object type, but may be created in different levels. This is accomplished by allowing an object type to have multiple parents and displayed in the figure below.



The two views represent the same object type structure. In this example, when creating a node below a node of the object type **Major Product Group**, it is possible to create a node of the object type **Minor Product Group** or of the object type **Sub-Product**.

If a **Minor Product Group** is created, it is then possible to create a child node of the object type **Sub-Product** also. No matter where in the hierarchy the node of the object type **Sub-Product** is created (below **Major Product Group** or **Minor Product Group**), it is a leaf node because it is not possible to create any nodes below a **Sub-Product**.

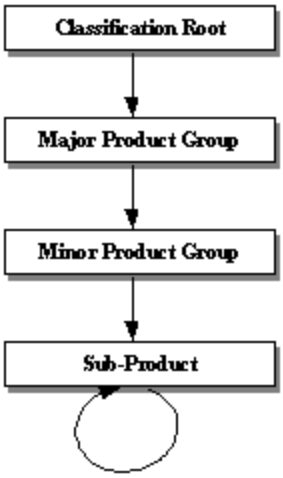
The following figure represents a hierarchy based on a varying object type structure.



Multiple Parents

A node of the object type **Major Product Group** can have children of either the object type **Minor Product Group** or **Sub-Product**. For example, the node Screwdrivers is of the object type **Sub-Product** and Saws is a **Minor Product Group**. A node of the object type **Minor Product Group** can only have children of the object type **Sub-Product**.

The object type hierarchy can be structured so it allows an object type to become a child of itself. This causes a situation in which a leaf node can never be created in the corresponding Product or Classification hierarchy, because when a node of the recursive object type is created, a child node of the same object type can always be created as displayed in the figure below.

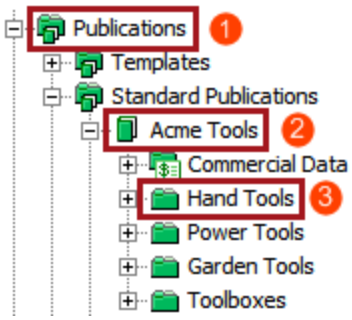


Creating a Standard Publication Object Type Hierarchy

Publication Object Types are created and maintained in System Setup under **Object Types & Structures**. The topics in this section describe how to create the object types needed to build a standard **Publication Hierarchy** in the Tree.

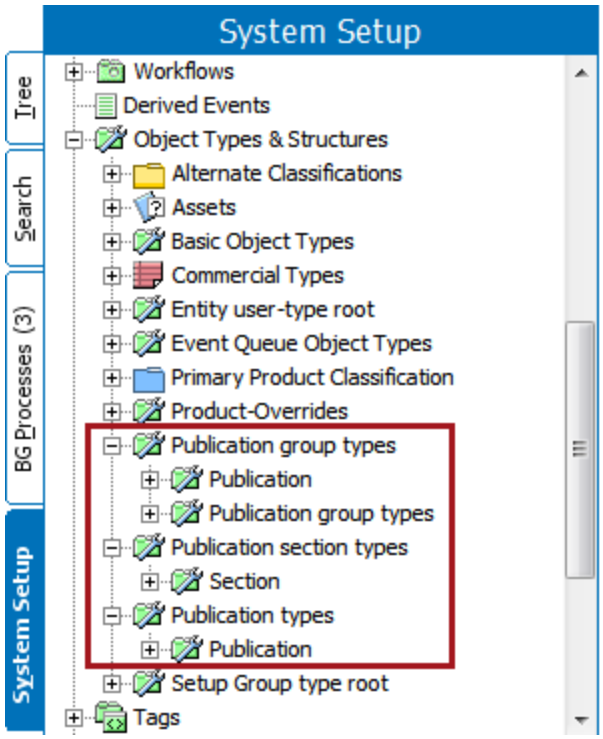
The following screenshot shows what a basic publication hierarchy looks like in the Tree. The publication object types addressed in this documentation are used to build the following objects:

1. Publication Group
2. Publication
3. Section



Typically, STEP systems are delivered preloaded with the following standard object types used in creating a Publication Hierarchy:

- **Publication group types** (ID = Publication group root): This object type serves a dual function as both the root node of the Publication Hierarchy as well as the standard object type used to create **Publication Group** objects in the Tree.
- **Publication types** (ID = Publication root): Root node for **publication** object types in System Setup; not used to create publication objects themselves in the Tree
- **Publication** (ID = Default publication type): Used to create **publication** objects in the Tree
- **Publication section types** (ID = Section root): Root node for **section** object types in System Setup; not used to create section objects themselves in the Tree
- **Section** (ID = Section): Used to create **section** objects in the Tree



Though these basic object types can be used to create an entire publication hierarchy 'out of the box,' you may need to create other publication hierarchy object types for scenarios such as:

- The need to differentiate different collateral types by object type (e.g., catalogs, fliers, brochures)
- The need to assign different User Groups to specific areas of the publication hierarchy, which can be accomplished by configuring User Group privileges in conjunction with the different publication hierarchy object types
- The need to place different types of metadata (by use of Description attributes) on different types of publications, publication groups, and sections

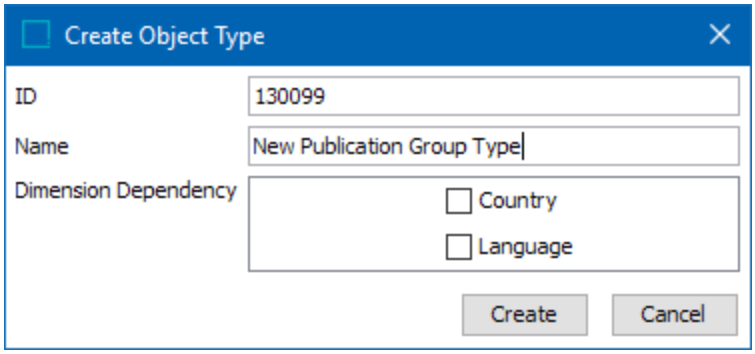
The following sections of this documentation will guide you through the process of creating new publication hierarchy object types as well as configuring valid parent / child relationships between these object types.

If your system is missing any of the three publication hierarchy *root node* object types (Publication group root, Publication root, or Section root), contact Stibo Systems for assistance, as publication hierarchy object types cannot be created unless their corresponding root node object types preexist in System Setup.

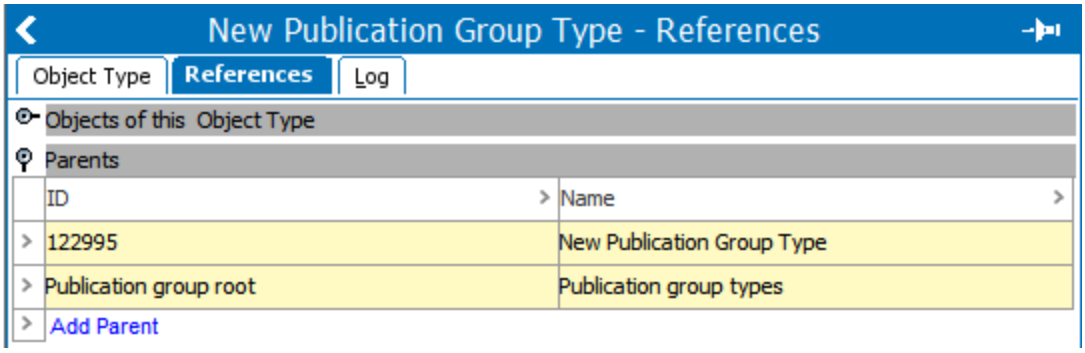
For more information on the creation and configuration of publication hierarchy objects in the Tree, refer to the **Publication Hierarchy** section of the **Publisher (Adobe InDesign Integration)** documentation.

Creating a Publication Group Object Type

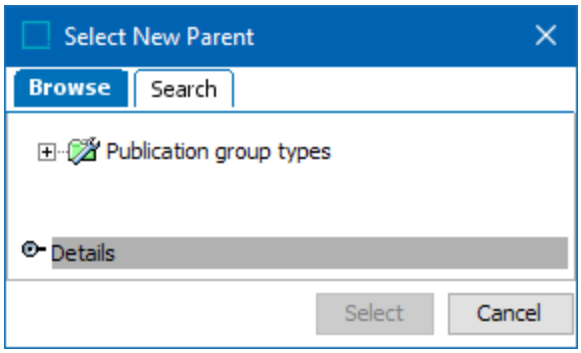
1. In System Setup, open the **Object Types & Structures** hierarchy.
2. Select **Publication group types**, right-click, and then select **New Object Type**. A **Create Object Type** dialog box appears.



3. If the STEP ID for the **Publication group root** object has not been set to autogenerate with an ID Pattern, type an ID in the **ID** field.
4. In the **Name** field, type a name.
5. Check the relevant **Dimension Dependency** check boxes, if applicable. (Dimension dependencies are optional, and are not typically used with publication group object types.)
6. Click **Create**. An Editor displays for the newly created publication group object type.
7. Click the **References** tab.



8. Click **Add Parent** to define which parent publication group object(s) should be valid for the new publication group object. The **Select New Parent** dialog box appears.

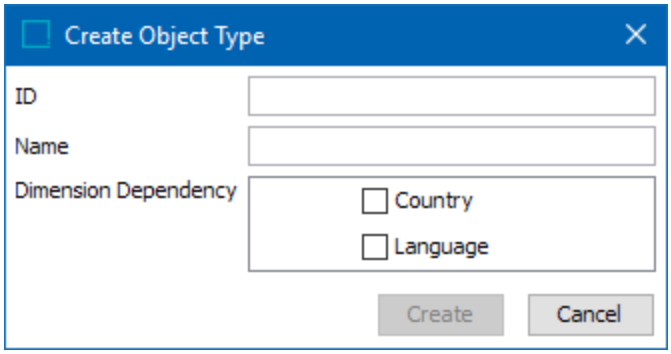


9. Search or browse for the relevant publication group type, then click **Select**.

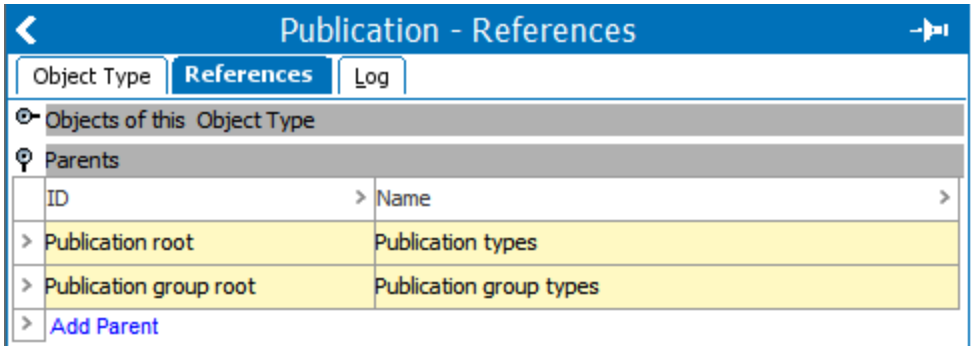
Note: Publication group objects may only be children of other publication group objects. They may not be children of publication objects or section objects.

Creating a Publication Object Type

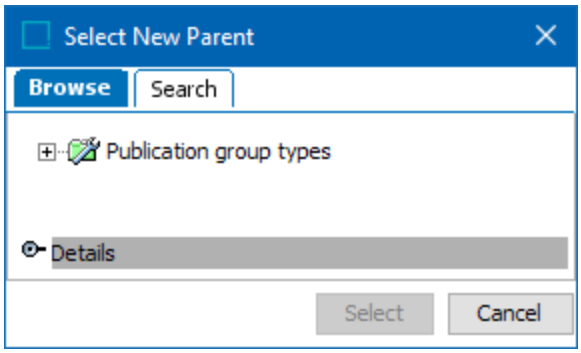
1. In System Setup, open the **Object Types & Structure** hierarchy.
2. Click **Publication types**, right-click, and then click **New Object Type**. A **Create Object Type** dialog box appears.



3. If the STEP ID for the 'Publication root' object has not been set to autogenerate with an ID Pattern, type an ID in the **ID** field.
4. In the **Name** field, type a name.
5. Check the relevant **Dimension Dependency** check boxes, if applicable. (Dimension dependencies are optional, and are not typically used with publication object types.)
6. Click **Create**. An editor displays for the newly created publication object type.
7. Click the **References** tab.



8. Click **Add Parent** to define which parent publication group object(s) should be valid for the publication object. The **Select New Parent** dialog box appears.

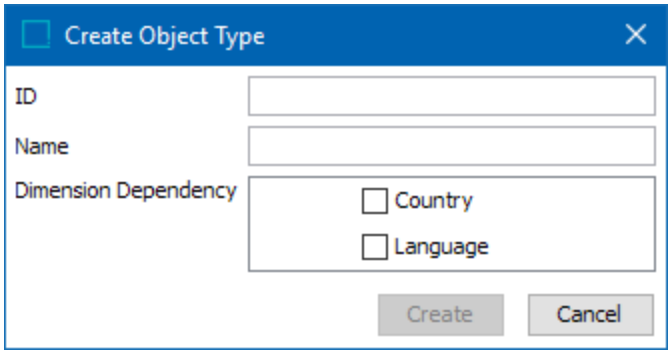


9. Search or browse for the relevant publication group type, then click **Select**.

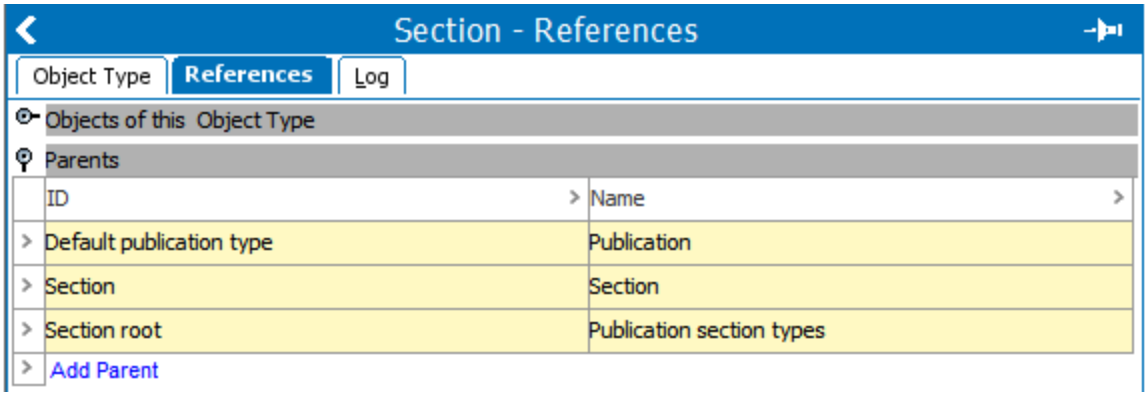
Note: Publication objects may only be children of publication group objects. They may not be children of other publication objects or section objects.

Creating a Publication Section Object Type

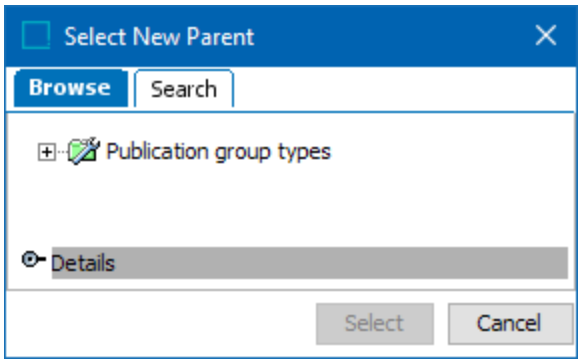
1. In System Setup, open **Object Types & Structures**.
2. Click **Publication section types**, right-click, and then select **New Object Type.** The **Create Object Type** dialog appears.



3. If the STEP ID for the 'Section root' object has not been set to autogenerate with an ID Pattern, type an ID in the **ID** field.
4. In the **Name** field, type a name.
5. Check the relevant **Dimension Dependency** check boxes, if applicable. (Dimension dependencies are optional, and are not typically used with publication section object types.)
6. Click **Create**. An Editor displays for the newly created Section object type.
7. Click the **References** tab.



8. Click **Add Parent** to define which parent publication and/or section object(s) should be valid for the section object. A **Select New Parent** dialog box appears.



9. Search or browse for the relevant publication and/or section type, and then click **Select**.

Note: Publication section objects may be children of publication objects and other section objects but they cannot be children of publication group objects.

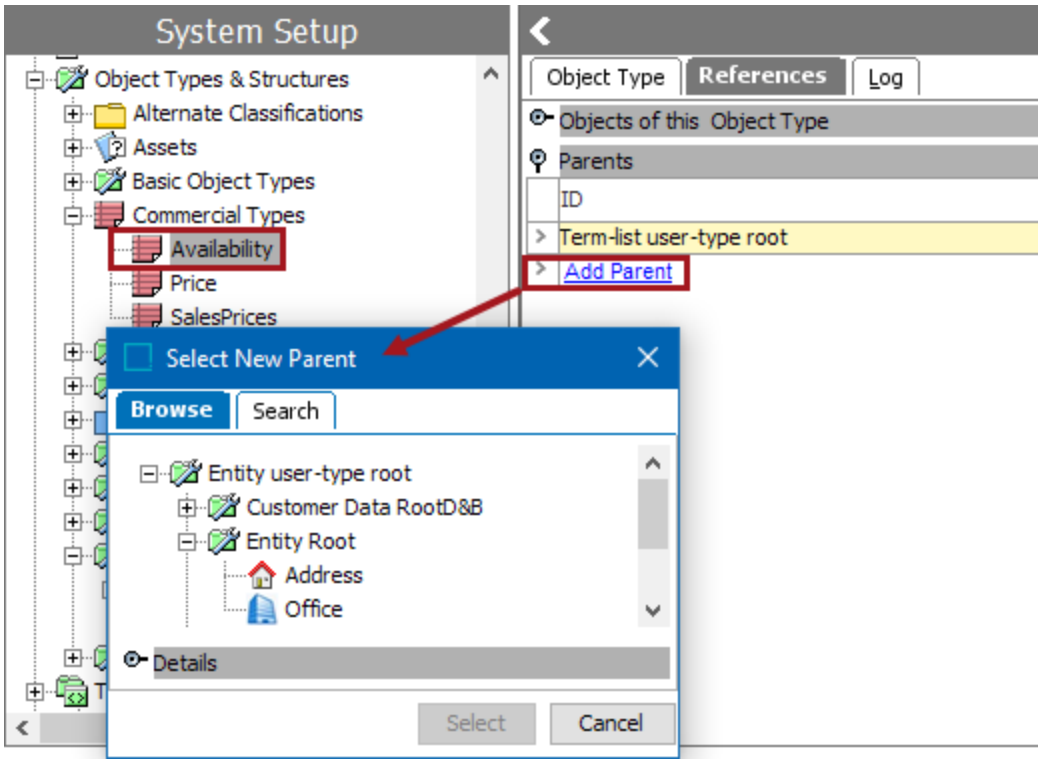
Product-Override Object Types and Commercial Object Types

Product-Override object types and Commercial object types appear in their own hierarchy under Object Types & Structures.

Before using Product-Overrides in the Product hierarchy or commercial data in the Entity hierarchy, the levels in which those objects can be legally created / maintained must be specified.

- Product-Override object types must be linked into the Product Object Type hierarchy.
- Commercial data types must be linked into Entity object types if they are needed within an Entity hierarchy. (Commercial Types can be used directly in publications and eCatalogs without additional linking.)

Link the Object Types from the References tab on either a Commercial Type or the References tab on a Product-Override by clicking the **Add Parent** link. A node selector displays a list of legal Object Types for linking.

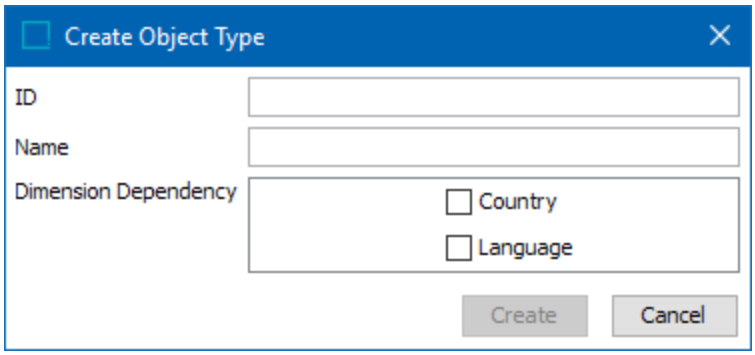


Note: When Commercial Types must be used in Entity Hierarchies, manually link the Commercial Type into the Entity Hierarchy.

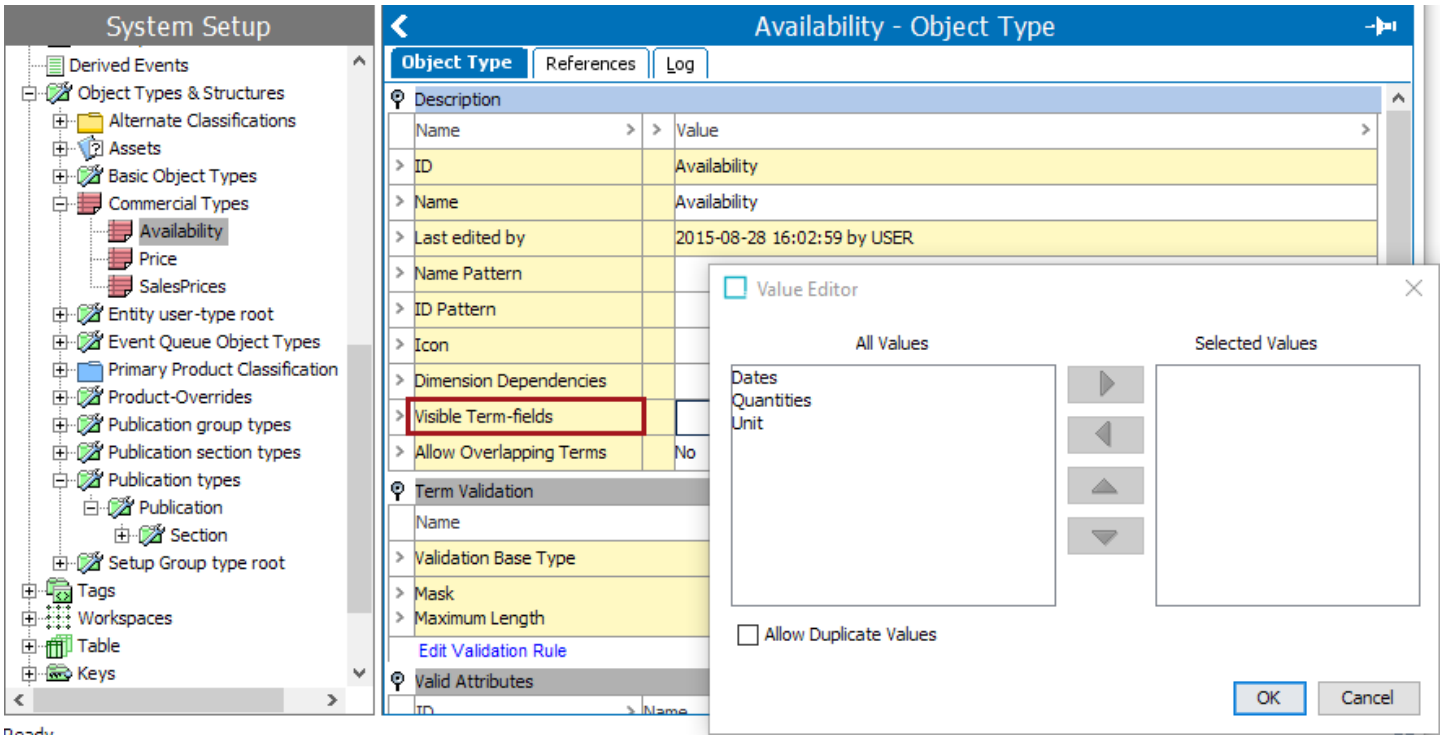
Creating a Commercial List Type

Commercial object types appear in their own hierarchy under Object Types & Structures.

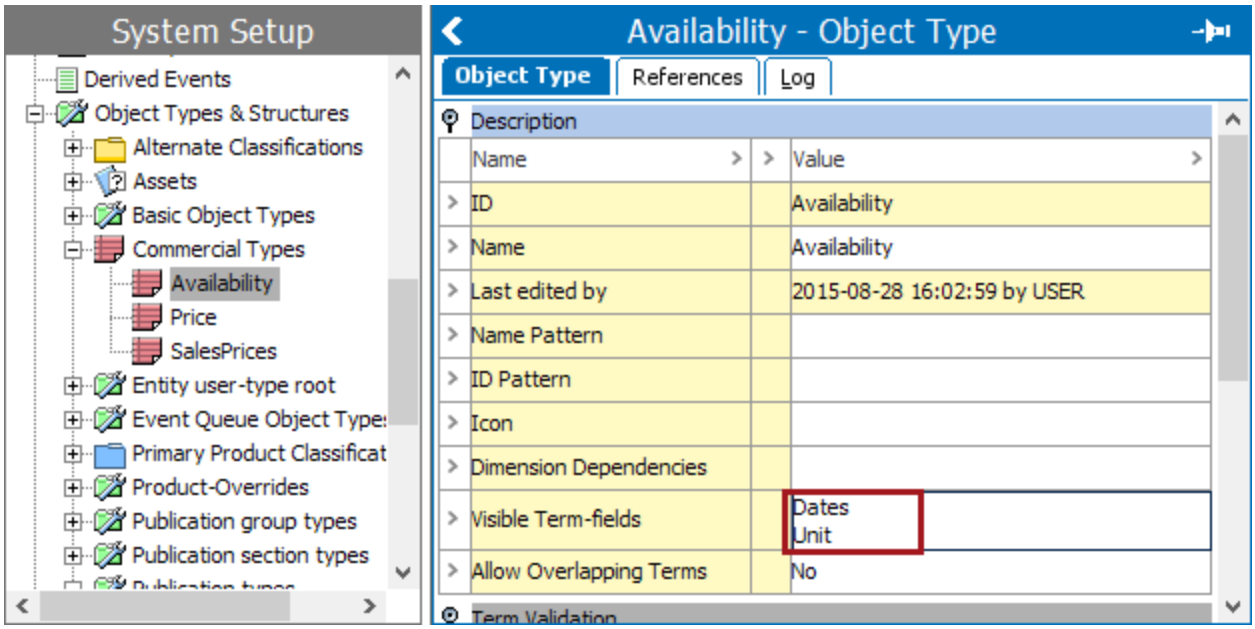
1. In System Setup, open **Object Types & Structures**.
2. Click **Term-list user-type root**, right-click, and select **New Object Type** to display the **Create Object Type** dialog.



3. Type an **ID** and **Name**. Dimension Dependencies are optional, and are not typically used with Commercial List Types.
4. Click **Create** to display the created Commercial List Type dialog.
5. In the **Object Type** tab, double-click in the **Value** column of the **Visible Term-fields** to display the **Value Editor** dialog.



6. Select one or more values in the left hand side under the ‘All Values,’ and click on the selection button, , to move the values to the right hand side under ‘Selected Values.’
7. Check the box for 'Allow duplicate Values,' if required and select 'OK' when finished.
8. Selected values will be populated in the **Visible Term-fields** value field.

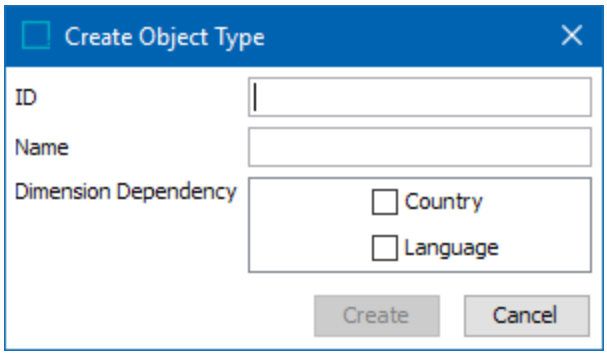


For more information, refer to the Commercial Data documentation.

Creating a Product-Override Object Type

One standard Product-Override Object Type is supplied with the system. Additional Product-Override Object Types can be created with specific settings for each, such as manual attribute sequencing and rules for template changes.

1. In System Setup, open **Object Types & Structures**
2. Select **Product-Overrides**, right-click, and click **New Object Type** to display the **Create Object Type** dialog.



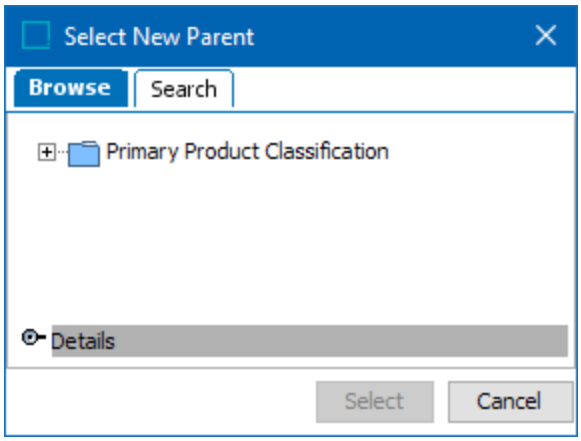
3. Type an **ID** and **Name** and optionally, check Dimension Dependencies.
4. Click **Create** and a new Product-Override Object Type is created.

> **Note:** To enable a Product-Override, additional linking is required. For more information, refer to the **Enabling a Product Override** section.

Enabling a Product-Override

A Product-Override Object Type must be linked to the folders in the Primary Product Hierarchy on which a Product-Override should be possible.

1. In System Setup, open **Object Types & Structures**.
2. Open **Product-Overrides**, and select the relevant Object Type to display an editor.
3. On the **References** tab click the **Add Parent** link to display the **Select New Parent** dialog.

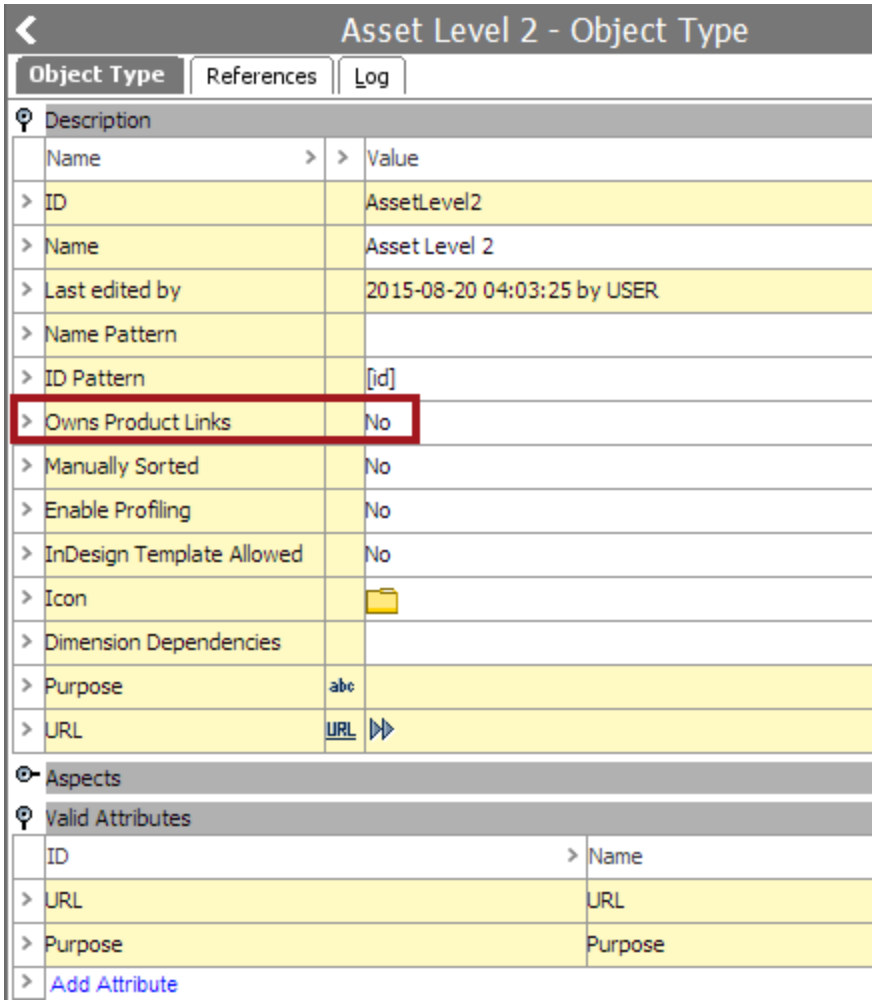


4. Use Search or Browse to select an Object Type under **Product user-type root**.
5. Click **Select** to apply a Product-Override to a Product Object Type.

> **Note:** It may be necessary to define specific settings for each Product-Override Type such as manual attribute sequencing and rules for template changes.

Owns Product Links on Alternate Classifications Object Type

Owns Product Links specifies the ownership of a link from a product to a classification. The Owns Product Links field determines if the link should be unapproved when products are linked to the classification.



The available options for Owns Product Links are:

- **No** means the product 'owns' the link to the classification. When an additional product is linked to the classification the approval status of the classification is not changed. It is not necessary to approve the classification in order to display linked products in the classification in the approved workspace.
- **Yes** means the classification reference 'owns' the link to the product. When an additional product is linked, the classification will become unapproved. It is necessary to approve the classification in order to display linked products in the classification in the 'Approved Workspace.'

Note: By default the Owns Product Links is set to 'No' whenever a new classification object type is created. You can instantly set the option to 'Yes' if the classification object type is not used as a target in any of the classification reference Links.

Once set, although this parameter can be modified, doing so may require special handling. For Cassandra databases, this action uses Lock-free Schema Change (LFSC) functionality, as defined in the Lock-free Schema Change topic.

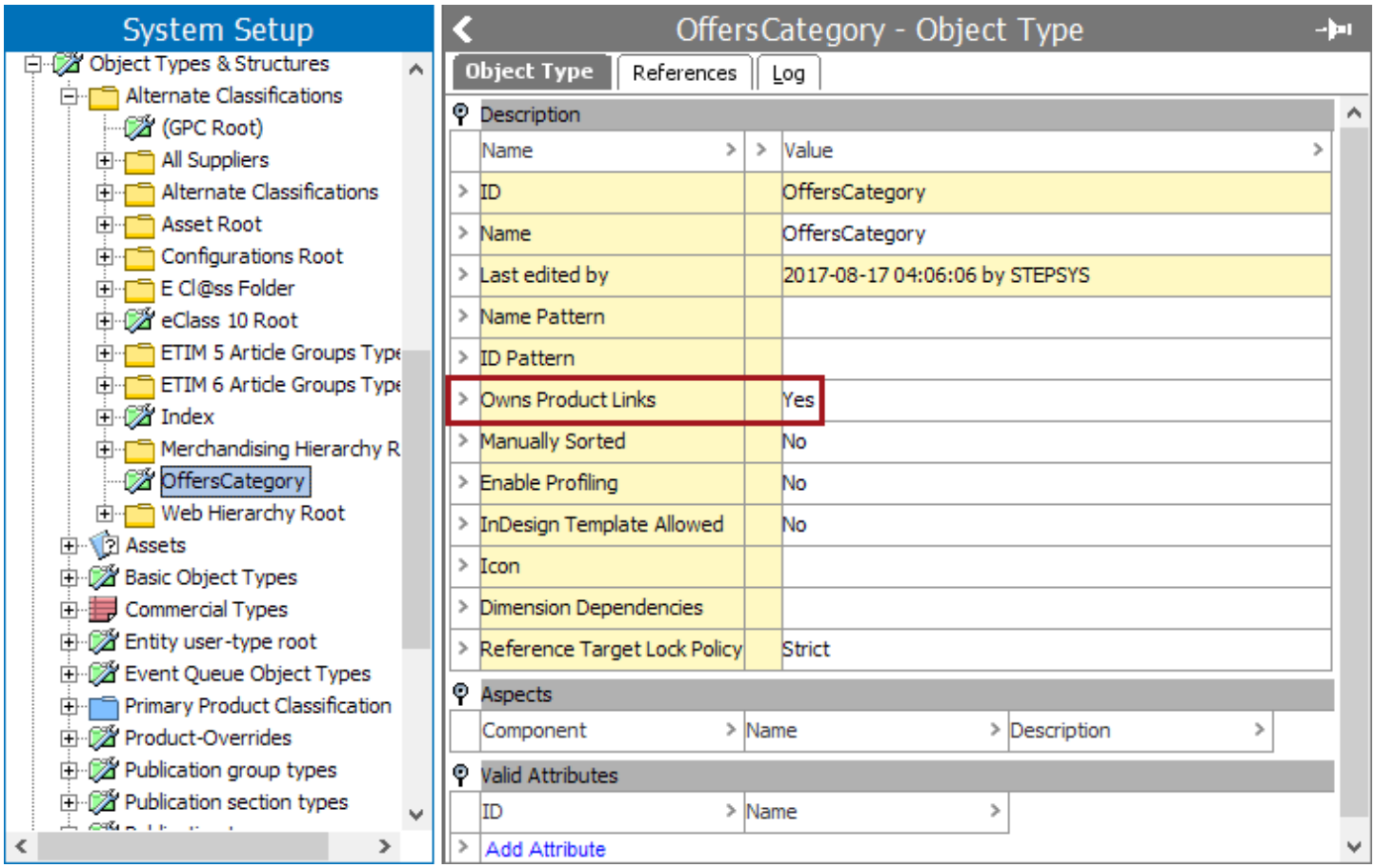
Owns Product Links Affects STEPXML

When Owns Product Links is set to 'Yes', Advanced STEPXML exports these references as both 'ProductReferences' under the Classification and as 'ClassificationReferences' under the Product.

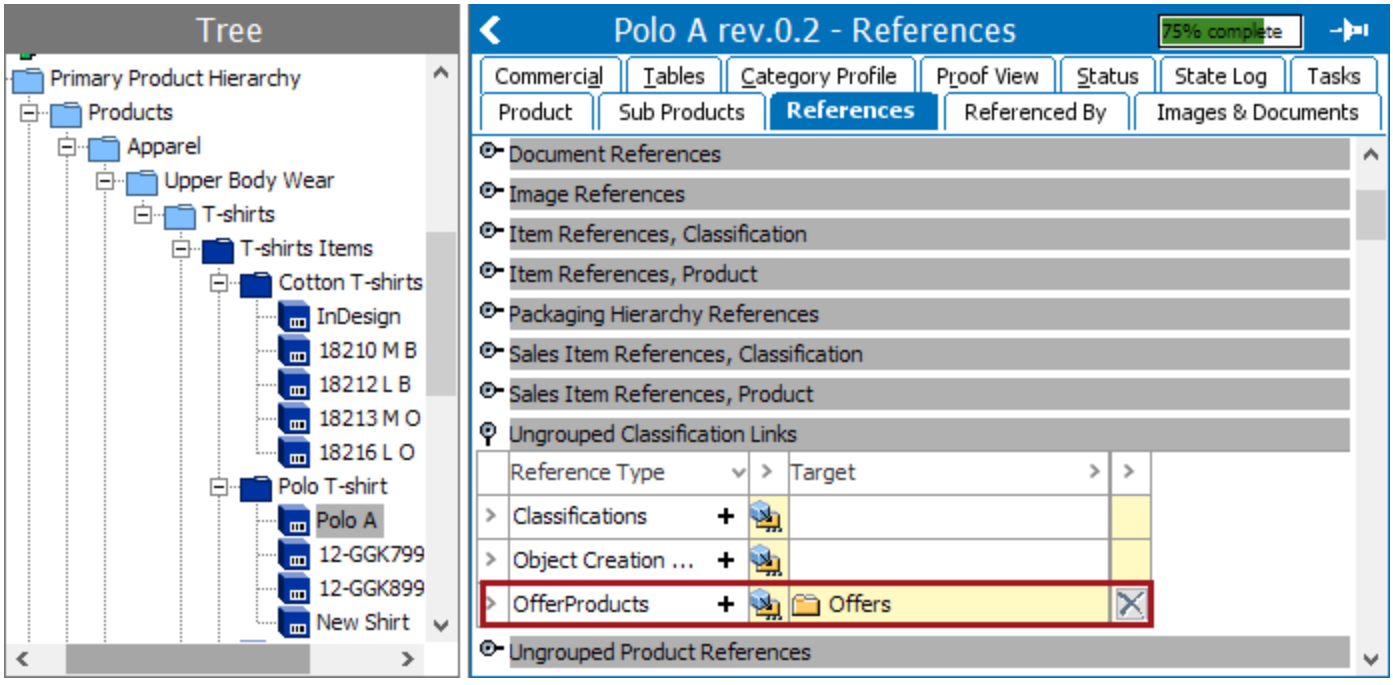
To stop the classification-owned links from being exported under the products, set the recorder option 'IncludeClassificationOwned' on the Products element to false as shown in the red text below:

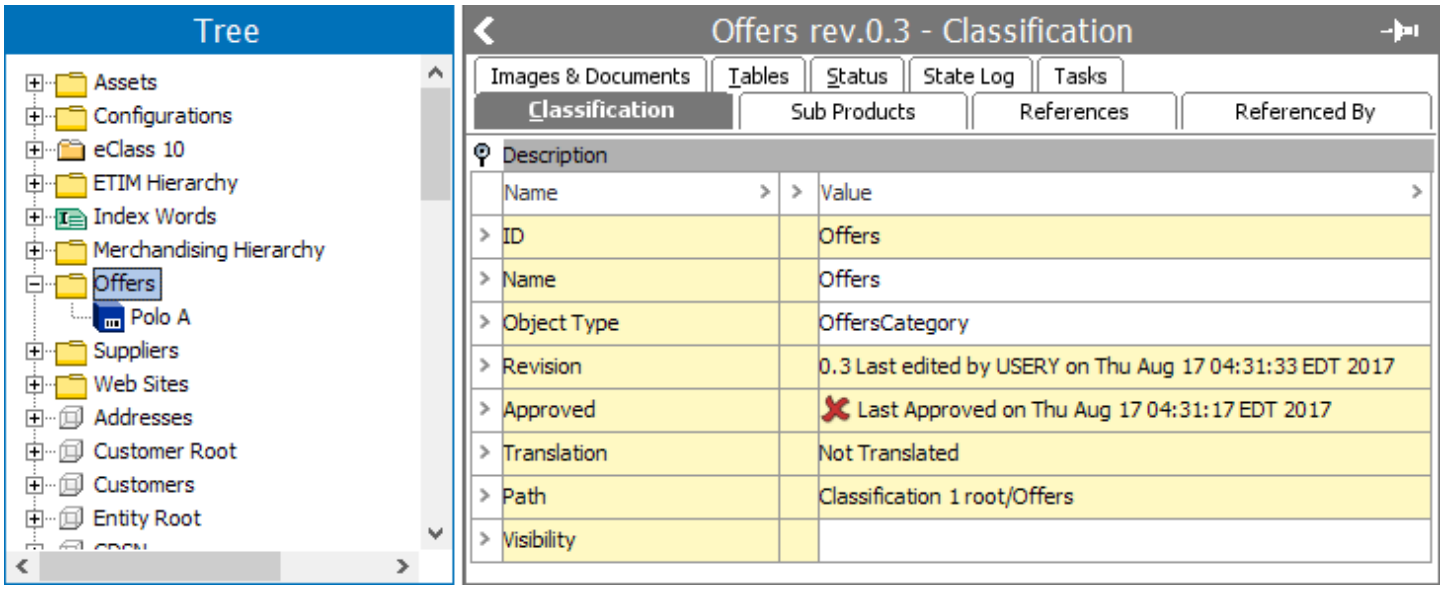
```
<STEP-ProductInformation>
<Products IncludeClassificationOwned="false">
<Product>
</Product>
</Products>
</STEP-ProductInformation>
```

Consider the following example where a product is linked to a classification. Looking at the Object Type tab of this classification, OffersCategory, the 'Owns Product Links' is set to 'Yes'.

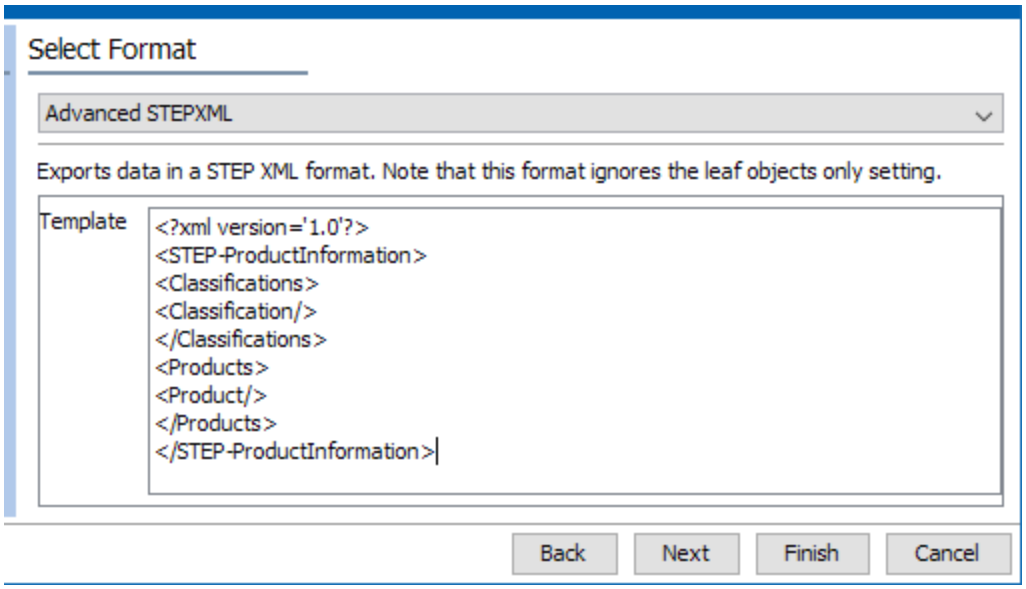


Product 'Polo A' is linked to classification 'Offers' through Classification Link 'OfferProducts.'





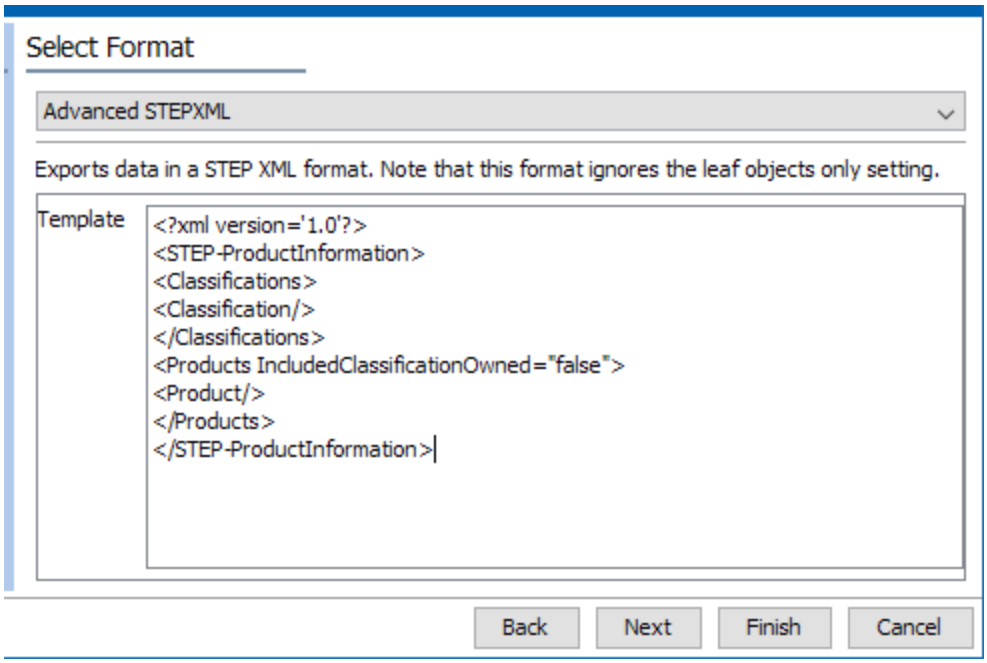
To export an object like this via Advanced STEPXML, use a template similar to the one below. In this example 'Polo A' will be used:



When the user has finished going through the wizard and pressed 'Finished,' part of the complete output will look like the following:

```
  <Classifications>
    <Classification ID="Offers" UserTypeID="OffersCategory"
ParentID="Classification 1 root" Selected="false"
Referenced="true">
      <Name>Offers</Name>
      <ProductReference ProductID="113202" Type="OfferProducts"/>

    </Classification>
  </Classifications>
  <Products>
    <Product ID="113202" UserTypeID="Item" ParentID="113201">
      <Name>Polo A</Name>
      <ClassificationReference ClassificationID="Offers"
Type="OfferProducts"/>
```

If the export of 'Polo A' via Advanced STEPXML with a template is complete, but with the recorder option 'IncludeClassificationOwned' included in Product element the output will look similar to the following:



When the user has finished going through the wizard and pressed 'Finished,' part of the complete output will look like the following:

```
  <Classifications>
    <Classification ID="Offers" UserTypeID="OffersCategory"
ParentID="Classification 1 root" Selected="false"
Referenced="true">
      <Name>Offers</Name>
      <ProductReference ProductID="113202"
Type="OfferProducts"/>

    </Classification>
  </Classifications>
  <Products>
    <Product ID="113202" UserTypeID="Item" ParentID="113201">
      <Name>Polo A</Name>
```

Changing Owns Product Links

Owns Product Links specifies the link ownership when a Product is linked to a Classification. For more information about Owns Product Links, refer to the **Owns Product Links on Alternate Classifications Object Type** topic within this guide.

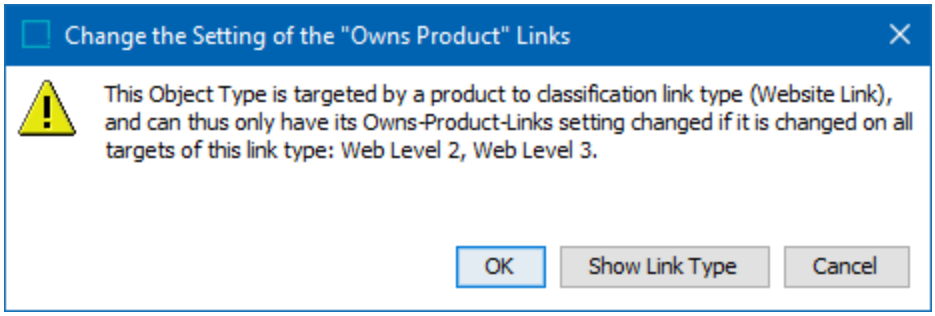
Note: Changing the setting of Owns Product Links can be a time-consuming operation.

Steps to Change the Owns Product Links

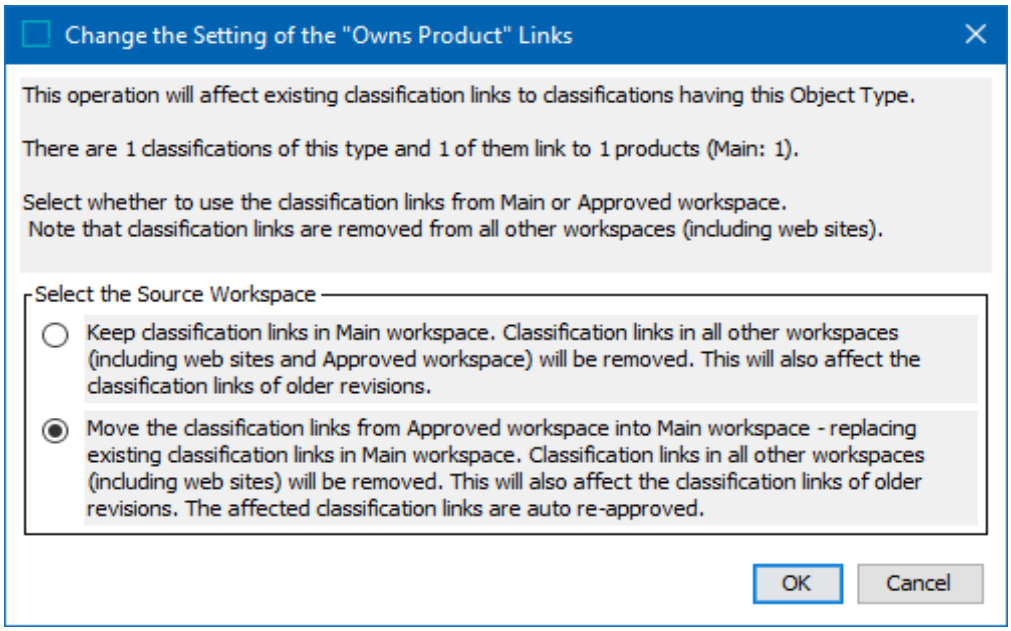
Changing the Ownership for an existing Classification Object Type which is being used as Target in various Classification Link Types can be done by following the steps below:

1. Go to **System Setup** > Expand **Object Types & Structures** > Select the **Alternate Classification Object Type** that needs to have the **Owns Product Links** setting changed.
2. Click the **Object Type** tab.
3. In the **Own Product Links** field, select **Yes** or **No** to display the **Change Owns Product Links Setting** dialog.

   If the object type is targeted by a product to classification link type then the dialog will display as shown in the screenshot below.



- Clicking the **Show Link Type** button will close the dialog and display the specified link type editor.
- Clicking the **Cancel** button will close the dialog and display the classification object type editor.
- Clicking the **OK** button will close the dialog and display the dialog as shown below.

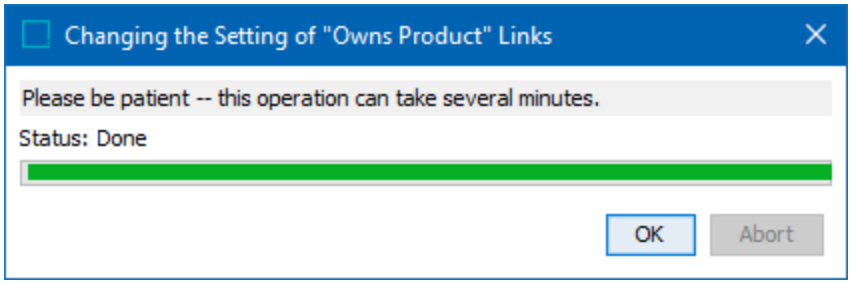


4. Select an option to handle the existing links across the Workspace:

   Note: Both options affect the Classification References in older revisions.

   - **Keep classification links in Main Workspace:** the Classification References in the Main Workspace remain untouched. Classification References in all other Workspaces are removed. Since the references in the Approved Workspace are replaced with the references from Main Workspace, the Approved Workspace might not have the same references after the change.
   - **Move the classification links from Approved Workspace into Main Workspace:** *This is the recommended option.* The Classification References in the Approved Workspace remain untouched. Classification References in Main Workspace are replaced with the Classification References from the Approved Workspace. The affected Classification References are auto re-approved. Since the references in the Main Workspace are replaced with the references from Approved Workspace, the Main Workspace might not have the same references after the change.

5. Click the **OK** button to start the process and display the Changing the Setting of "Owns Product" Links status dialog, as shown below.



Reference Target Lock Policy on Object Types

The 'Reference Target Lock Policy' parameter for an asset, entity, classification, and product object type manages how objects are locked while they are being referenced.

When long-running transactions cannot be simplified easily, consider setting the 'Reference Target Lock Policy' parameter to 'Relaxed' on the object types to which the long transaction applies.

Strict or Relaxed

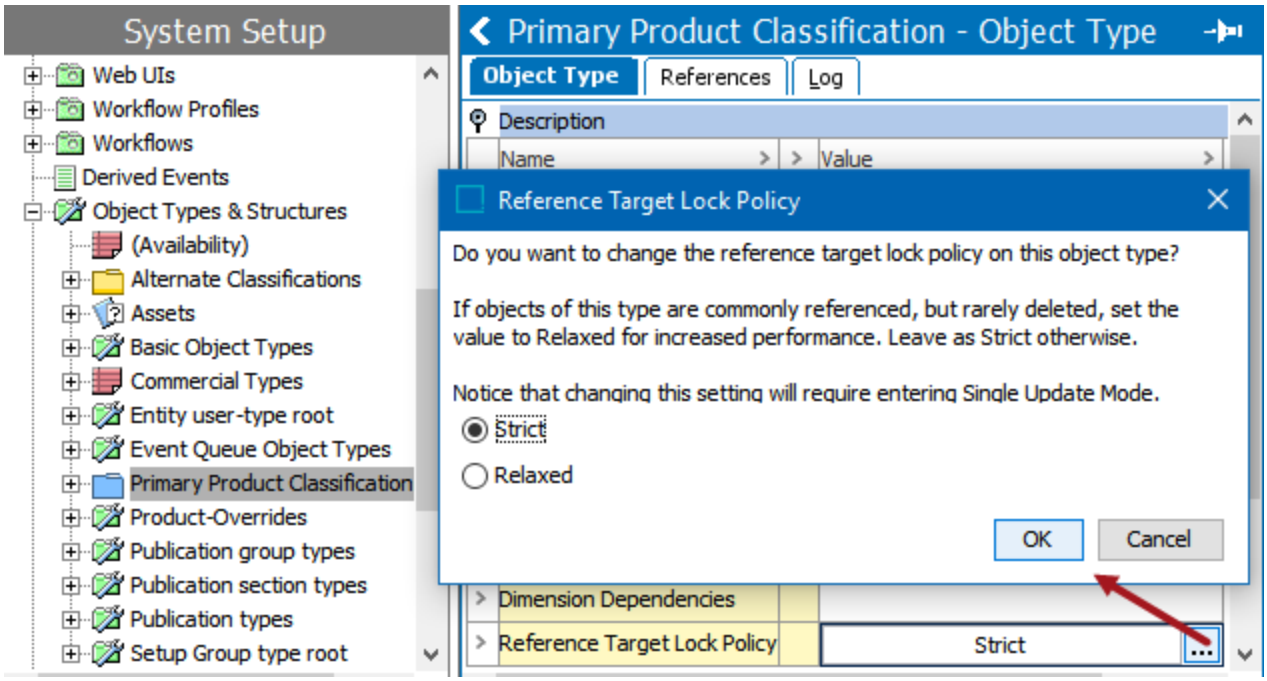
The 'Strict' setting is default for the 'Reference Target Lock Policy' parameter. When a reference between two objects is being created, the target object is locked to ensure that it is not being deleted while the reference is being created. This means that only one process or user can edit it at a time. Often, deletion of the object is not a deletion from the database, but a deletion due to revision control when the insert of a new history entry occurs.

When using the Optimistic Locking option, a 'Strict' setting can result in an issue running parallel imports where the first import locks the object type being referenced, and the second import eventually stops running because it cannot access the locked object. Since STEP continues to retry the import, this can negatively impact inbound feeds.

The 'Relaxed' setting uses a less restrictive lock (a shared 'user lock') on the reference target objects being edited so that concurrent updates by multiple processes and/or users are allowed. A full lock is used only when a deletion is attempted. The Relaxed setting allows faster parallel creation of references to the same target object. This setting, when used with object types that are frequently referenced but rarely deleted, improves the performance and stability of parallel inbound imports, bulk updates, and users concurrently creating references to the same objects.

Important: Do not use the 'Relaxed' setting on an object type for objects that are often deleted as this can result in poor performance, and risks locks and deadlocks.

For information on locking options, refer to the **Optimistic and Pessimistic Locking** Recommendations topic in the **System Administration** documentation.



The Relaxed / Strict setting can be changed as needed, but Oracle databases require the system to enter Single Update Mode for only as long as it takes to update the setting. For more information, refer to the **Single-Update Mode** topic.

Note: Changing this setting during peak production hours can have a negative impact on performance.

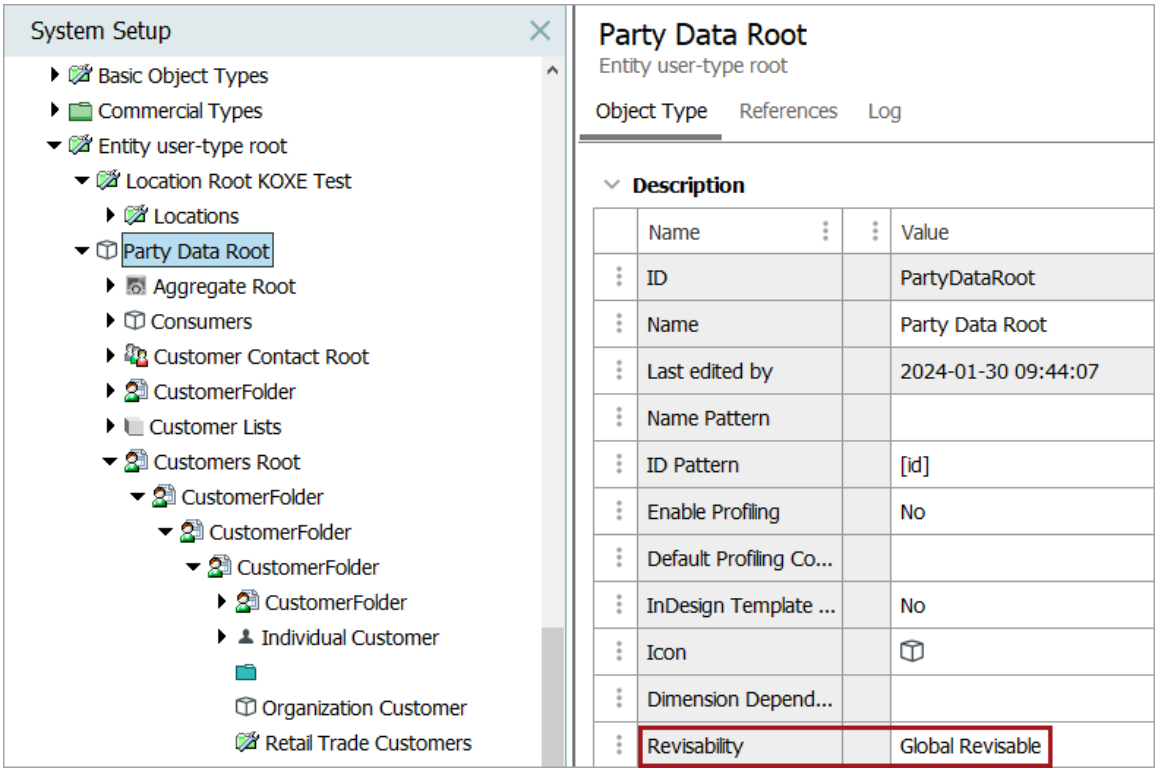
Revisability on Entity Object Type

Unlike other objects which are always workspace revisable or globally revisable, the entity object type editor includes a Revisability parameter that can be set to 'Global Revisable' or 'Workspace Revisable'.

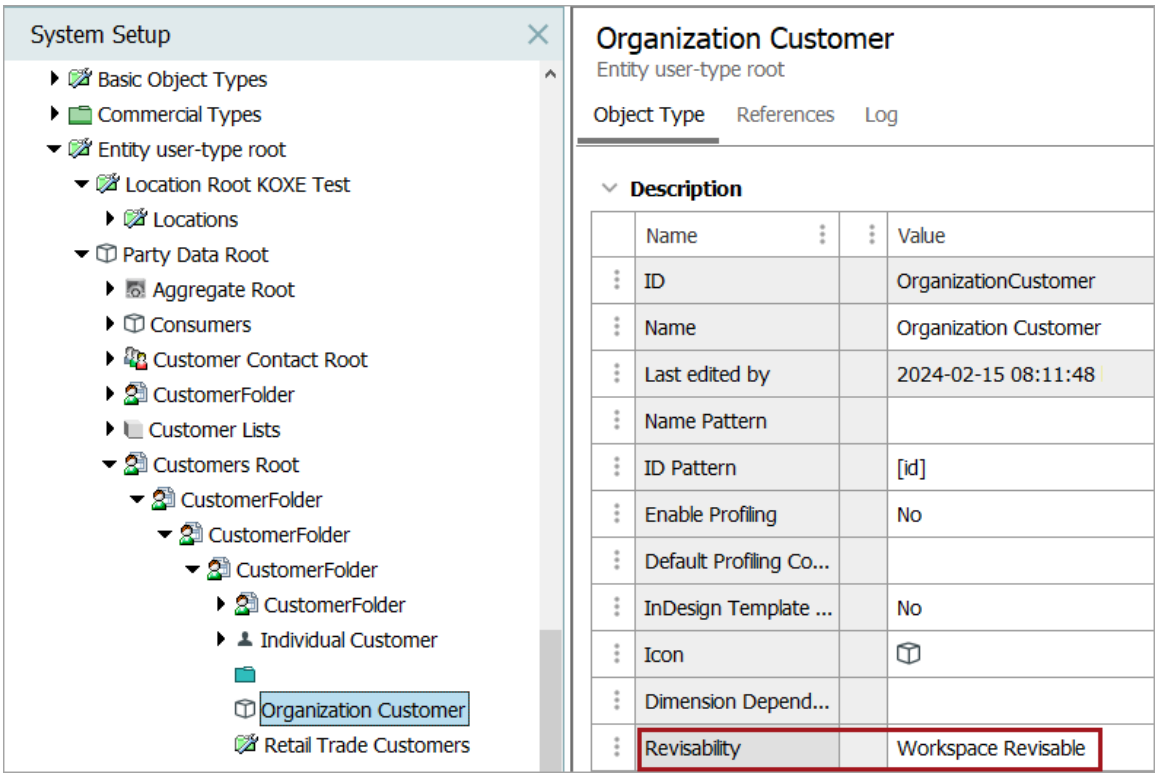
Once set, although this parameter can be modified, doing so requires special handling. For Oracle databases, this action requires single-update mode (SUM), as defined in the Single-Update Mode topic.For Cassandra databases, this action uses Lock-free Schema Change (LFSC) functionality, as defined in the Lock-free Schema Change topic.

Note: When building an entity object structure, a top entity object type can be global revisable, while child entity object types are workspace revisable. However, a top entity object type that is workspace revisable can only have child entity object types that are also workspace revisable.

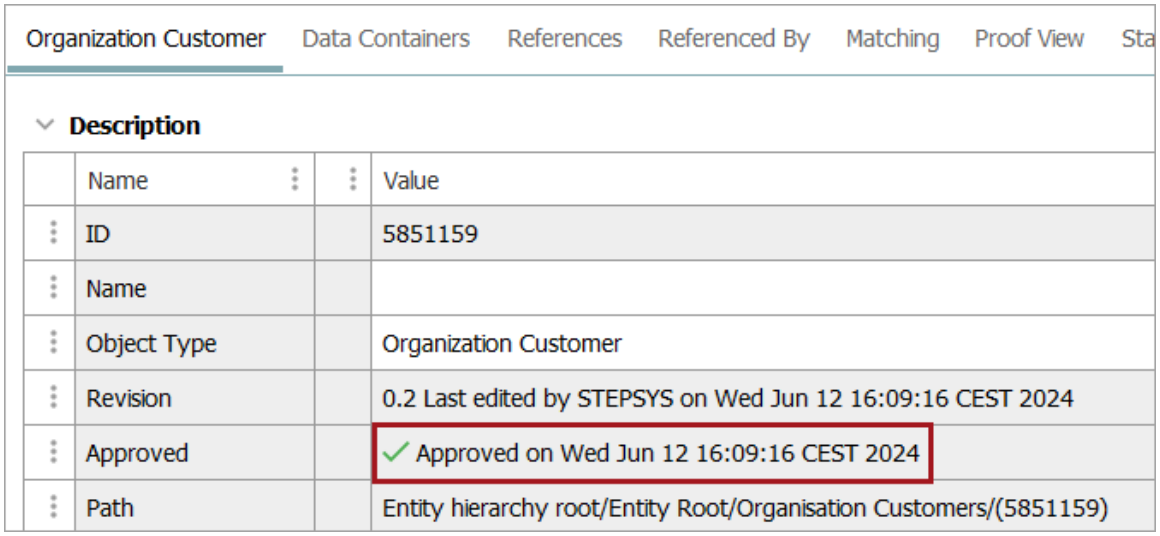
- Global revisable entity values display identically in all workspaces and do not require approval.



- Workspace revisable entity values display in the workspace where created and must be approved before they can display in the Approved workspace.



Note: Global Revisable is typically selected when the party data is imported into STEP from an upstream system after being reviewed and approved and does not need to be revisited.



The revisability setting also plays a part in determining when events are generated. For more information, refer to the Events section of the System Setup documentation.

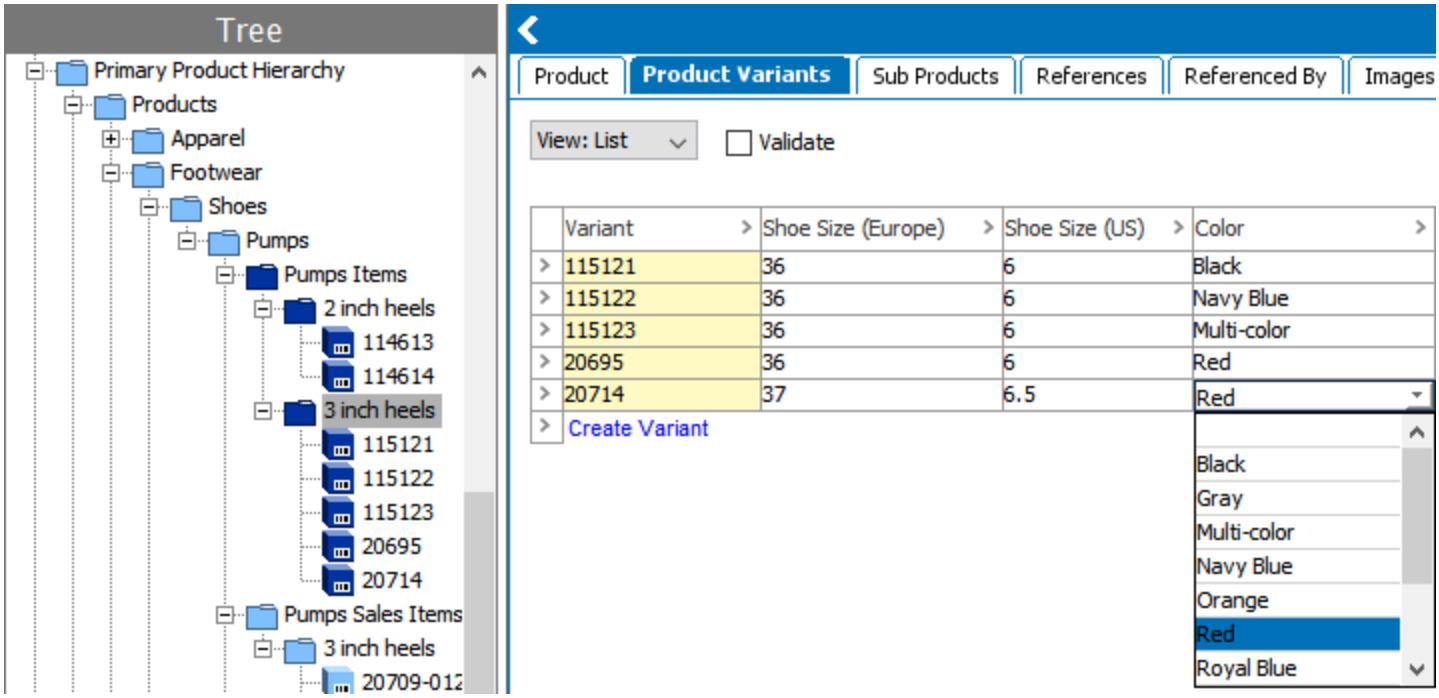
Note: Both global and workspace revisable entity values are under revision control, which allows users to revert to previous revisions and track the changes made to the entities over time.

Product Variants

A product variant family is a group of products where the members are considered to be the same product except for variations in the predefined attributes.

For example, clothing and shoes both offer good use cases for product variants as those items may come in multiple sizes and colors but are otherwise identical. The product family holds all data for the item, e.g., a particular shoe, while the variants hold only the combinations of the color and size varieties (e.g., size 7 red, size 8 blue, etc).

The following image shows this concept.



The Product Variants tab is not available by default as there is configuration required to determine where variants should be enabled and what attributes should be considered variant attributes for each category of objects.

Important: Any attributes that are considered variant attributes cannot be multivalued.

To configure a system for product variants, refer to the **Setting Up Product Variants** topic in this guide.

For working with variants, refer to the following topics:

- Products Variants List in Workbench
- Products Variants List in Web UI
- Product Variants Matrix in Workbench
- Product Variants Matrix in Web UI
- Business Condition: Validate Product Variant in the Business Rules documentation

Setting Up Product Variants

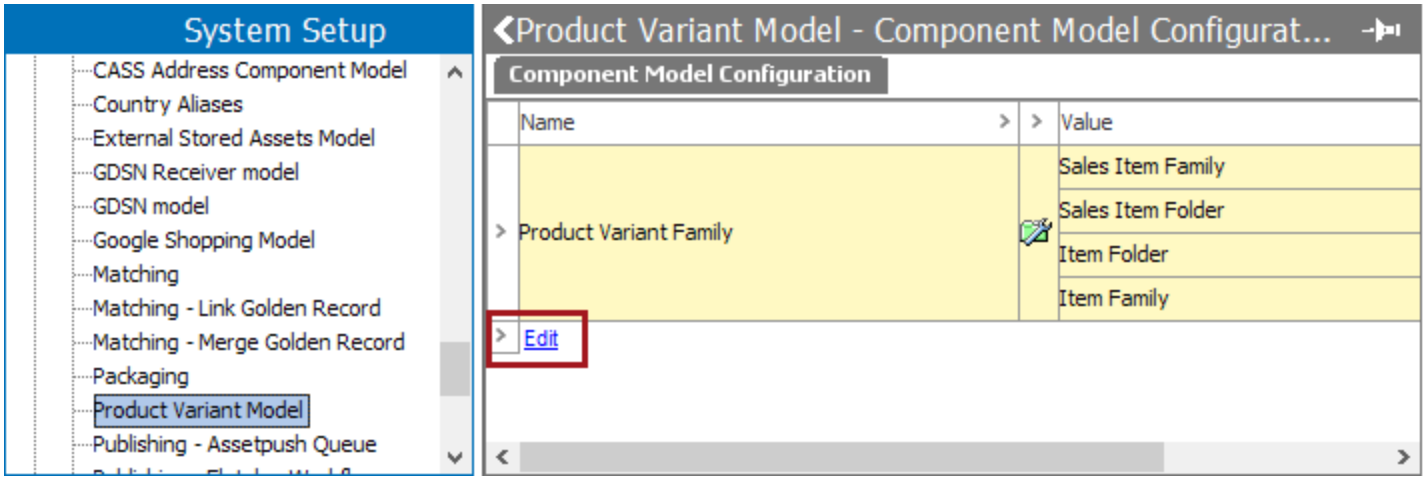
To set up product variants, complete the following steps as defined in the sections below:

- Add the object types to the component model.
- Create product variant priority attribute.
- Specify variant and non-variant attributes.

Add the Object Types to the Component Model

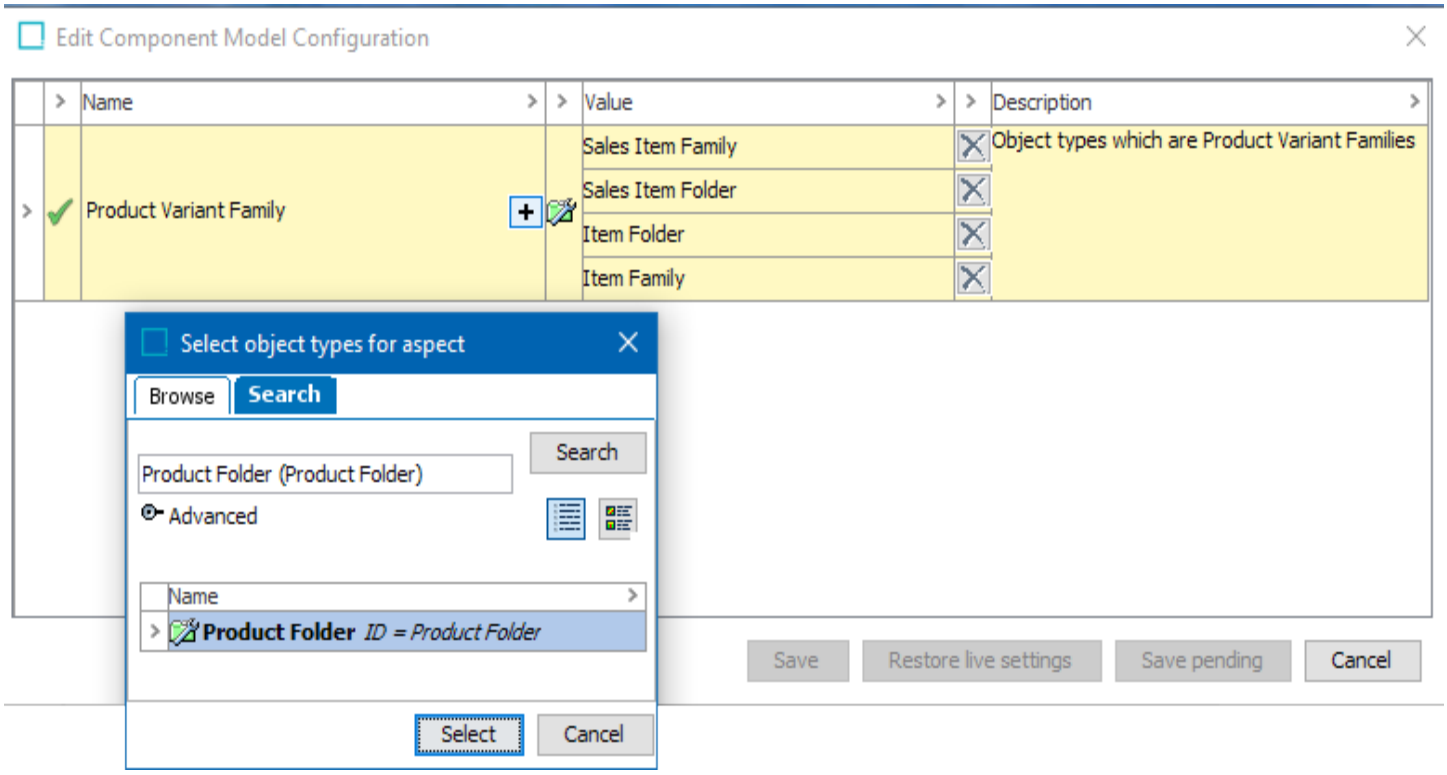
The object type of the parent folder must be added to the component model to enable the product variant capabilities and display the Product Variants tab in the product editor on Tree.

1. In System Setup, expand the Component Models node, and select **Product Variant Model**.
2. On the 'Component Model Configuration' tab, click the **Edit** link.

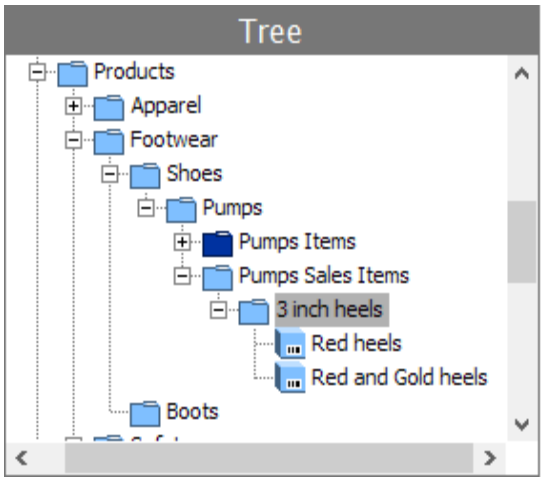


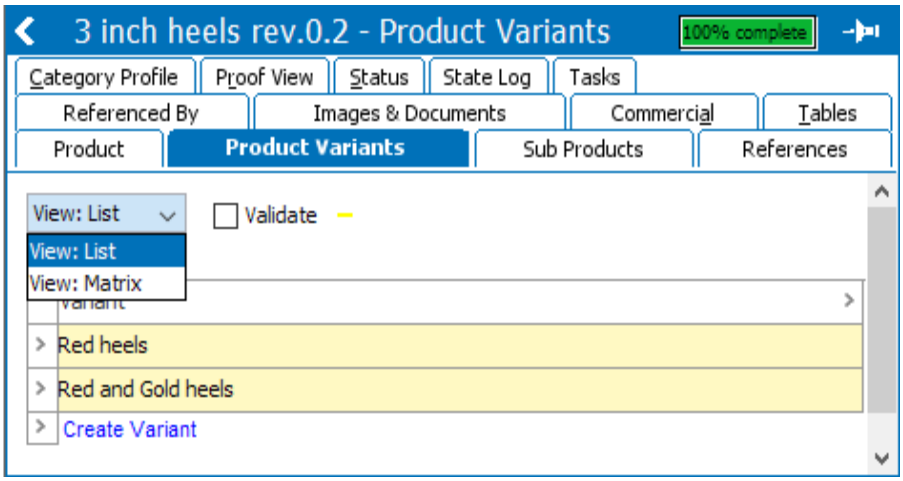
3. In the 'Edit Component Model Configuration' dialog, double-click the plus sign (), choose the object type(s) of the parent folder(s) and click the **Select** button. The parent object types selected are the levels that will house individual items and be used to display the actual item object types.

   When all object types have been added, click **Save** to create a 'Product Variants' tab on all products of the selected object types.



On Tree, select an object that has been added within the Product Variant Model component model and click the 'Product Variants' tab. As shown below, the **List** view and the **Matrix** view are available, but no attributes are displayed until a variant priority attribute is created as defined in the next section.

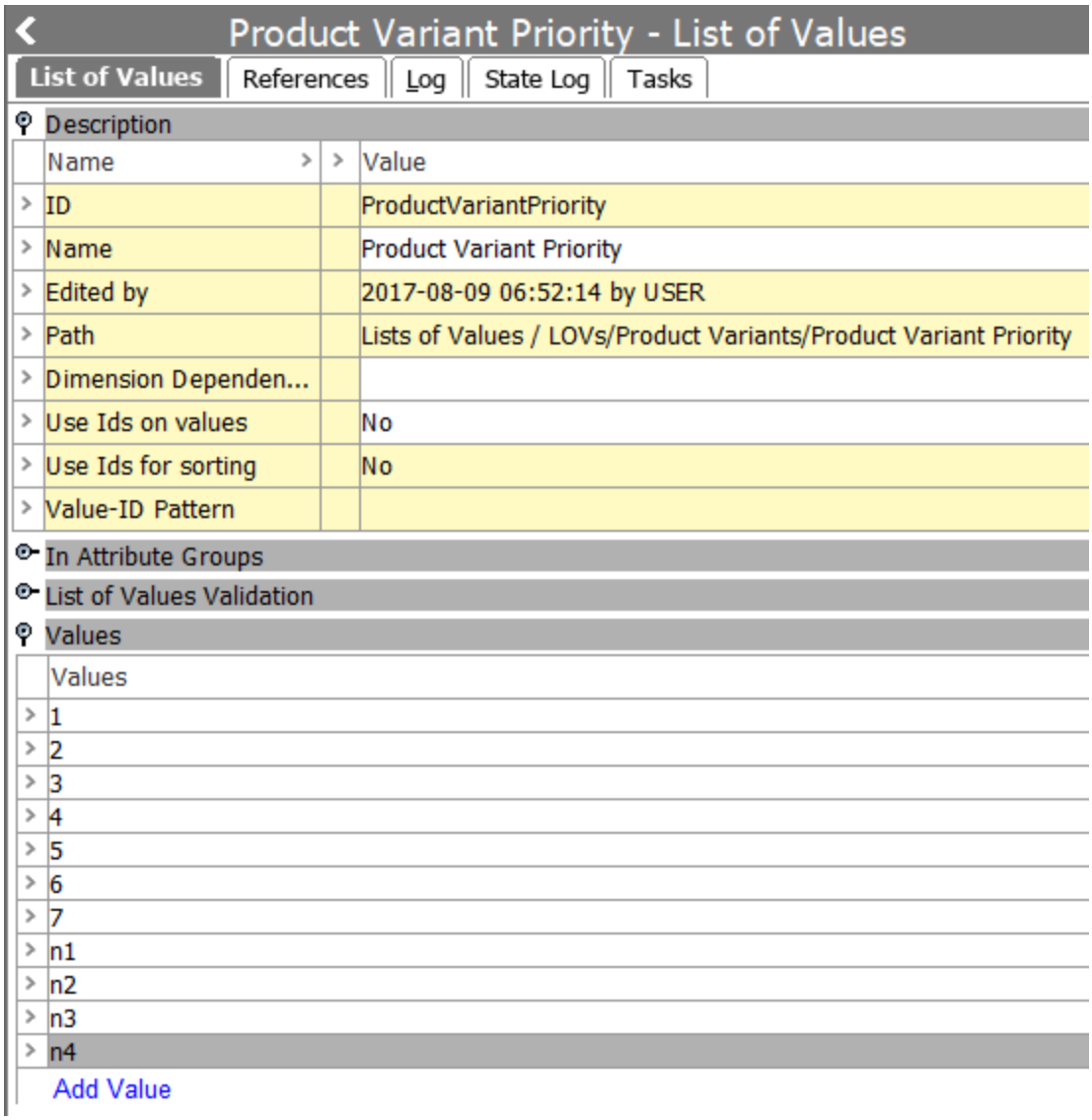




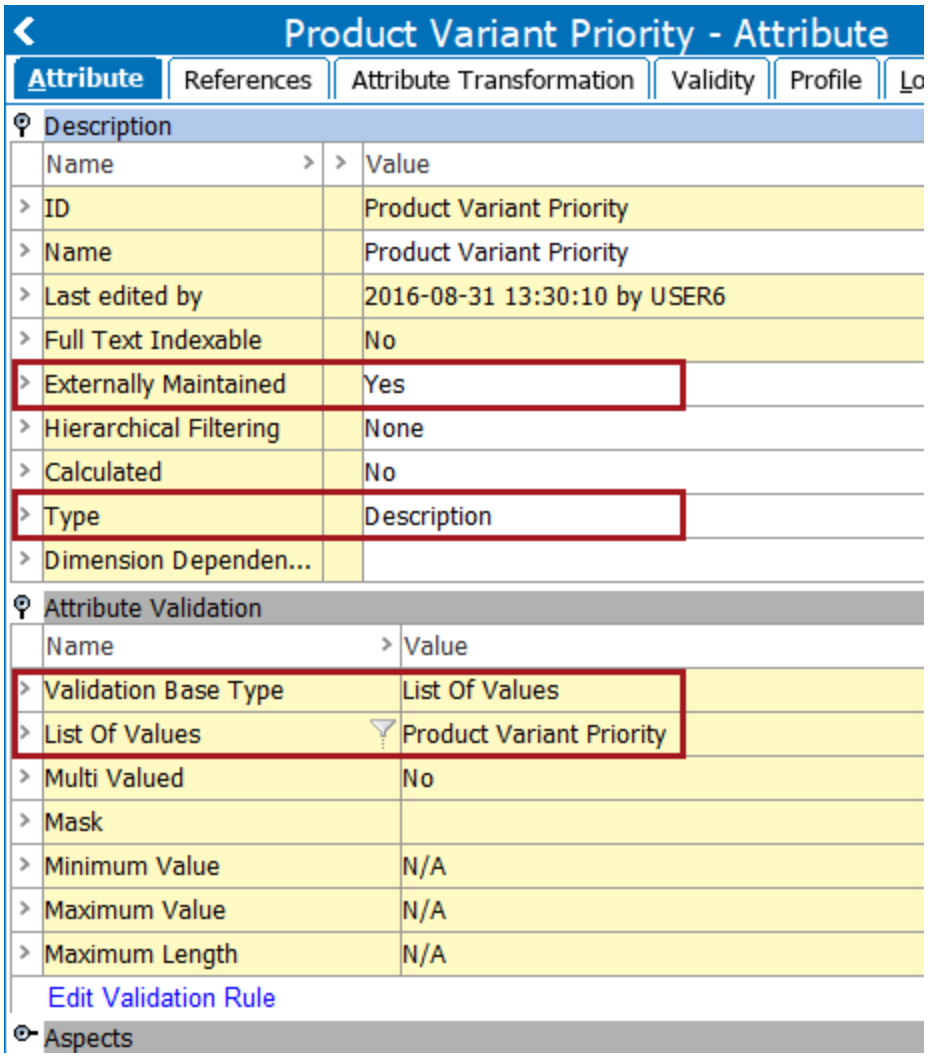
Create a Product Variant Priority Attribute

The priority metadata attribute lives on the link from the parent to the variant and non-variant attributes and allows you to define the order of the attributes.

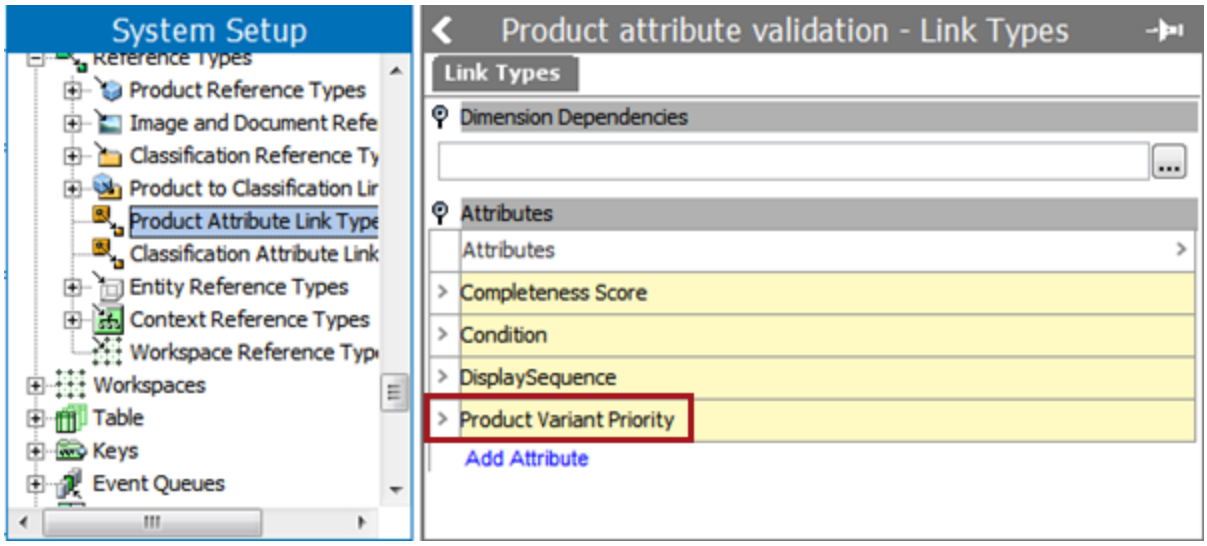
1. Create an LOV with numbers and 'n'-prefixed number values.



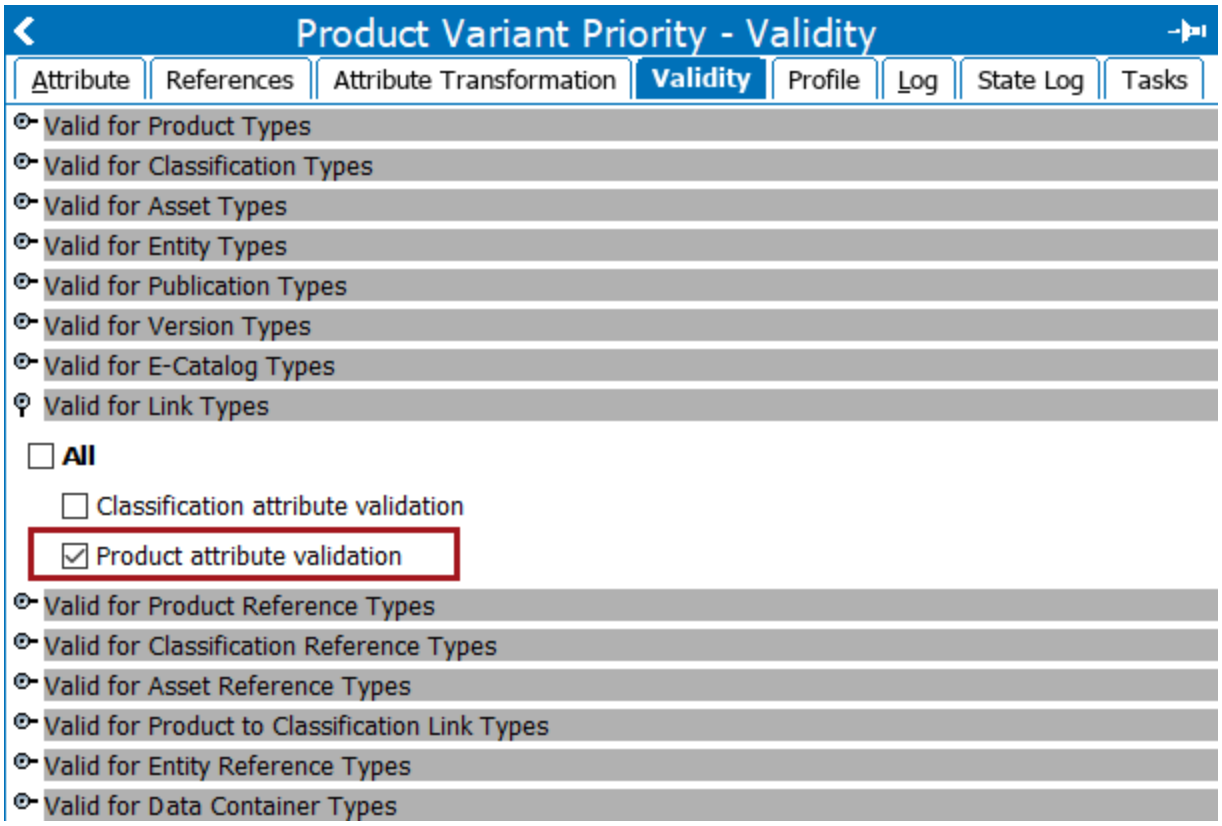
2. Create an externally maintained description attribute, choose List Of Values as the validation base type, and assign the LOV created above.



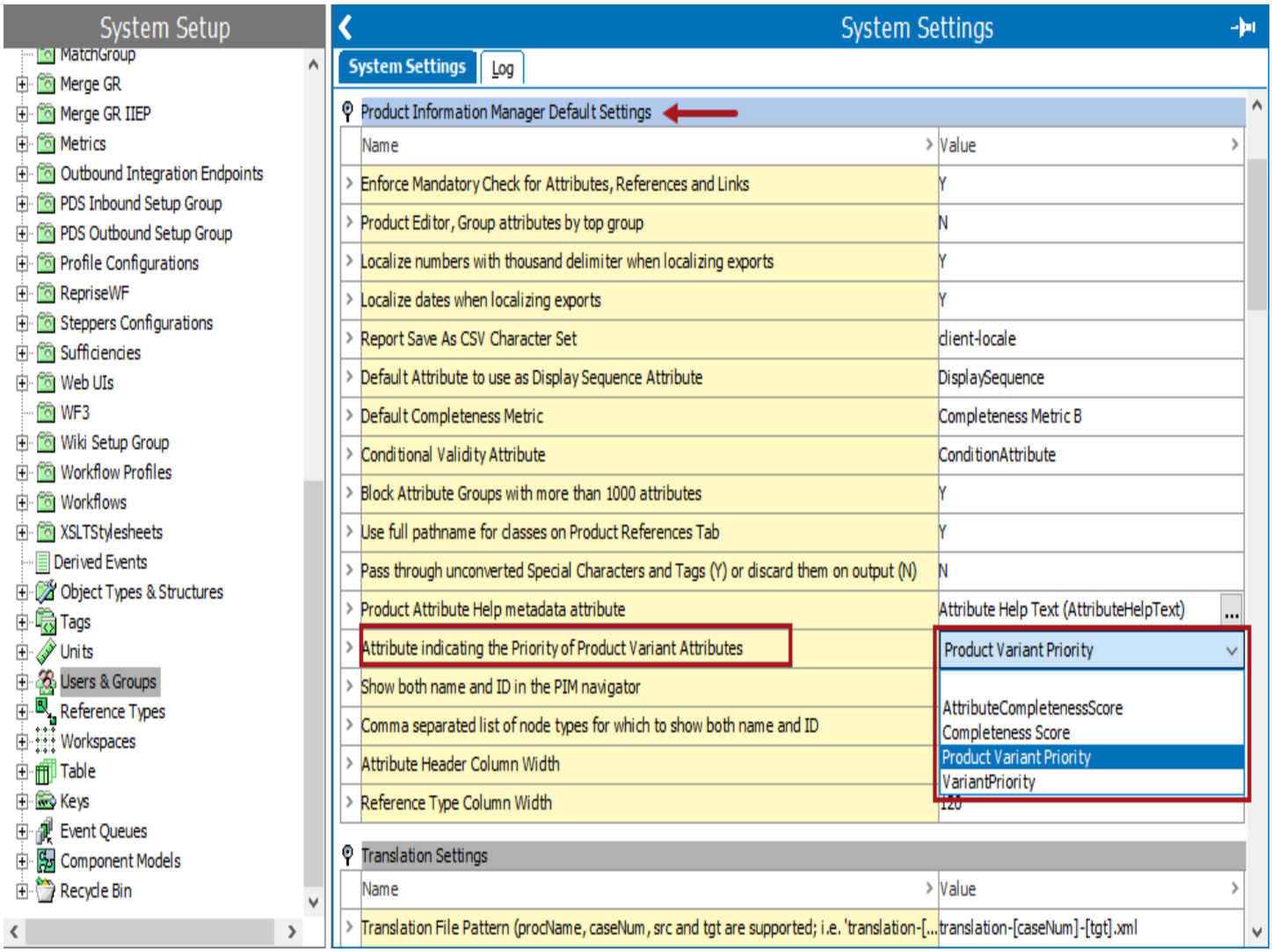
3. In System Setup, expand the Reference Types node, select **Product Attribute Link Type**, and then add the attribute created above. This makes the priority attribute available on the valid objects within the References tab under the Linked Attributes from Product Hierarchy flipper.



This can also be achieved from the attribute Validity tab under the 'Valid for Link Types' flipper by selecting the 'Product attribute validation' checkbox.



4. In System Setup, select the Users & Groups node, open the 'Product Information Manager Default Settings' flipper, and select the new attribute from the **Attribute indicating the Priority of Product Variant Attributes** dropdown.



Specify Variant and Non-variant Attributes

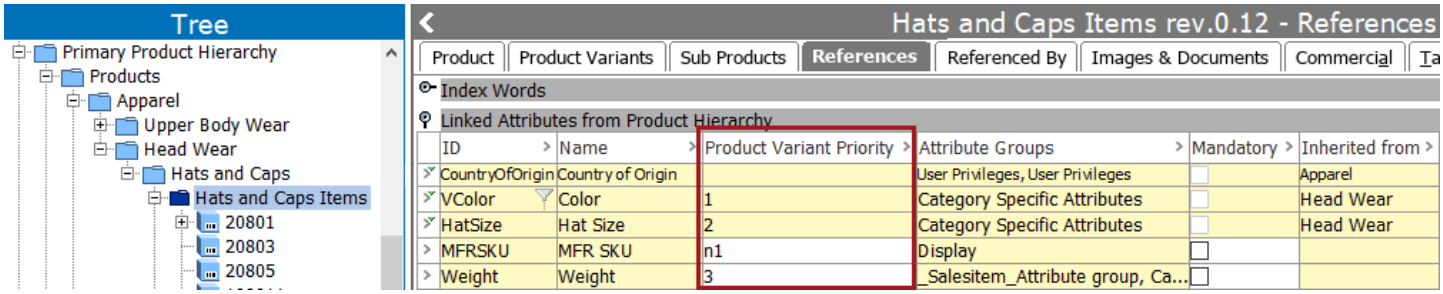
To specify which values are considered to determine variants, you use the variant priority metadata attribute created above. The metadata attribute must be valid on the link from the parent folder to the variant attributes. This way, each linked attribute can be attached with a number indicating that the attribute is a variant attribute and specifying where in the related views the attribute is shown.

Attributes linked from a product variant family are categorized into three groups:

- **Variant attributes:** A variant priority attribute value is a number: 1, 2, 3, ...
- **Non-variant attributes:** The variant priority attribute value is a number prefixed with the text "n": n1, n2, n3, ...
- **Regular attributes:** The variant priority attribute is empty.

Important: Product variant attributes cannot be multivalued.

In the example below, the variant priority attribute on the link from 'Hats and Caps Items' to Color is 1, from 'Hats and Caps Items' to Hat Size is 2, and from 'Hats and Caps Items' to Weight is 3. This indicates that Color, Hat Size, and Weight are **variant attributes** and that they will display in that order.



As created in the previous step, the variant priority attribute value on a linked attribute can also be a number prefixed with an 'n' (e.g., 'n1' or 'n2'). This specifies that the linked attribute is a **non-variant attribute** and is visible in the views related to variant attributes. However, for validation, deduplication, and variant creation, it is not considered a variant attribute. In the example above (which is also continued below), the link from 'Hats and Caps Items' to MFR SKU is 'n1', which indicates that the SKU is shown in the views, but it is not used to distinguish variants.

The **regular attribute** Country of Origin is linked from 'Hats and Caps Items' but has no value for the variant priority attribute, which indicates that is not used for variants.

Note: Set the variant priority as high in the hierarchy as possible to reduce the setup and maintenance effort.

Choose a method to identify the variant and non-variant attributes.

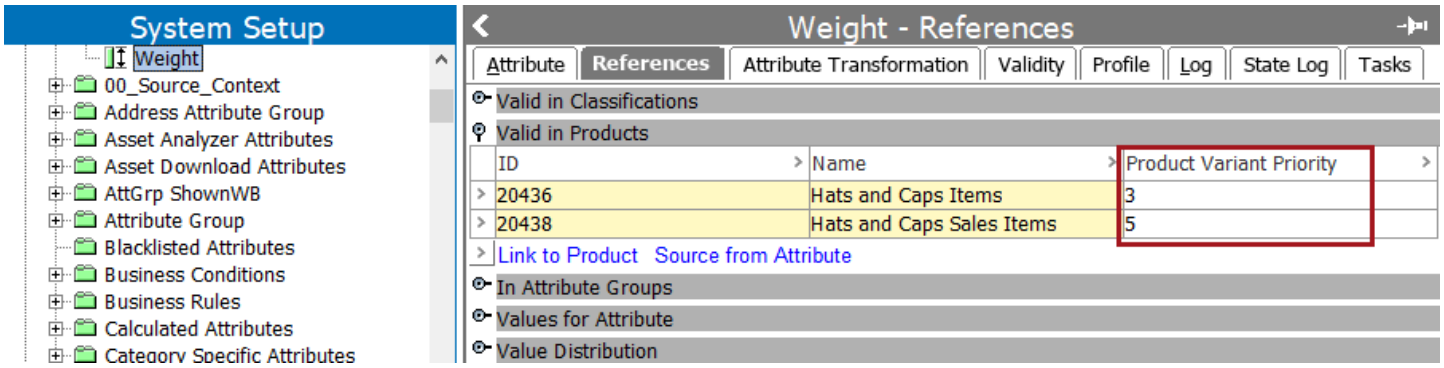
To display the priorities for all attributes that impact variants on the family (as shown in the image above):

1. In the Tree, expand the 'Primary Product Hierarchy' and select the relevant product folder configured for variants.
2. Click the **References** tab.
3. In the 'Linked Attributes from Product Hierarchy' flipper, specify the display priority of the linked attributes using the attribute created previously.

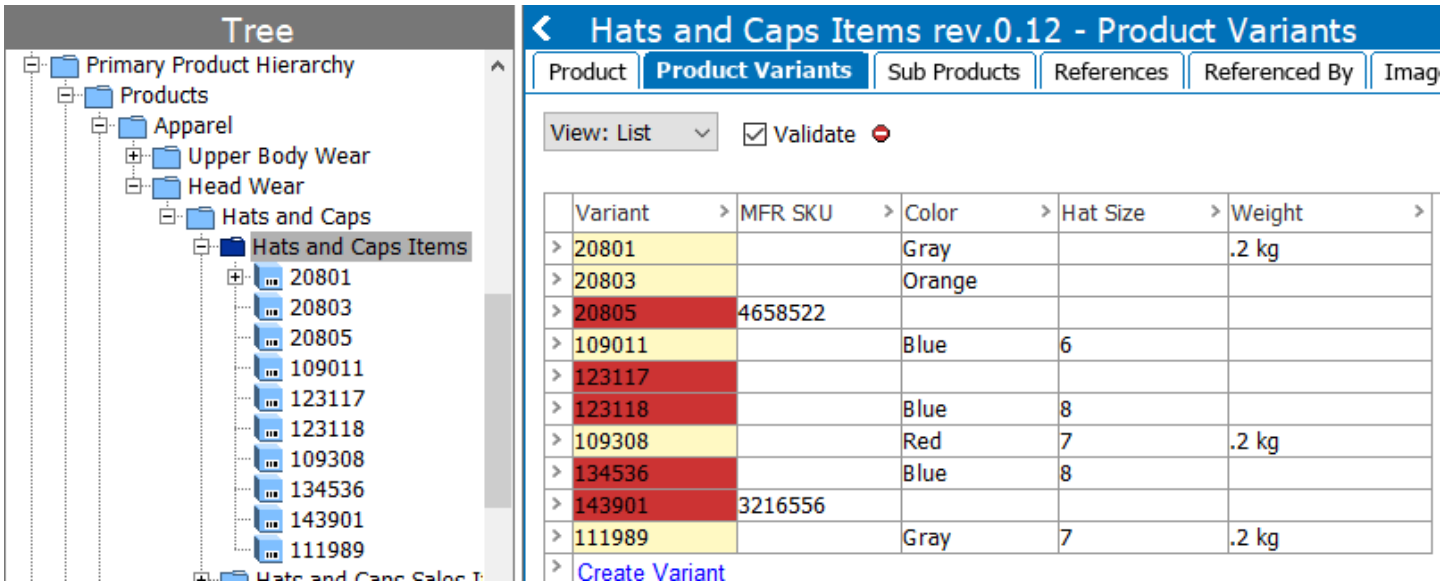
Or

To display the priorities based on attribute, which may include multiple variant families (as shown in the image below):

1. In System Setup, select an variant attribute.
2. Click the **References** tab and open the 'Valid in Products' flipper.
3. Assign the priority for each product family using the Product Variant Priority attribute.



In the following image, the results of the Product Variant Priority settings above are displayed on the Product Variant tab using the list view.



Refer to the following topics for information on viewing variants as a list or a matrix:

- Products Variants List in Workbench
- Products Variants List in Web UI
- Product Variants Matrix in Workbench
- Product Variants Matrix in Web UI

Products Variants List in Workbench

The List view is an overview of all variant products and the variant attribute values. This view also allows you to create and delete variants and modify variant values.

In the list view, one product variant ID is displayed on a row, and the value for the variant attributes are shown in the columns. After validating the data, potential duplicate product IDs are displayed with a red background, and hover text shows all product variant IDs that match the selected attributes.

Note: Product variant attributes cannot be multivalued.

For a more advanced view, use the matrix view as defined in the **Product Variants Matrix in Workbench** topic.

To view variant information in the Web UI, refer to the **Products Variants List in Web UI** topic or the **Product Variants Matrix in Web UI** topic.

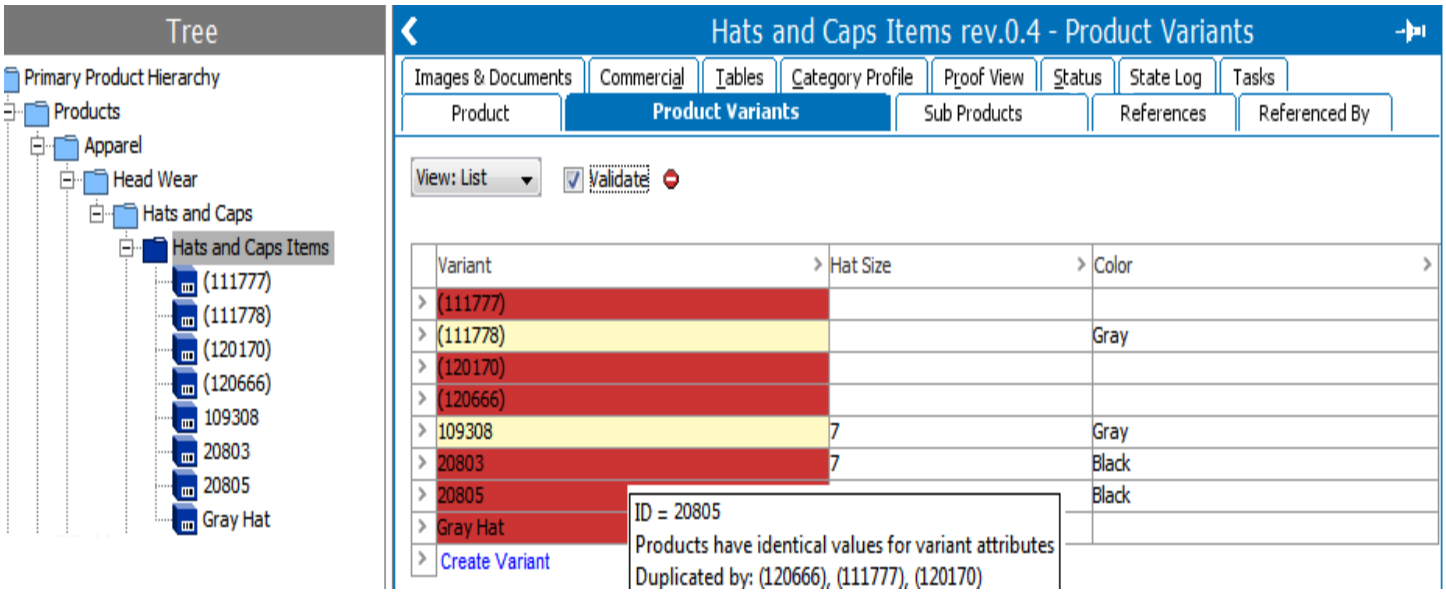
Prerequisite

Before using a product variant view, you must complete the steps in the **Setting Up Product Variants** topic.

Use the List View

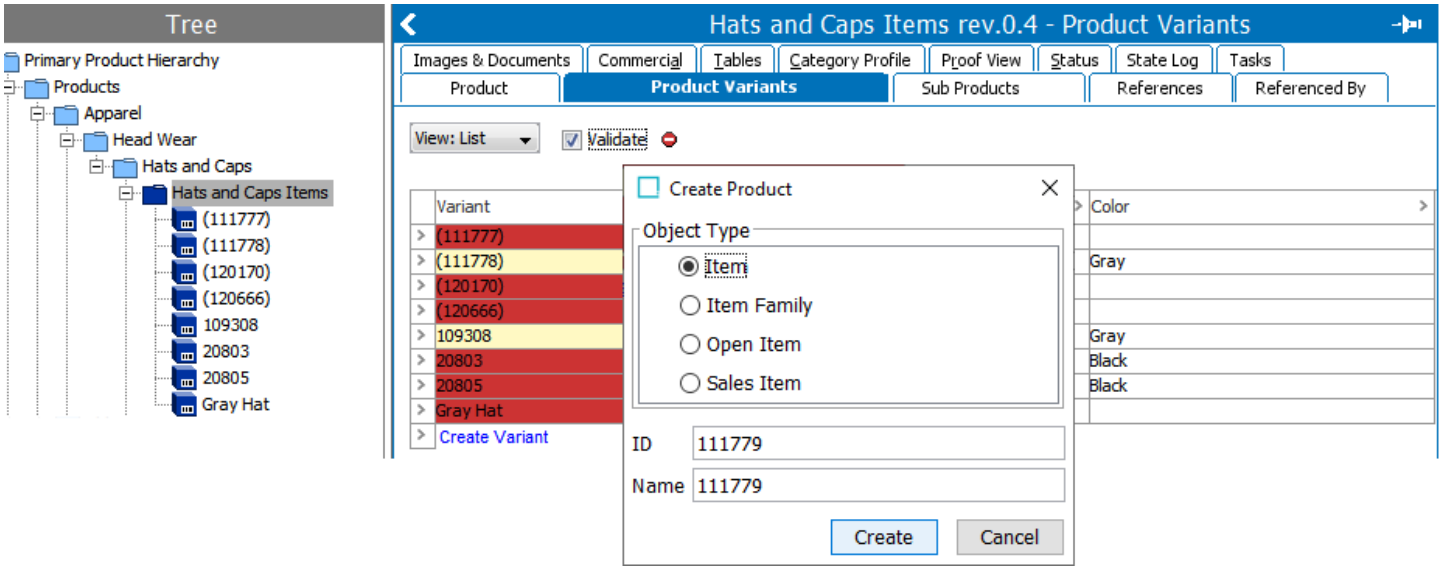
1. In the Tree, select a relevant product parent node that is configured for variants.
2. Click the Product Variants tab, and select **View: List** from the dropdown.
3. Check **Validate** checkbox to view the following information:
   - The possible duplicate variants highlighted in red indicate that at least one other ID has the same values for the variant attributes, including empty values.
   - Hover over a product variant ID to display the ID as a hyperlink. Click the link to display the editor for the product.
   - Hover over a product variant ID to display information about its variant values, non-variant values, and possible duplicates.

Important: While the Validate box is checked, updates are made to the display and hover text as data is changed. Once the checkbox is cleared, no additional updates are displayed.



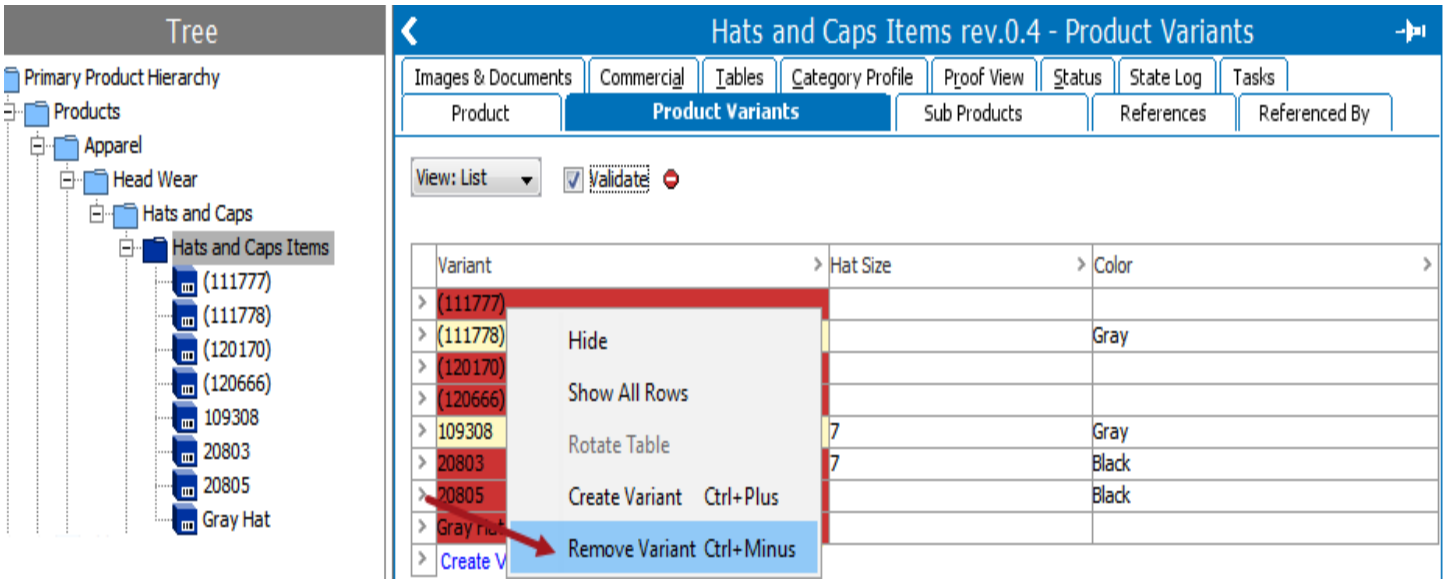
Create a Variant

To manually create a variant, click the Create Variant link, and then complete the parameters on the Create Product dialog. The typical way to create variants is to import them to the parent node.



Delete a Variant

To delete a variant, click the arrow to the left of the row, and then choose **Remove Variant**. A confirmation dialog is displayed and the user can delete the variant or cancel the process.


Tree
Primary Product Hierarchy
Products
Apparel
Head Wear
Hats and Caps
Hats and Caps Items
(111777)
(111778)
(120170)
(120666)
109308
20803
20805
Gray Hat
Hats and Caps Items rev.0.4 - Product Variants
Images & Documents
Commercial
Tables
Category Profile
Proof View
Status
State Log
Tasks
Product
Product Variants
Sub Products
References
Referenced By
View: List
Validate
Variant
Hat Size
Color
(111777)
(111778)
(120170)
(120666)
109308
20803
20805
Gray Hat
Create V
Hide
Show All Rows
Rotate Table
Create Variant Ctrl+Plus
Remove Variant Ctrl+Minus
Gray
7
7
Black
Black

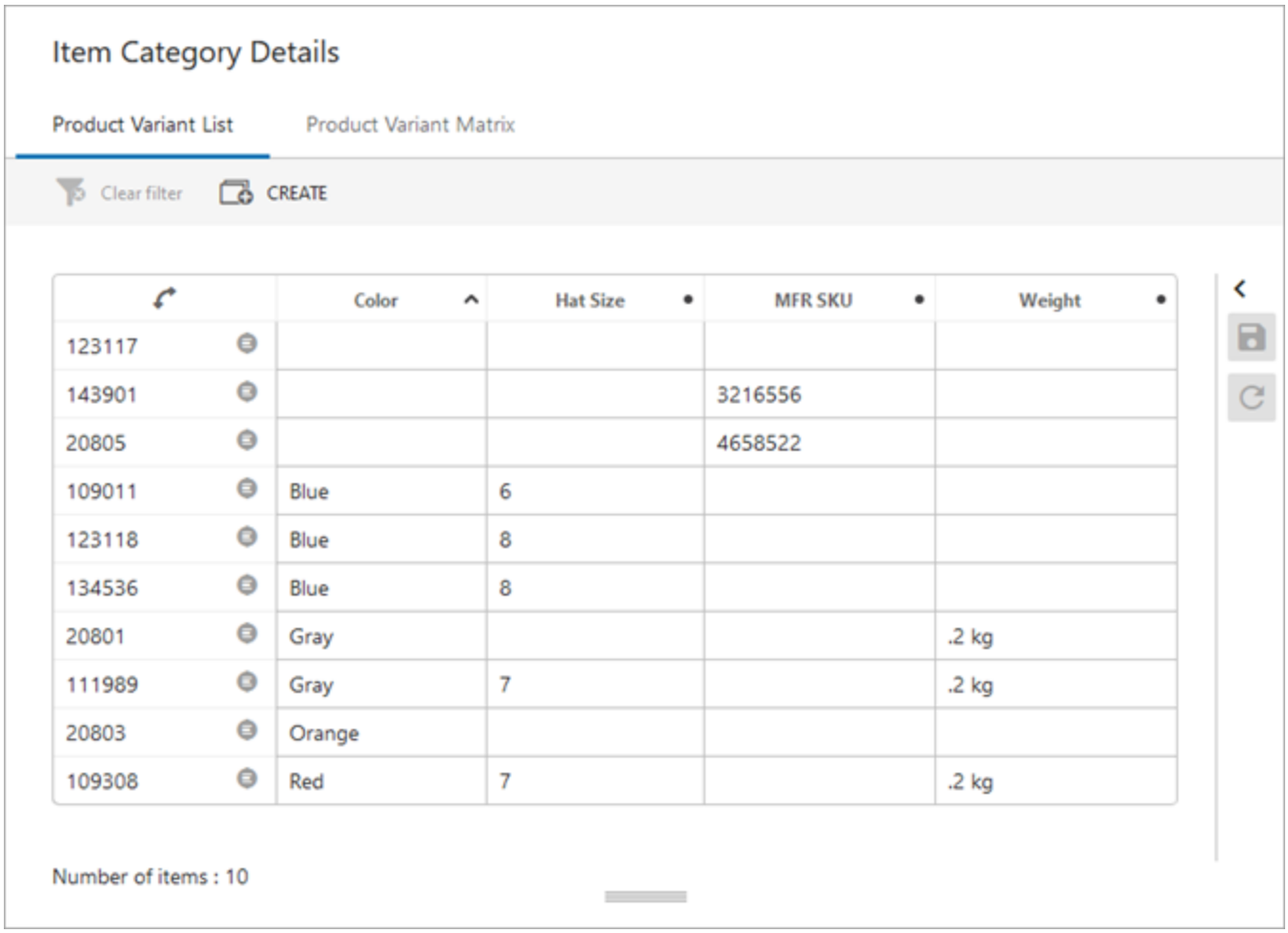
Products Variants List in Web UI

The List view is an overview of all variant products and the variant attribute values. This view also allows you to create and delete variants and modify variant values.

Note: Product variant attributes cannot be multivalued.

In the list view, one product variant ID is displayed on a row and the value for the variant attributes are shown in the columns.

The configured Product Variants List tab page is shown in the following image:



For a more advanced view including the ability to display the duplicates, use the matrix view as defined in the **Product Variants Matrix in Web UI** topic.

To view variant information in the workbench, refer to the **Products Variants List in Workbench** topic or the **Product Variants Matrix in Workbench** topic.

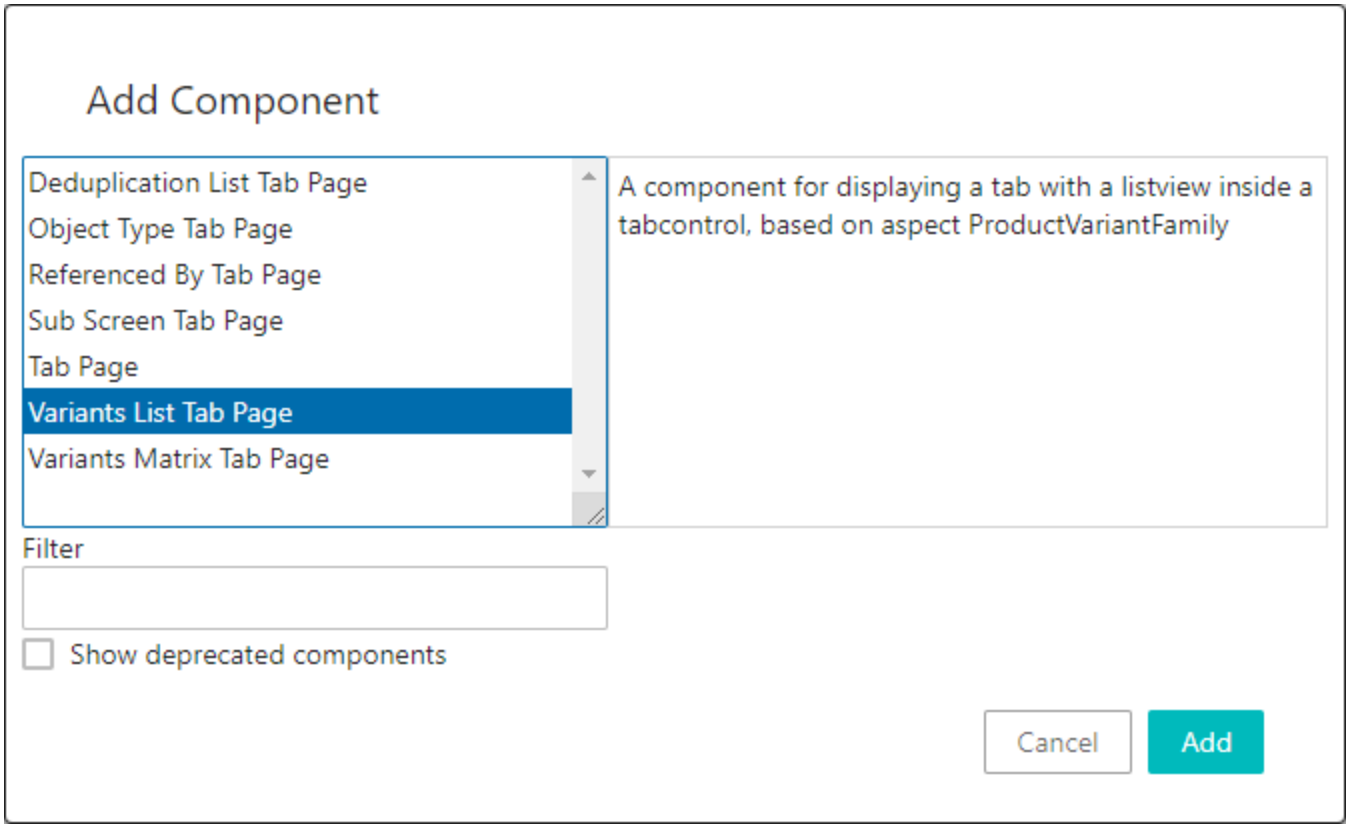
Prerequisite

Before using a product variant view, you must complete the steps in the **Setting Up Product Variants** topic.

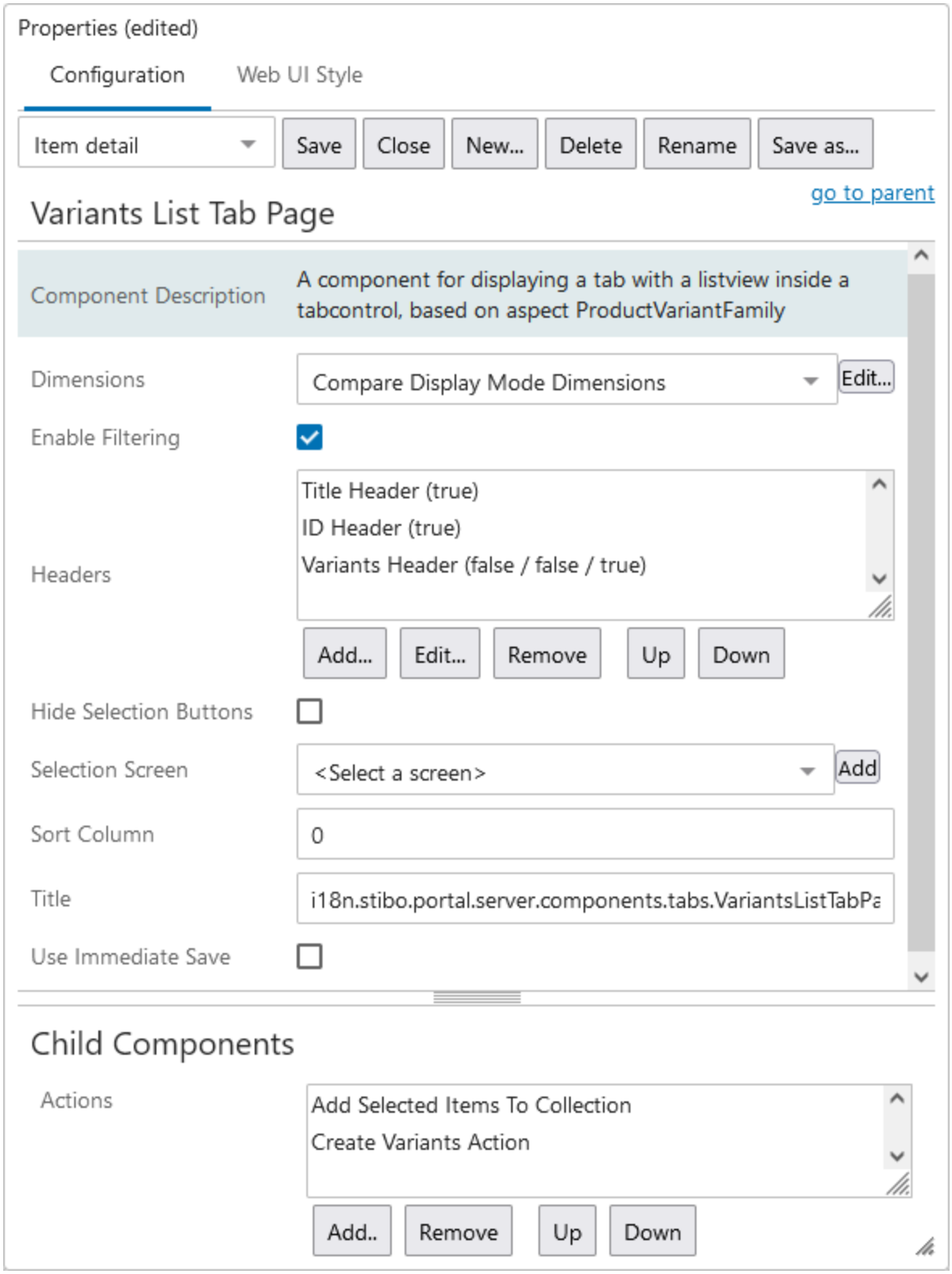
Configure Product Variants List

Use the following steps to display a product variants list view.

1. In Web UI, product variants can be displayed using the **Variants List Tab Page**. You can insert it into a **Tab Control** on a **Node Details** screen using the Child Components 'Main' parameter. For more information, refer to the **Design Mode Basics** topic and the **Node Details Screen** topic in the **Web User Interfaces** documentation.



2. Once added to the Node Details screen, double-click the Variant List Tab Page component to set the configuration parameters.


Properties (edited)
Configuration
Web UI Style
Item detail
Save
Close
New...
Delete
Rename
Save as...
go to parent
Variants List Tab Page
Component Description
A component for displaying a tab with a listview inside a tabcontrol, based on aspect ProductVariantFamily
Dimensions
Compare Display Mode Dimensions
Edit...
Enable Filtering
Headers
Title Header (true)
ID Header (true)
Variants Header (false / false / true)
Add...
Edit...
Remove
Up
Down
Hide Selection Buttons
Selection Screen
<Select a screen>
Add
Sort Column
0
Title
i18n.stibo.portal.server.components.tabs.VariantsListTabPa
Use Immediate Save
Child Components
Actions
Add Selected Items To Collection
Create Variants Action
Add..
Remove
Up
Down

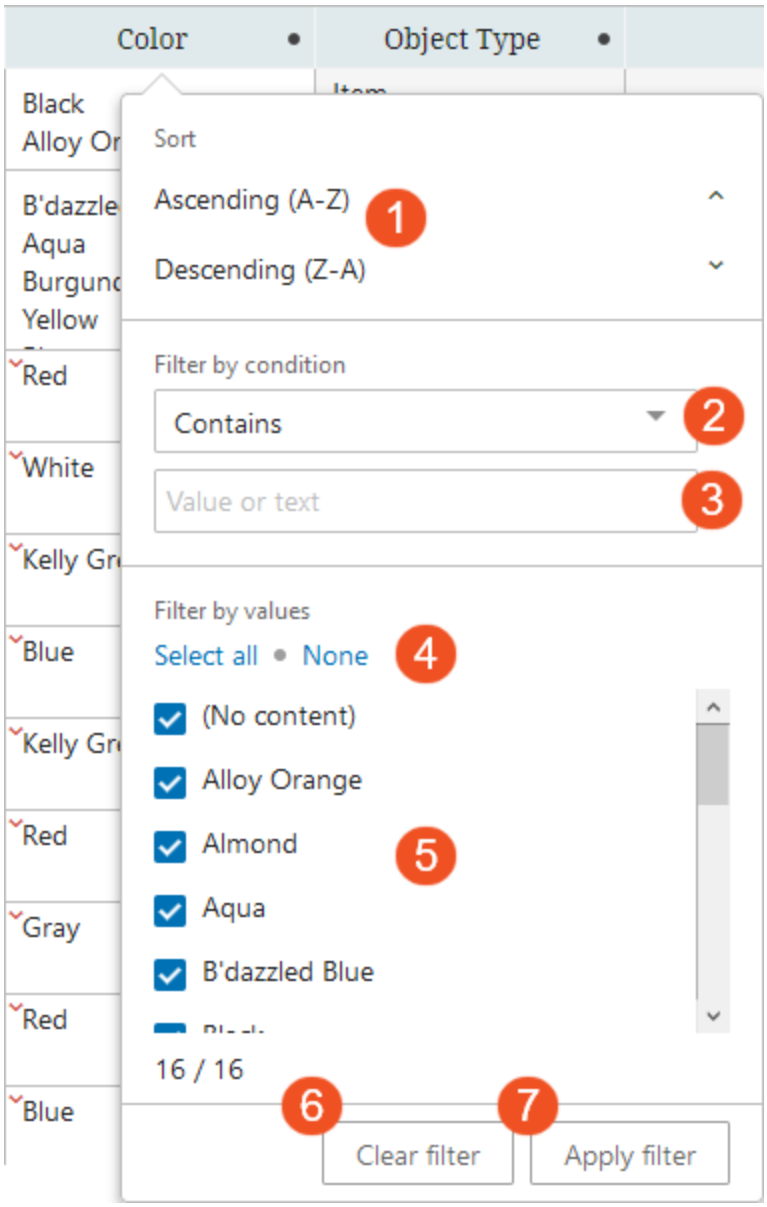
Dimensions

This option may change the standard sheet dimensions.

Enable Filtering

When the Enable Filtering option is selected on this component, the ability to filter based on attribute values is enabled.

To apply a filter, click anywhere in a column's header. This brings up the sorting and filtering window highlighted in the screenshot below:



Referencing the numbered elements in the above screenshot to the corresponding numbers in the list below, functionality in the filtering window enables users to:

1. Sort the attributes in either ascending (^) or descending (˅) alphabetic order.
2. Filter the linked attributes by a condition to show only attributes that:
   - 'Begins with' - The filter value begins with one or a sequence of character.
   - 'Contains' - The filter value contains one or a specific sequence of characters. This value may appear anywhere within a value string.
   - 'Does not contain' - The filter value does not contain one or a specific sequence of characters, whether in a single-valued or multi-valued cell. This value may appear anywhere within a value string.
   - 'Equals' - The filter value matches a precise set of characters.

- 'Include Only' - This filter option allows users to set a list of values separated by a delimiter, like commas, semicolons, pipes, tabs, or newlines, and if one or more of the items in the list matches, then those rows will be populated. If no items from the list are present in the column, then no results will display.
- 'Wildcard' - This filter value option will display attribute values containing a repeated set of characters that includes known variable characters that can be substituted with an asterisk '*' symbol. Wildcard may be used singularly or multiple times in a filter setting. For more information, refer to the **Wildcard in Searches** section of the **Searching Functionality** topic of the **Getting Started** documentation.

3. With any of the above filtering criteria in place, users may enter their search terms into the **Search** field. As characters are typed into this field, the blue-checked values that display in the filtering menu change to reflect a filtered list of attribute values culled from the column's full list of values. From these, users may select only those attributes they want to display by adding a check beside each.

   The default filter setting is 'Contains.' For the settings 'Begins with,' 'Equals,' and 'Wildcard,' if a user just deselects any value in the search list, then the filter will revert to a 'Contains' filter once it is applied. For the settings 'Begins with,' 'Contains,' 'Equals,' and 'Wildcard,' any values entered that do not meet the filter criteria are removed from the filtered selection. For the setting 'Does not contain,' any rows containing values that do meet the filter criteria are removed from the filtered selection.

   Note: If you are dealing with multi-valued attributes where more than one value is populated, then All Values for that attribute are considered when creating a filter. Excluding one value by a filter does not mean the attribute will necessarily be removed from the view.

4. Click the 'Select all' button to ensure all listed attribute values are checked. Click the 'None' button to deselect all attribute values. When users click 'None', the 'Apply filter' button is grayed out and cannot be selected until at least one of the attribute values is selected.
5. Users may also forgo the filtering and manually select from the full attribute list only those attributes they want to display by adding a check beside each. All values are checked by default.
6. Quickly clear any work you have done in the filtering window by clicking the 'Clear filter' button. The configuration you have applied remains in this filtering window, even if you clear the filter on the actual attribute link table. To clear all filtering, first clear the filter from the table, and then in the filtering window, click the 'Clear filter' button.
7. Apply the configured filter to the attribute link table by clicking the 'Apply filter' button.

   Note: The sorting and filtering option applied in the attribute link editor screen of a product will be applicable only on the current selection. Once the user navigates to a different selection, sorting and filtering applied on the previous selection will be removed.

Note: When a Node List contains more than the configured number of objects (the default maximum being 5,000), sorting and filtering is disabled. This is because when Node Lists contain more than the configured maximum for display, all objects above that maximum will not display. Because sorting and filtering actions applied to the displayed objects will not also apply to non-displayed objects, sorting and filtering is disabled. For example, if an advanced search result contains 10,000 results, and the user clicks a header to sort and filter the Node List based on the values in the column, it will not be obvious that all objects after 5,000 are not included in the filtering, and so the resulting list will not be accurate. When users initiate sorting and filtering on a Node List with more than the configured maximum number of objects, an informational dialog displays

that reads, 'Sorting and filtering on this subset of data would display inaccurate results, so they have been disabled.' This restriction is applied to all display modes that support sorting and filtering, i.e., Multi Edit, Table, and Compare views.

Headers

Use the 'Variant Header' option to display variant attributes on the table component.

Hide Selection Buttons

This option determines if the 'Select All' and 'Clear selections' options are displayed.

Selection Screen

This option determines the screen that will be displayed when one item is selected. If nothing is selected, the details panel will be hidden.

Sort Column

This field sets the starting column for sorting.

Title

This is the title of the configured component.

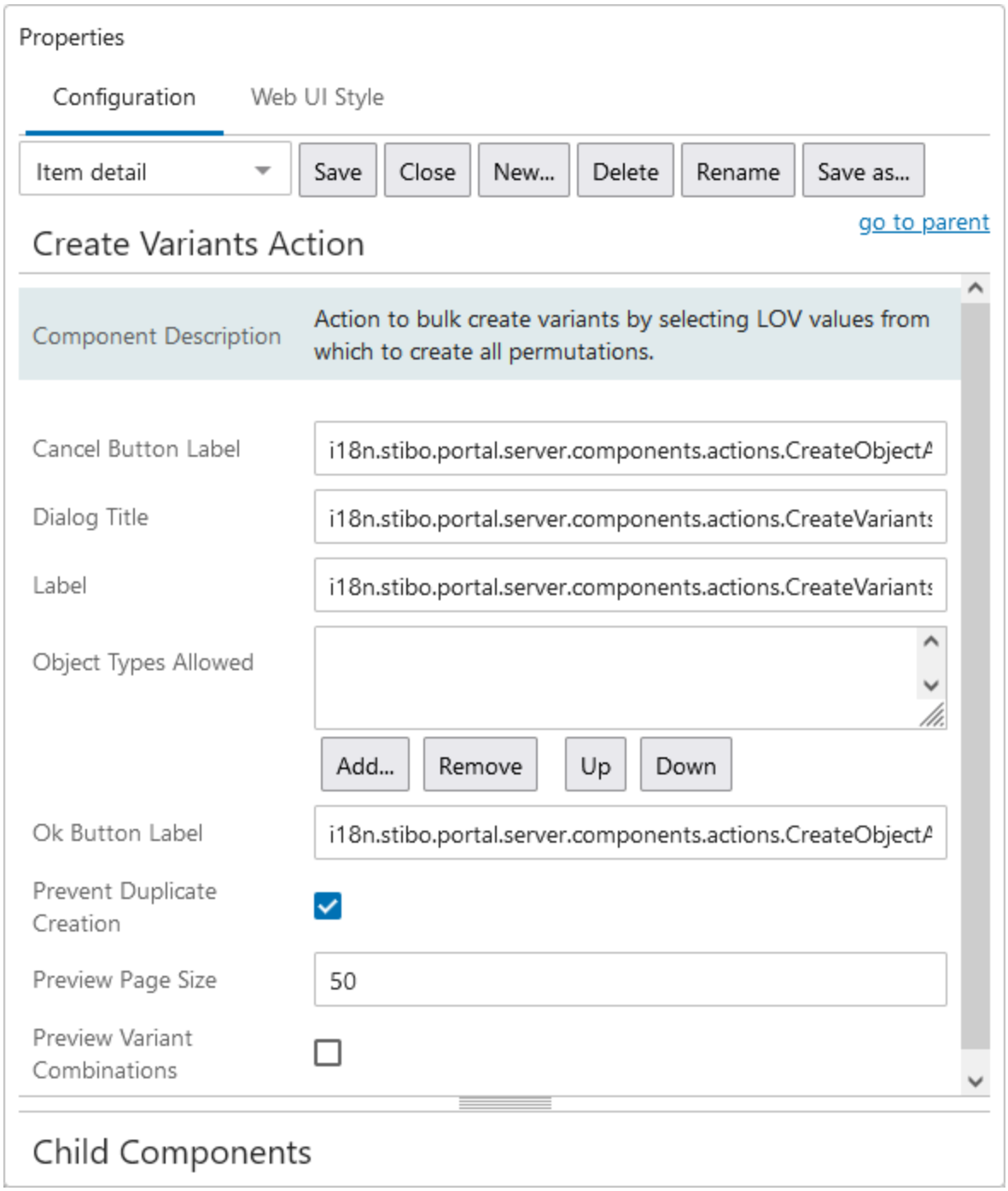
Use Immediate Save

If selected, then STEP will automatically save changes as soon as an edit is performed. Otherwise, the user will need to explicitly save their changes.

Actions

Add the 'Create Variants Action' button if desired. This child component allows for actions to be added for the user to interact with the data. For more information, refer to the **Action Buttons** topic in the **Web User Interfaces** documentation.

If added, configure the 'Create Variants Action'



Prevent Duplicate Creation

When checked, clicking the 'Create Variants Action' button and selecting duplicate variant values displays an error and duplicates are not allowed.

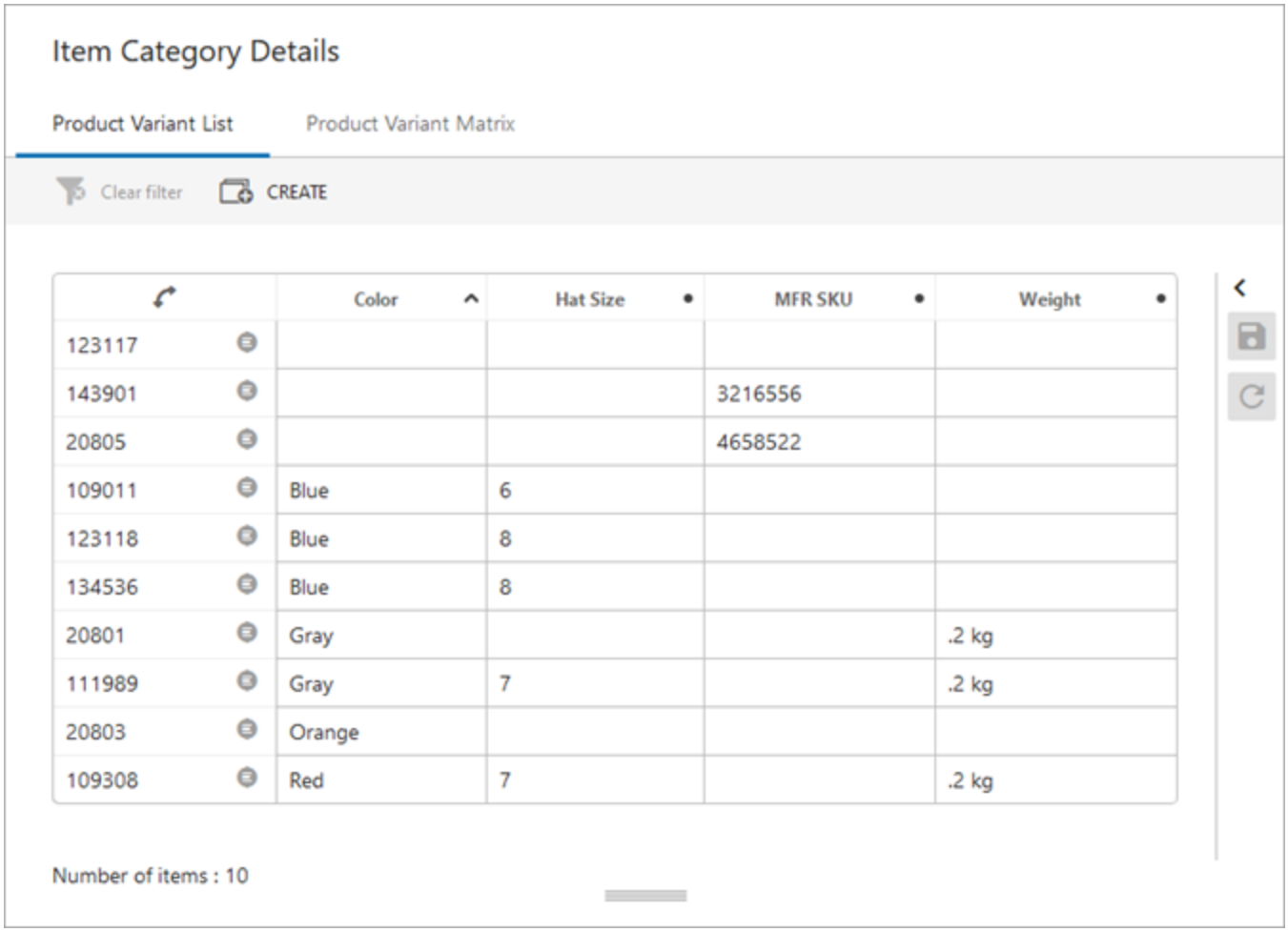
Preview Variant Combinations

When checked, clicking the 'Create Variants Action' button, selecting variant values, and clicking OK opens a Preview dialog with all new variants to be created. The user can click OK to create the items being previewed, or Cancel to return to the create variants dialog.

Note: As with any screen, the Node Details screen with Variants List Tab Page must be mapped appropriately in Main Properties > Mappings for end users to be able to access it.

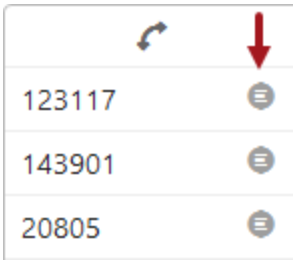
Use the List View

1. In the Tree, expand the Primary Product Hierarchy, and select the relevant product parent node that is configured for variants to display the list.



2. Click the Variants List tab to view the following information:
   - By default, product IDs are displayed in the first column and variant attributes and values are displayed to the right.

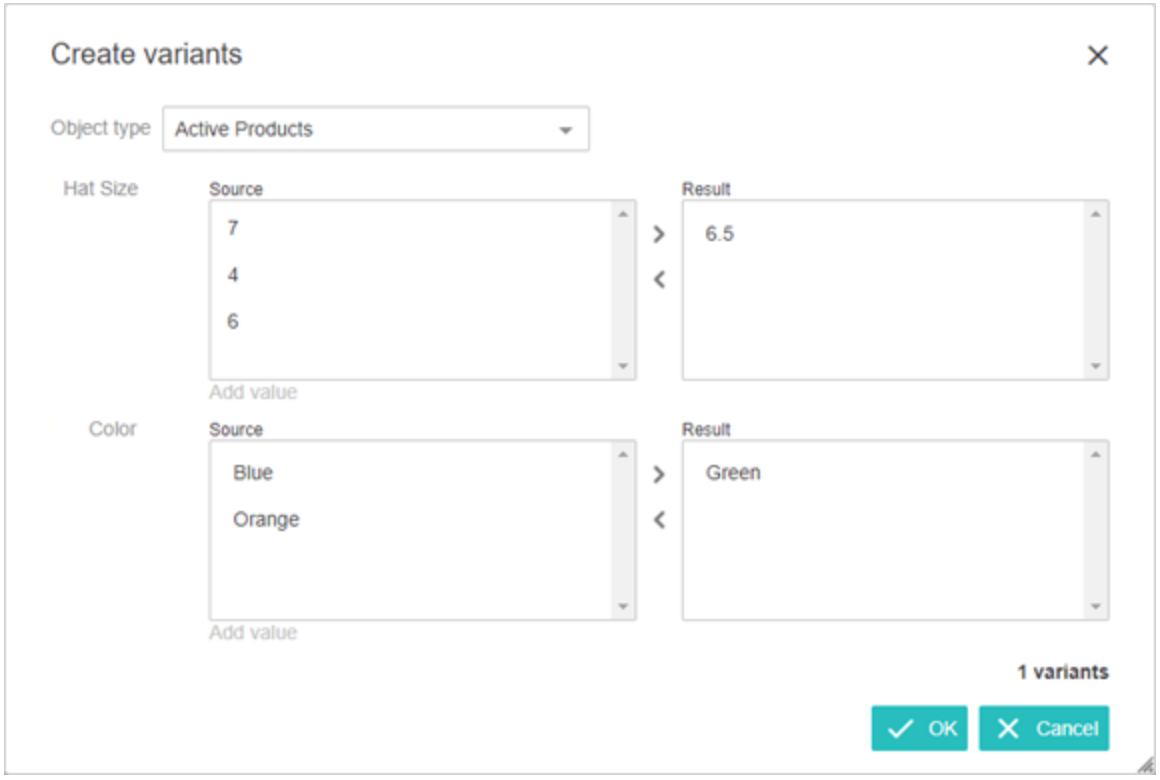
- If a Selection Screen is configured (in the Configure Product Variants List section above), click the details button to the right of an ID to show details for the selected product.



- Double-click into a cell to add a value for the variant attribute. LOV attributes show a dropdown and non-LOV attributes allow you to type directly into the cell.

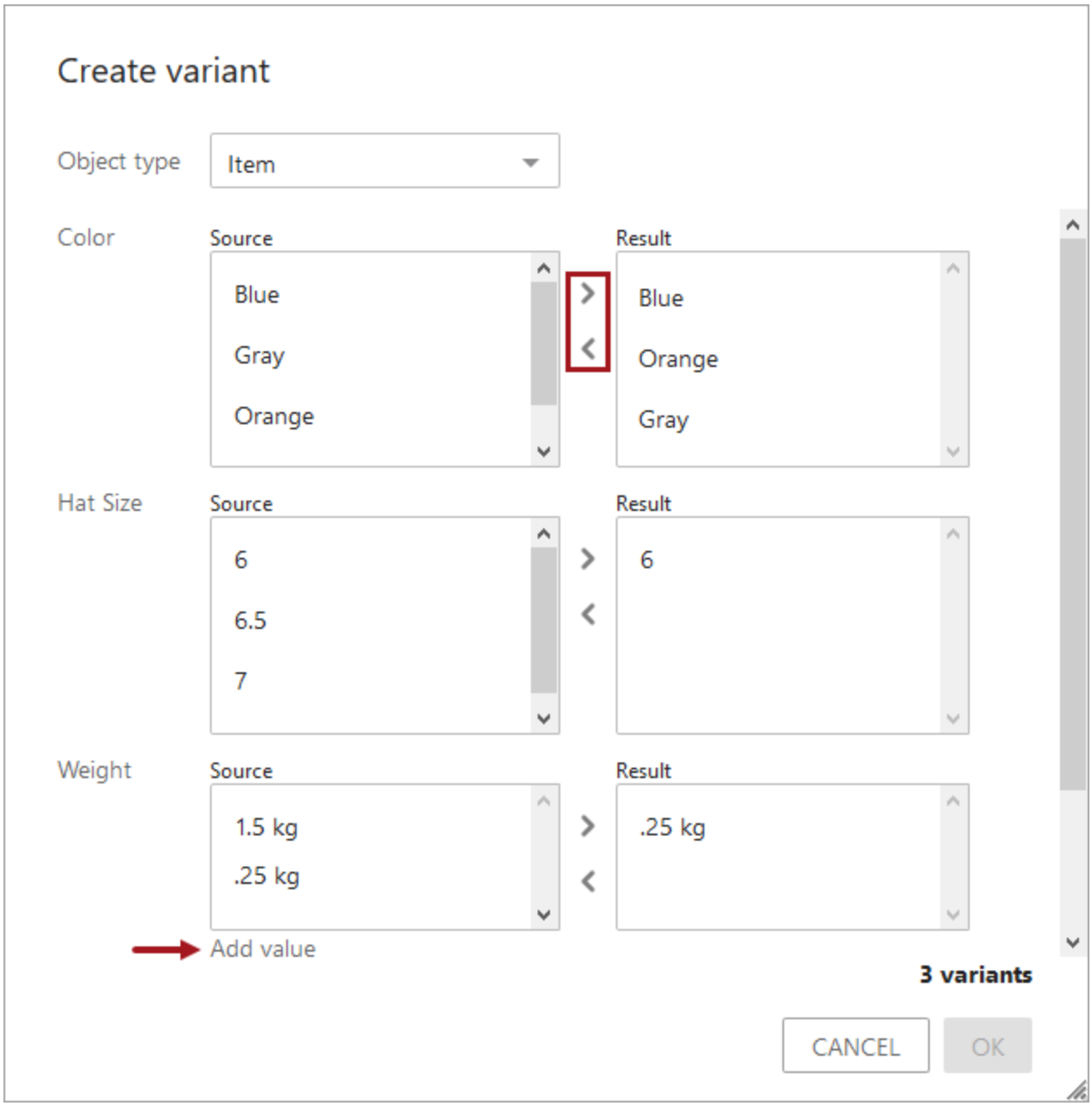
Create a Variant

If added as an Action during configuration, click the 'Create variants' button to display the 'Create variants' dialog. Variant attributes are displayed and values can be added for the selected object type. If the new values match an existing variant, the potential duplicates are shown above the Cancel button. In the following example, one other variant already exists with the selected 'Hat Size' and 'Color' combination selected.

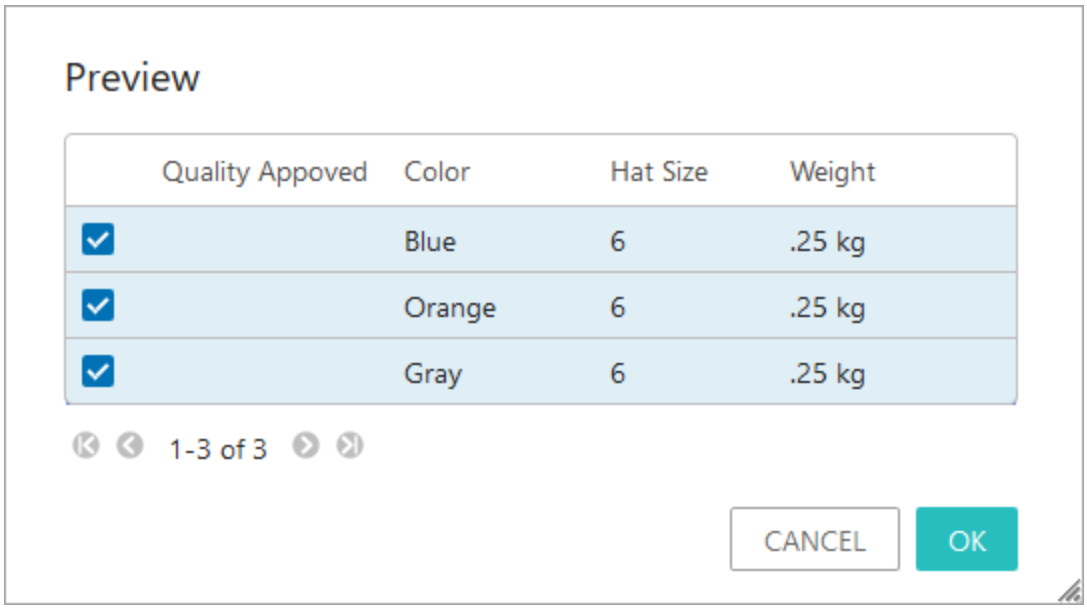


When creating a variant manually (rather than using an import file), note that only variant attributes values are added. Additional values can be added on a product editor screen.

1. Verify an ID pattern for the variant object type is defined. This 'Create variants' button is disabled if no ID pattern is included. For more information, refer to the **Autogenerate using Name Pattern and ID Pattern** topic in this guide.
2. Select a cell within the table to activate the 'Create Variant' button (configured in the Configure Product Variants Matrix section above).
3. Click the 'Create Variant' button to display the 'Create Variant' dialog. Variant attributes and the values are displayed and for the selected object type. Add the required data and click OK.



4. If the parameter **Preview Variants Combinations** is configured (in the Configure Product Variants Matrix section above), the preview dialog shows the chosen combinations to be created. Click OK to proceed with the process or click Cancel to return to the create variant dialog.



Note: If the **Prevent Duplicate Creation** parameter is checked (configured in the Configure Product Variants Matrix section above), the combinations that match an existing variant are not created when the action is applied.

Product Variants Matrix in Workbench

The Matrix view focuses on the product IDs and is organized using two variant attributes. In the matrix view, product variant IDs are placed in a cell with attributes that match the selected row and column attributes. After validating the data, potential duplicate products are displayed with a red background and show all product variant IDs that have matching selected attributes.

For a simpler view, use the list view as defined in the **Product Variants List in Workbench** topic.

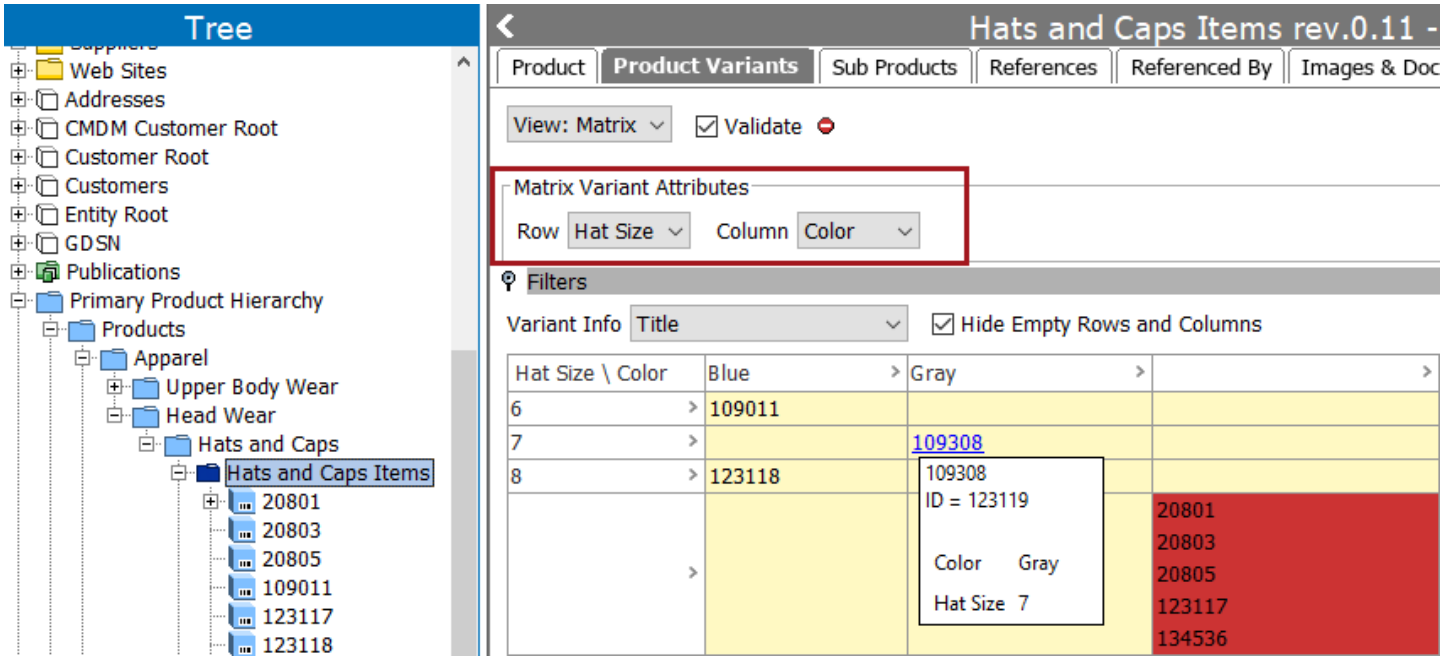
To view variant information in the Web UI, refer to the **Products Variants List in Web UI** topic or the **Product Variants Matrix in Web UI** topic.

Prerequisite

Before using the product variant view, you must complete the steps in the **Setting Up Product Variants** topic.

Use the Matrix View

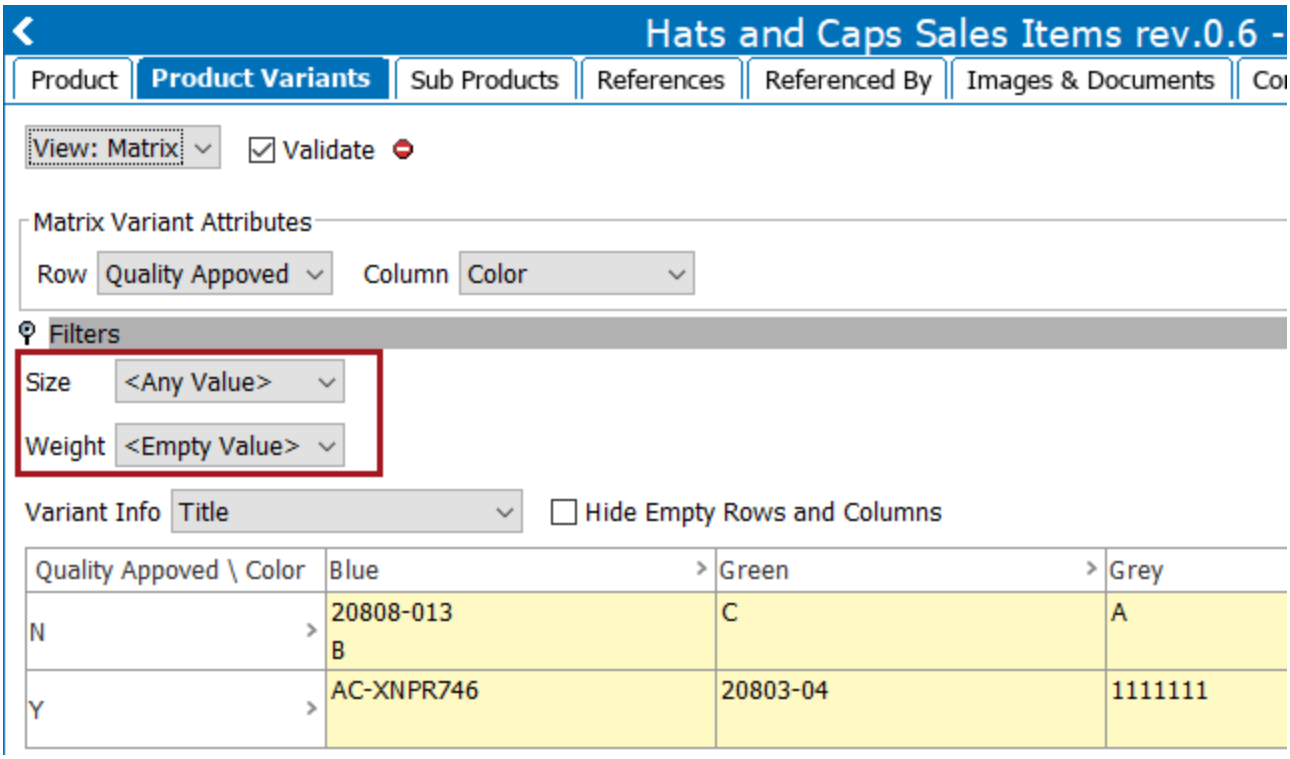
1. In the Tree, select the relevant parent node that is configured for variants.
2. Click the Product Variants tab, and select **View: Matrix** from the dropdown.
3. In the **Matrix Variant Attributes** section, choose two variant attributes to set the data displayed as **Row** and **Column**.



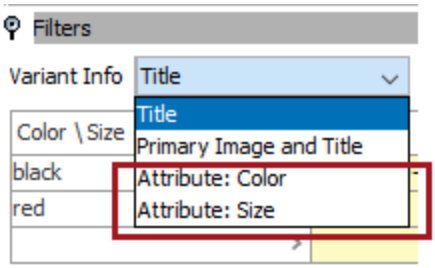
4. Check the **Validate** checkbox to view the following information:

- The possible duplicate variants are highlighted in red to show IDs that have the same values for the variant attributes, including empty values.
- Hover over a product variant ID to display the ID as a hyperlink. Click the link to display the editor for the product.
- Hover over a product variant ID to display information about its variant values and possible duplicates.

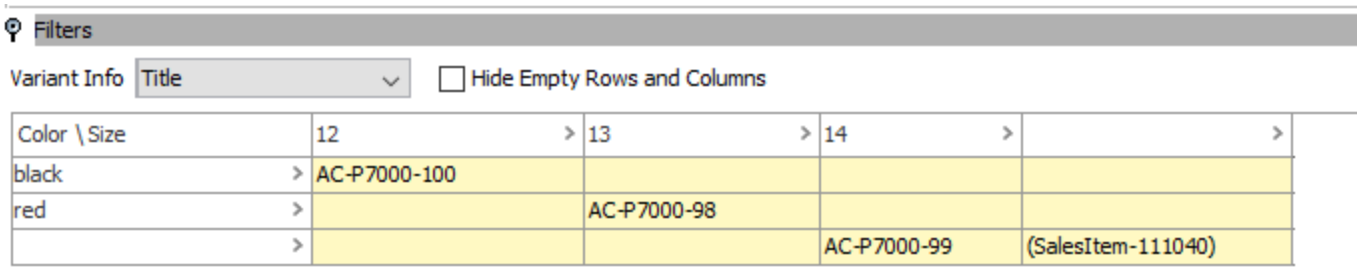
5. In the **Filters** area, product variant attributes that are not selected as a row or column (shown below) are available, as defined below. The filter options are existing values, <Any value>, and <Empty value>.
   - If more than two variant attributes are in use, each is displayed as a filter option between the Filters flipper and the Variant Info dropdown. In the image below, the variant attributes are Quality Approved, Color, Size, and Weight. Since Quality Approved and Color were selected for Row and Column, Size and Weight are available as filters.



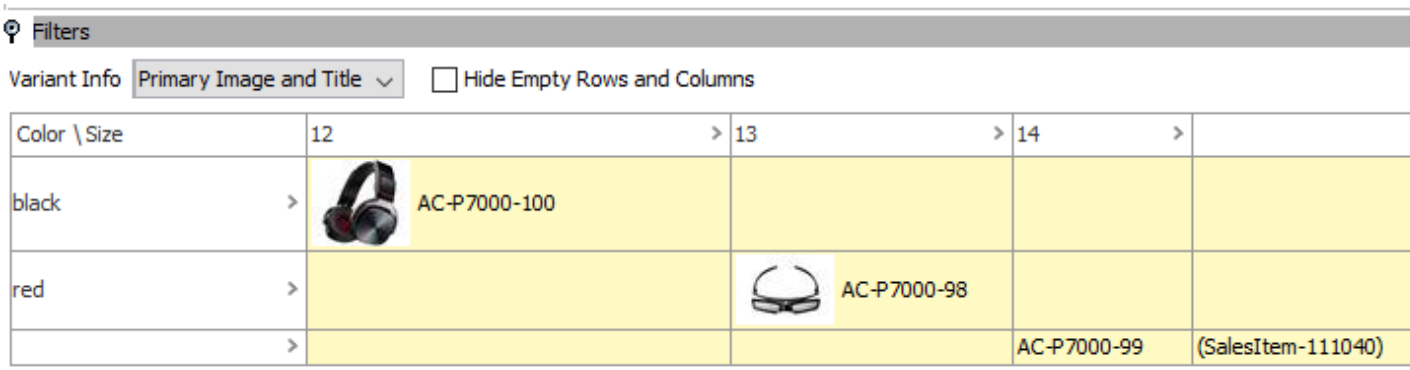
   - The **Variant Info** dropdown includes default options of 'Title' and 'Primary Image and Title' as well as variant attributes, such as 'Attribute: Color' shown below.



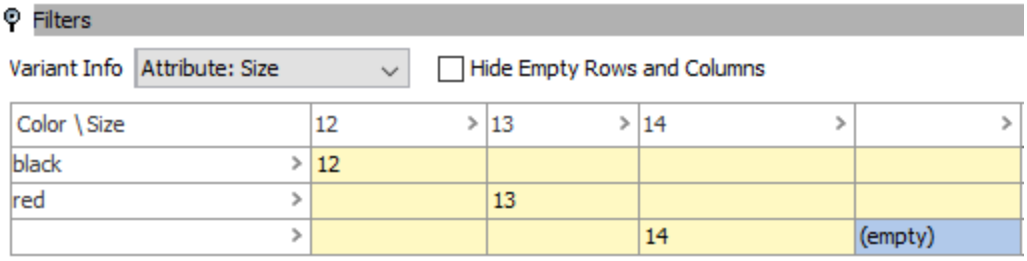
- **Title**: Displays the results only with the name of the product.



- **Primary Image and Title**: Displays the result with the name and primary image of the product. If there is no image, it displays only the name for the product.

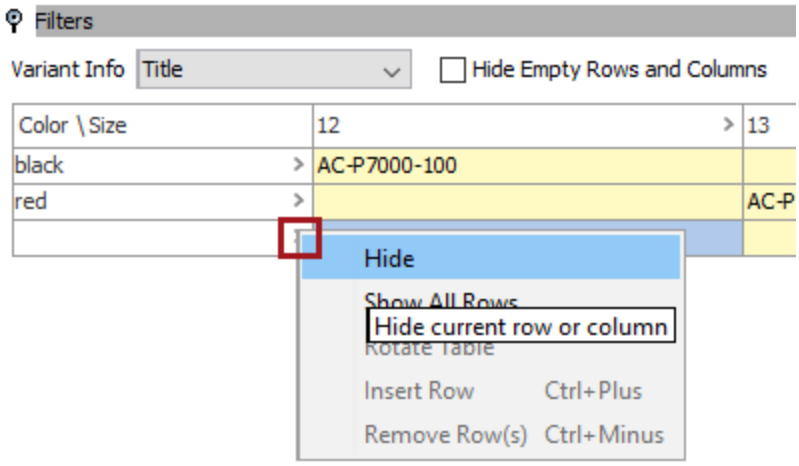


- **Variant Attributes**: If a variant attribute was selected in the drop-down list, it displays the values. If there are any blank values, it displays as '(empty).' In the example below the 'Size' attribute values are displayed across the Color attribute values.



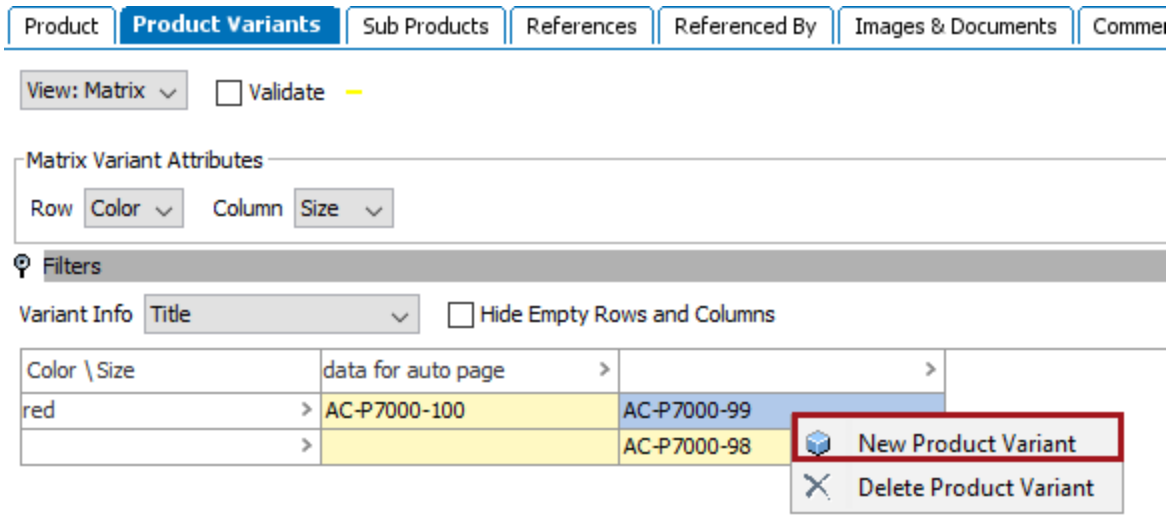
- The **Hide Empty Rows and Columns** checkbox allows empty rows / columns to be hidden in the view.

  Additionally, a user can hide rows and columns by clicking the arrow [>] for the row / column and choosing the Hide option to temporarily hide them from view.



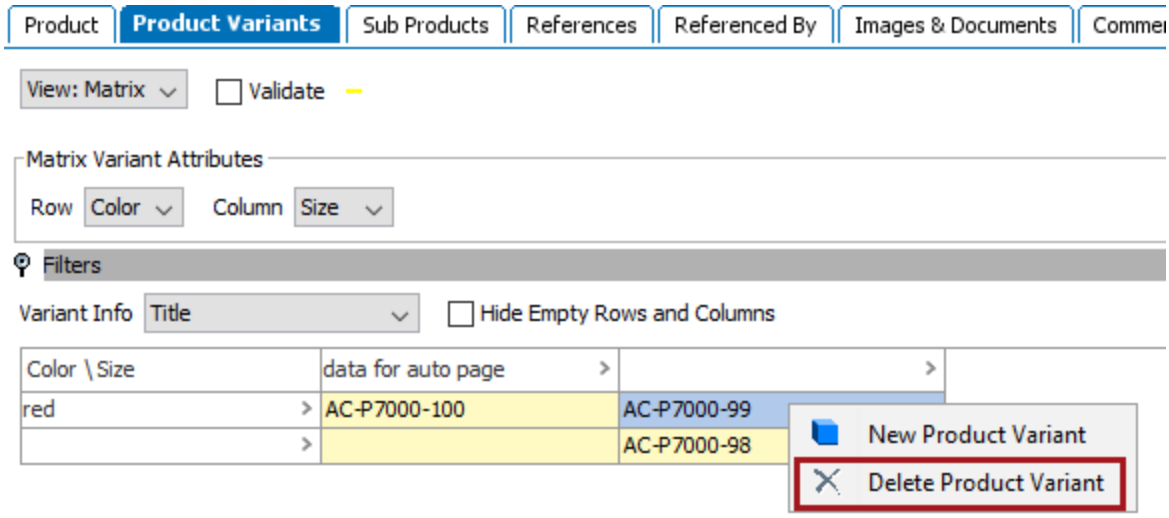
Create a Variant

To manually create a variant, right-click the relevant cell, and then click **New Product Variant**. A variant is created with attribute values that correspond to those of the selected cell. The typical way to create variants is to import them to the parent node.



Delete a Variant

To delete a variant, right-click the relevant cell, and then choose **Delete Product Variant**. A confirmation dialog is displayed and the user can delete the variant or cancel the process.


Product
Product Variants
Sub Products
References
Referenced By
Images & Documents
View: Matrix
Validate
Matrix Variant Attributes
Row
Color
Column
Size
Filters
Variant Info
Title
Hide Empty Rows and Columns
Color \ Size
data for auto page
red
AC-P7000-100
AC-P7000-99
AC-P7000-98
New Product Variant
Delete Product Variant

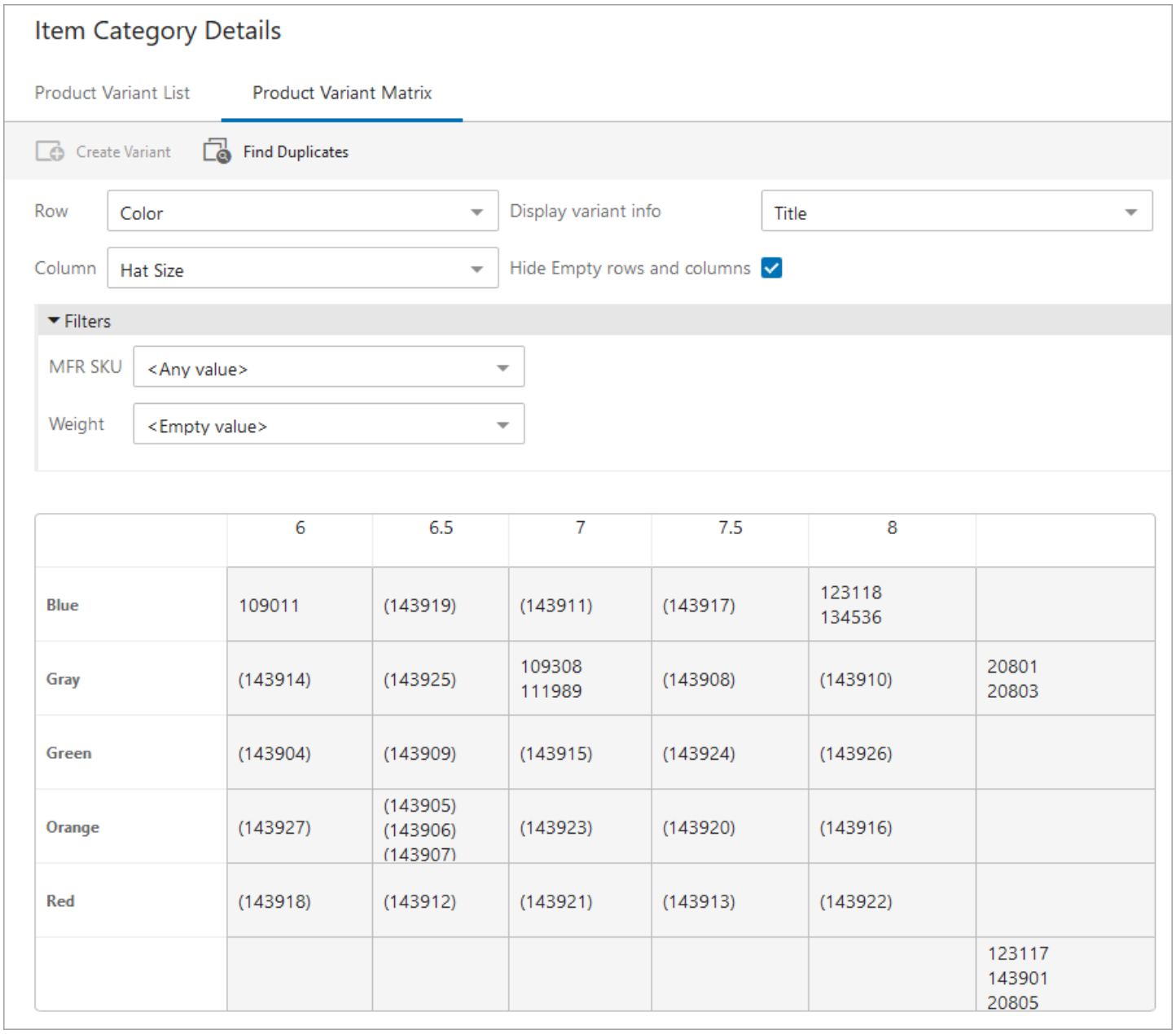
Product Variants Matrix in Web UI

The Matrix view focuses on the product IDs and is organized using two variant attributes. In the matrix view, product variant IDs are placed in a cell with attributes that match the selected row and column attributes. After validating the data, potential duplicate products are displayed with a red background and show all product variant IDs that match the selected attributes.

For a simpler view, use the list view as defined in the **Product Variants List in Web UI** topic.

To view variant information in the workbench, refer to the **Product Variants Matrix in Workbench** topic or the **Products Variants List in Workbench** topic.

The configured Product Variants Matrix tab page is shown in the following image:



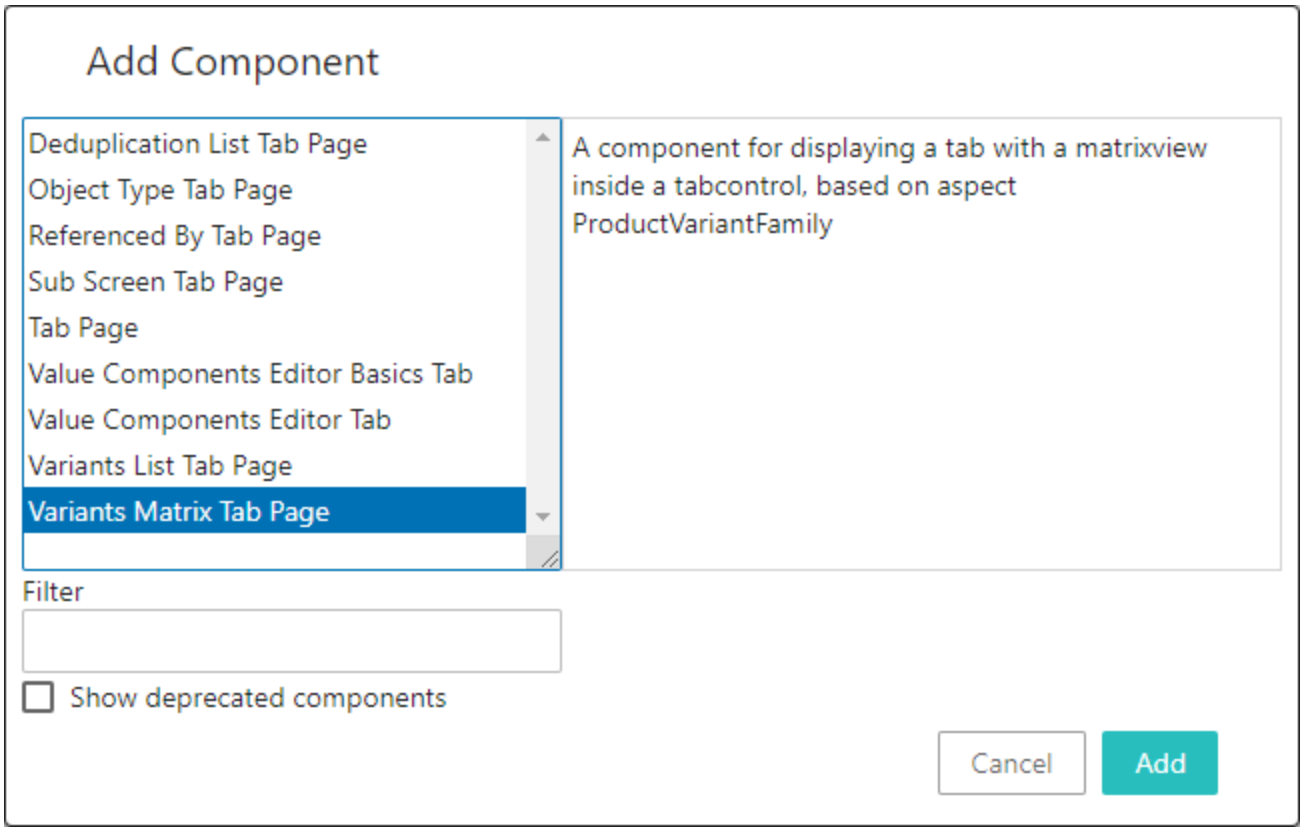
	6	6.5	7	7.5	8	
Blue	109011	(143919)	(143911)	(143917)	123118 134536	
Gray	(143914)	(143925)	109308 111989	(143908)	(143910)	20801 20803
Green	(143904)	(143909)	(143915)	(143924)	(143926)	
Orange	(143927)	(143905) (143906) (143907)	(143923)	(143920)	(143916)	
Red	(143918)	(143912)	(143921)	(143913)	(143922)	
						123117 143901 20805

Prerequisite

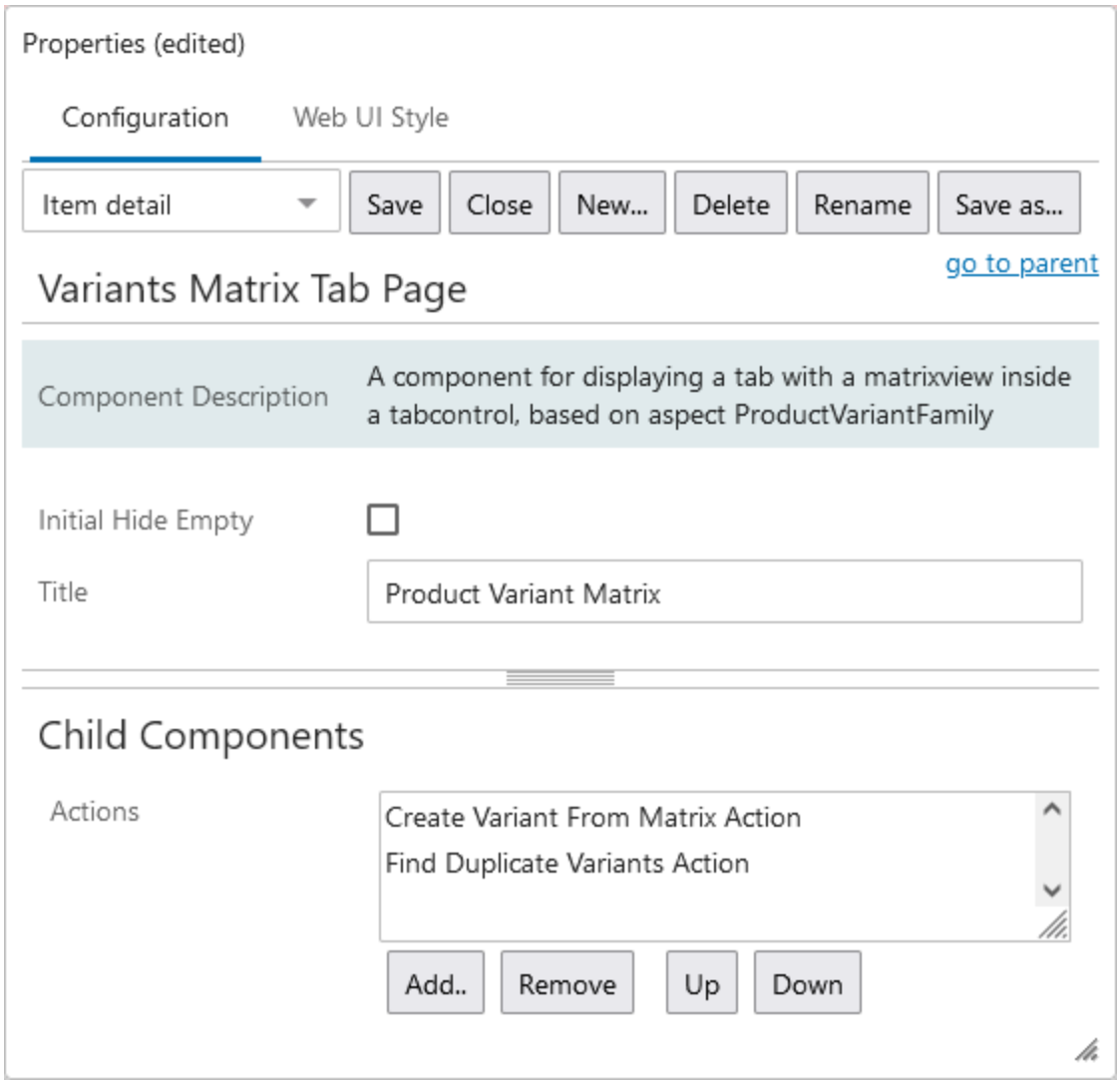
Before using the product variant view, you must complete the steps in the **Setting Up Product Variants** topic.

Configure Product Variants Matrix

1. In the Web UI, product variants can be displayed using **Variants Matrix Tab Page**. You can insert it into a **Tab Control** on a **Node Details** screen using the Child Components 'Main' parameter. For more information, refer to the **Design Mode Basics** topic and the **Node Details Screen** topic in the **Web User Interfaces** documentation.



2. Once added to the Node Details screen, double-click the Variants Matrix Tab Page to set the configuration parameters.



Initial Hide Empty

When checked, the 'Hide Empty rows and columns' checkbox is checked by default and only rows and columns with values are displayed initially. The user can uncheck the 'Hide Empty rows and columns' checkbox to display empty variant attribute values.

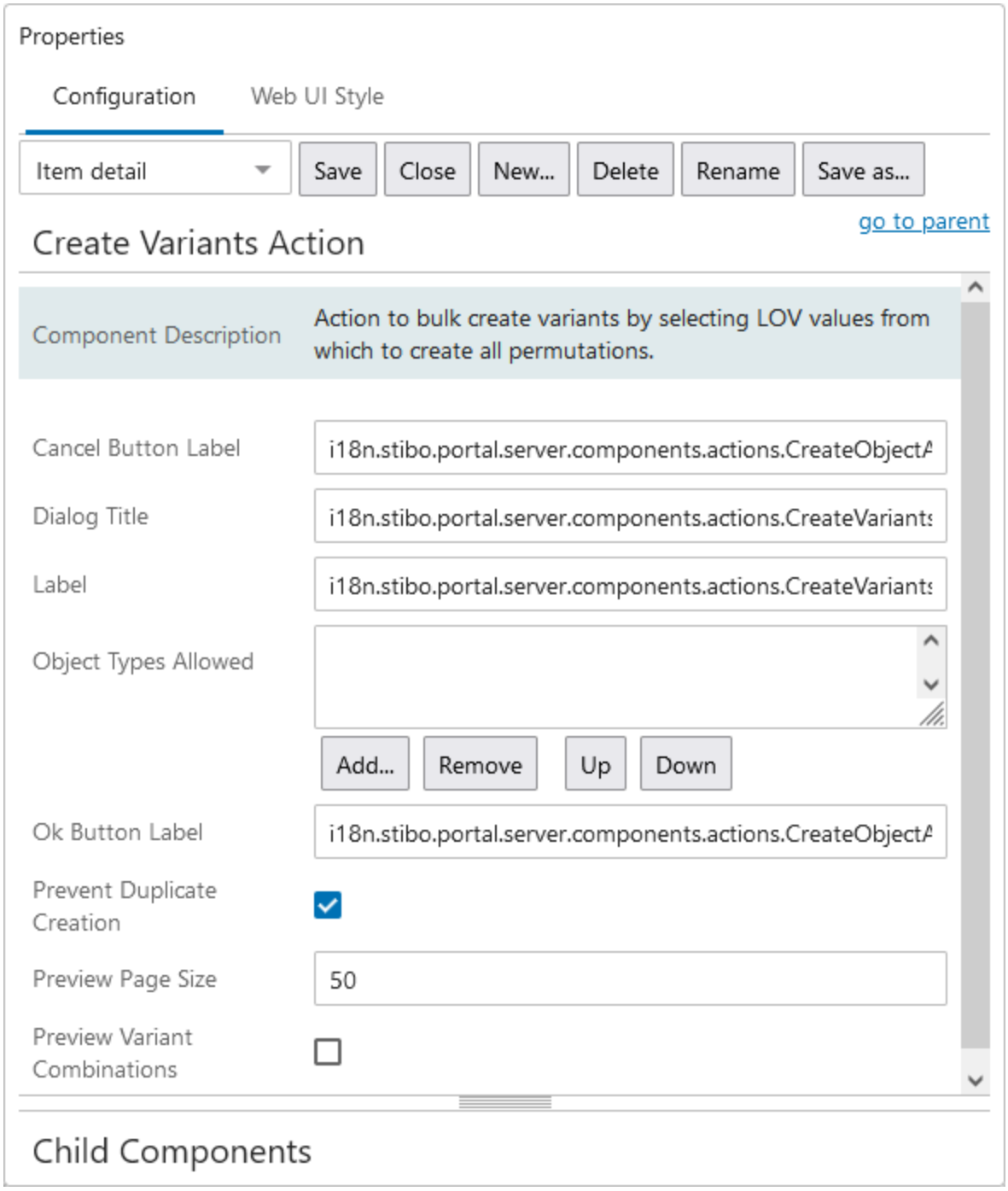
Title

This is the title of the configured component.

Actions

Add the 'Create Variant From Matrix Action' and 'Find Duplicate Variants Action' buttons if desired. This child component allows for actions to be added for the user to interact with the data. For more information, refer to the **Action Buttons** topic in the **Web User Interfaces** documentation.

If added, configure the 'Create Variants Action.'



Prevent Duplicate Creation

When checked, clicking the 'Create Variants Action' button and selecting duplicate variant values displays an error and duplicates are not allowed.

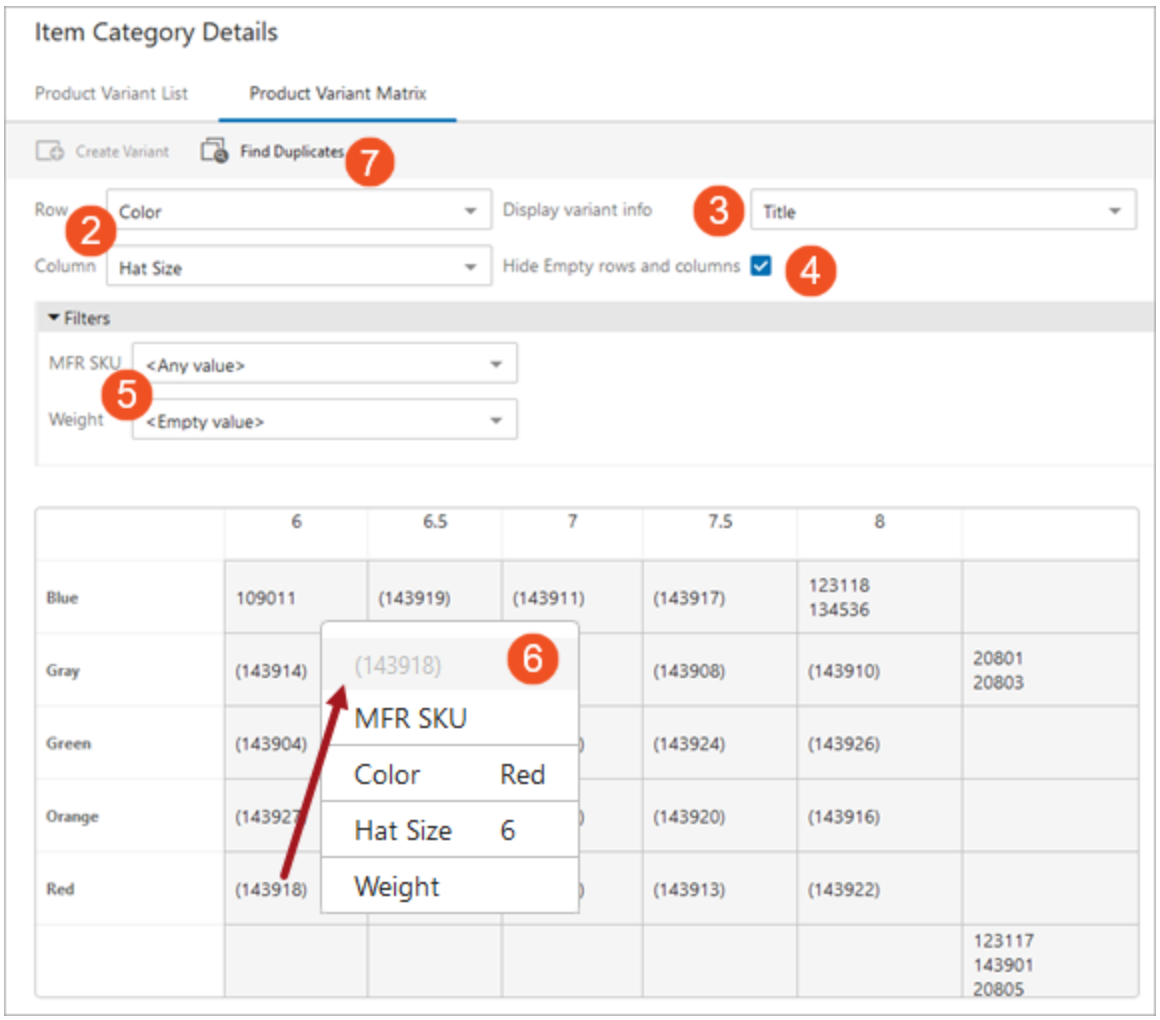
Preview Variant Combinations

When checked, clicking the 'Create Variants Action' button, selecting variant values, and clicking OK opens a Preview dialog with all new variants to be created. The user can click OK to create the items being previewed, or Cancel to return to the create variants dialog.

Note: As with any screen, the Node Details screen with Variants Matrix Tab Page must be mapped appropriately in Main Properties > Mappings for end users to be able to access it.

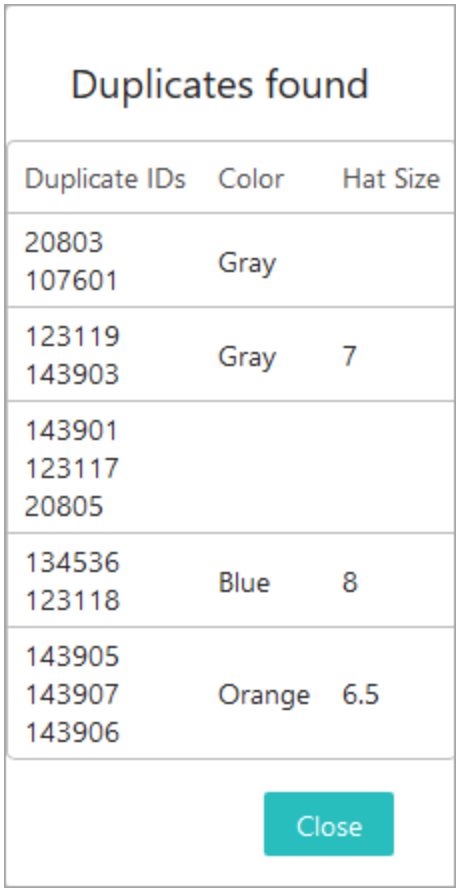
Use the Matrix View

1. In the Tree, expand the Primary Product Hierarchy, and select the relevant product parent node that is configured for variants to display the matrix.



2. Set the **Row** and **Column** parameters to the variant attribute to be displayed the row and the column of the matrix. All variant attributes are available.

3. Set the **Display variant info** parameter to determine how the variant's details within the matrix are displayed. In addition to the variant attribute values, 'Title' and 'Primary Image and Title' are also available for selection.
4. Check the **Hide Empty rows and columns** parameter to exclude empty valued options from the matrix.
5. In the **Filters** section, matrix data can be displayed based on the variant attributes not selected as Row or Column. The filter options are existing values, <Any value>, and <Empty value>. In the image above, the variant attributes are MFR SKU, Color, Hat Size, and Weight. Since Color and Hat Size were selected for Row and Column, MFR SKU and Weight are available as filters.
6. On the Variants Matrix, hover over a variant ID to display details about the variant attributes.
7. Click the 'Find Duplicates' button (if configured in the Configure Product Variants Matrix section above) to display the 'Duplicates found' dialog. Values that are used for more than one variant are displayed as potential duplicates. In the following example, two variant IDs have a value of 'Gray' for the 'Color' attribute and no value for 'Hat Size' attribute.



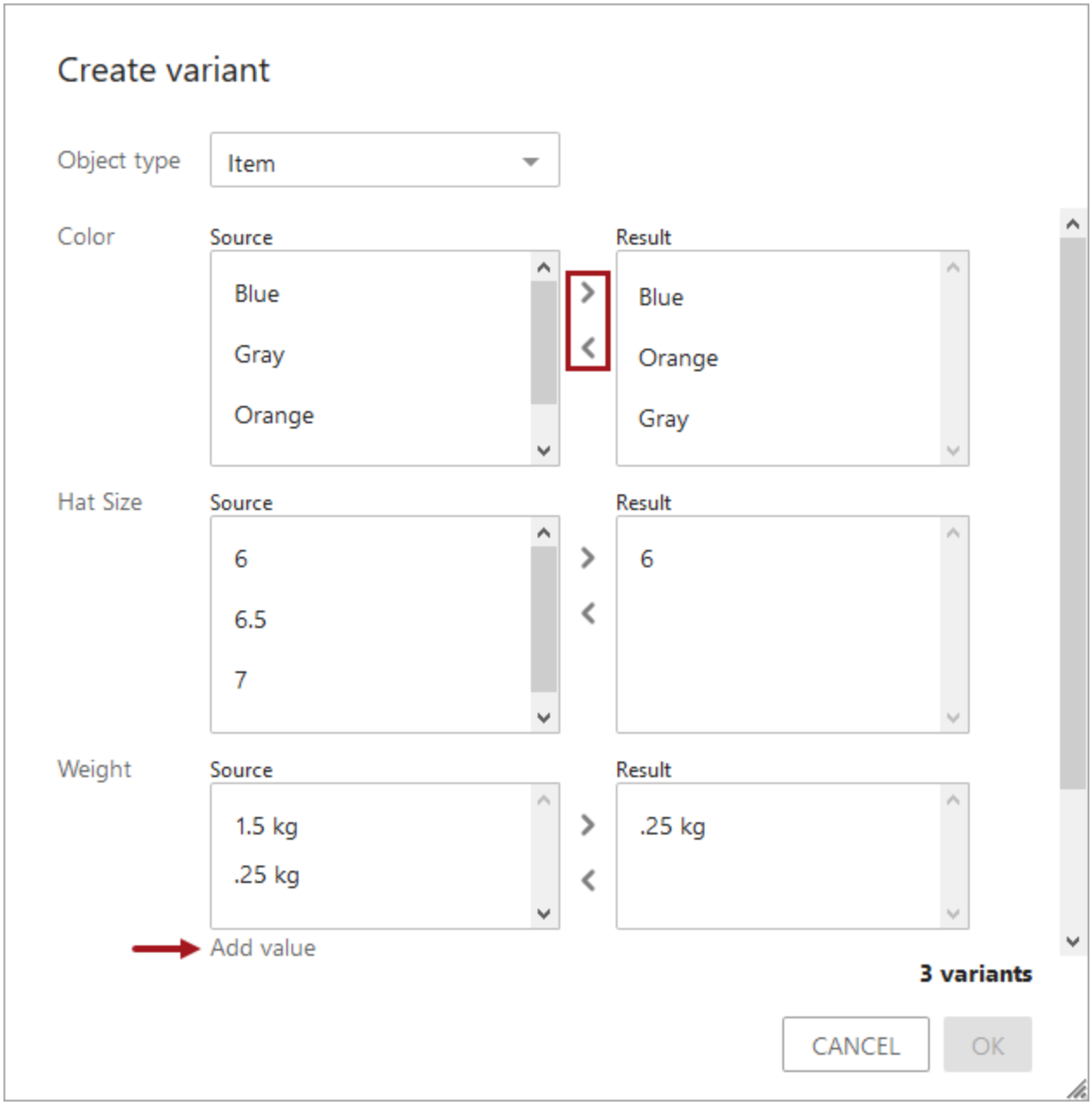
Create a Variant

When creating a variant manually (rather than using an import file), note that only variant attributes values are added. Additional values can be added on a product editor screen.

1. Verify an ID pattern for the variant object type is defined. This 'Create variants' button is disabled if no ID pattern is included. For more information, refer to the **Autogenerate using Name Pattern and ID Pattern**

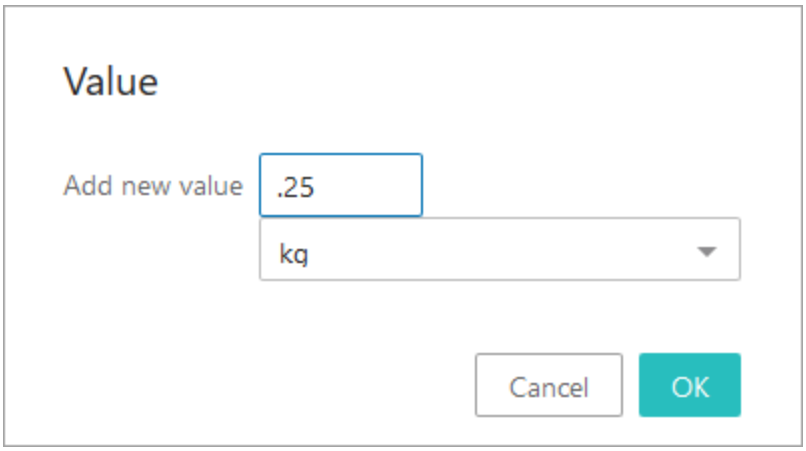
topic in this guide.

2. Verify the 'Create Variant' button was configured in the Configure Product Variants Matrix section above.
3. Click the 'Create Variant' button to display the 'Create Variant' dialog. Variant attributes and the existing values are displayed and for the selected object type.

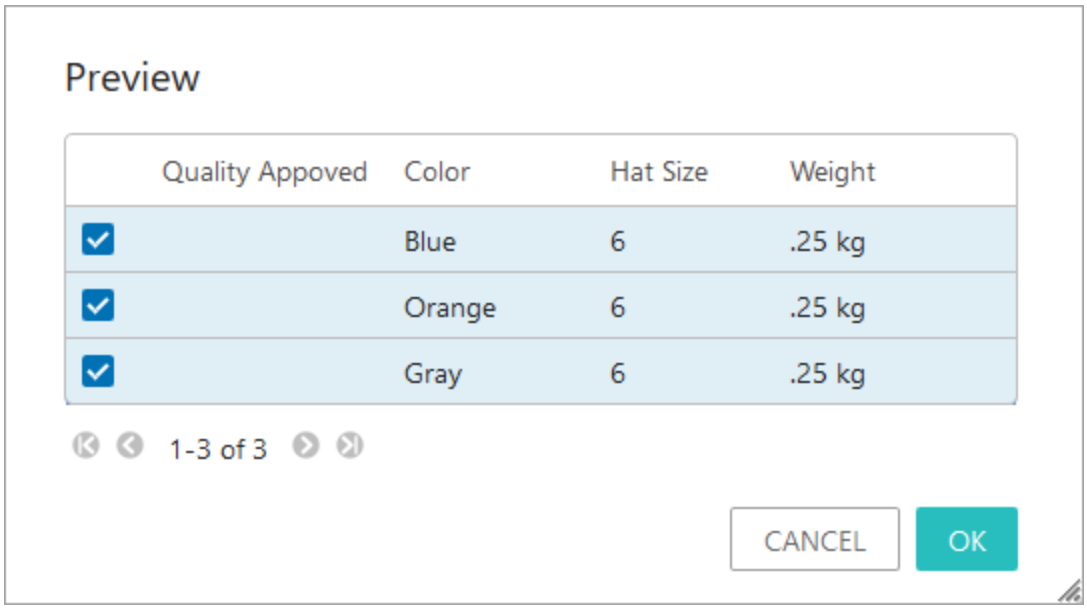


4. For each variant attributes:
   - Click one or more of the existing values in the Source column and click the > button to move it to the Result column. You can also double-click existing values to move them, or multi-select values before using the > button.

- The number of new variants to be created is displayed as the count above the OK button.
- Click the 'Add value' link when available to supply a new value. Click OK to close the Value dialog.



5. Click OK.
6. If the parameter **Preview Variants Combinations** is configured in the Configure Product Variants Matrix section above, the preview dialog shows the chosen combinations to be created. Click OK to proceed with the process or click Cancel to return to the create variant dialog.



Note: If the **Prevent Duplicate Creation** parameter is checked (configured in the Configure Product Variants Matrix section above), the combinations that match an existing variant are not created when the action is applied.

Business Condition: Validate Product Variant

A product variant family is a group of products where the members are considered to be the same product except for variations in the predefined attributes.

For example, a product folder named 'Shoes' contains children products and has one variant attribute: Size. This condition can be used to identify the duplicate sizes (variants) within the product variant family.

This condition works on the Product Variant level and returns 'False' if the product variant is a duplicate.

> **Note:** This condition can affect performance based on the number of siblings and variant attributes to be checked.

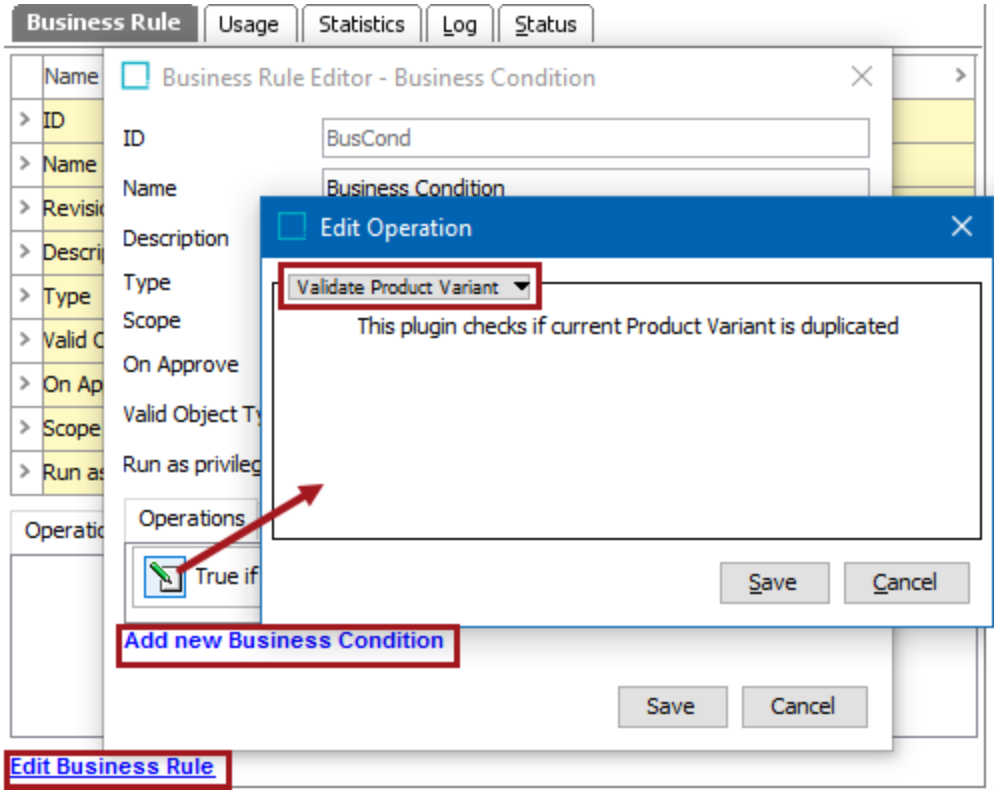
For more information and required configuration, refer to the **Product Variants** topic in the **System Setup** documentation.

Prerequisites

Before using this business condition:

1. Verify the configuration on the Product Variant Families is correct since it is used by this condition.
2. Create a business rule as defined in the **Creating a Business Rule, Function, or Library** topic.
3. Edit the business rule to configure the operation as defined in **Editing a Business Rule or Function** topic.

Configuration



1. On the Edit Operation dialog, select **Validate Product Variant** from the dropdown.
2. Click the **Save** button to add the operation to the business rule editor.

Recycle Bin for System Setup

Deleting objects in System Setup moves them to the Recycle Bin on the System Setup tab. However, only the following objects display in the System Setup Recycle Bin:

- Business Rules (actions, conditions, and functions)
- Business Rule Libraries
- Event Queues
- Integration Endpoints
- Metrics
- Sufficiency Configuration Types
- Value Generators
- Workflows

For information about the Recycle Bin for the Tree tab, refer to the **Recycle Bin for the Tree Tab** topic in the **Getting Started** documentation.

Considerations

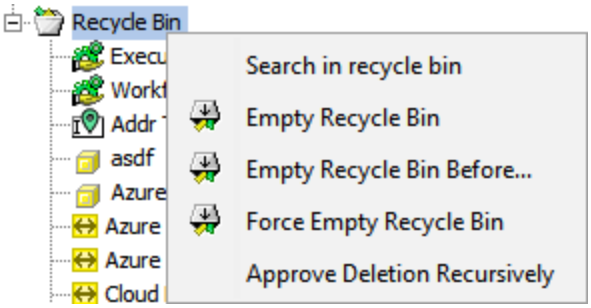
- Objects in the recycle bins are not included when searching from the Advanced Search tab, nor from Search. Recycle bin objects can be searched using the Search in recycle bin option defined below.
- Attribute values of objects in the recycle bins cannot be edited. If editing is required, the object must be revived.

Resolving Deleted Objects

Deleted objects in the System Setup Recycle Bin can be managed as a group from the Recycle Bin node or individually.

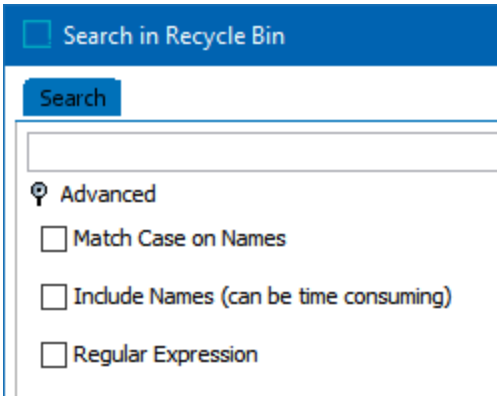
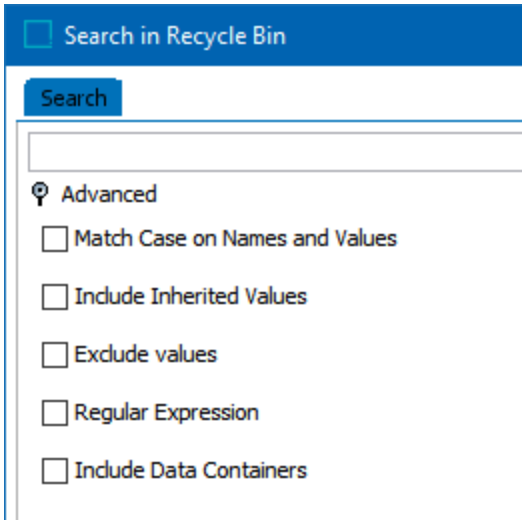
Group actions

To address all objects in the System Setup Recycle Bin, right-click the Recycle Bin node and choose one of the available options described below:



- **Search in recycle bin** searches for deleted objects in this recycle bin. In Oracle-based systems, by default this includes both ID and Name, while the default for Cassandra-based systems is by ID but allows searching Name via an Advanced option.

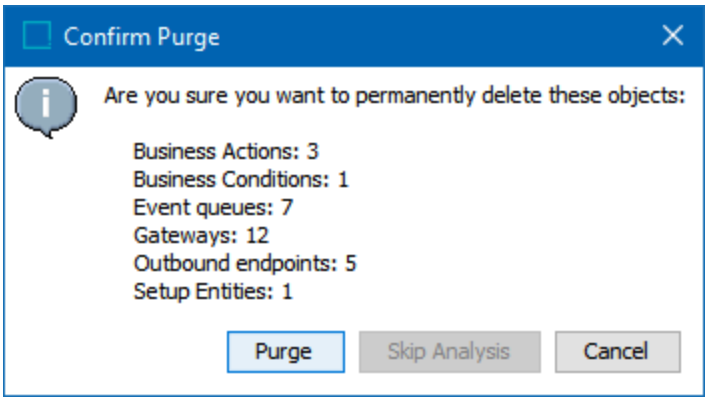
  The options in the Advanced flipper vary based on the type of database in use.

Cassandra Database Options	Oracle Database Options
	
Match Case on Names – when checked, capitalization provided in the search field for an object must exactly match the name. **Include Names (can be time consuming)** – when checked, searches for matches on name and ID; when not checked, only IDs are searched. **Regular Expression** – when checked, search is based on the RegEx provided.	**Match Case on Names and Values** – when checked, capitalization provided in the search field for an object must exactly match the name or value. **Include Inherited Values** – when checked, inherited values are also searched. **Exclude values** – when checked, values are not searched. **Regular Expression** – when checked, search is based on the RegEx provided.

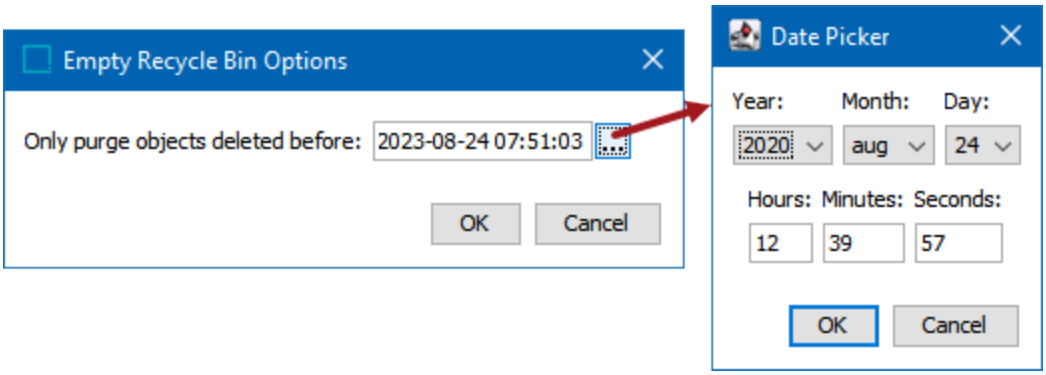
Cassandra Database Options	Oracle Database Options
	Include Data Containers – when checked, values in data containers are searched.

- **Empty Recycle Bin** permanently deletes the contents of this recycle bin.

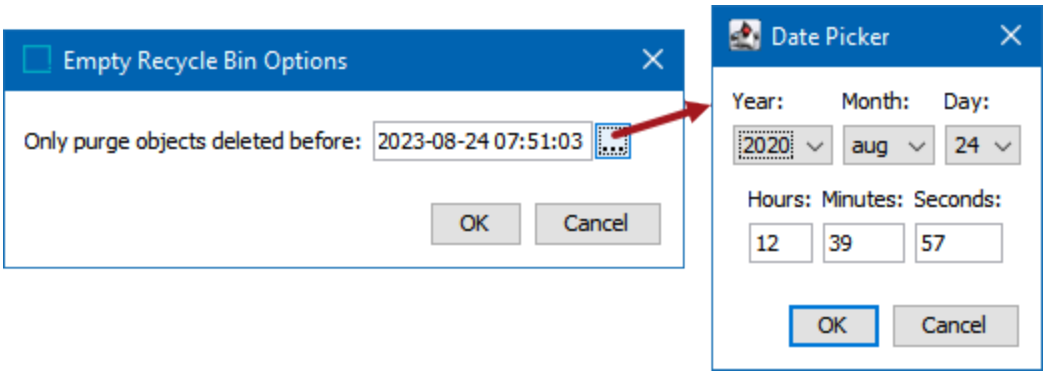
  On the Confirm Purge dialog, the **Skip Analysis** button is enabled while counting the number of objects in the recycle bin. Review the object counts and click **Purge** to delete them or click **Cancel** to close without changing the recycle bin.



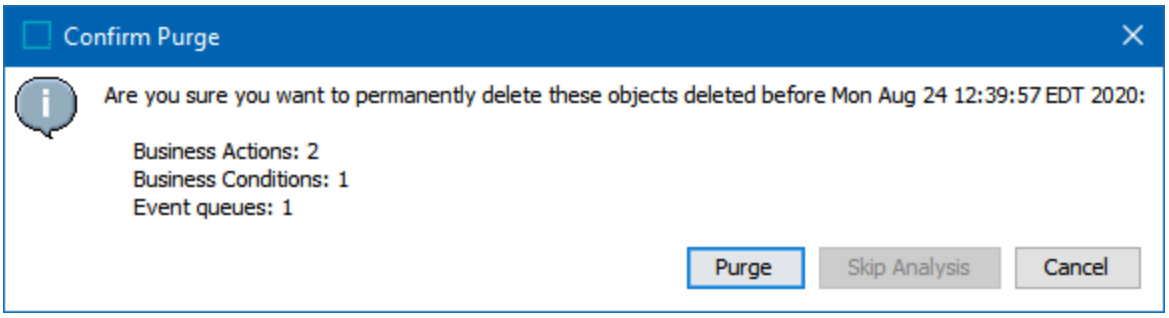
- **Empty Recycle Bin Before** permanently deletes only contents deleted before the specified date and time.



  On the Empty Recycle Bin Options dialog, click the ellipsis button (...) to display the Date Picker and set the date and time. Click **OK** to close each dialog and perform the purge.



On the Confirm Purge dialog, the **Skip Analysis** button is enabled while counting the number of objects in the recycle bin. Review the object counts and click **Purge** to delete them or click **Cancel** to close without changing the recycle bin.

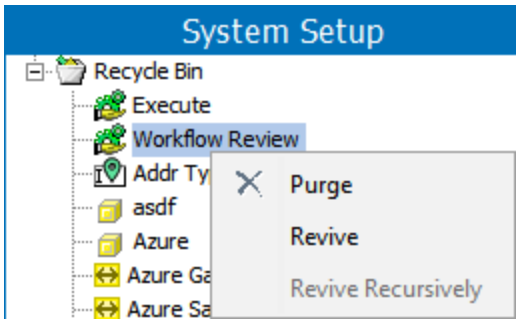


When a background process is required for the deletions due to the number of objects, it can be monitored on the BG Processes tab within the Empty Recycle Bin node.

- **Force Empty Recycle Bin** is not recommended for production data since it ignores deletion approvals, events, and references and purges objects with an 'in Use' status. This option is intended to remove test data when ignoring dependencies is not an issue.
- **Approve Deletion Recursively** has no impact on objects in the System Setup Recycle Bin since they cannot be approved. All objects are flagged with 'Not In Use'. For information about using an Approve Deletion Recursively option on objects in the Tree Recycle Bin, refer to the **Recycle Bin for the Tree Tab** topic in the **Getting Started** documentation.

Individual object actions

To address one or more selected objects in the System Setup Recycle Bin, right-click the object or multiselect objects and choose an option described below.

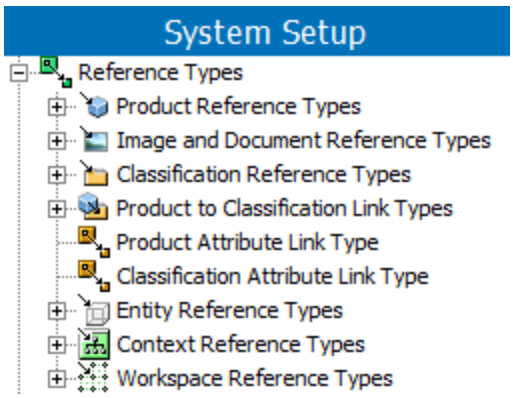


- **Purge** deletes the object from this recycle bin.
- **Revive** restores the selected object to its previous location in the System Setup tab.
- Revive Recursively is only available for objects in the Tree Recycle Bin.

Reference and Link Types

References and links allow you to establish a relationship between objects. Fundamentally, references and links are similar to attributes in that they can be internally or externally maintained, can have dimension dependencies, can be inherited, and can allow multiple values. References and links are different from attributes in that they model relationships between objects, that the relationships between objects have directionality, and that they can also include metadata in the form of attributes that live on the reference or link itself.

Referencing or linking objects allows those objects to be used for different purposes, while avoiding data duplication and minimizing data maintenance. For example, a single stock image could be referenced for a whole family of products. Reference and link types are housed and created in System Setup under the Reference Types node.



STEP includes the following options for object relationships: References, Product to Classification Links, Product Attribute Links, and Classification Attribute Links. Each is defined below.

Consideration

For each reference type or link type, the recommended limit is 1000 of the same type on an object. Exceeding this number of references can result in degraded performance across the workbench and Web UI when the data is accessed. For example, when importing objects with an excessive number of references / links, or in Web UI, when displaying the objects and the references / links.

References

References allow you to define a connection between two objects in STEP, essentially they are a set of rules for relationships between objects. For example, a reference can associate an image with a product, or join multiple addresses with a single company, or connect a classification to an object, among other uses.

Prerequisites for Reference Types

Before creating a reference type, consider the available options, and determine the type most suited for your data as described in **Reference Types**.

Setup Requirements for References

Setting up and using any reference involves the following steps:

1. Create the appropriate reference type as described in **Creating a Reference Type**.
2. Apply the reference to the necessary objects as described in **Creating a Reference**.

Additional Information About References

- Understand the benefits of attribute groups as described in **Attribute Groups for Reference and Link Types**
- Understand the effects of dimension dependencies as described in **Dimension Dependent Reference and Link Types**
- Understand how visibility affects dimension-dependent references as described in **Visibility of Reference and Link Types**
- Understand the importance of designating the source and target as described in **Direction of a Reference**
- Review effects of the Parent/Child Relation as described in **Entity Reference Types**
- Modify settings on existing reference types as described in **Maintaining a Reference Type**
- Understand metadata functionality as described in **Metadata Attributes on Reference and Link Types**
- Understand the uses for multiple references as described in **Multiple References for the Same Objects**
- Review effects of inheritance as described in **Inheritance Example for a Reference**
- Create references for use in data containers as described in **References on Data Containers**

Product to Classification Links

Product to classification links allow you to define a connection between a product and a classification, in addition to showing the product as a child to the classification and are described in **Product to Classification Link Types**.

Setup Requirements for Product to Classification Links

Setting up and using a product to classification link involves the following steps:

1. Create a link type as described in **Creating a Product to Classification Link Type**.
2. Apply the link to the necessary objects as described in **Creating a Product to Classification Link**.

Additional Information About Product to Classification Links

- Understand the benefits of attribute groups as described in **Attribute Groups for Reference and Link Types**
- Understand the effects of dimension dependencies as described in **Dimension Dependent Reference and Link Types**
- Understand how visibility affects dimension-dependent link types as described in **Visibility of Reference and Link Types**

- Modify settings on existing link types as described in **Maintaining a Product to Classification Link Type**
- Understand metadata functionality as described in **Metadata Attributes on Reference and Link Types**
- Review effects of inheritance as described in **Inheritance Example for a Product to Classification Link Type**

Product Attribute Links

A product attribute link allows a specification attribute to be available when the product is a child of the selected level of the primary product hierarchy. A product attribute link can also include dimension dependencies and metadata attributes. This enables you to control when the attribute is available and/or published based on its location in the product hierarchy.

Using the Product Attribute Link

The product attribute link is pre-configured and ready to use as described in **Creating a Product Attribute Link**.

Optional Setup for the Product Attribute Link

Set up is only necessary when dimension dependencies and metadata attributes are required as described in **Setting Up an Attribute Link Type**.

Additional Information About Product Attribute Links

- Understand metadata functionality as described in **Metadata Attributes on Reference and Link Types**
- Understand the available functionality as described in **Product Attribute Link Type**

Classification Attribute Links

A classification attribute link allows a specification attribute to be available when the object is also linked into the specified classification hierarchy via a Product to Classification Link Type. Classification attributes links can also include dimension dependencies and metadata attributes. This enables you to control when the attribute is available and/or published based on the classification hierarchy.

Using the Classification Attribute Link

The classification attribute link is pre-configured and ready to use as described in **Creating a Classification Attribute Link**.

Optional Setup for the Classification Attribute Link

Set up is only necessary when dimension dependencies and metadata attributes are required as described in the **Setting Up an Attribute Link Type**.

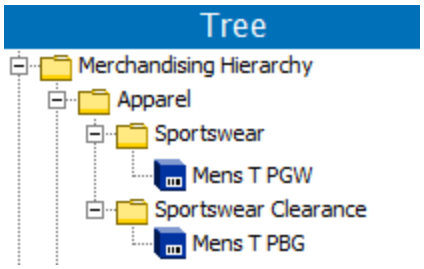
Additional Information About Classification Attribute Links

- Understand metadata functionality as described in **Metadata Attributes on Reference and Link Types**
- Understand the available functionality as described in **Classification Attribute Link Type**

Classification Attribute Link Type

The Classification Attribute Link Type is pre-configured and allows a specification attribute to be available when the product is linked into the specified classification hierarchy via a Product to Classification Link Type.

For example, consider the attribute 'Marked Down %' that is only needed for clearance items. Using two classifications, one for general items and another for clearance items, allows you to display the clearance attribute only on the group of products where it is required.



With additional setup, the Classification Attribute Link Type can also include dimension dependency and metadata attributes as described below.

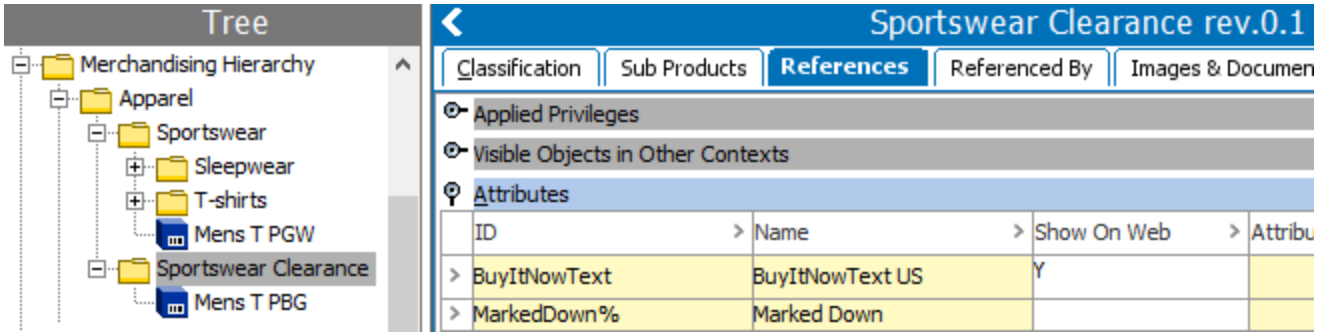
Dimension Dependency

Dimension dependencies are not recommended for classification attribute link types.

Metadata Attributes

Metadata (description) attributes enable you to control when the linked attribute is published based on an additional setting or provide additional data for any other purpose.

For example, a description attribute named 'Show on Web' has been added to the Classification Attribute Link Type. This description attribute holds the value 'yes' or 'no' and indicates if the specification attribute 'BuyItNowText' should be displayed on the web.

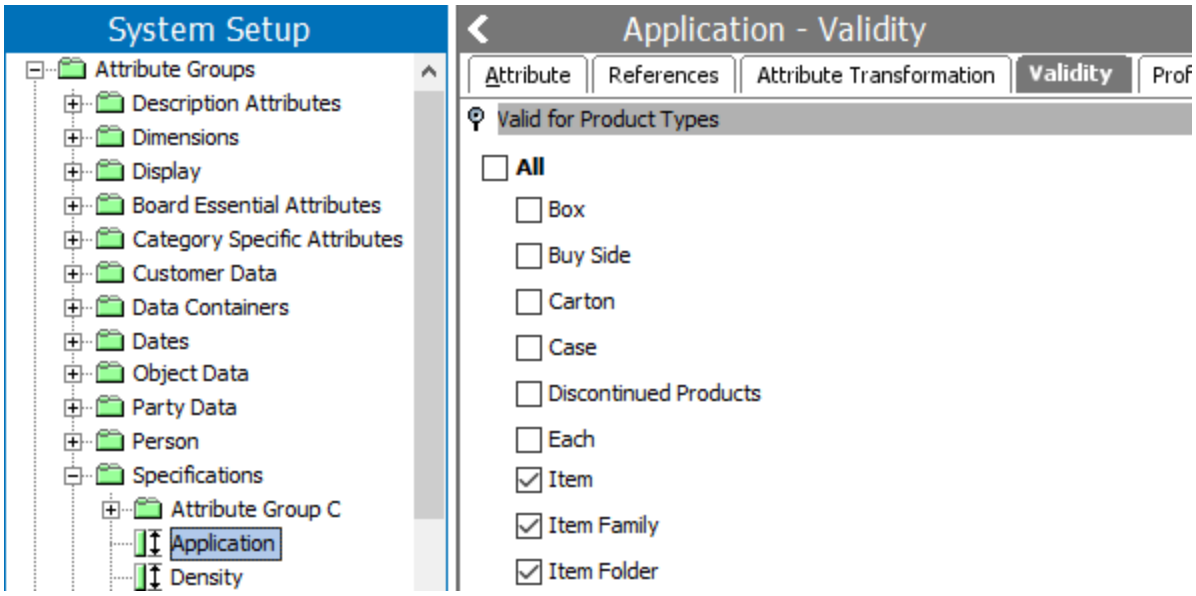


For more information, refer to **Description Attributes**.

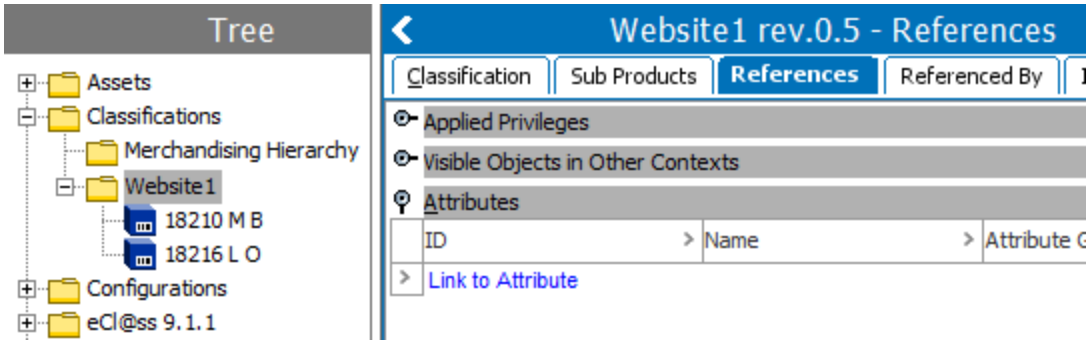
Creating a Classification Attribute Link

Adding a classification attribute link allows a specification attribute to be available when a product is linked into the specified classification hierarchy via a Product to Classification Link Type.

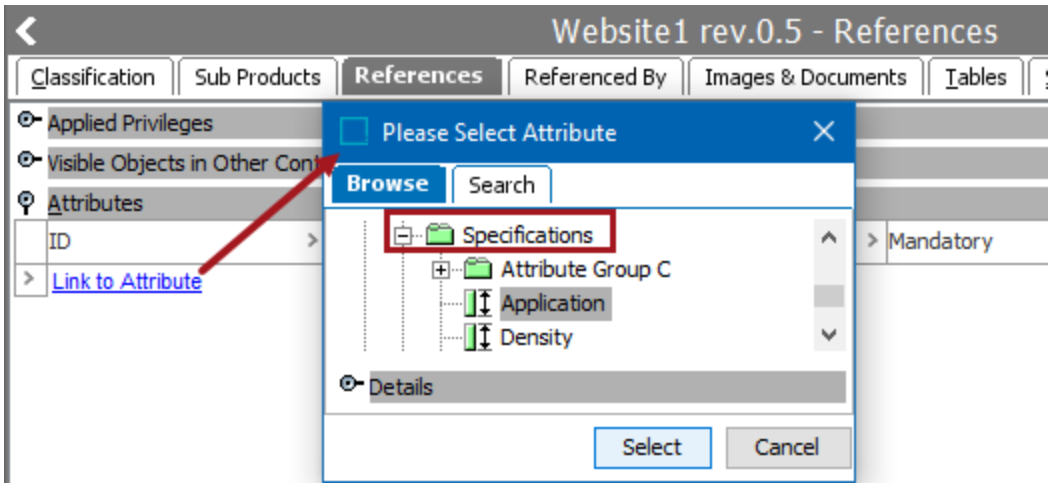
1. In System Setup, verify that the specification attribute to be linked has Validity that includes the products in the classification.



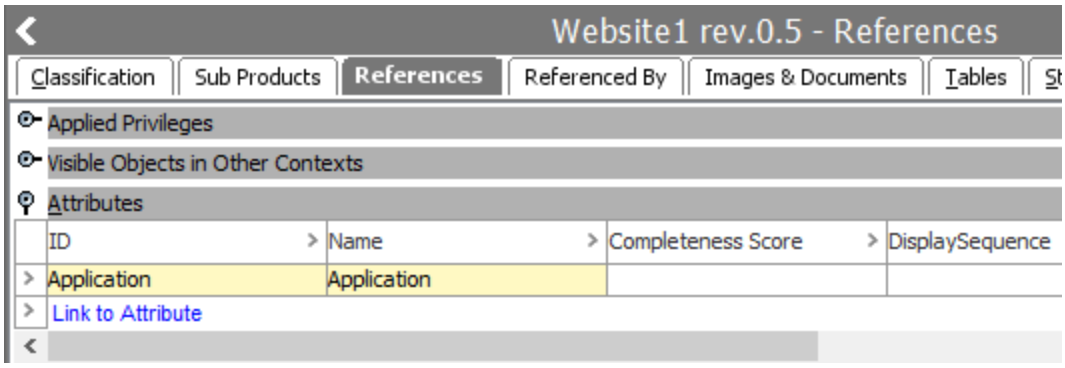
2. On Tree, select the classification that contains the products (via a Product to Classification Link Type) that should display the specification attribute.



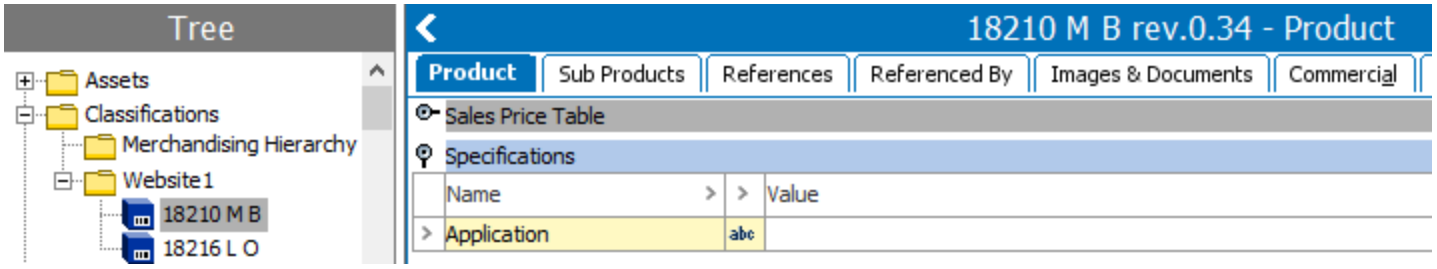
3. On the References tab > Attributes flipper> click the 'Link to Attribute' link to display the Select Attribute dialog.



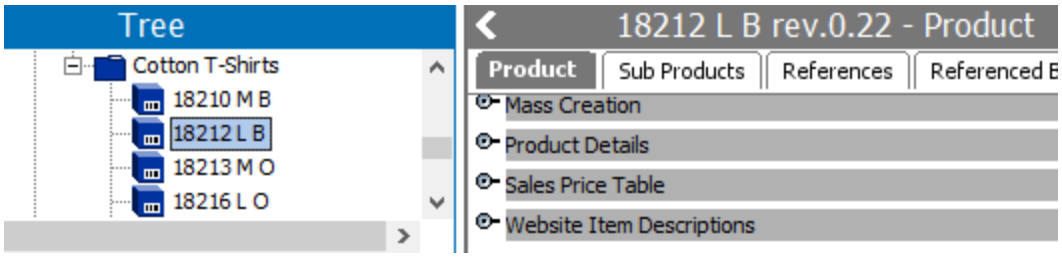
4. Note the attribute group of the desired specification attribute, choose the attribute, and click the Select button. The specification attribute is displayed under the Attributes flipper.



5. Select a product currently displayed in the classification, open the attribute group flipper identified previously, and verify that the linked attribute is available.



Note that other products of the same type that are not linked into the classification do not include the specification attribute (the flipper is absent).


Tree
Cotton T-Shirts
18210 M B
18212 L B
18213 M O
18216 L O
18212 L B rev.0.22 - Product
Product
Sub Products
References
Referenced E
Mass Creation
Product Details
Sales Price Table
Website Item Descriptions

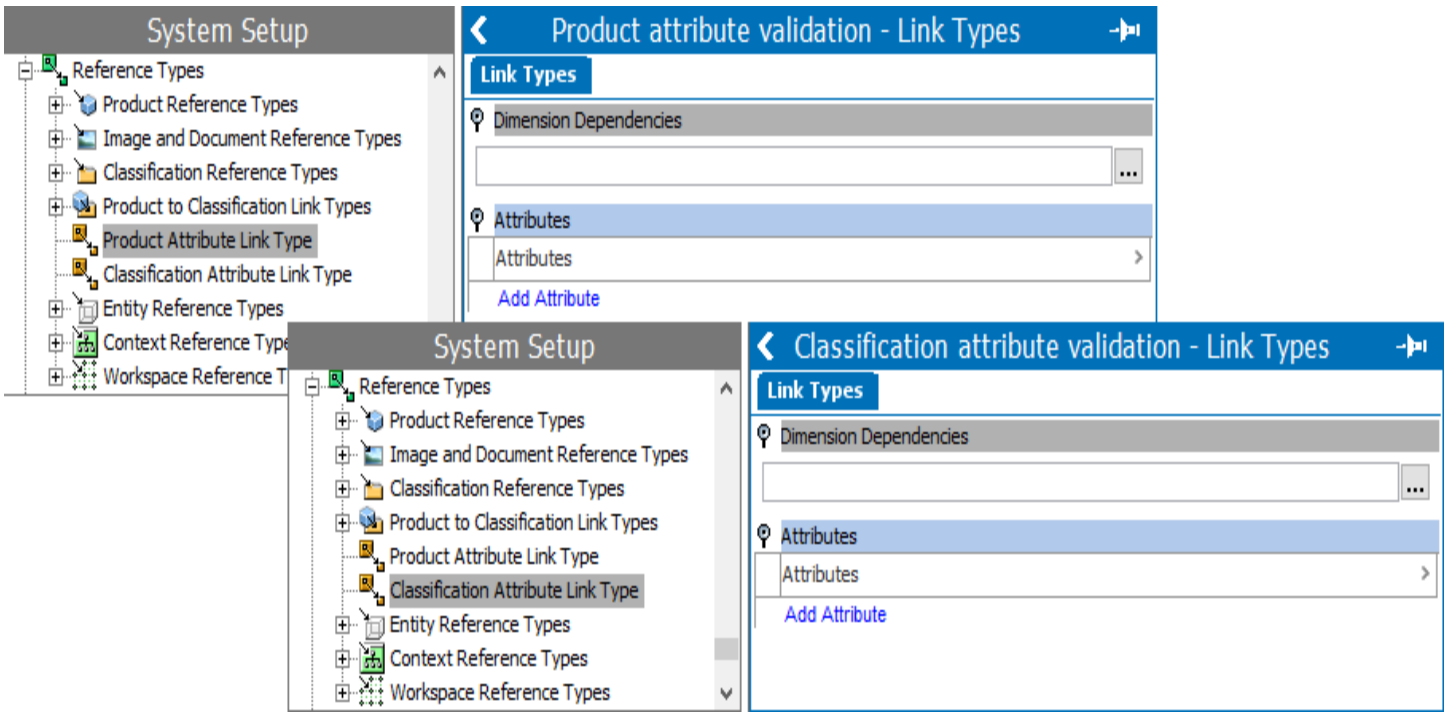
Setting Up an Attribute Link Type

The 'Product Attribute Link Type' and the 'Classification Attribute Link Type' are pre-configured. By default, linked attributes are displayed for the selected product hierarchy or classification hierarchy. If dimension dependency or metadata attributes are required, use the following steps to further configure the appropriate link type.

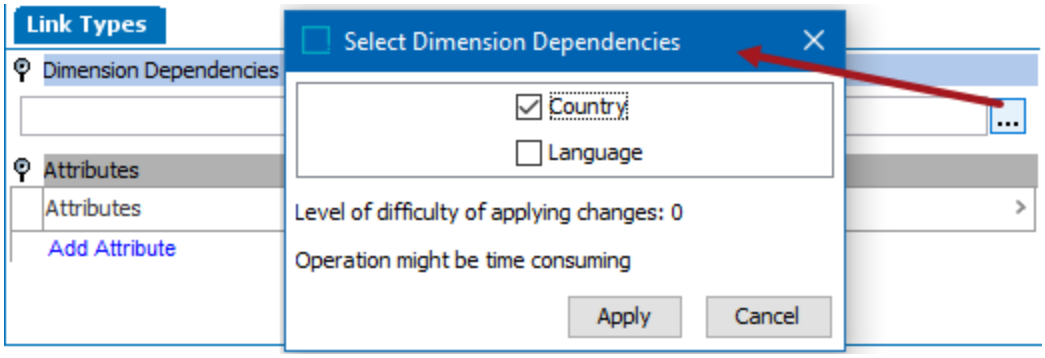
Only the default attribute link types can exist in STEP. Unlike references, user-created types are not allowed. The settings on the default attribute link types are applied to all 'Product Attribute Link Type' and 'Classification Attribute Link Type' used in the database.

Note: Setup is the same for both the Product Attribute Link Type and the Classification Attribute Link Type.

1. To set up an attribute link type for dimension dependencies or metadata attributes, in System Setup > Reference Types > click the desired attribute link type to display the editor.

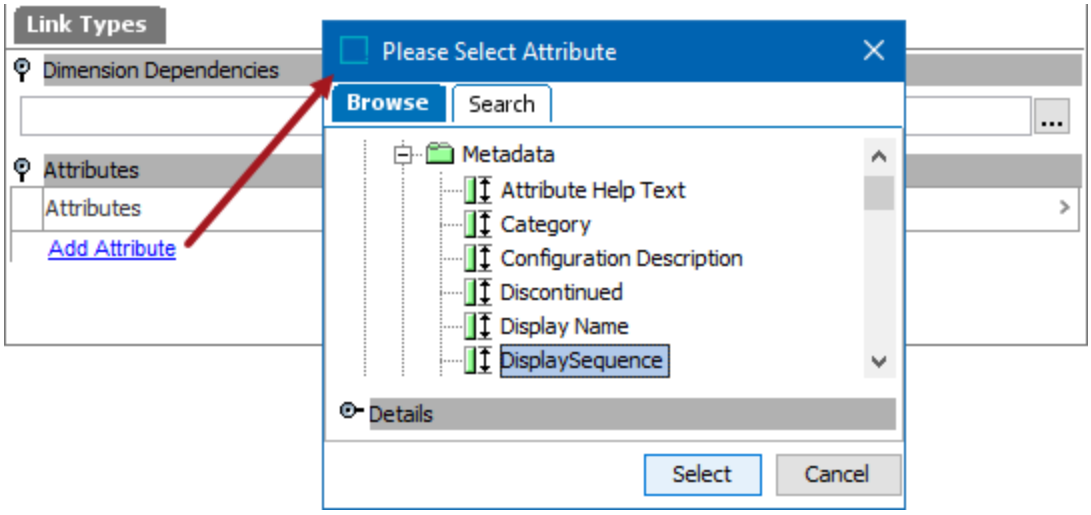


2. If required, set the dimension dependencies on the Link Types tab, under the Dimension Dependencies flipper. Only one dimension is recommended if any, due to the increased complexity of managing more than one. Setting an attribute link type to be dimension dependent will allow variations of values on the linked specification attribute across dimension points, and by extension, contexts.



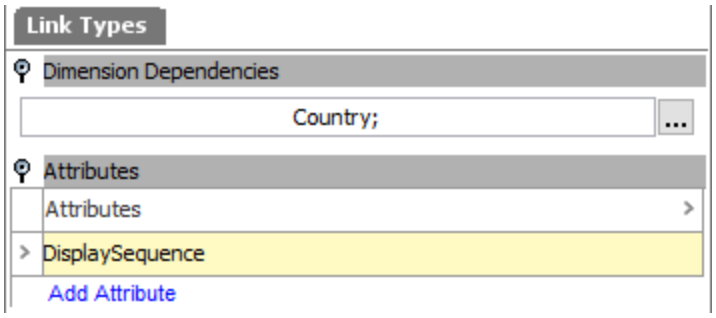
- Click the ellipsis button (...) to display the Select Dimension Dependencies dialog.
- Choose the required dimension(s).
- Click **Apply**.

3. If required, set metadata attributes on the Link Types tab, under the Attributes flipper. Specification attributes and groups cannot be added.

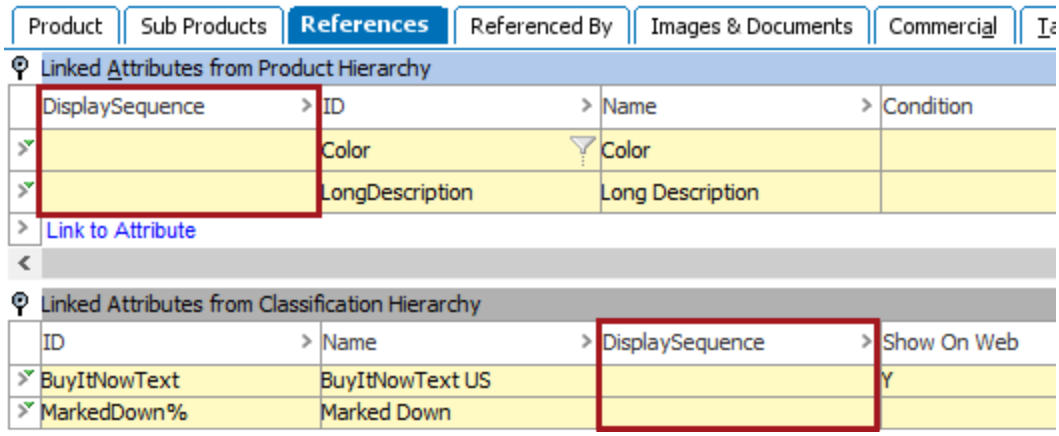


- Click the **Add Attribute** link to display the Select Attribute dialog.
- Browse or search for the required description attribute and choose it.
- Click **Select**.

4. The link type displays the selected dimension dependencies and metadata attributes.



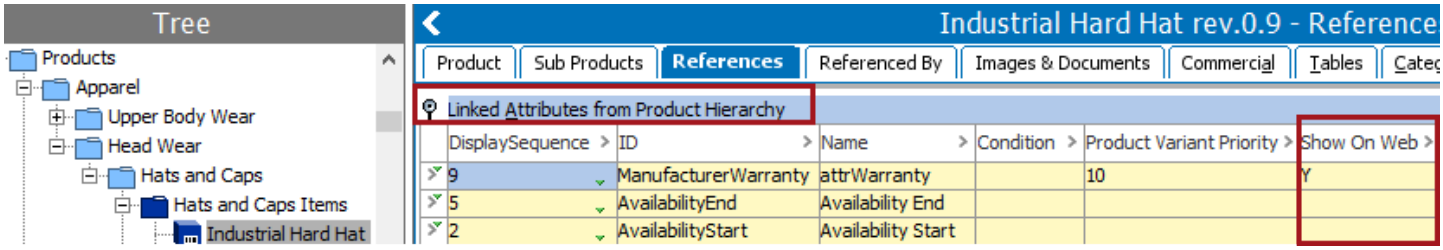
If the same metadata attribute is set for both attribute links, the product's References tab shows the attribute in both the 'Linked Attributes from Product Hierarchy' and the 'Linked Attributes from Classification Hierarchy' flippers.



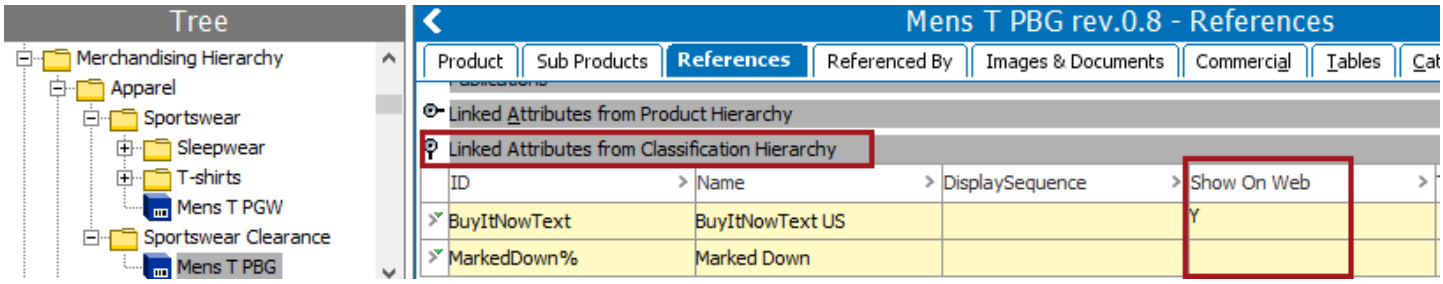
5. Add metadata values as described in **Maintaining Attribute Link Metadata Values**.

Maintaining Attribute Link Metadata Values

When a metadata attribute has been added to the **Product Attribute Link Type**, it is displayed on the References or Referenced By tabs under the 'Linked Attributes from Product Hierarchy' flipper for all linked attributes. In the image below, the 'Show on Web' description attribute is metadata on the product attribute link.



When a metadata attribute has been added to the **Classification Attribute Link Type**, it is displayed on the References or Referenced By tabs under the 'Linked Attributes from Classification Hierarchy' flipper for all linked attributes. In the image below, the 'Show on Web' description attribute is metadata on the classification attribute link.



To add a new metadata attribute for an attribute link type, refer to the **Setting Up an Attribute Link Type**.

As defined in the sections below, values can be added for a metadata attribute on an attribute link type and can be:

- Inherited
- Written locally
- Made mandatory

Inherited Metadata Values

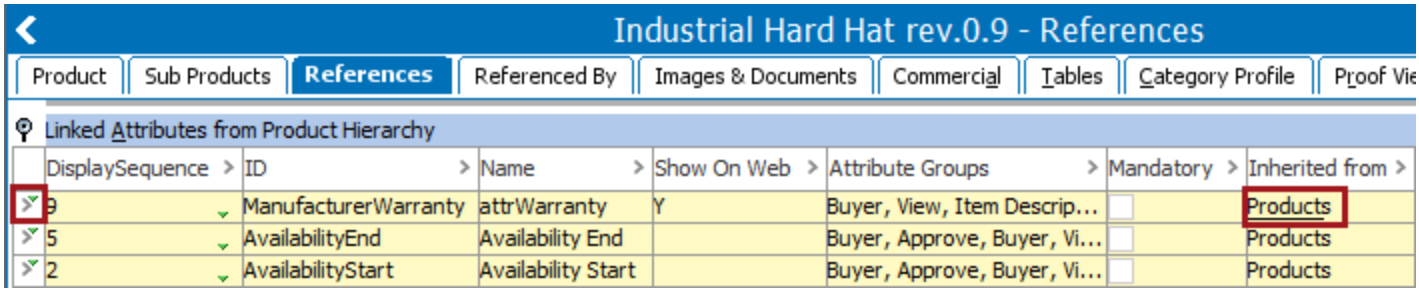
A value being inherited is indicated by the small green arrow ( ) in the first column of the list. Inherited values must be edited at the parent level, and are displayed as read-only for all children.

Use inheritance when the value is the same from all or most of the products from the 'Inherited from' level and below.

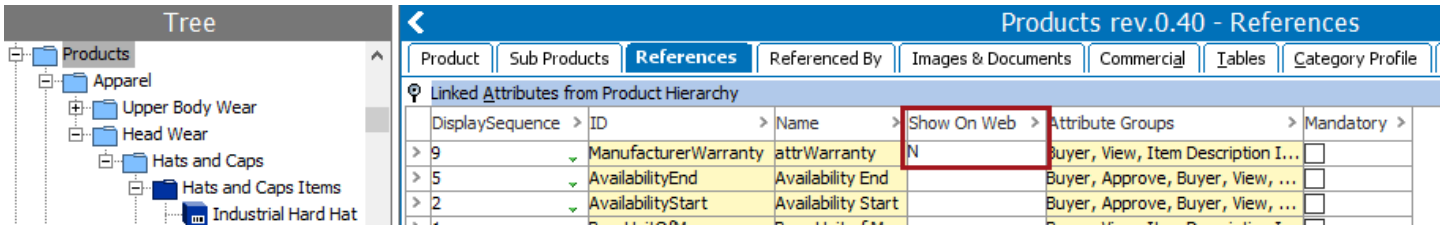
Edit an Inherited Value

Note: Although the following images show the Product Attribute Link, the process is the same for Classification Attribute Link maintenance.

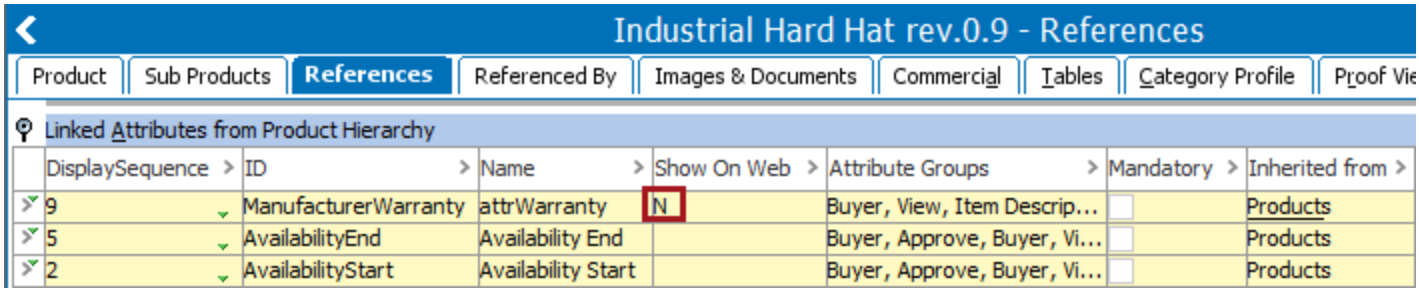
1. Click the link in the 'Inherited from' column to display the parent object where the value is being held.



2. Edit the value on the parent object. Also note that the 'Inherited from' column is not displayed for a parent object.



All children display the new value.



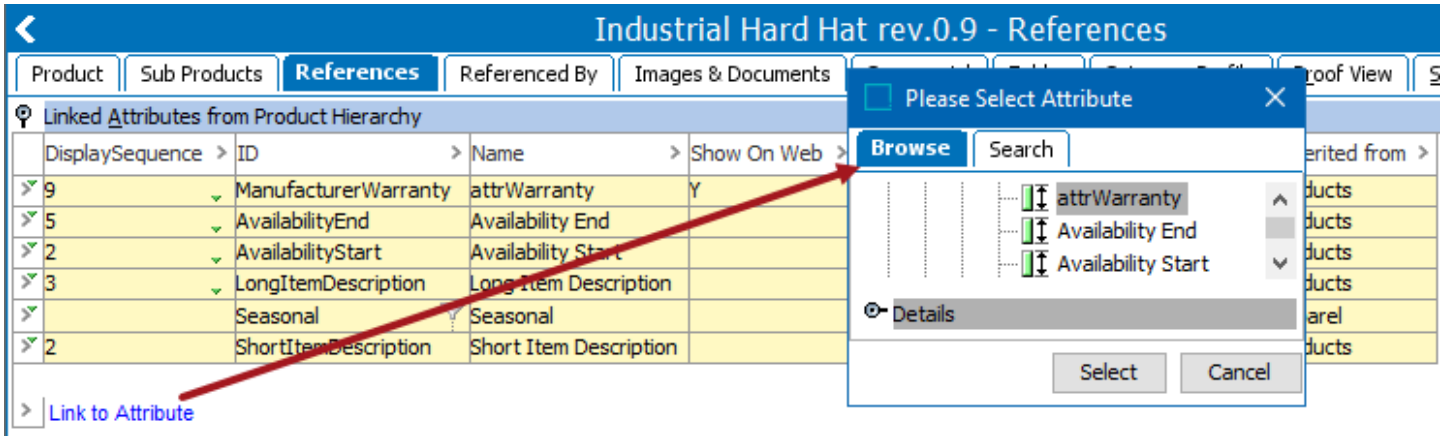
Local Metadata Values

A local value overwrites any inherited value from a higher level and can be edited. It is indicated by the absence of the small green arrow (›) in the first column of the list and the absence of the data in the 'Inherited from' column.

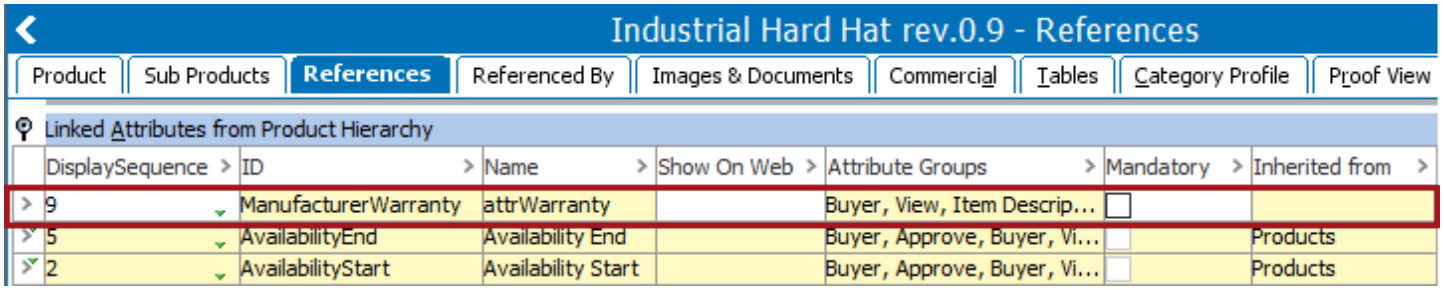
Add a Local Value

Note: Although the following images show the Product Attribute Link, the process is the same for Classification Attribute Link maintenance.

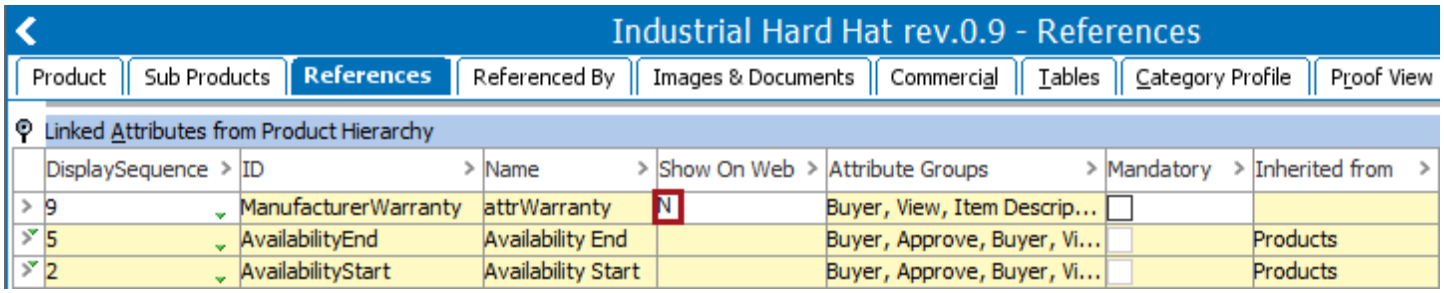
1. On the product References or Referenced By tabs, open the 'Linked Attributes from Product Hierarchy' (or 'Linked Attributes from Classification Hierarchy') flipper.
2. Click the **Link to Attribute** link to display the Select Attribute dialog.
3. Choose a specification attribute (description attributes are not allowed) and click the **Select** button.



4. Now that the attribute can be edited, add a local value.



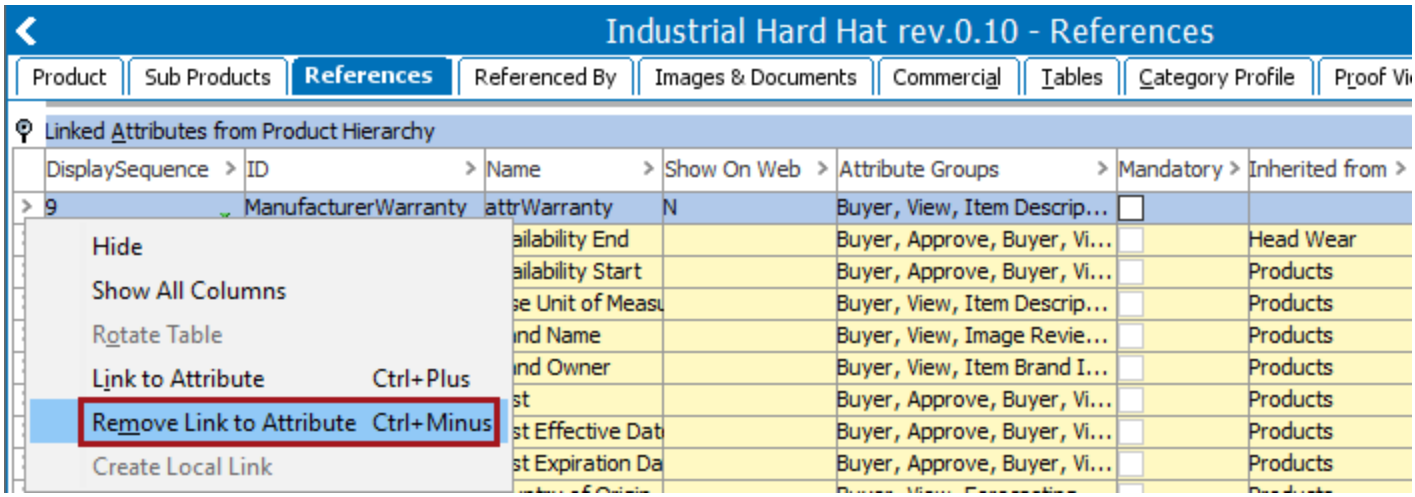
The local value shows at the level where it is added, and at any lower levels, via inheritance.



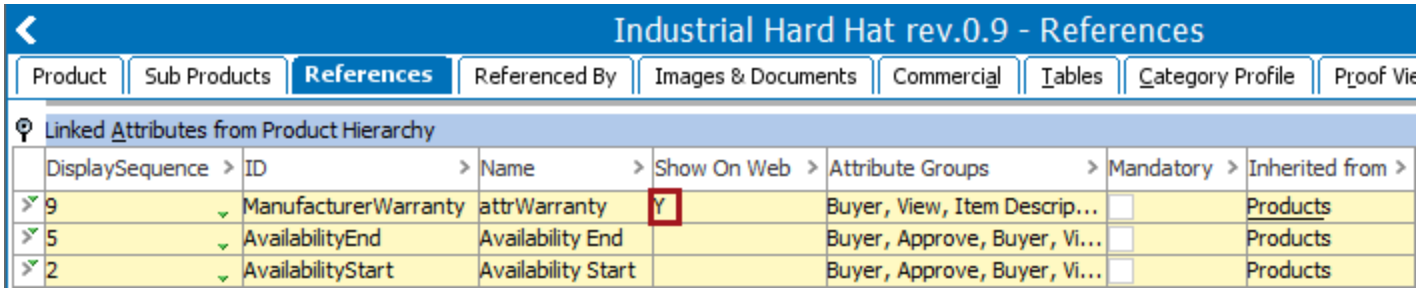
Restore an Inherited Value

Note: Although the following images show the Product Attribute Link, the process is the same for Classification Attribute Link maintenance.

Click the arrow button on the row to display a menu and select **Remove Link to Attribute**. Other display options are also available on this menu.



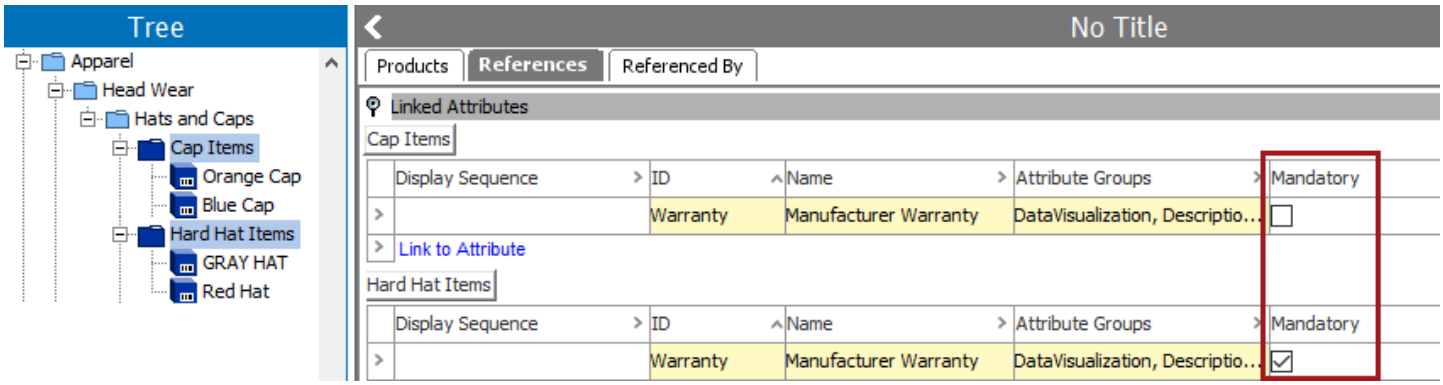
The inherited value is displayed again.



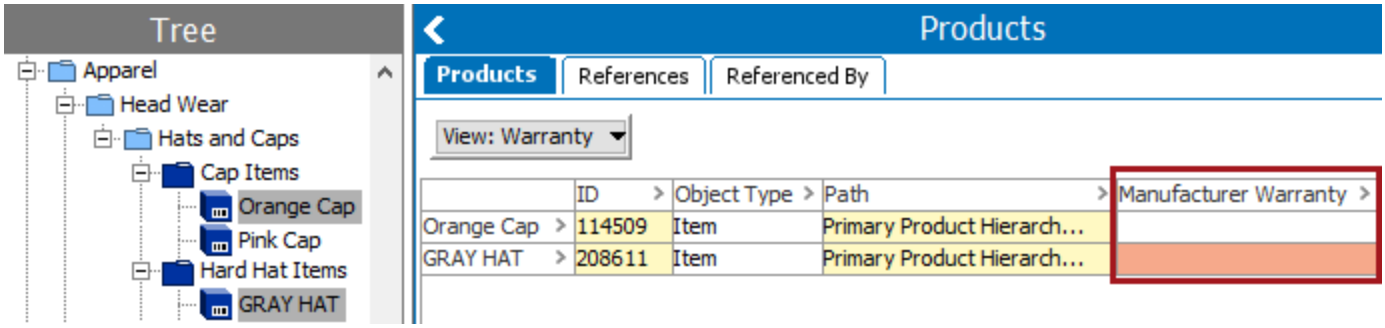
Mandatory Linked Attribute Values

The mandatory checkbox allows the attribute value to be required at the level in the hierarchy where the link is created. This provides a way to have an attribute that is available for all objects of the valid type, while only making it mandatory when the object types reside in a particular location.

For example, the 'Manufacturer Warranty' attribute is required for hard hats, but is not necessary on ball caps.



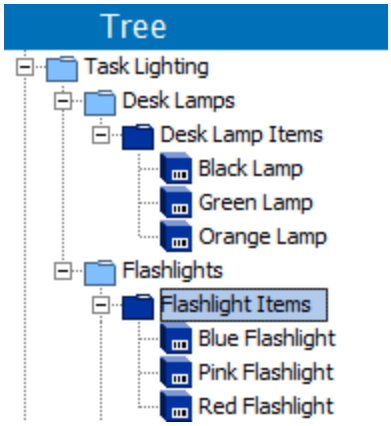
When viewing objects below the mandatory settings, one shows with a white background because it is not mandatory, and the other has a red background because it is mandatory.



Product Attribute Link Type

The Product Attribute Link Type is pre-configured, and allows a specification attribute to be available when the product is a child of the selected level of the PPH (primary product hierarchy). This reduces the number of unnecessary attributes displayed in the product editor.

For example, consider a PPH where one set of products requires batteries and the other set does not. In the following PPH, the 'Desk Lamps' level does not need battery values, but the 'Flashlights' level does. Instead of making battery information available at all levels via the object type, the product attribute link is used to display the attribute only where it is needed.



With additional setup, the Product Attribute Link Type can also include dimension dependency and metadata attributes as described below.

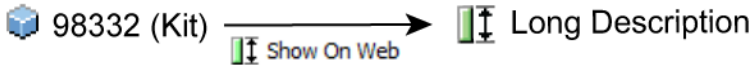
Dimension Dependency

Dimension dependencies are not recommended for product attribute link types.

Metadata Attributes

Metadata (description) attributes enable you to control when the linked attribute is published based on an additional setting.

For example, a description attribute named 'Show on Web' has been added to the Product Attribute Link Type. This description attribute holds the value 'yes' or 'no' and indicates if the specification attribute 'Long Description' should be displayed on the web. The description attribute 'Show on Web' will be available on all attributes on the References tab under the 'Linked Attributes from Product Hierarchy' flipper.



For more information, refer to **Description Attributes**.

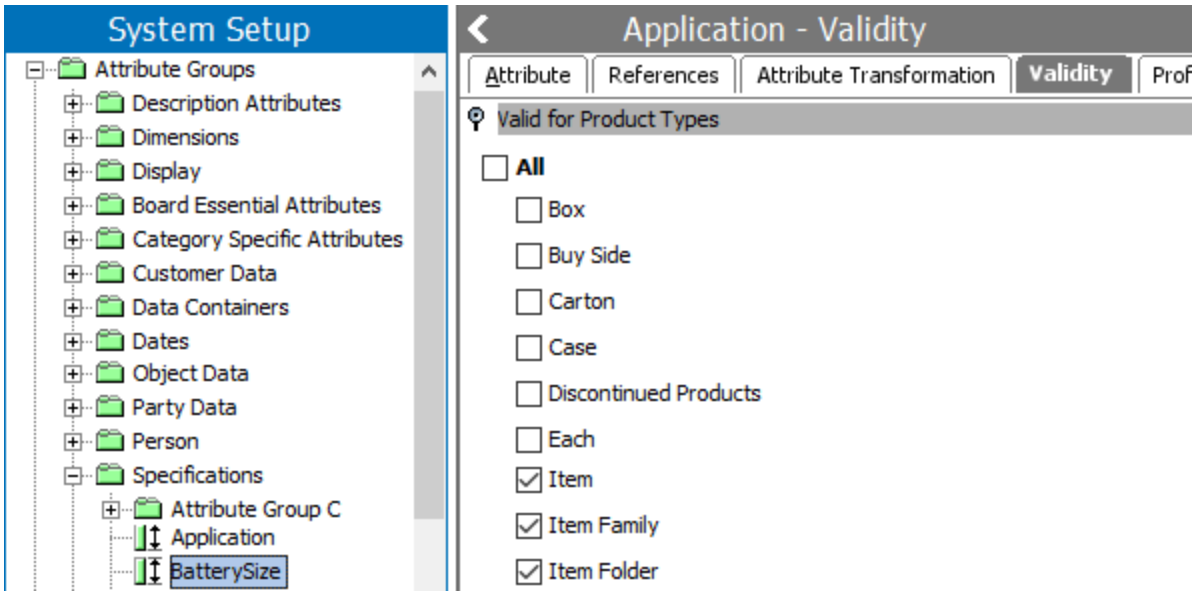
For information on creating a product attribute link type, refer to **Setting Up an Attribute Link Type**.

For information on creating a product attribute link, refer to **Creating a Product Attribute Link**.

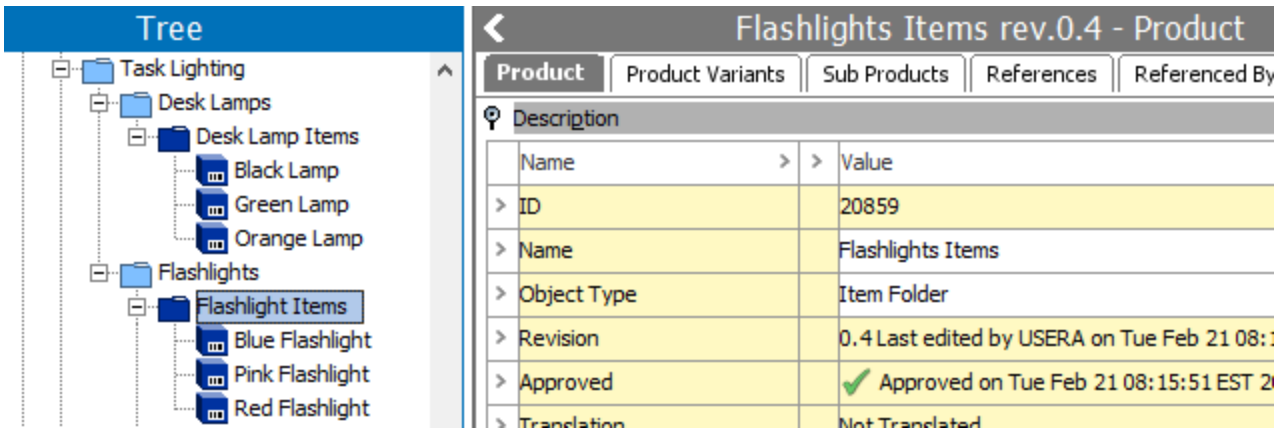
Creating a Product Attribute Link

Adding a product attribute link allows a specification attribute to be available when the object is a child of the selected level of the PPH (primary product hierarchy).

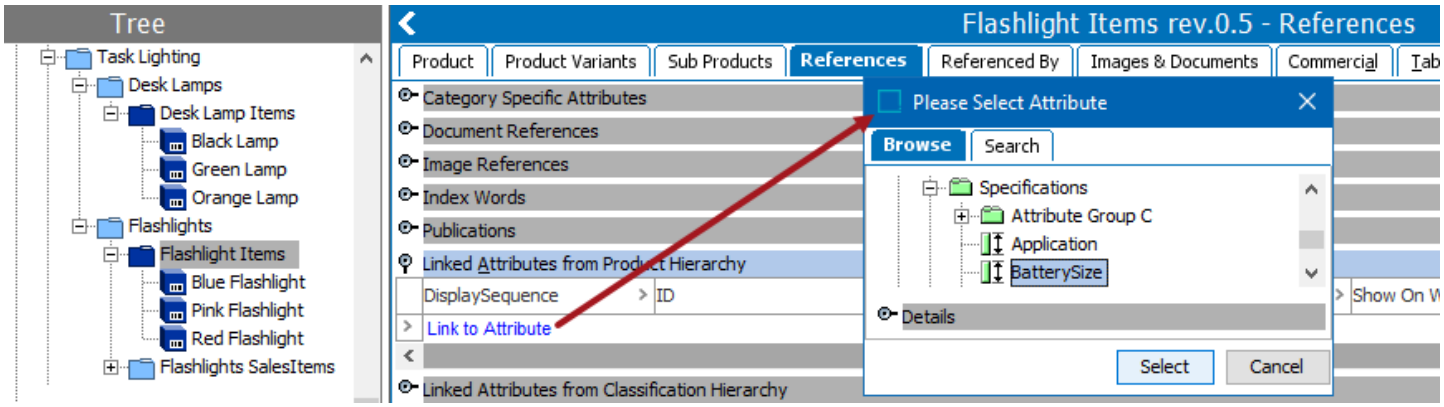
1. In System Setup, verify that the specification attribute to be linked has Validity that includes the objects in the intended levels of the PPH.



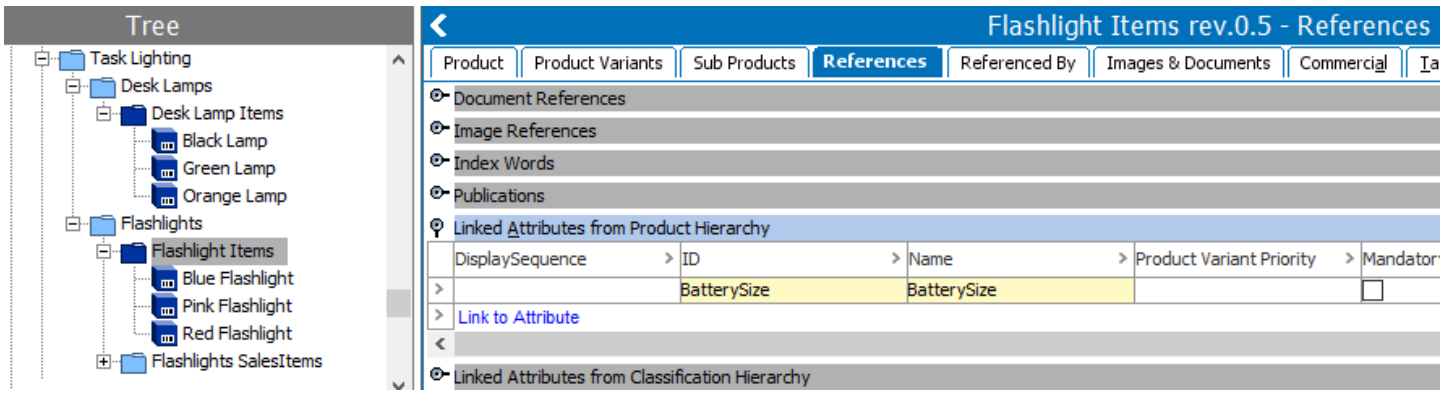
2. On Tree, select the PPH that should display the specification attribute.



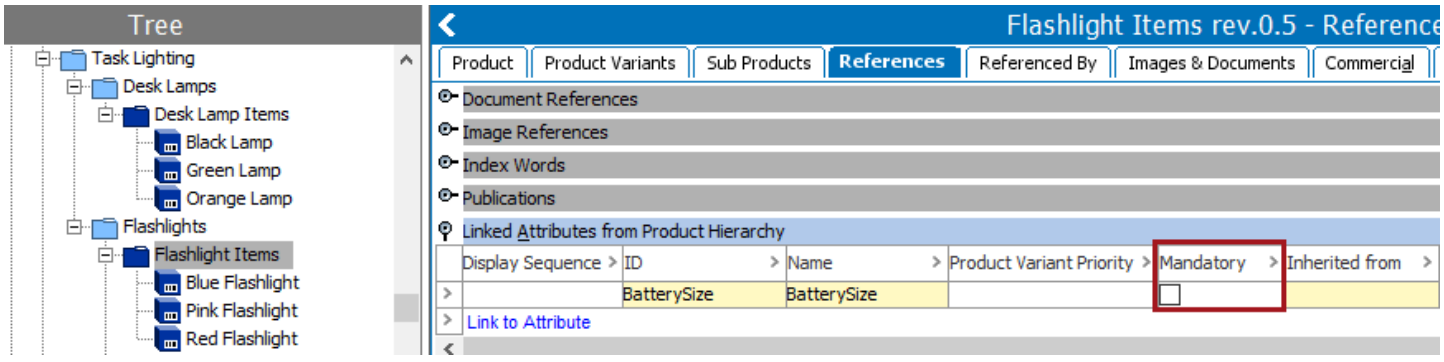
3. On the References or Referenced By tabs > 'Linked Attributes from Product Hierarchy' flipper> click the 'Link to Attribute' link to display the Select Attribute dialog.



4. Note the attribute group of the desired specification attribute, choose the attribute, and click the Select button. The specification attribute is displayed under the Attributes flipper.

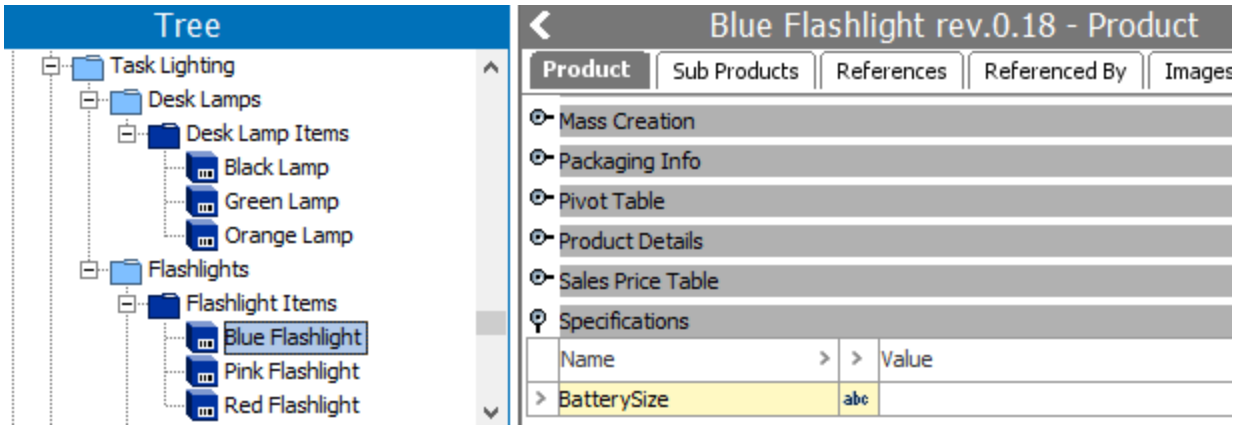


5. Optionally, scroll to the right to display the Mandatory column. If the attribute value is required at the linked location, check the checkbox.

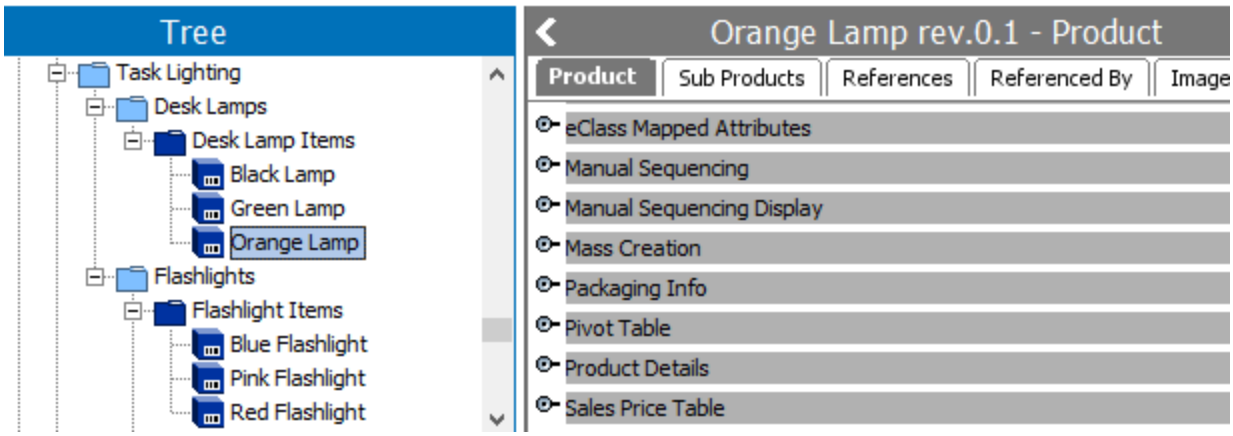


For more information on Mandatory settings, refer to the **Mandatory Linked Attribute Values** section of the **Maintaining Attribute Link Metadata Values** topic in this guide.

6. Select an object in the linked PPH level, open the attribute group flipper identified previously, and verify that the linked attribute is available. The mandatory visual indicator is also present if the Mandatory checkbox is checked.



Note that other objects of the same type, but that are linked into a different PPH level, do not include the specification attribute (the flipper is absent).



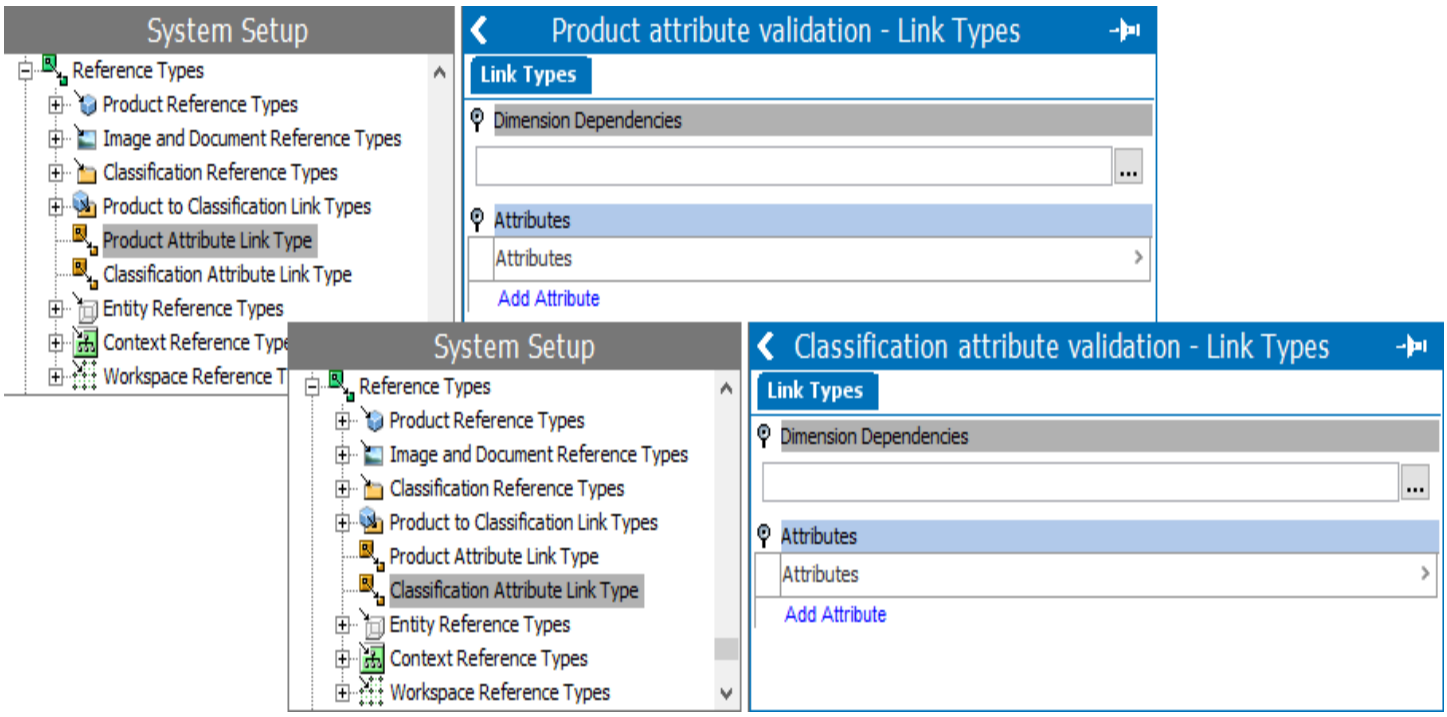
Setting Up an Attribute Link Type

The 'Product Attribute Link Type' and the 'Classification Attribute Link Type' are pre-configured. By default, linked attributes are displayed for the selected product hierarchy or classification hierarchy. If dimension dependency or metadata attributes are required, use the following steps to further configure the appropriate link type.

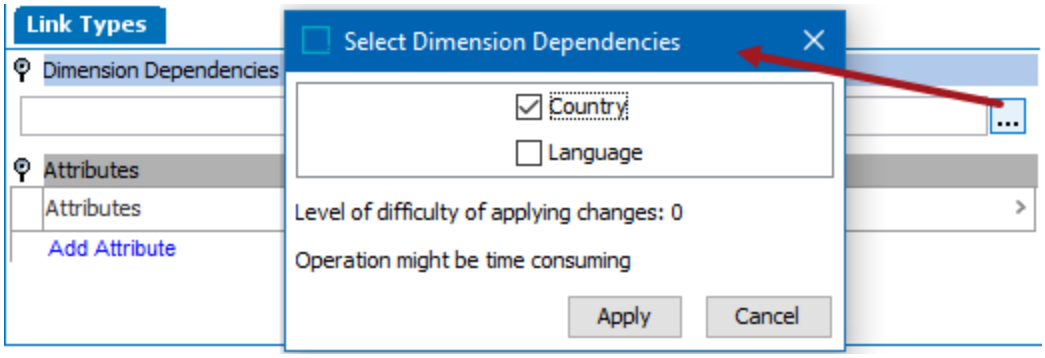
Only the default attribute link types can exist in STEP. Unlike references, user-created types are not allowed. The settings on the default attribute link types are applied to all 'Product Attribute Link Type' and 'Classification Attribute Link Type' used in the database.

Note: Setup is the same for both the Product Attribute Link Type and the Classification Attribute Link Type.

1. To set up an attribute link type for dimension dependencies or metadata attributes, in System Setup > Reference Types > click the desired attribute link type to display the editor.

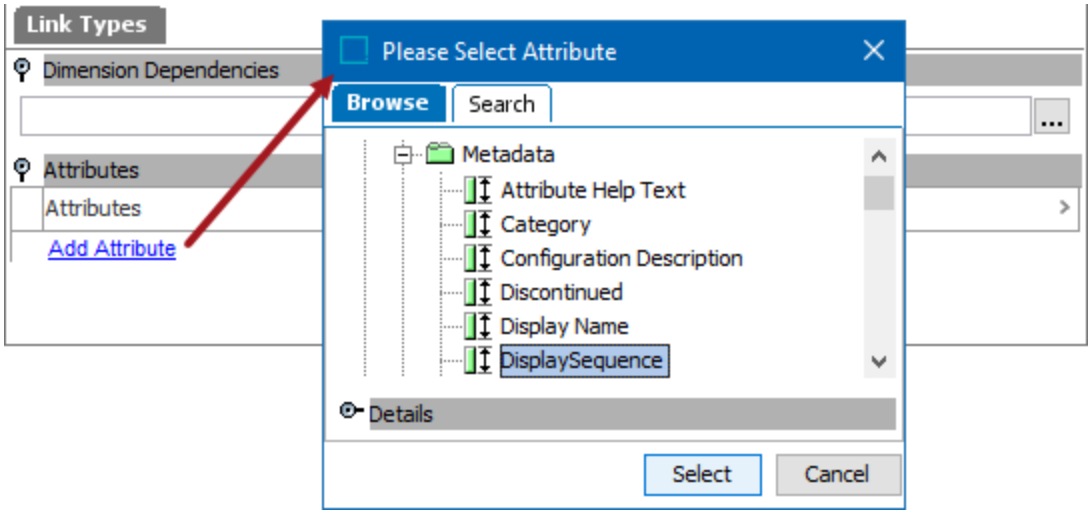


2. If required, set the dimension dependencies on the Link Types tab, under the Dimension Dependencies flipper. Only one dimension is recommended if any, due to the increased complexity of managing more than one. Setting an attribute link type to be dimension dependent will allow variations of values on the linked specification attribute across dimension points, and by extension, contexts.



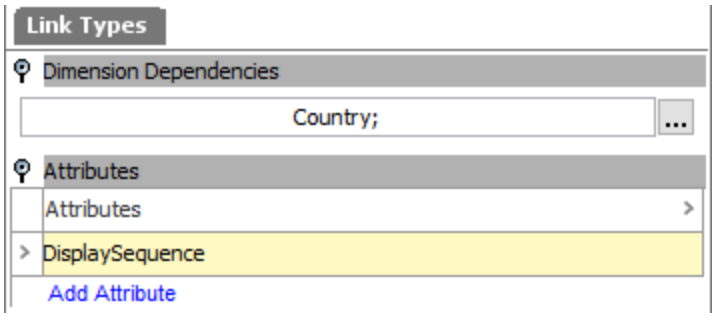
- Click the ellipsis button (...) to display the Select Dimension Dependencies dialog.
- Choose the required dimension(s).
- Click **Apply**.

3. If required, set metadata attributes on the Link Types tab, under the Attributes flipper. Specification attributes and groups cannot be added.

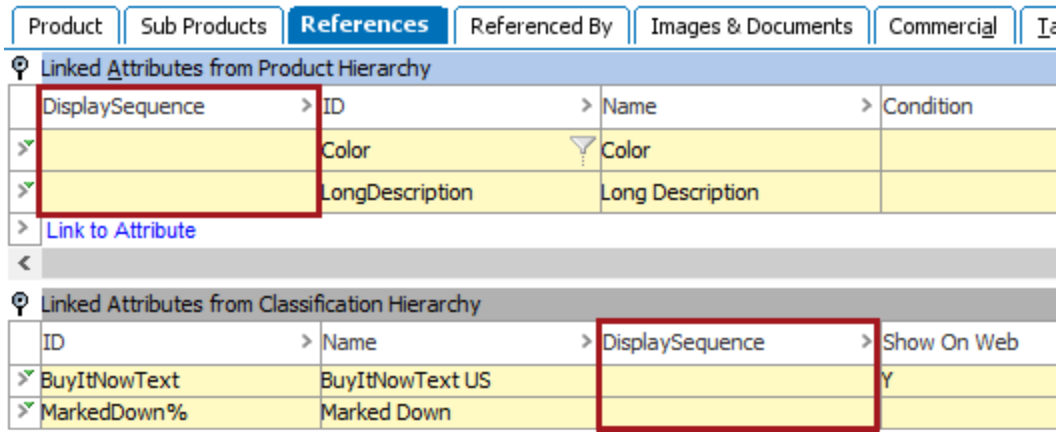


- Click the **Add Attribute** link to display the Select Attribute dialog.
- Browse or search for the required description attribute and choose it.
- Click **Select**.

4. The link type displays the selected dimension dependencies and metadata attributes.



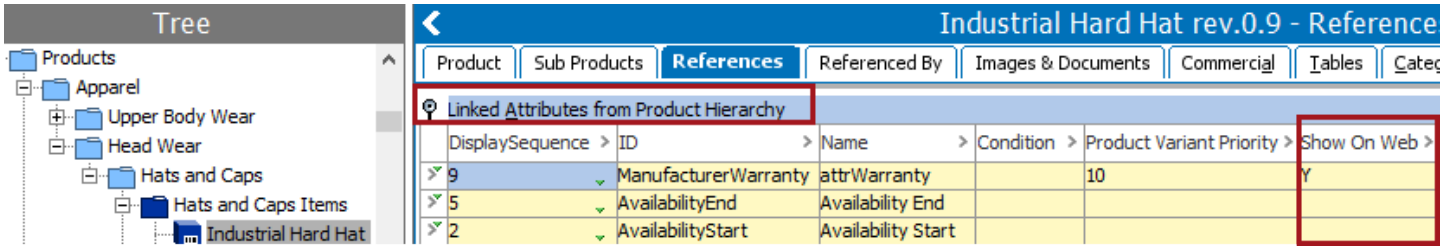
If the same metadata attribute is set for both attribute links, the product's References tab shows the attribute in both the 'Linked Attributes from Product Hierarchy' and the 'Linked Attributes from Classification Hierarchy' flippers.



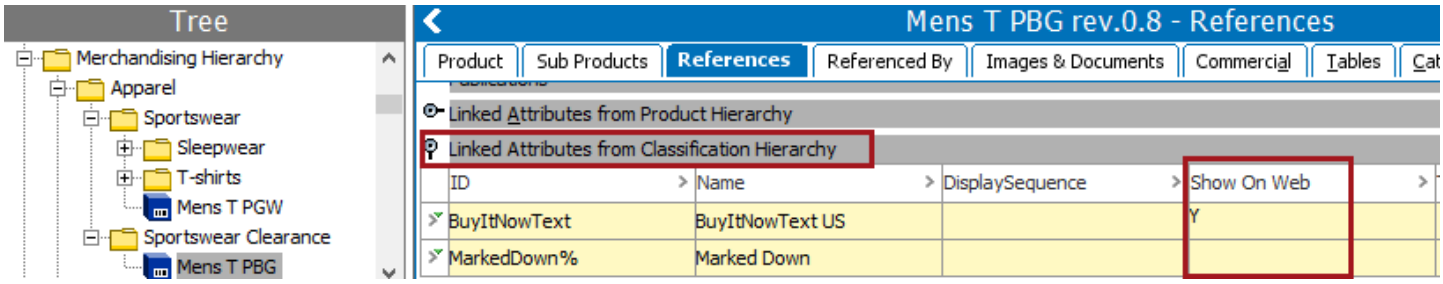
5. Add metadata values as described in **Maintaining Attribute Link Metadata Values**.

Maintaining Attribute Link Metadata Values

When a metadata attribute has been added to the **Product Attribute Link Type**, it is displayed on the References or Referenced By tabs under the 'Linked Attributes from Product Hierarchy' flipper for all linked attributes. In the image below, the 'Show on Web' description attribute is metadata on the product attribute link.



When a metadata attribute has been added to the **Classification Attribute Link Type**, it is displayed on the References or Referenced By tabs under the 'Linked Attributes from Classification Hierarchy' flipper for all linked attributes. In the image below, the 'Show on Web' description attribute is metadata on the classification attribute link.



To add a new metadata attribute for an attribute link type, refer to the **Setting Up an Attribute Link Type**.

As defined in the sections below, values can be added for a metadata attribute on an attribute link type and can be:

- Inherited
- Written locally
- Made mandatory

Inherited Metadata Values

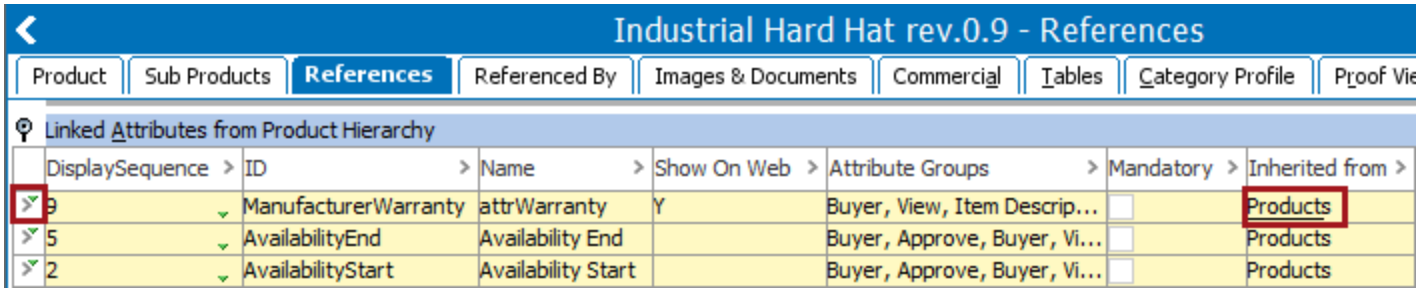
A value being inherited is indicated by the small green arrow ( ) in the first column of the list. Inherited values must be edited at the parent level, and are displayed as read-only for all children.

Use inheritance when the value is the same from all or most of the products from the 'Inherited from' level and below.

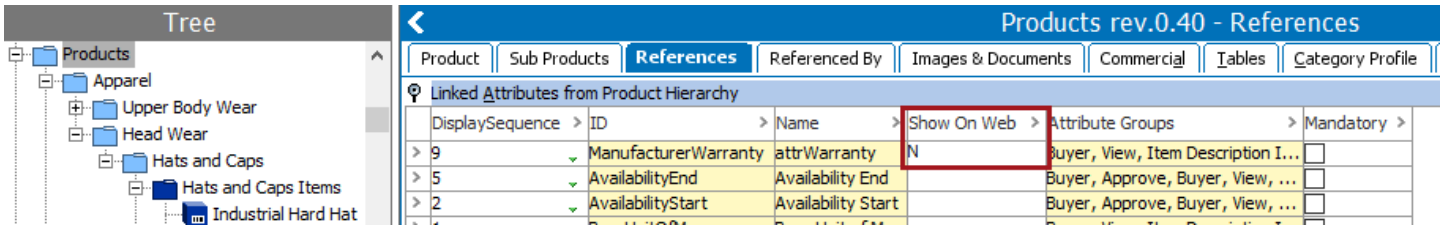
Edit an Inherited Value

Note: Although the following images show the Product Attribute Link, the process is the same for Classification Attribute Link maintenance.

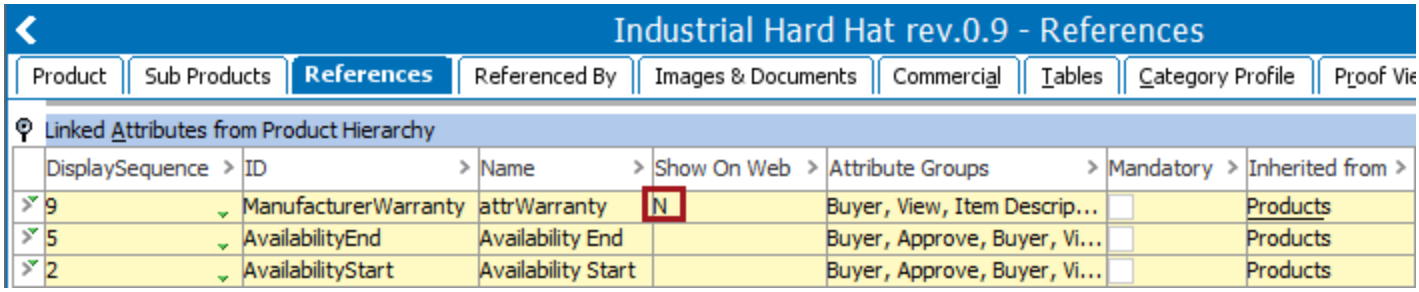
1. Click the link in the 'Inherited from' column to display the parent object where the value is being held.



2. Edit the value on the parent object. Also note that the 'Inherited from' column is not displayed for a parent object.



All children display the new value.



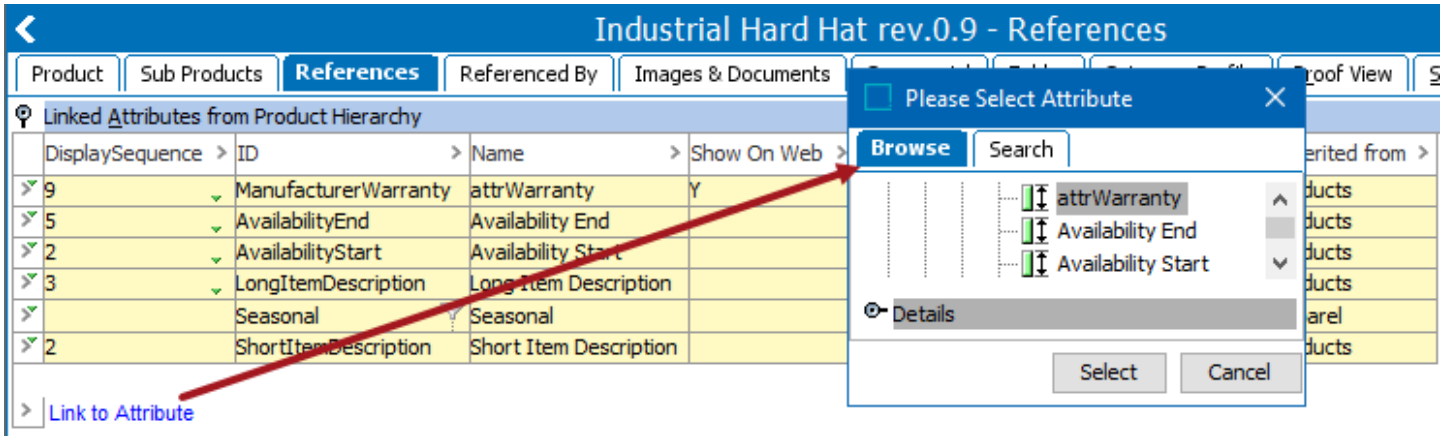
Local Metadata Values

A local value overwrites any inherited value from a higher level and can be edited. It is indicated by the absence of the small green arrow (›) in the first column of the list and the absence of the data in the 'Inherited from' column.

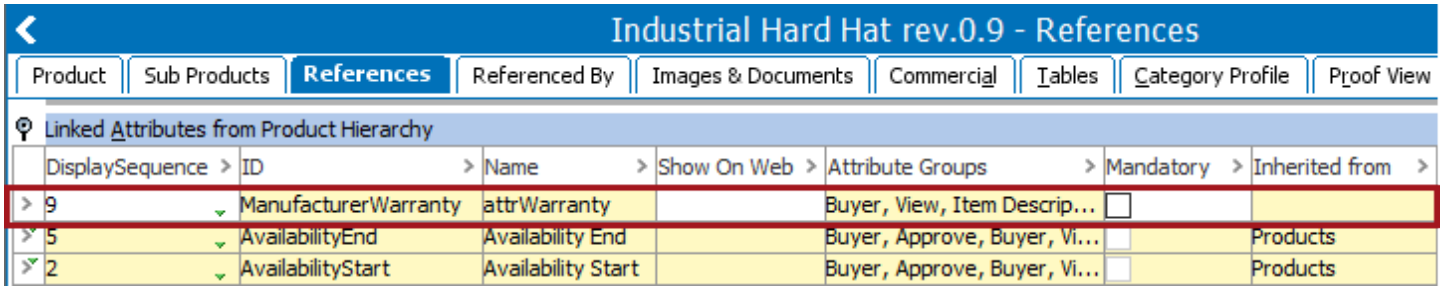
Add a Local Value

Note: Although the following images show the Product Attribute Link, the process is the same for Classification Attribute Link maintenance.

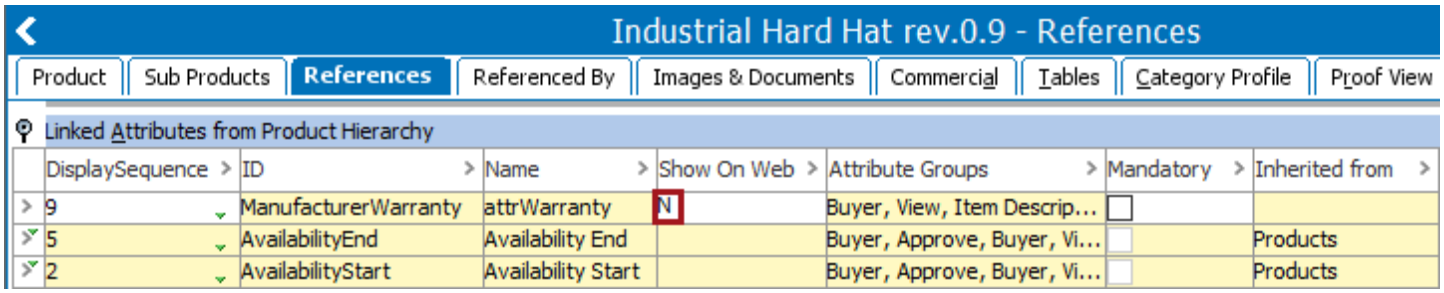
1. On the product References or Referenced By tabs, open the 'Linked Attributes from Product Hierarchy' (or 'Linked Attributes from Classification Hierarchy') flipper.
2. Click the **Link to Attribute** link to display the Select Attribute dialog.
3. Choose a specification attribute (description attributes are not allowed) and click the **Select** button.



4. Now that the attribute can be edited, add a local value.



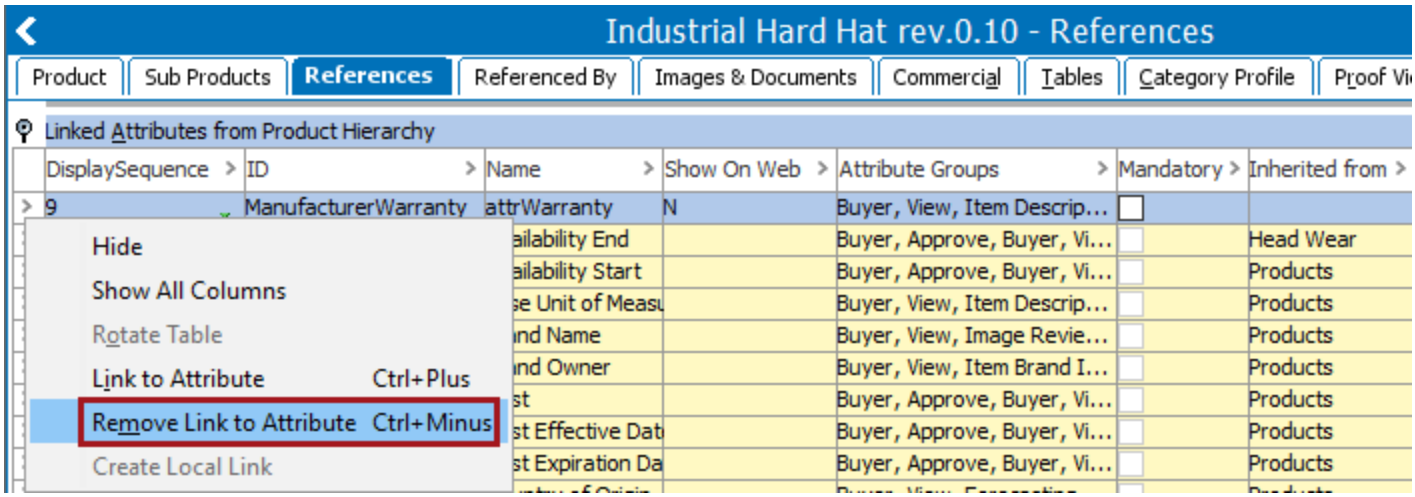
The local value shows at the level where it is added, and at any lower levels, via inheritance.



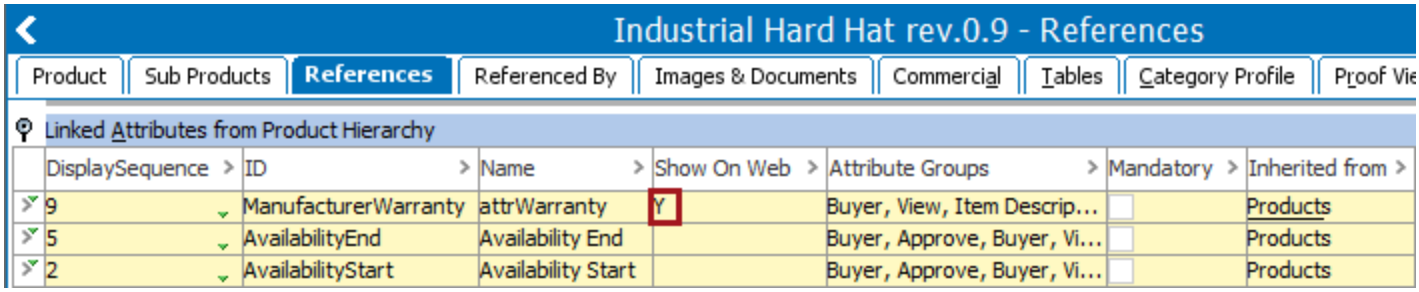
Restore an Inherited Value

Note: Although the following images show the Product Attribute Link, the process is the same for Classification Attribute Link maintenance.

Click the arrow button on the row to display a menu and select **Remove Link to Attribute**. Other display options are also available on this menu.



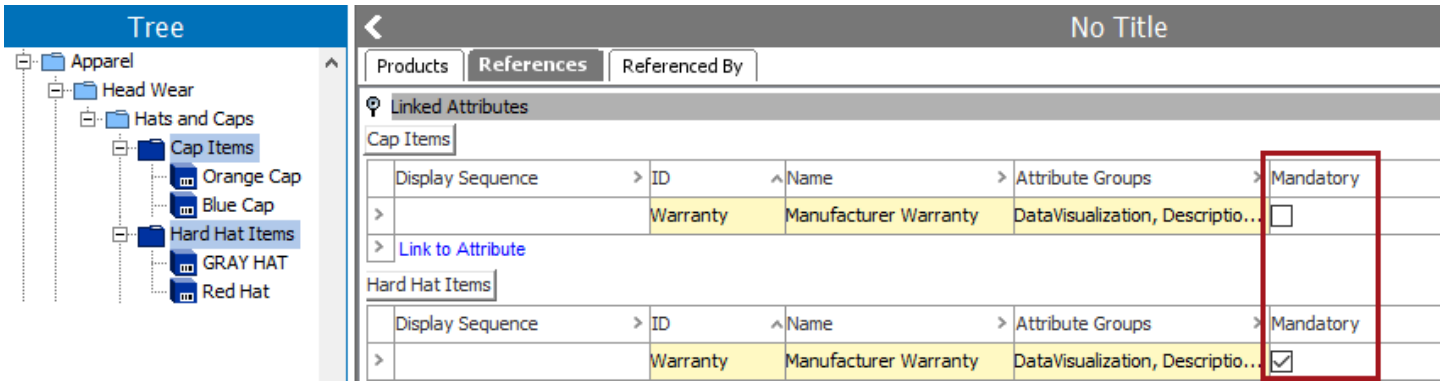
The inherited value is displayed again.



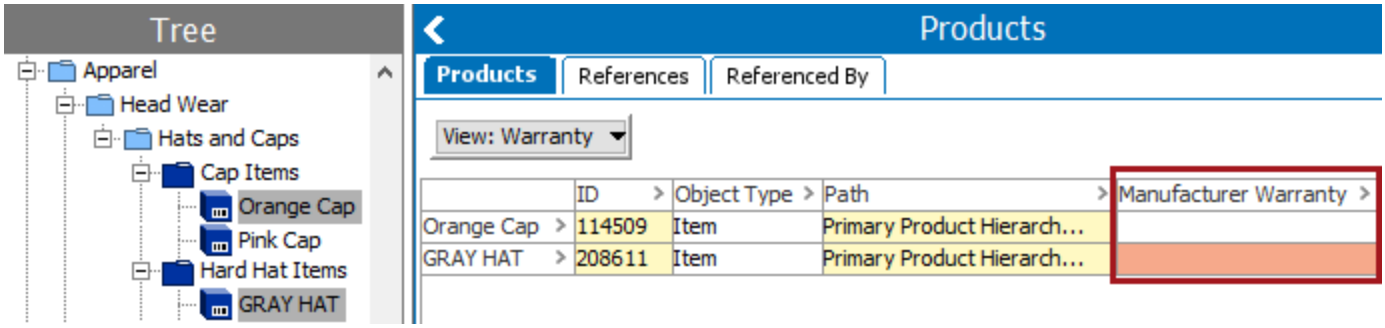
Mandatory Linked Attribute Values

The mandatory checkbox allows the attribute value to be required at the level in the hierarchy where the link is created. This provides a way to have an attribute that is available for all objects of the valid type, while only making it mandatory when the object types reside in a particular location.

For example, the 'Manufacturer Warranty' attribute is required for hard hats, but is not necessary on ball caps.



When viewing objects below the mandatory settings, one shows with a white background because it is not mandatory, and the other has a red background because it is mandatory.



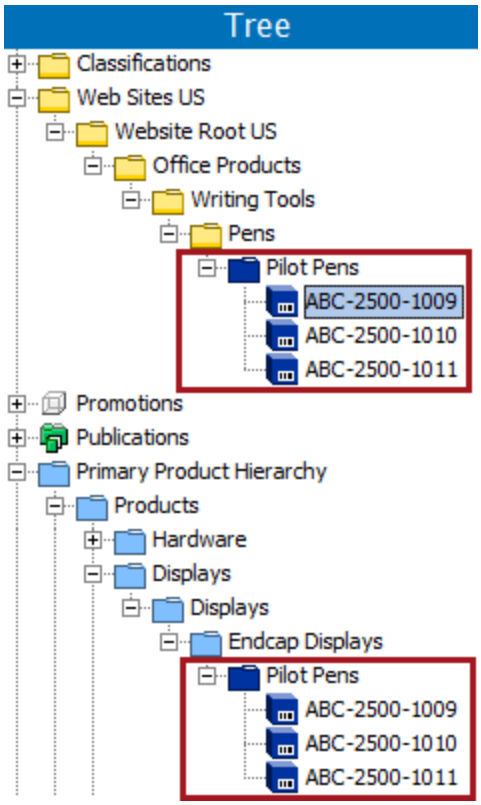
Product to Classification Link Types

A Product to Classification Link Type defines a set of rules for linking products into classifications. This link type displays the products under the linked classification folder as a parent / child relationship, which is how it differs from a classification reference type where the source is a product and the target is a classification.

Products should only be added to the PPH (primary product hierarchy) once. A product displayed within a classification folder is a shortcut to the actual object in the primary product hierarchy. Regardless of the number of classification folders that display the product, they all have the same ID and are the same object. Edits made to the product are displayed in all places that display that ID.

Note: Deleting an object from a classification folder deletes every instance of the object. To remove a product from a classification folder, while continuing to display it in the PPH, only remove the product to classification link from the product's References tab.

For example, in the image below, the pen products classified into 'Writing Tools' are the same products that are displayed in the primary product hierarchy. Since a Product to Classification Link Type controls which products are valid to be linked into the 'Writing Tools' classification, it can be configured to allow pens to be linked into 'Writing Tools,' and also prevent products like hammers from being linked.



Consider the following elements when setting up a product to classification link type:

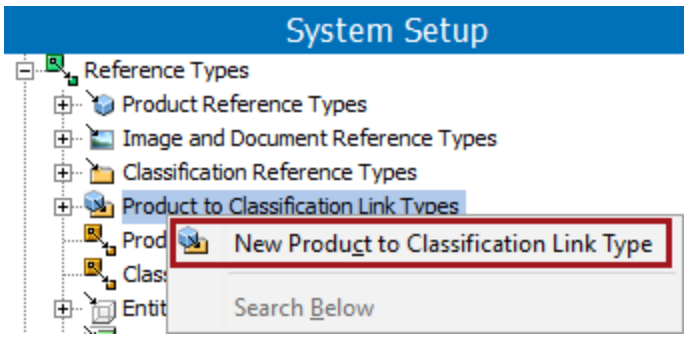
- Adding a link to an attribute group allows grouping of references and links, customized views, and added security via user group privileges. For more information, refer to **Attribute Groups for Reference and Link Types**.
- Dimension dependency determines if the link is displayed in a context, based on the selected dimension point. Metadata is not shared between dimension points, so values must be added for each link. For more information, refer to **Dimension Dependent Reference and Link Types**.
- Metadata attributes on a link allow description attributes to supply additional information about the link itself. For more information, refer to **Metadata Attributes on Reference and Link Types**.
- Dimension dependent links are displayed based on the Visibility setting. For more information, refer to **Visibility of Reference and Link Types**.

To create a product to classification link type, follow the steps outlined in **Creating a Product to Classification Link Type**.

Creating a Product to Classification Link Type

Adding a product-to-classification link type allows a product to be associated with a classification.

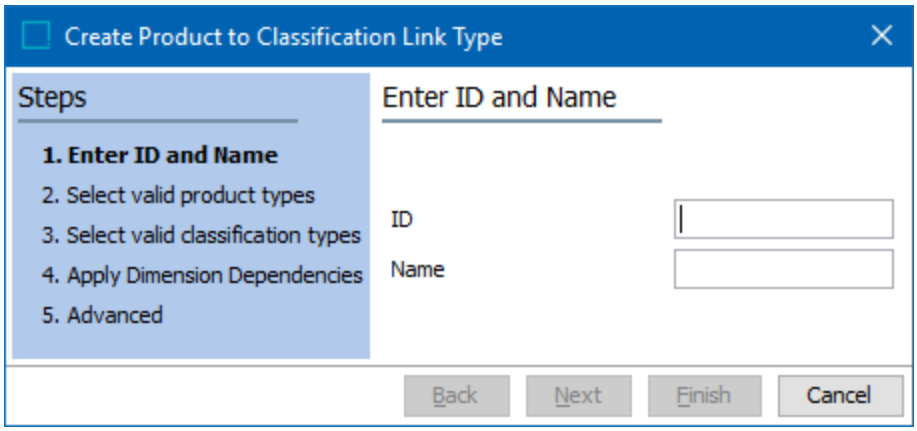
1. In System Setup > Reference Types > select **Product to Classification Link Type** > right-click, and choose the **New** option from the menu.



   For information on the attribute link types, refer to the **Product Attribute Link Type** topic or the **Classification Attribute Link Type** topic.

   For information on reference types, refer to the **Reference Types** topic.

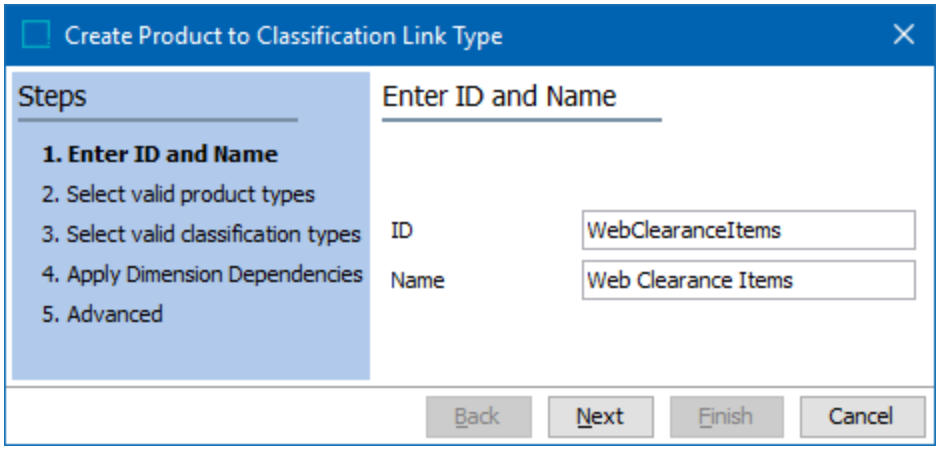
2. The Create Product to Classification Link Type wizard displays and includes the following steps:



   - **Enter ID and Name** allows you to identify the link.
   - **Select Valid Product Types** allows you to choose the types of products valid for this link.
   - **Select Valid Classification Types** allows you to choose the alternate classifications valid for this link.
   - **Apply Dimension Dependencies** allows you to define the dimension points that are affected by this link.
   - **Advanced** allows you to configure multiple references, set externally maintained, mandatory, and inheritance for the link.

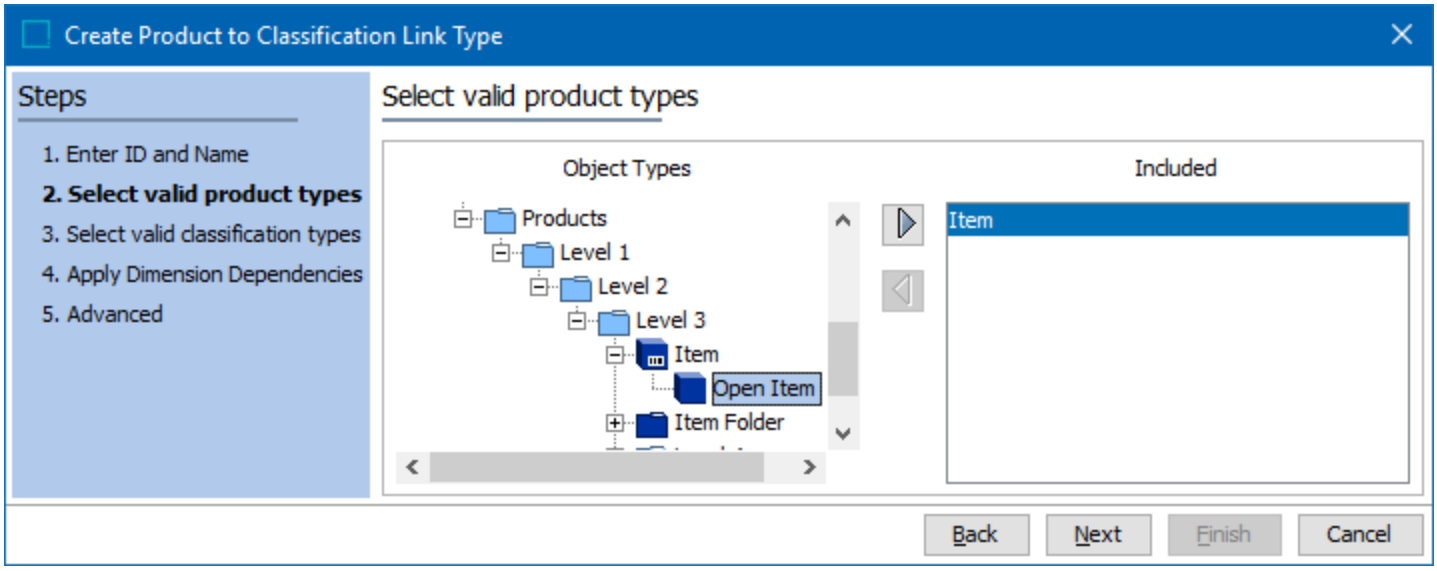
Once the reference type exists, create a reference between the two objects as outlined in **Creating a Product to Classification Link**.

Product to Classification Link Type - Enter ID and Name



1. Enter an **ID** for the link. Common setup is to use no spaces or punctuation.
2. Enter a **Name** for the link. Common setup is to repeat the ID with added spaces for readability.
3. Click the **Next** button to display **Product to Classification Link Type - Select Valid Product Types**.

Product to Classification Link Type - Select Valid Product Types

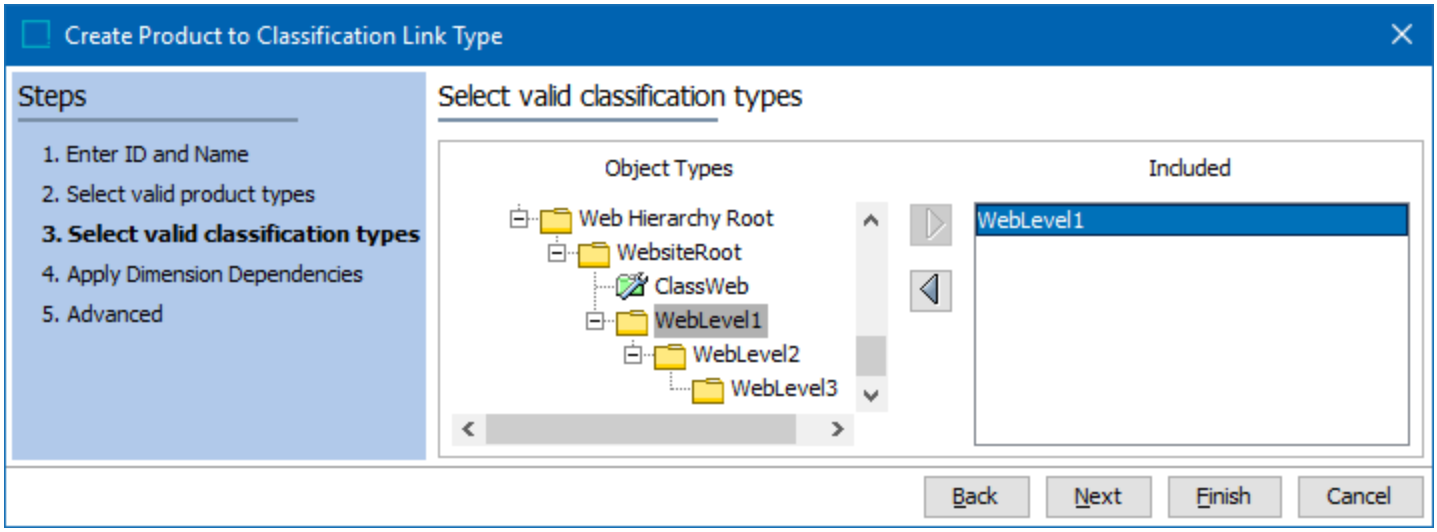


1. Use the displayed hierarchy to browse to and select one or more product object types of the reference. This is where the reference starts. For more information, refer to **Direction of a Reference**. Selecting an item from the Object Types pane enables the right arrow button.
2. Click the right arrow button ( ) to move each required selected object type to the Included pane. All objects in the Included pane will be valid for the Product to Classification Link type being created.

   Note: To remove an object type from the Included pane, first select the Included item, and then click the left arrow button ( ).

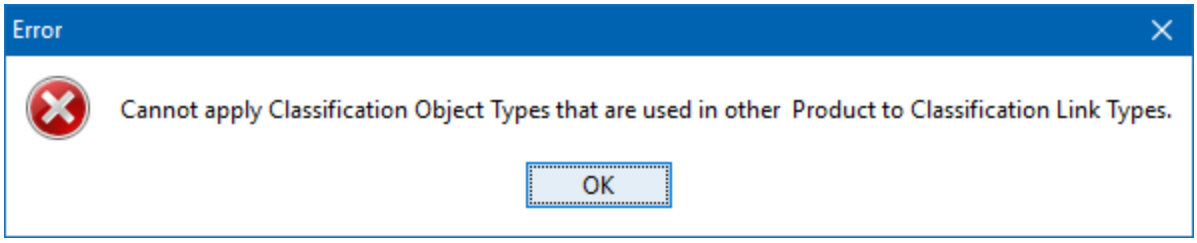
3. Click the **Next** button to display **Product to Classification Link Type - Select Valid Classification Types**.

Product to Classification Link Type - Select Valid Classification Types



1. Use the displayed hierarchy to browse to and select one or more classification object types of the reference. This is where the reference ends. For more information, refer to **Direction of a Reference**. Selecting an item from the Object Types pane enables the right arrow button.

   Each classification object type can only be used in one Product to Classification Link Type. A warning is displayed if you choose a classification that has already been selected for a product -to-classification link type.

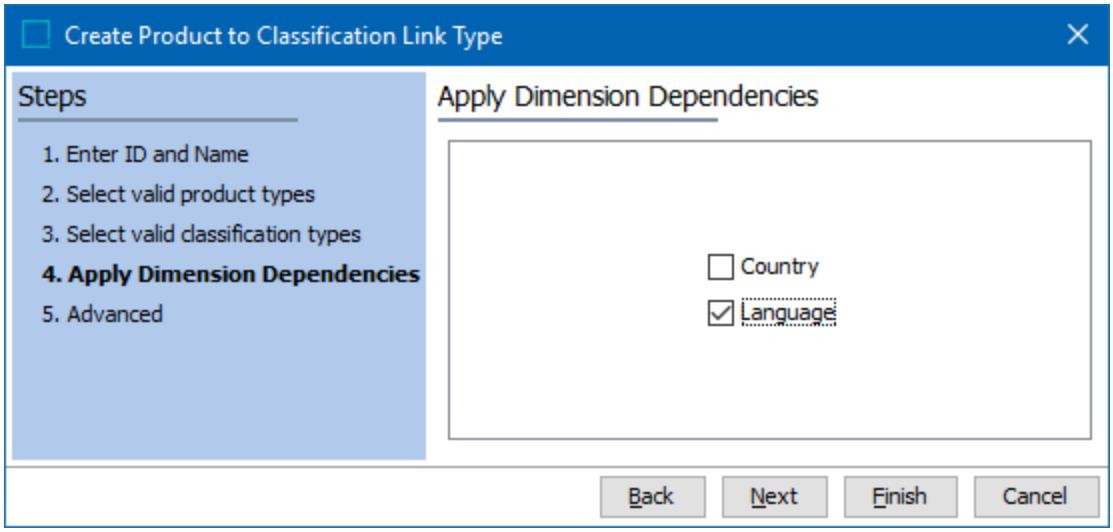


2. Click the right arrow button ( ) to move the selected object type to the Included pane. All objects in the Included pane will be valid for the Product to Classification Link type being created.

   Note: To remove an object type from the Included pane, first select the Included item, and then click the left arrow button ( ).

3. Click the **Next** button to display **Product to Classification Link Type - Apply Dimension Dependencies**.

Product to Classification Link Type - Apply Dimension Dependencies

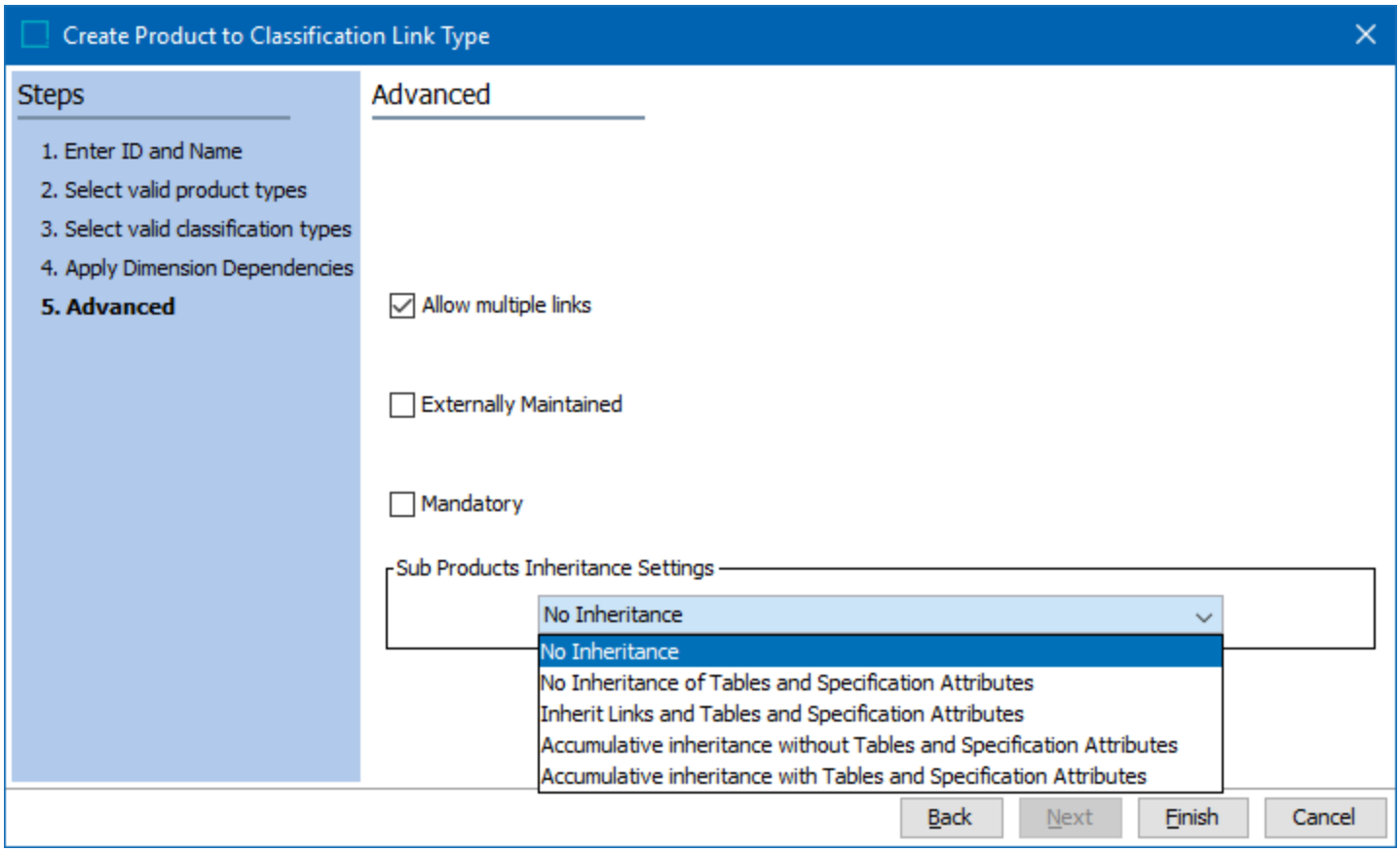


1. If the link type should be dimension dependent, select a dimension checkbox. Only one dimension is allowed for a link type. If multiple dimension dependencies are needed, create a separate link type.

   For more information about dimension dependencies, refer to the **Dimension Dependent Reference and Link Types** topic.

2. Click the **Next** button to display **Product to Classification Link Type - Advanced**.

Product to Classification Link Type - Advanced



1. **Allow Multiple Links** determines if more than one of this link type is allowed on a product and is indicated by the icon.
   - **Checked** means the link type can be used to link the same product of the valid product types to more than one classification of the valid classification types.
   - **Unchecked** means the link type is restricted to a single link a product of the valid product types to one classification of the valid classification types.
2. **Externally Maintained** determines if adding or modifying the link affects the Approved parameter on the product. When using an externally maintained link between product and classification, the link will automatically be included in all workspaces and the product will remain in its current approval status when the link is modified.
   - **Checked** means adding a link from a product to a classification will not require approved to display in the Approved workspace.
   - **Unchecked** means the link type is controlled by revision control and adding a link from a product and/or changing values on attributes applied to the link on the product will required approval to display in the Approved workspace.

Note: The product's approved status is reset (requires approval to display in the Approved workspace) if metadata attribute values are changed on the link and the metadata attributes are not externally maintained.

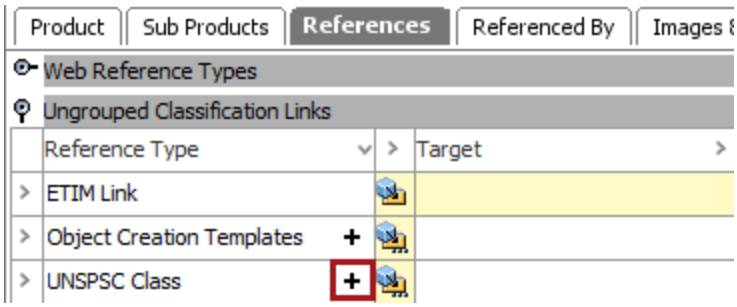
3. **Mandatory** determines if the link type is required for approval of the product and is indicated by the icon. The approval check for mandatory 'Product to Classification Link Type' is determined by the ownership of the link, which is set on the classification object types. For more information, refer to **Owns Product Links on Alternate Classifications Object Type**.
   - **Checked** means the link type is required from a product to a classification before the product can be approved.
   - **Unchecked** means the link type for a product to a classification is optional and does not affect approval of the product.
4. **Sub Products Inheritance Settings** determines if and how links are displayed on valid child objects below the product with respect to the Validity settings, and is indicated by the icon. For an illustration of the effects of each setting, refer to **Inheritance Example for a Product to Classification Link Type**.
   - **No Inheritance** means the product to classification link is not inherited to leaf nodes below the linked product. Specification attributes and table definitions applied on the classification are not inherited to any product linked to the classification.
   - **No Inheritance of Tables and Specification Attributes** means the link from product to classification is inherited to all leaf nodes below the product. Specification attributes and tables applied to the classification are not inherited to all products below the classification.
   - **Inherit Links and Tables and Specification Attributes** means the link from product to classification is inherited to all products below the product. Specification attributes and tables applied to the classification are inherited to all products below the classification. Additionally, if multiple links are allowed, and a new link of this type is added to a sub product, the inherited link is removed and only the local link remains.
   - **Accumulative Inheritance without Tables and Specification Attributes** (requires that 'Allow multiple links' is checked) means the link from product to classification will be inherited to all leaf nodes below the product. Additionally, leaf nodes can be linked to valid classifications with collective additions to the existing targets. Specification attributes and tables applied to the classification are excluded from the inheritance to any products below the classification. When a new link of this type is added to a sub product, the inherited link remains and the local link is added to the list.
   - **Accumulative Inheritance with Tables and Specification Attributes** (requires that 'Allow multiple links' is checked) means the link from product to classification will be inherited to all leaf nodes below the product. Additionally, leaf nodes can be linked to valid classifications with collective additions to the existing targets. Specification attributes and tables applied to the classification are also inherited. When a new link of this type is added to a sub product, the inherited link remains and the local link is added to the list.
5. Click the **Finish** button to create the link type.
6. To apply the new link type to an object, refer to **Creating a Product to Classification Link**.

Creating a Product to Classification Link

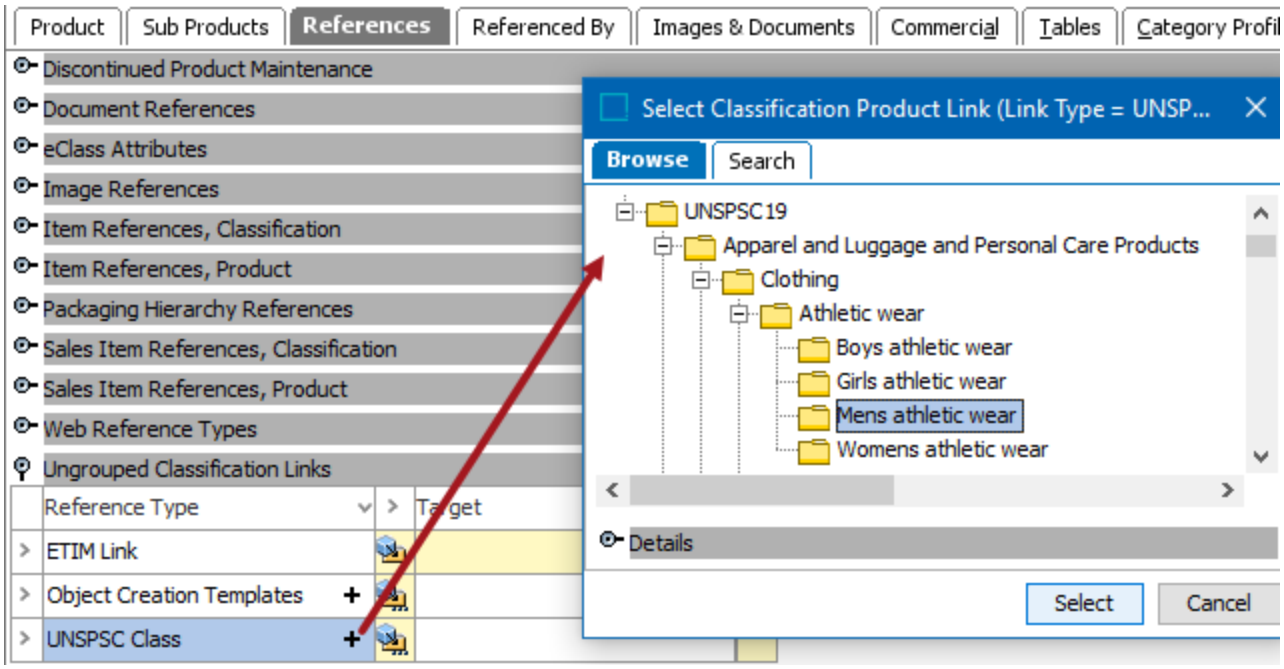
After creating a product to classification link type, you can add that type on an object's References or Referenced By tabs.

To maintain data on the References and Referenced By tabs, refer to the **References Tab** topic and the **Referenced By Tab** topic in **Getting Started** documentation.

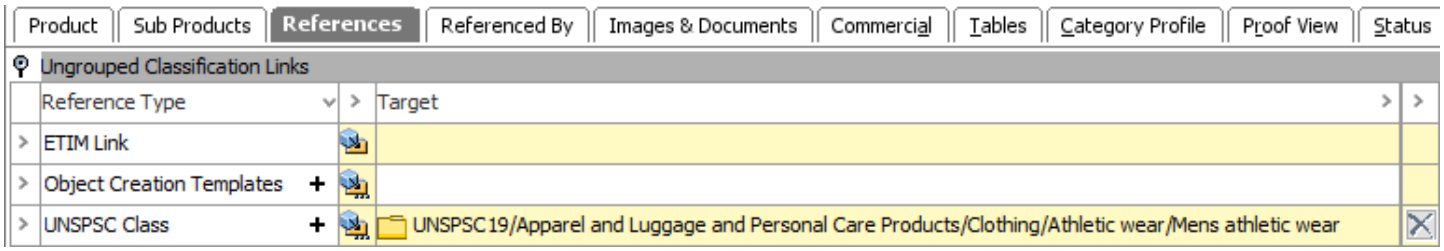
1. To add a product to classification link to either the **References** or **Referenced By** tab of an object, use one of the following ways to find the product to classification link type in a flipper:
   - If the link type has been added to an attribute group, it appears under a flipper that is named the same as the attribute group.
   - If the link type is not in an attribute group, it appears under an 'Ungrouped Classification Links' flipper, as shown in the image in the next step.
2. Click the plus sign button in the desired link field. If more than one link is allowed for the link type, the plus sign button continues to display after the first link is added, otherwise it is removed.



3. In the Select Classification Product Link dialog, find the object that is to be linked, and click the Select button. If you know the target ID / Name of the object, use the Search tab to find it quickly using the typeahead functionality to display the options as a dropdown.



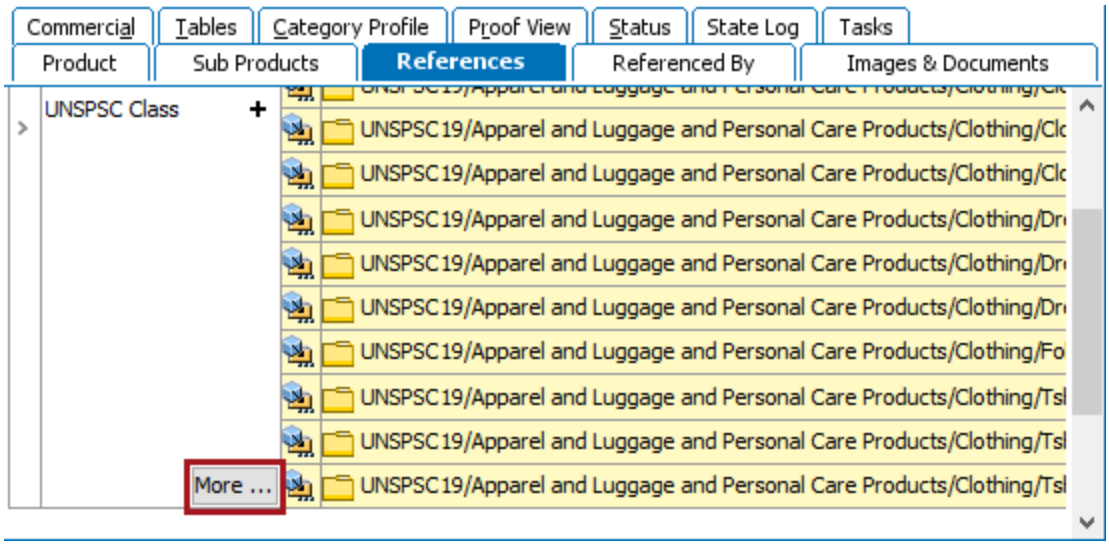
Once selected, the object displays as an added link.



- To remove a link, click the X button.

Displaying a large number of links

If more than 50 links of the same type are added, a button labeled 'More...' (More ...) displays, allowing users to expand the list, and view 50 additional links.

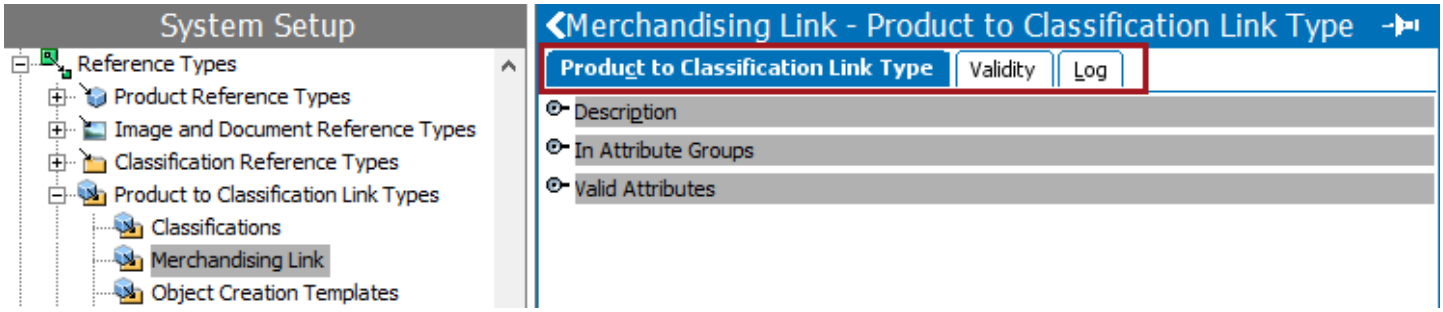


Repeatedly clicking the button doubles the number of links shown each time, until the full set is displayed. Note that if new links are added, they display on the list immediately indicating that they were added properly, though normal functionality will resume if the user presses the 'More...' button again. This means that items may become hidden until the list is fully expanded.

After the list has been fully expanded for the given link type, it stays expanded until the user refreshes the page, or clicks away to another object in workbench.

Maintaining a Product to Classification Link Type

Select a Product to Classification Link Type ( ) to display the Product to Classification Link Type editor and make updates to the link type settings. Each tab on the editor and the parameters are defined below.

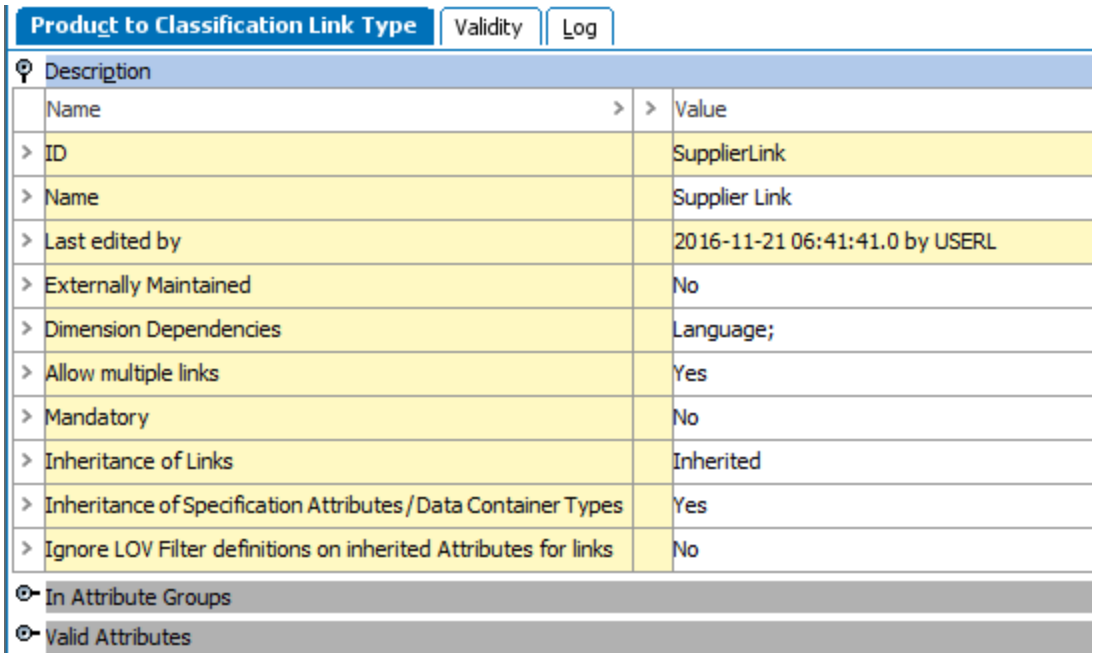


Product to Classification Link Type Tab

This tab holds basic information within the Description, In Attribute Groups, and Valid Attribute flippers.

Description Flipper

The Description flipper includes basic information to identify the link. This data is originally set up in the Product to Classification Link Type wizard, refer to **Creating a Product to Classification Link Type** documentation.

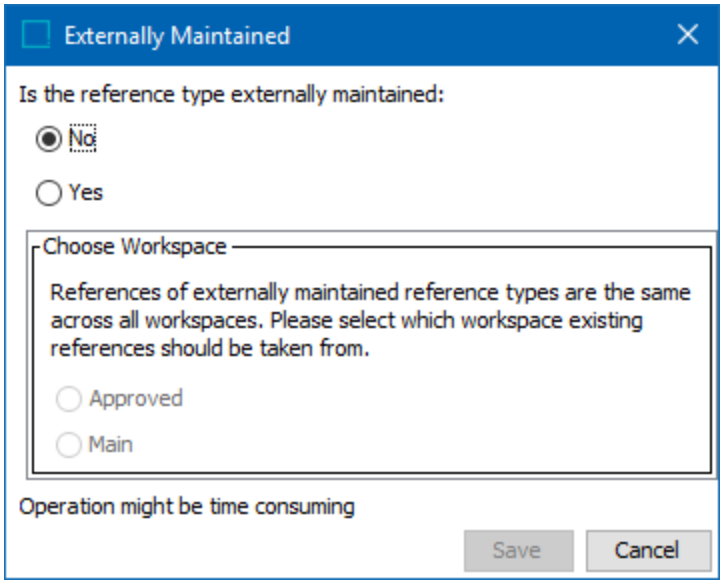


All fields except the ID and 'Last edited by' can be edited. The method required to edit a parameter in the link editor is determined by the parameter type:

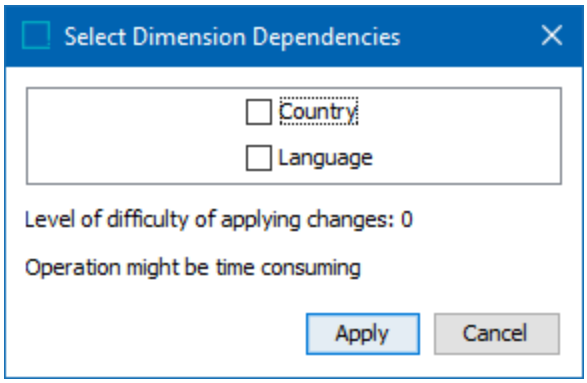
- For **Name**, click into the text box and make the desired changes. The ID and name parameters are discussed in the **Product to Classification Link Type - Enter ID and Name** documentation.
- For **Externally Maintained**, double-click to display a dialog. The externally maintained parameter is discussed in the **Product to Classification Link Type - Advanced** documentation.

  While this parameter can be modified, doing so requires special handling. For Oracle databases, this action requires single-update mode (SUM), as defined in the Single-Update Mode topic. For Cassandra databases, this action uses Lock-free Schema Change (LFSC) functionality, as defined in the Lock-free Schema Change topic.

  If a link type is edited to be Externally Maintained = Yes, and the link type has been used to link objects, you must select a workspace. All existing links will be synchronized across all workspaces based on the value in the selected workspace.



- For **Dimension Dependencies**, double-click to display an ellipsis button (...). Click the ellipsis button (...) to display a dialog that includes the dimension points on your system. Only one dimension point is allowed. If more are needed, create a separate link type. The dimension dependencies parameter is set in the **Product to Classification Link Type - Apply Dimension Dependencies** documentation.



- For **Allow multiple links**, click the parameter to display the dropdown list of options. Three (3) small dots displayed below the icon indicates multiple links are allowed ( ). This parameter is discussed in the **Product to Classification Link Type - Advanced** topic.

  While this parameter can be modified, doing so requires special handling. For Oracle databases, this action requires single-update mode (SUM), as defined in the Single-Update Mode topic. For Cassandra databases, this action uses Lock-free Schema Change (LFSC) functionality, as defined in the Lock-free Schema Change topic.

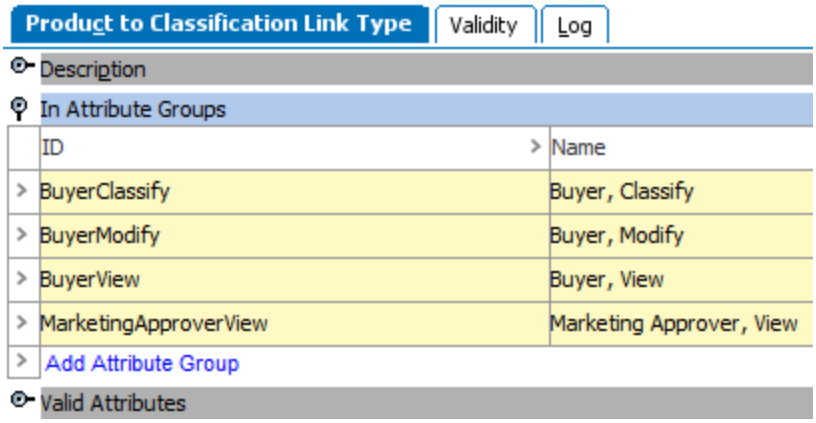
- For **Mandatory**, click the parameter to display the dropdown list of options. The red check mark displayed below the icon indicates the links is required for full approval ( ). This parameter is discussed in the **Product to Classification Link Type - Advanced** topic.

  The approval check for mandatory product to classification links is determined by the ownership of the link. The ownership of a link is set on the classification object type editor using the 'Owns Product Links' parameter. For more information, refer to **Owns Product Links on Alternate Classifications Object Type**.

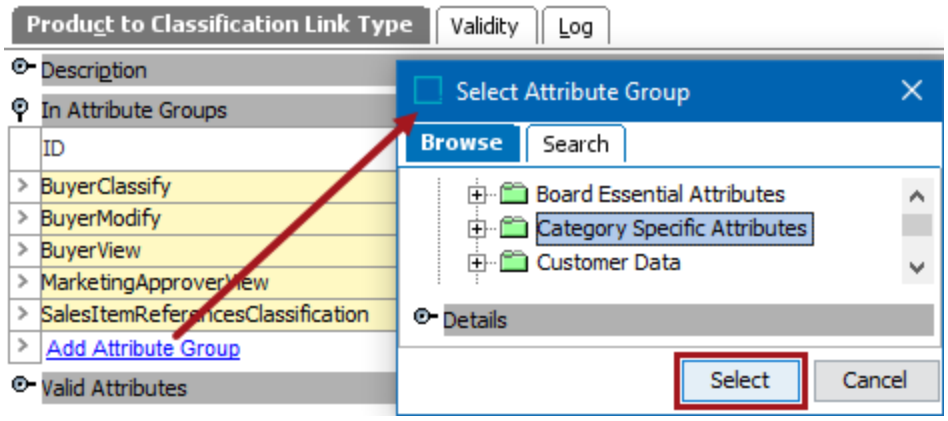
- For **Inheritance of Links** and **Inheritance of Specification Attributes**, click the parameter to display the dropdown list of options. The small green down arrow displayed above the icon indicates the value is inherited ( ). This parameter is discussed in the **Product to Classification Link Type - Advanced** topic. The inheritance of tables is indicated by the 'Inheritance of Specification Attribute' parameter setting.
- For **Ignore LOV Filter definitions on inherited Attributes for links**, click the parameter to display the dropdown list of options. This parameter determines if the LOV Filter definition is inherited when the attributes on the link are inherited and is only available when Inheritance of Specification Attributes / Data Container Types = Yes. This option defaults to No, and must be manually changed to Yes in the link editor, if required. For more information on LOV filtering, refer to **Setting Hierarchical Filters on Attributes**.

In Attribute Groups Flipper

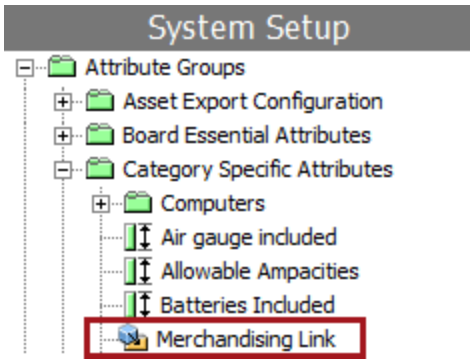
The 'In Attribute Groups' flipper includes all attribute groups that include the link. Adding a link type to one or more attribute groups determines the label of the flipper that displays the link in an object editor, enables you to set up user privileges to restrict approval of the link type, and to define a customized view of the link types in the group. For more information, refer to **Attribute Groups for Reference and Link Types** topic.



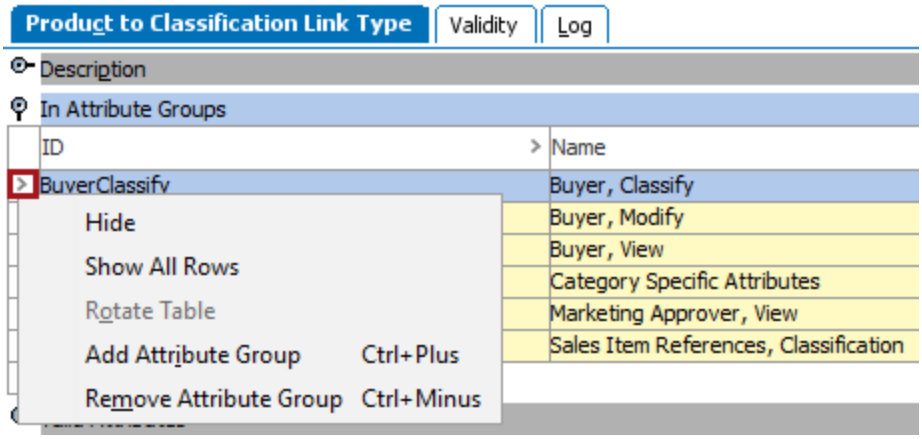
- To add an attribute group, click the **Add Attribute Group** link to display the Select Attribute Group dialog. Choose a group and click the Select button to add the link type to the attribute group.



Once added to an attribute group, the link type is also displayed within the System Setup > Attribute Groups node.

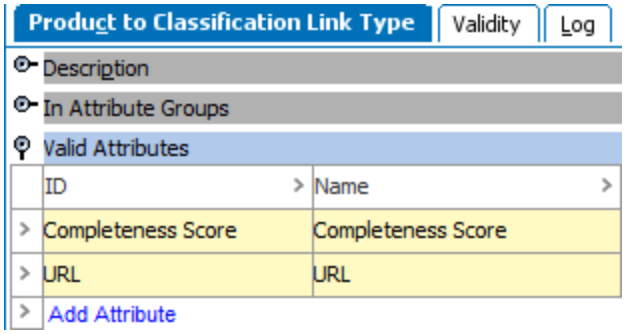


- To modify the attribute groups included or displayed, right-click the arrow to the left of the group ID and select an option from the menu.

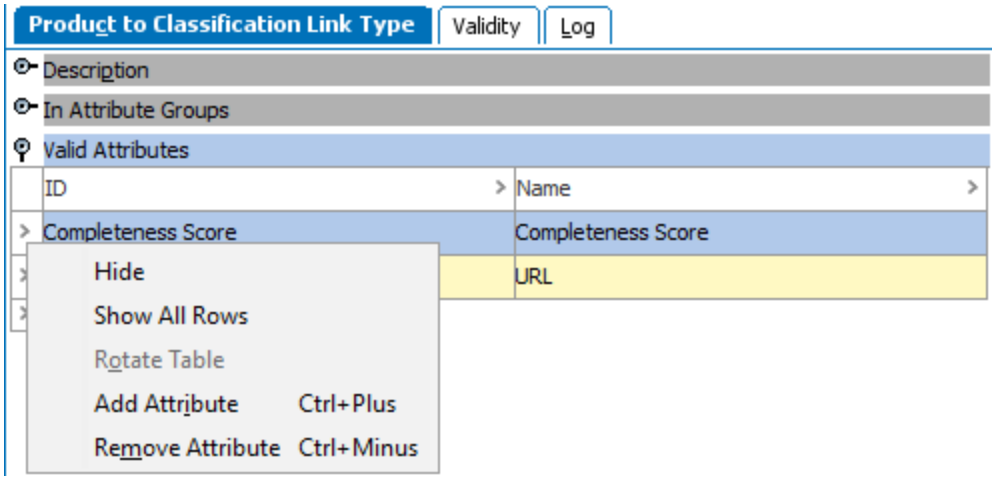


Valid Attributes Flipper

Metadata (description) attributes allow information to be captured on the link itself, to determine when the target object should be used, or to provide additional information about the connection between the objects.



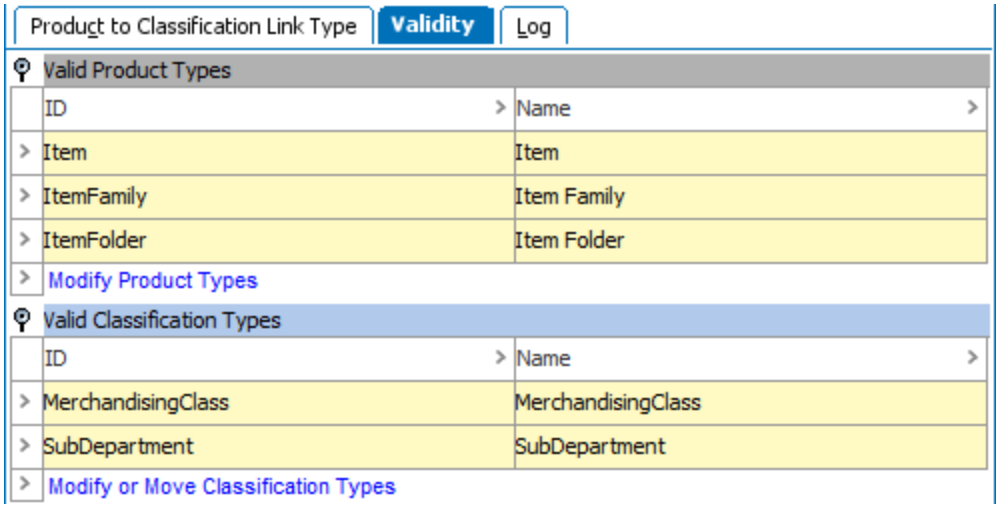
To modify the attributes included or displayed, right-click the arrow to the left of the ID and select an option from the menu.



For more information, refer to **Metadata Attributes on Reference and Link Types** topic.

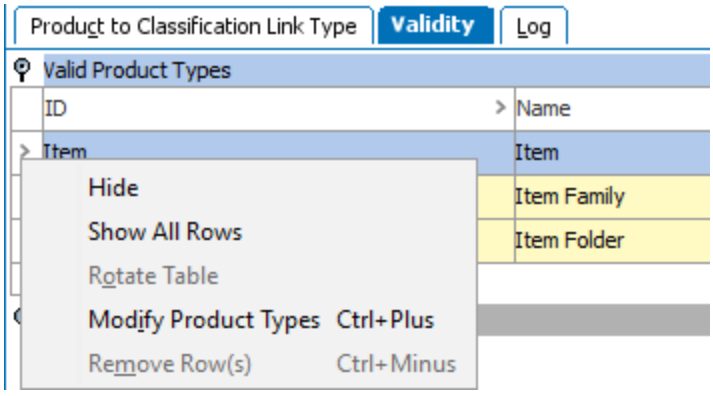
Validity Tab

The Validity tab stores the source product types and target classification types allowed on the product to classification link type.



- For **Valid Product Types**, any number of product object types can be added. Click the 'Modify Product Types' link to add or remove a product object type. When an object type is removed from the list, if Product to Classification Link of this type already exists for the product object type, the links are deleted. This parameter is discussed in the **Product to Classification Link Type - Select Valid Product Types** topic.

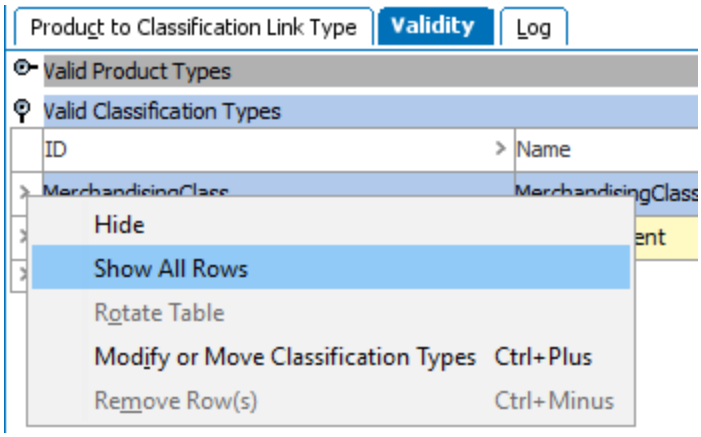
  To modify the object types included or displayed, right-click the arrow to the left of the ID and select an option from the menu.



- For **Valid Classification Types**, any number of classification object types can be added, however, the same object type cannot be added to more than one product to classification link type. Click the 'Modify Product Types' link to add or remove a classification object type. This parameter is discussed in the **Product to Classification Link Type - Select Valid Classification Types** topic.

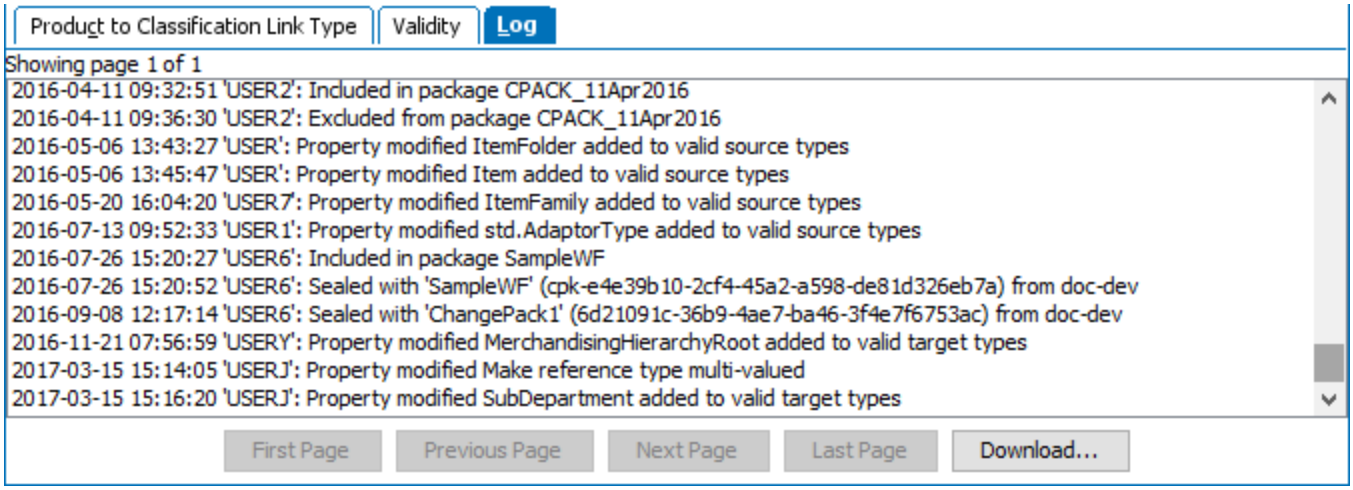
While this parameter can be modified, doing so requires special handling. For Oracle databases, this action requires single-update mode (SUM), as defined in the Single-Update Mode topic. For Cassandra databases, this action uses Lock-free Schema Change (LFSC) functionality, as defined in the Lock-free Schema Change topic.

To modify the object types included or displayed, right-click the arrow to the left of the ID and select an option from the menu.



Log Tab

The Log tab stores the information about the changes that have taken place on the product to classification link type since it was created.



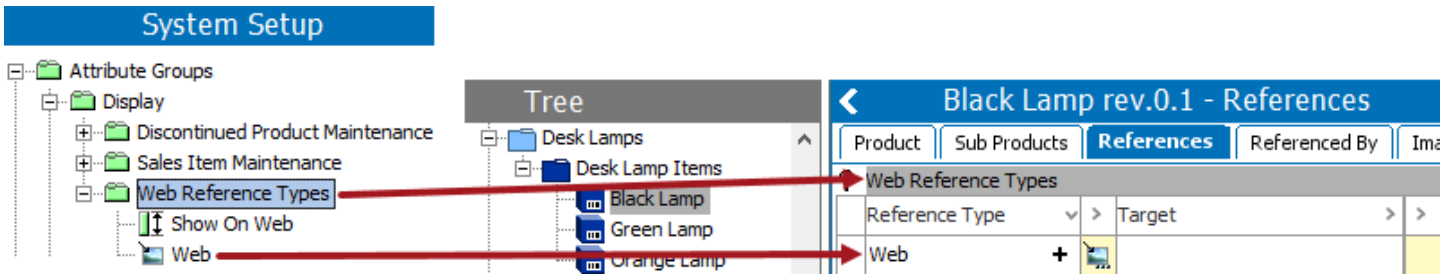
As additional log entries become available and the page is filled, the pagination buttons are enabled. Additionally, you can download the complete log as a zipped text file.

Attribute Groups for Reference and Link Types

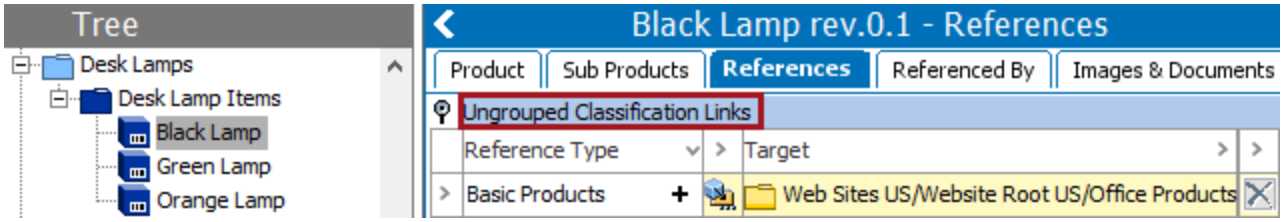
Adding a Reference or Product to Classification Link type to an attribute group provides easy identification, a customized view, and control of approvals via user privileges.

Easy Identification

The name of the attribute group is used as the name of the flipper that displays the reference or link within the object editor. This provides a logical grouping for the references or links.

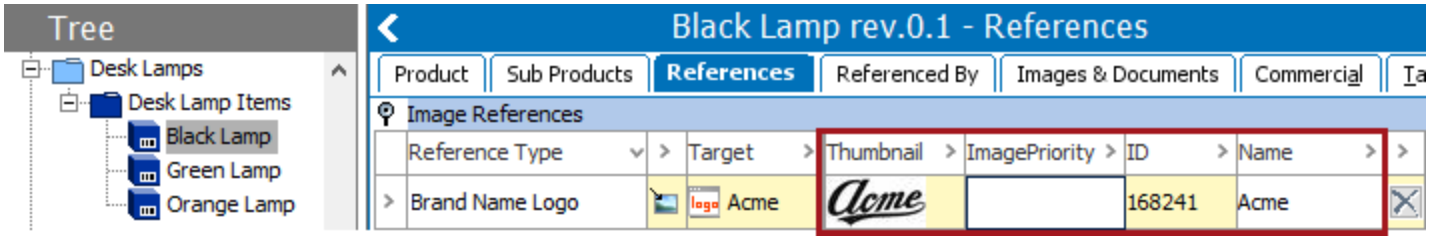


Otherwise, the reference or link displays in a flipper with the 'Ungrouped' label.



Customized View

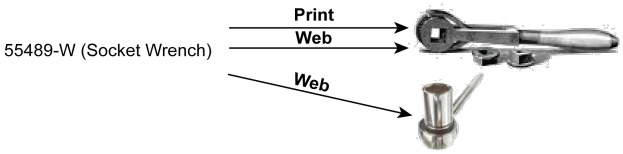
A customized view can be defined on the attribute group of all reference or link types in the group to display additional information on the reference or link. For more information, refer to the **Creating a Customized View** section in the **Attribute Groups** topic of the **System Setup** documentation.



Control of Approvals via User Privileges

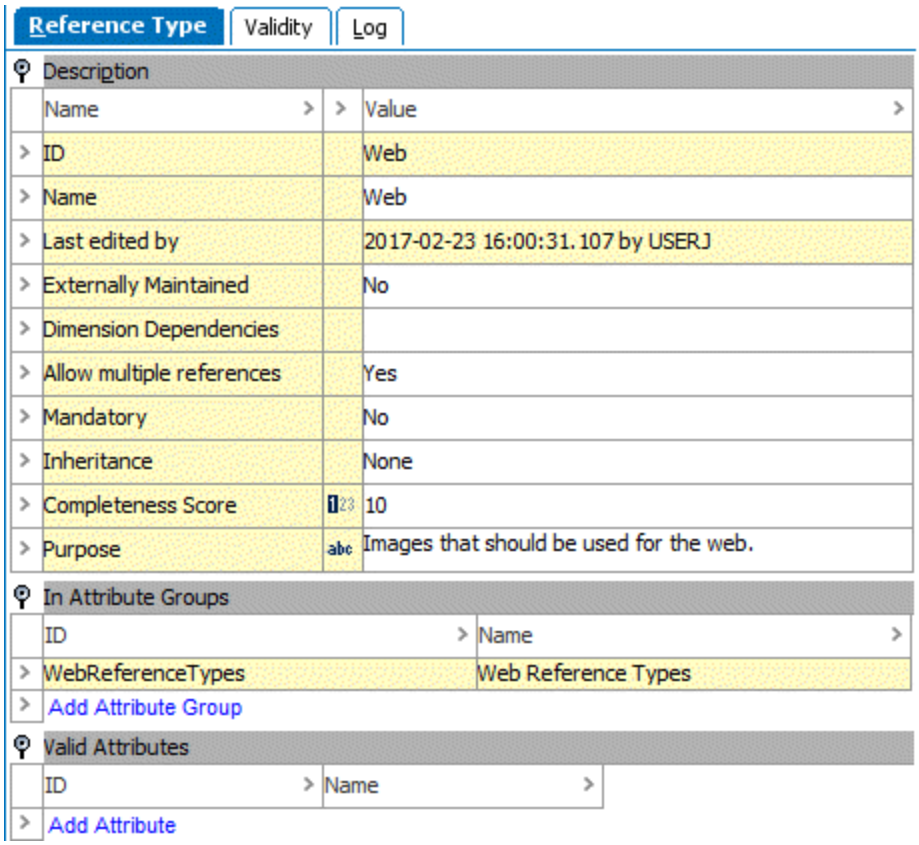
Perhaps most importantly, an attribute group allows you to control user privileges for approval of the reference or link. This means that approval of specific types of references and links is based on the user's access to the attribute group, so that users will only be allowed to approve references or links of the types in the attribute group.

For example, consider a user who should only be allowed to approve references used for the web. As shown below, approving Product 55489-W (Socket Wrench) should also allow approving the images used for web.

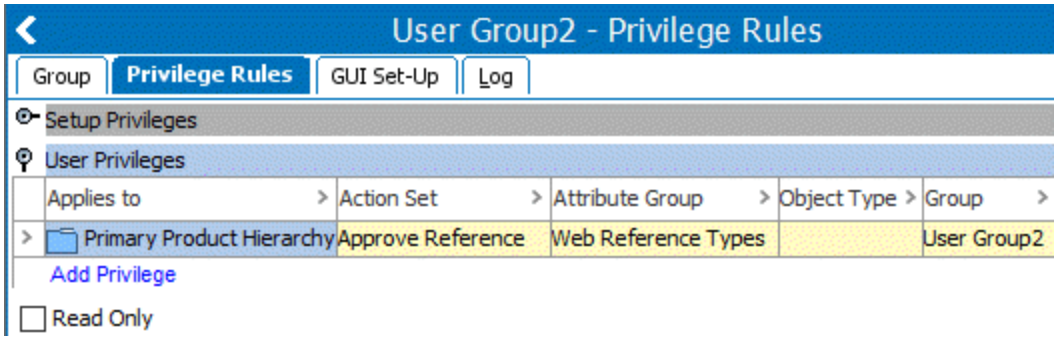


To implement this, the reference type named 'Web' is added to an attribute group named 'Web Reference Types.'

A reference or link type can be added to as many attribute groups as needed by different users with different privileges.



A user privilege is set up to include the 'Approve Reference' privilege for reference types in the attribute group 'Web Reference Types.' For more information about setting up privileges, refer to **Action Sets** in the **System Setup** documentation.



A user with this privilege setup will only be allowed to approve references or links in the attribute group 'Web Reference Types.'

For more information on adding a Reference or Product to Classification Link type to an attribute group, refer to the **In Attribute Groups Flipper** section of:

- **Maintaining a Reference Type**
- **Maintaining a Product to Classification Link Type**

Dimension Dependent Reference and Link Types

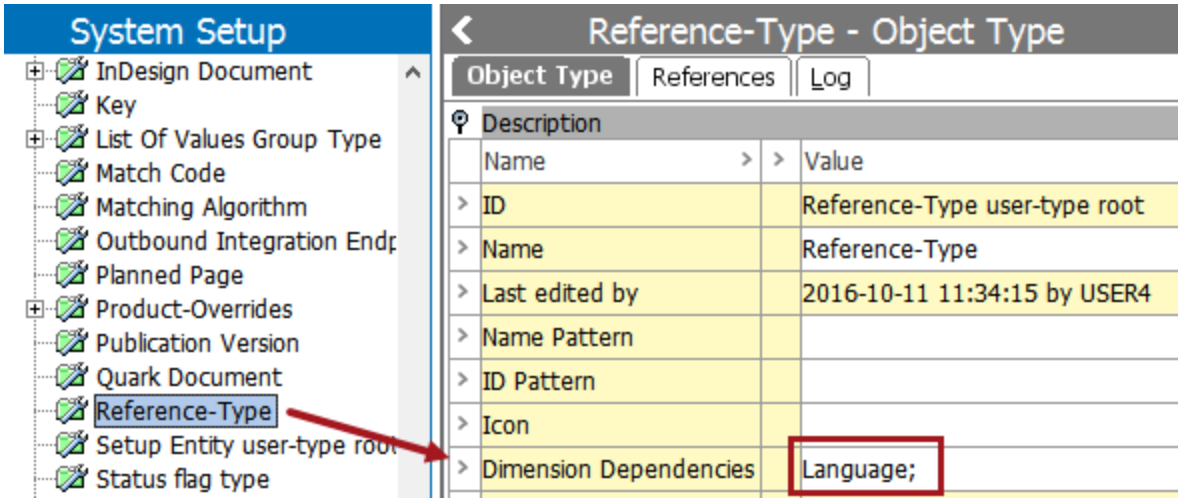
A Reference or Product to Classification Link type can be set up to be dependent on a dimension. Dimension dependency is used to specify the dimension points, and by extension, the contexts, where a reference or link should display or should be suppressed. A reference or link can only be dependent on a single dimension point. If additional dimensions are required, create a new type for the same source and target objects.

When deciding on the need for dimension dependency, consider the following points:

- You are strongly encouraged to give this topic a lot of thought when setting up the STEP system and before a lot of data is migrated in. It is easier to remove a dependency than to add the dependency after references have been created. Refer to the **Adding a Dimension Dependency After Loading Data** topic for more information on what it takes to correct this or to move dimension-dependent references from the All level to a real language or country.
- If you set dimension dependency on an asset reference type, do not use it in conjunction with dimension-dependent assets. Although STEP can handle this scenario, maintaining and troubleshooting is complicated when multiple dependencies are in use. For more information on dimension-dependent assets, refer to the **Asset Dimension Dependencies** section of **Maintaining Assets** in the **Getting Started** documentation.
- Consider using Users and Groups privileges to hide objects by Reference Type, instead of using dimension dependency. For more information, refer to the **Attribute Groups for Reference and Link Types** topic.

Dimension Dependency on the 'Reference-Type' Object Type

Dimension dependency can be added on the 'Reference-Type' object type, which is located under System Setup > Object Types & Structures > Basic Object Types.



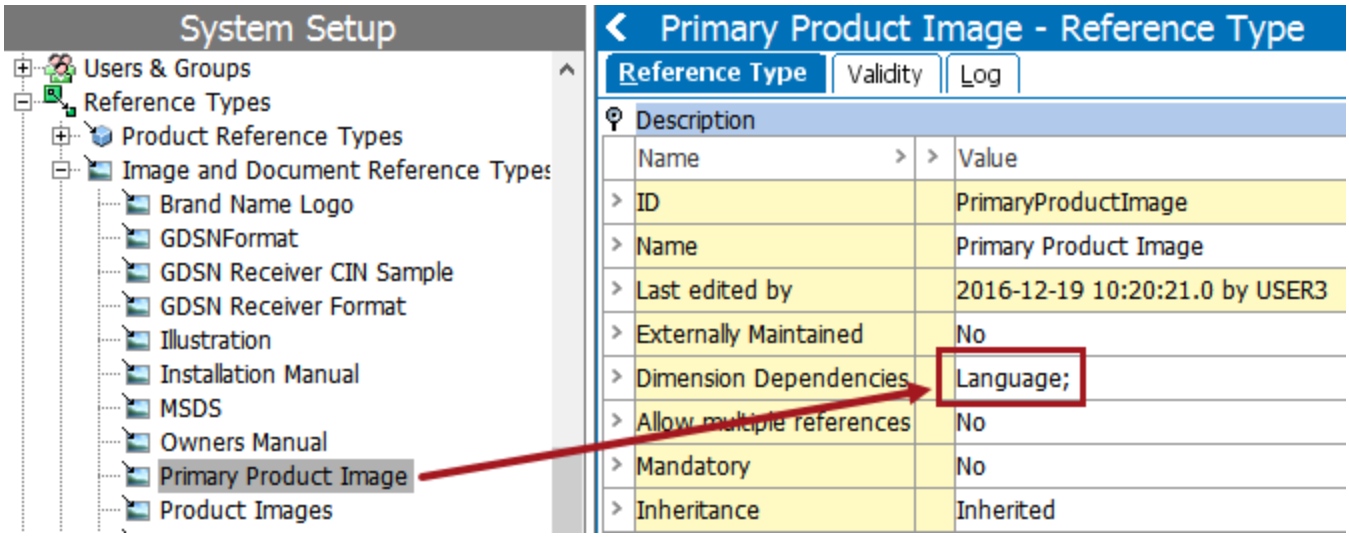
Using the Dimension Dependencies parameter on the Reference-Type object type is a global setting that enables translation of reference type names and requires that all reference type names be translated. Translated

reference type names are useful on websites where viewers want to display information in their own language. For example, 'Installation Guide' could be the reference type and the link that appears when someone needs to download a PDF version of a document.

Setting a Reference-Type object type dimension dependency does not affect the dimension dependencies between referenced objects.

Dimension Dependency on a Reference Type

Setting the Dimension Dependencies parameter on a reference type adds dimension dependency on the reference between objects. This can be useful for a global website structure where not all products are sold in all countries, or where documents vary by language or country and users only want to display the appropriate versions.



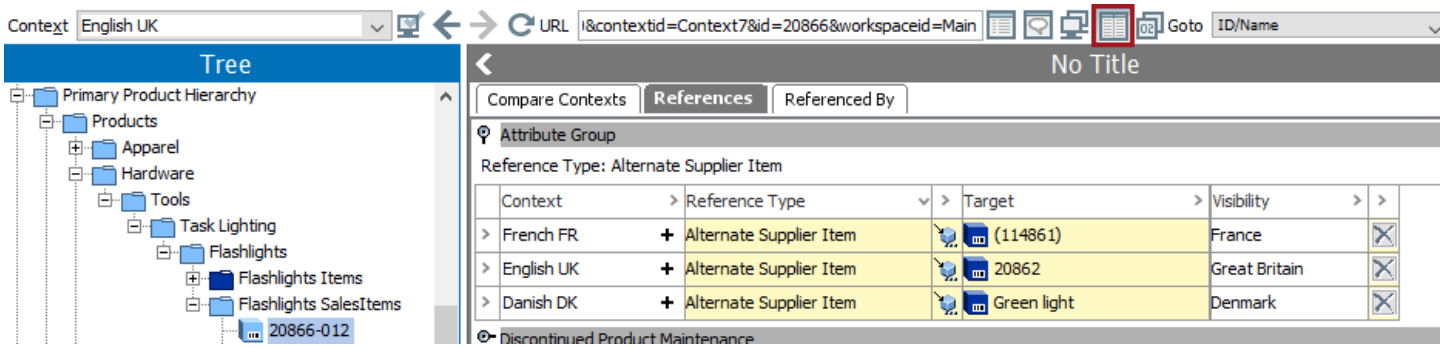
This is not a typical setup because the References / Referenced By tabs can become difficult to manage due to the layout required when viewing multiple contexts.

One scenario where this setup would be useful might be when there are 20 documents in STEP, one for each of the 20 countries where a product is sold. A dimension-dependent reference would make it possible for a user working in a country context to only display the document that is used for that country since the rest would be filtered from view.

For information on managing when a dimension dependent reference is available, refer to the **Visibility of Reference and Link Types** section.

Viewing Dimension Dependent Values

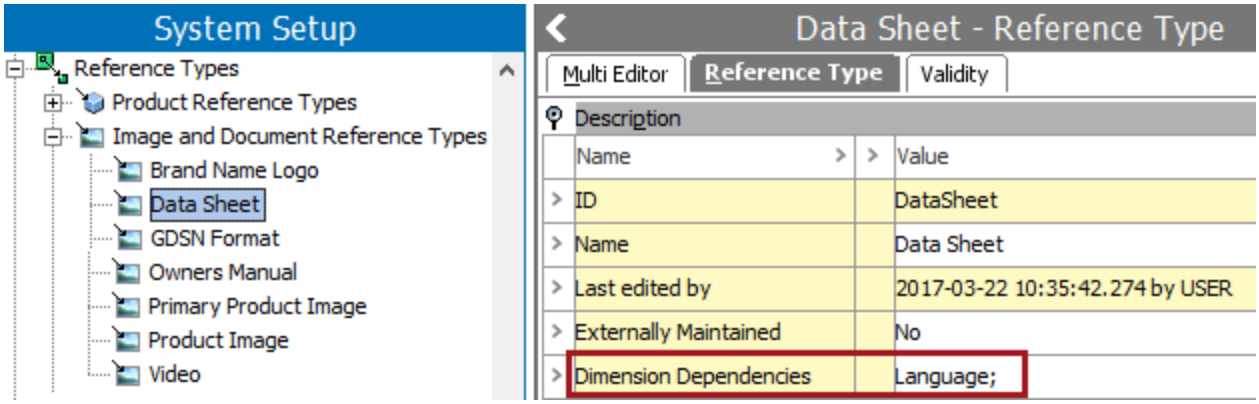
When dimension dependency is applied to a reference type, values can be applied based on the selected dimension. For example, the following reference is dependent on the Country dimension, so each country can have a different setting. The Context view displays all values for each country, based on the targets selected from the View > Target menu option.



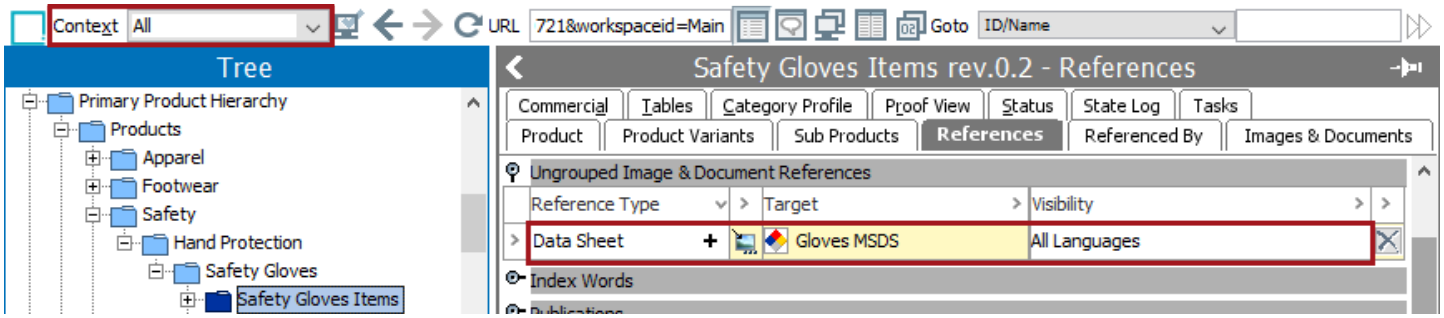
Dimension Dependent Reference Example

Consider a product that needs a 'Data Sheet' reference. The reference should be linked to the product for all languages except the English. Use the following steps to accomplish this:

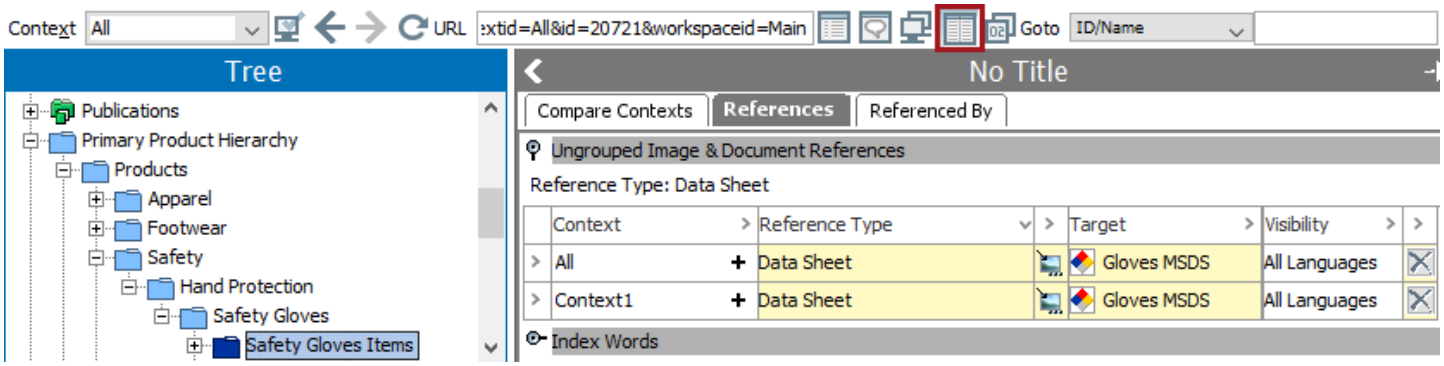
1. Create a reference type named 'Data Sheet' and set it to be language dependent.



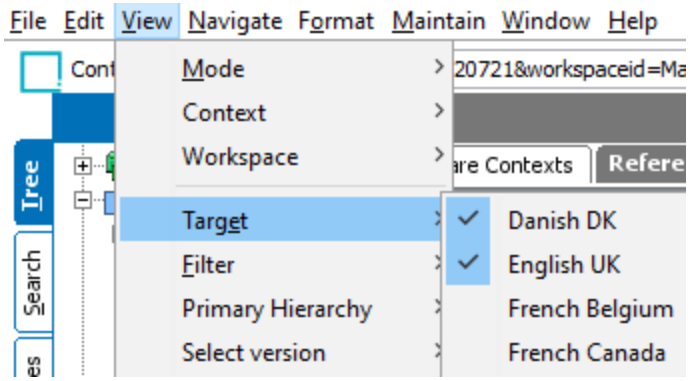
2. Select the 'All' context, add a Data Sheet reference. The reference is inherited to all languages.



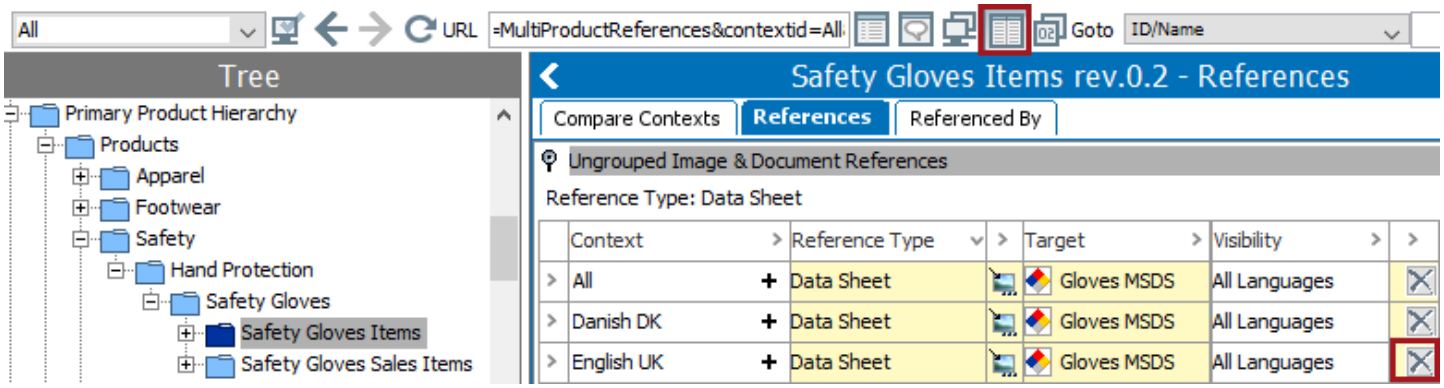
3. Display the References tab in Context Mode by clicking in the toolbar.



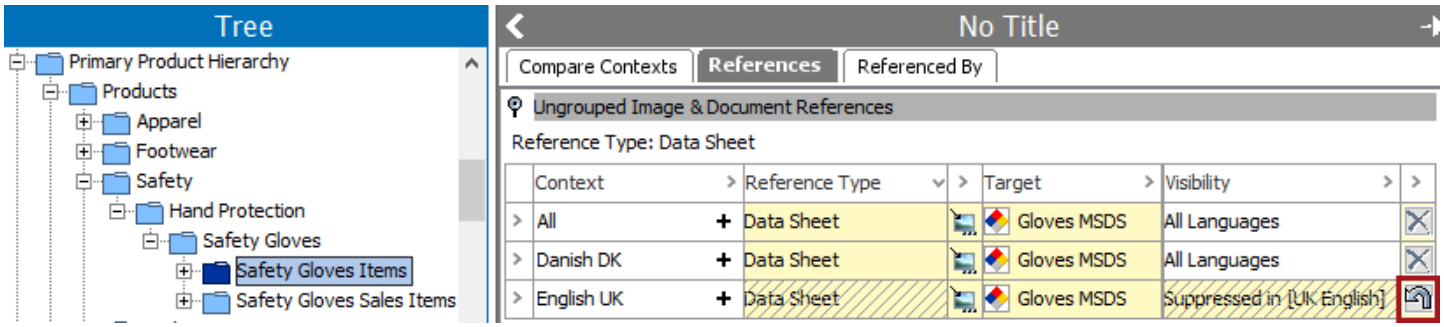
4. Navigate to View > Target and select the Contexts for the comparison view to display.



5. Click the X button to suppress the reference for the English language.



6. The suppressed reference type now appears shaded. If necessary, the reference can be restored by clicking the undo button on the shaded row.

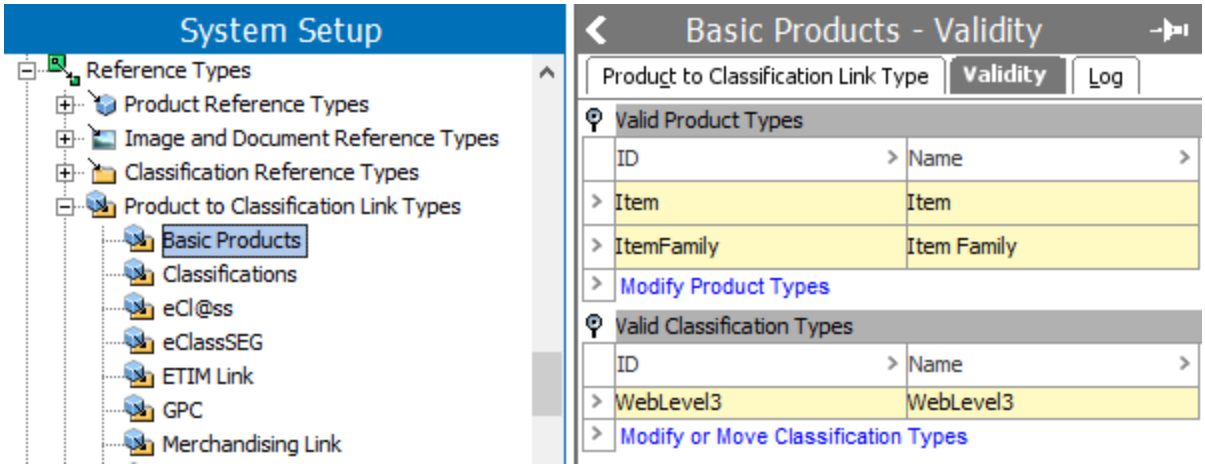

Tree
Primary Product Hierarchy
Products
Apparel
Footwear
Safety
Hand Protection
Safety Gloves
Safety Gloves Items
Safety Gloves Sales Items
No Title
Compare Contexts
References
Referenced By
Ungrouped Image & Document References
Reference Type: Data Sheet
Context
Reference Type
Target
Visibility
All
Data Sheet
Gloves MSDS
All Languages
Danish DK
Data Sheet
Gloves MSDS
All Languages
English UK
Data Sheet
Gloves MSDS
Suppressed in [UK English]

Inheritance Example for a Product to Classification Link Type

A Product to Classification Link Type has a product for the source, a classification for the target, and displays linked products as children of the selected classification. This type of link includes the inheritance options demonstrated below.

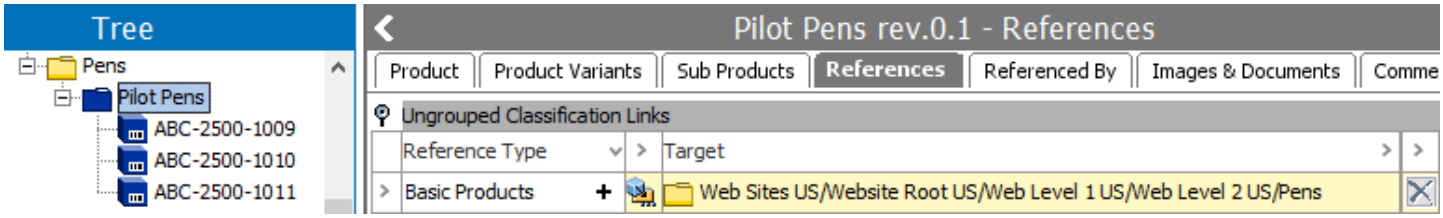
System Setup

The 'Basic Products' product to classification link type is created to allow products of the object type Item or ItemFamily to be linked into classifications of the object type WebLevel3.



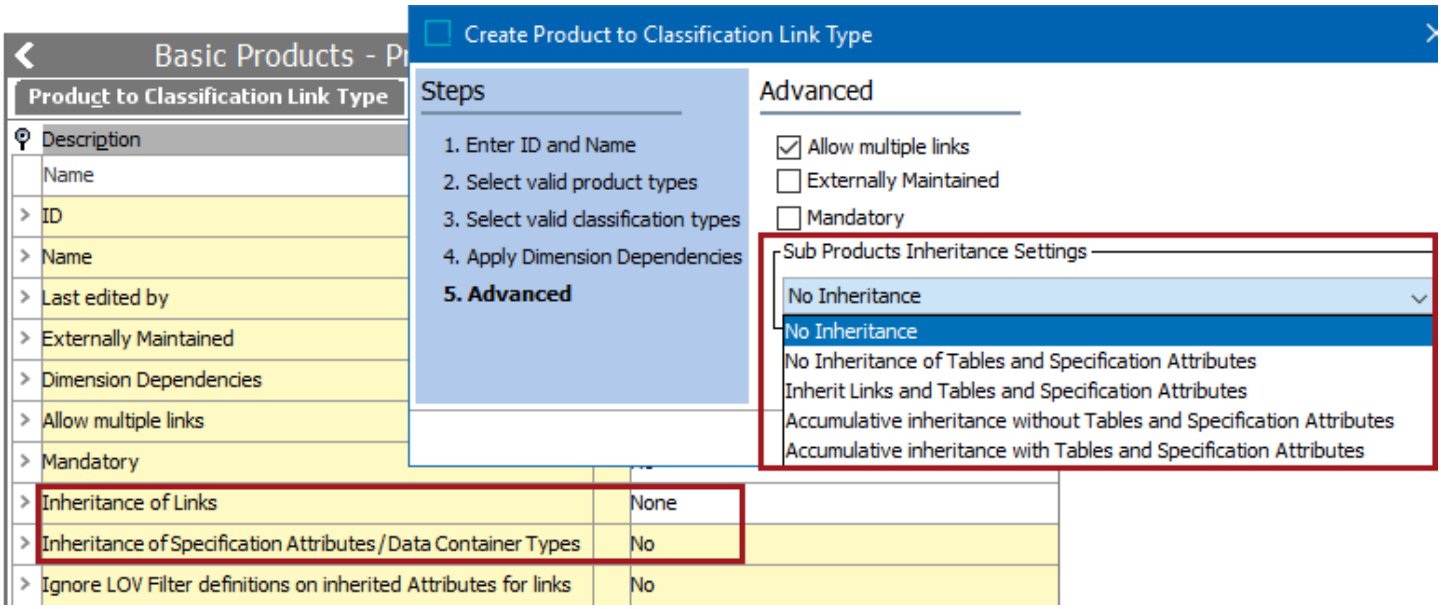
Tree

The 'Basic Products' product to classification link type is used to link a classification named 'Pens' (object type Weblevel3) to a product family named 'Pilot Pens' (object type ItemFamily).



Results

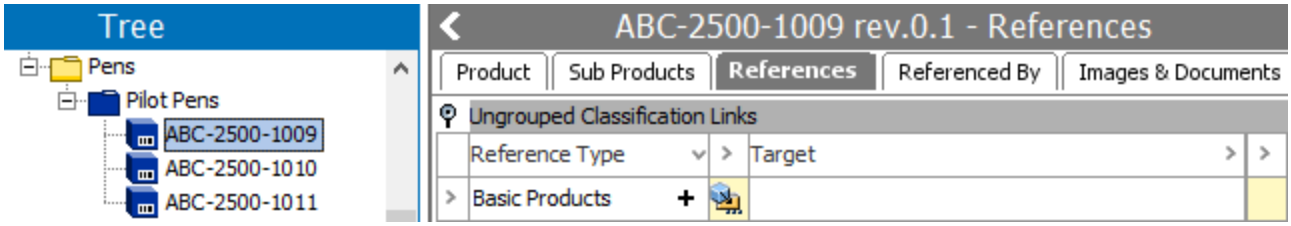
The 'Basic Products' link type would have the following inheritance effects on the linked products via the 'Sub Products Inheritance Settings' parameter on the wizard or the separate parameter settings on the editor 'Inheritance of Links' and 'Inheritance of Specification Attributes / Data Container Types.' Note that the inheritance of tables is indicated by the 'Inheritance of Specification Attribute' parameter setting.



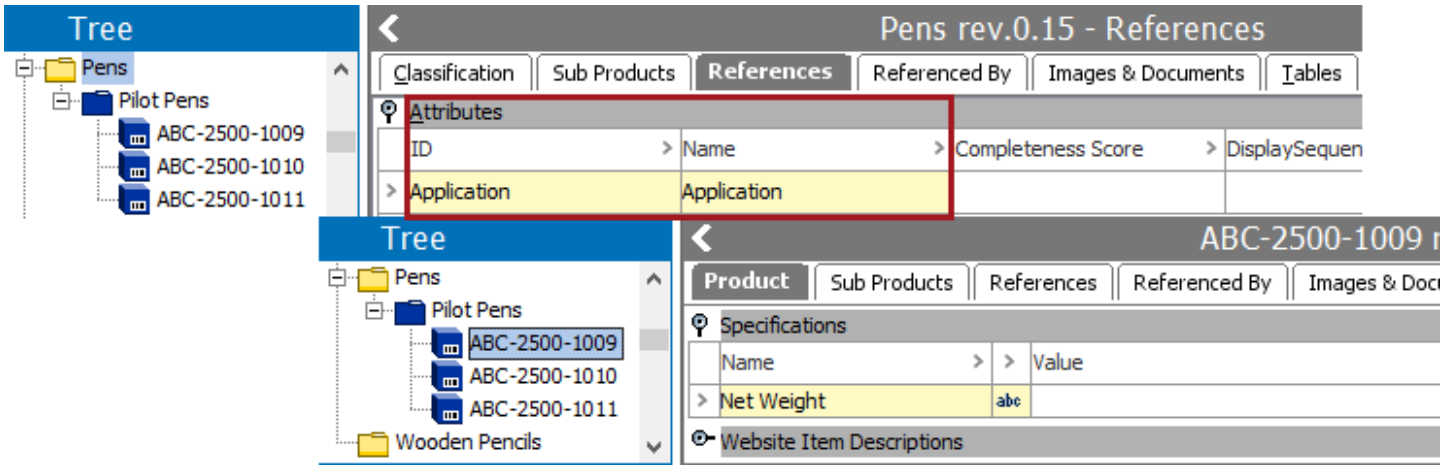
No Inheritance

This option in the wizard displays as 'Inheritance of Links = None' and 'Inheritance of Specification Attributes / Data Container Types = No' in the editor.

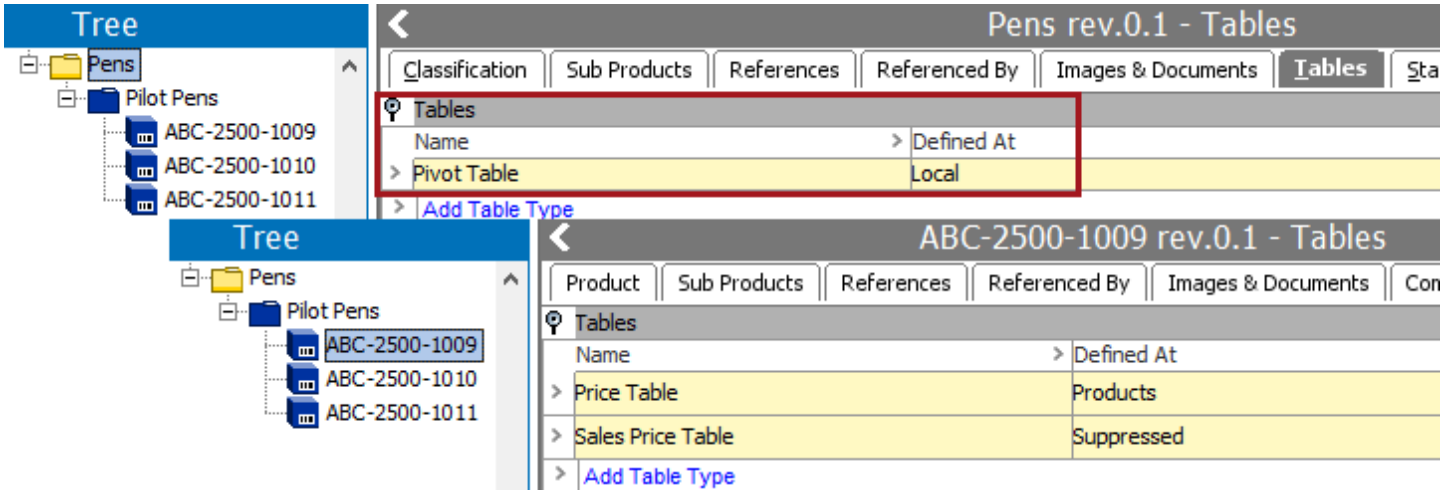
The value of the Basic Products link is not inherited from the product family (Pilot Pens) to the linked products (ABC-2500-1009, ABC-2500-1010, and ABC-2500-1011).



Specification attributes applied to the classification are not inherited to products below the classification. In the example below, if available, the Application attribute would display along with the Net Weight attribute in the Specifications attribute group flipper.



Tables applied to the classification are not inherited to products below the classification.

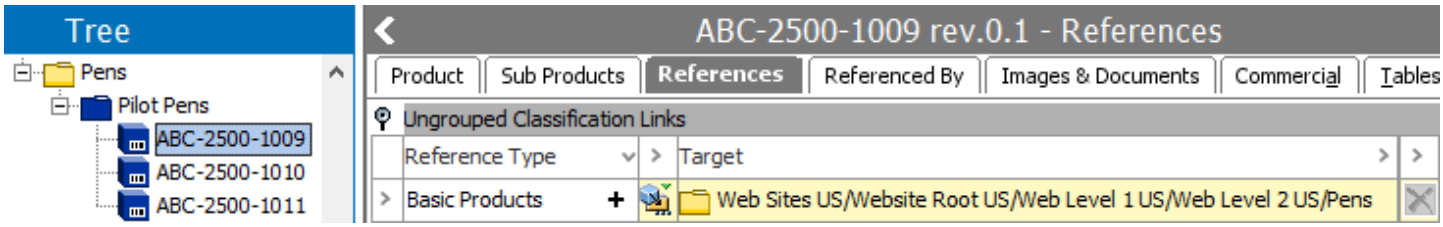


No Inheritance of Tables and Specification Attributes

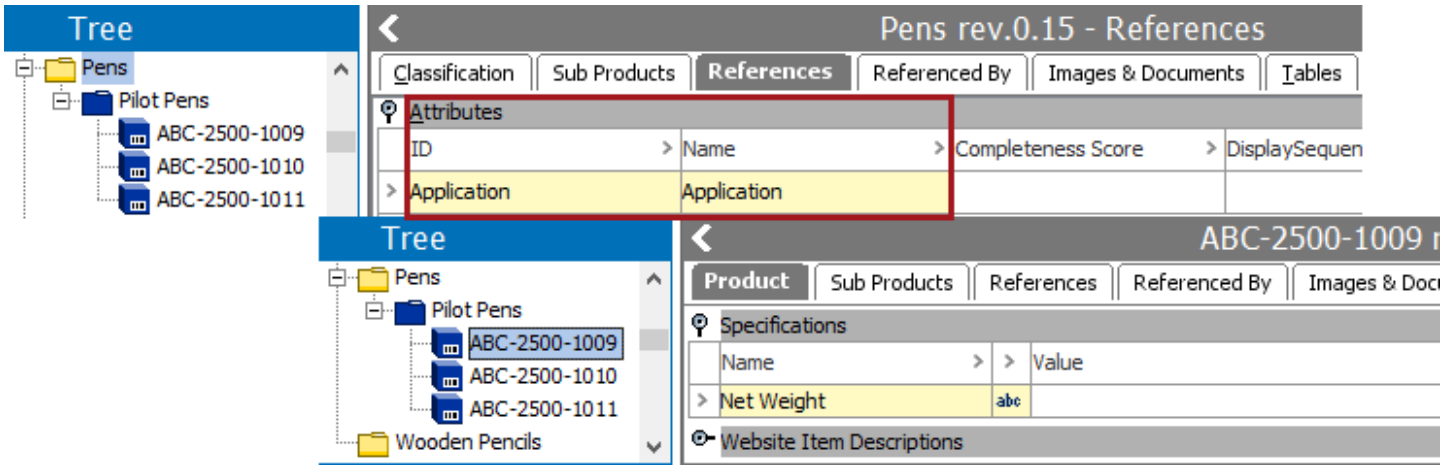
This option in the wizard displays as 'Inheritance of Links = Inherited' and 'Inheritance of Specification Attributes / Data Container Types = No' in the editor.

The value of the Basic Products link is inherited from the classification (Pens) to the linked products (ABC-2500-1009, ABC-2500-1010, and ABC-2500-1011).

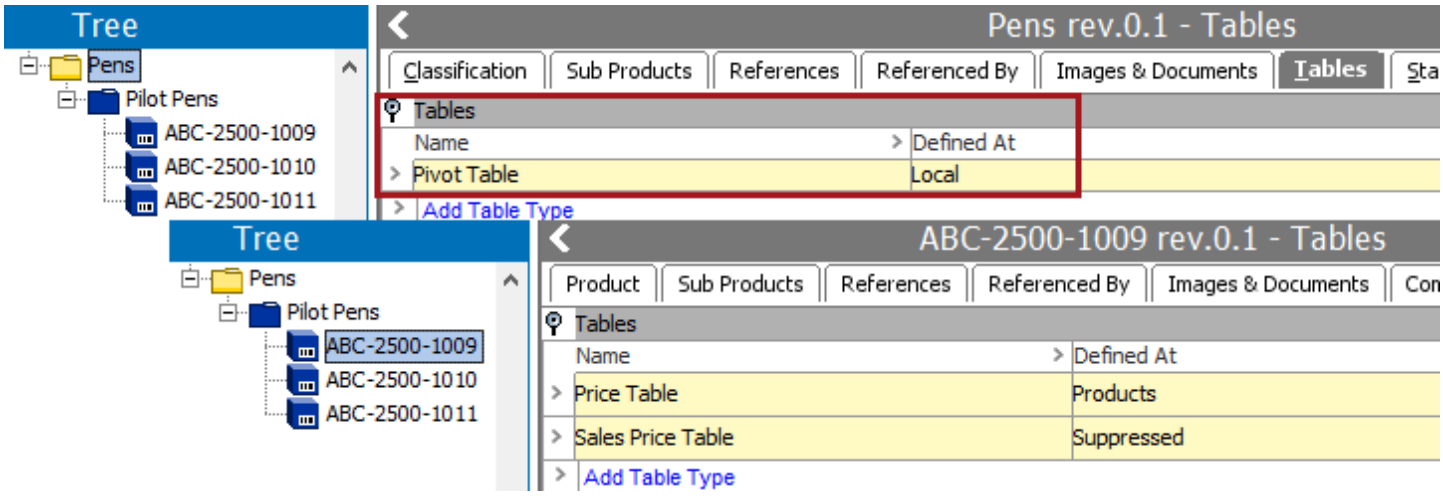
Note: If multiple links are allowed, and a new link of this type is added to a linked product (sub product), the inherited link is removed and only the local link remains.



Specification attributes applied to the classification are not inherited to products below the classification. In the example below, if available, the Application attribute would display along with the Net Weight attribute in the Specifications attribute group flipper.



Tables applied to the classification are not inherited to products below the classification.

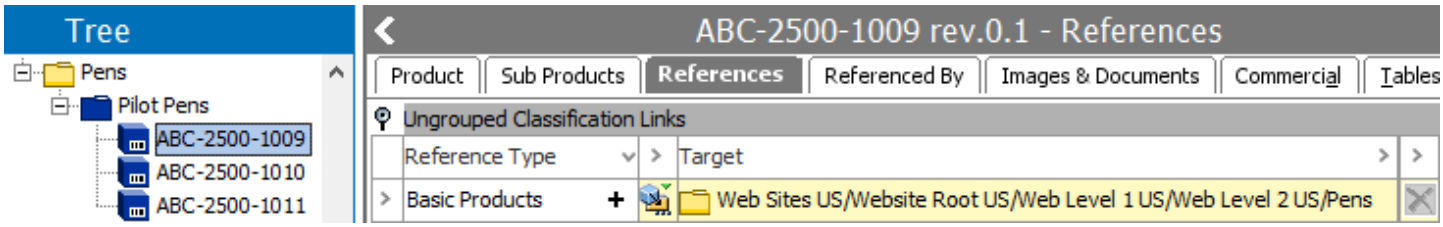


Inherit Links and Tables and Specification Attributes

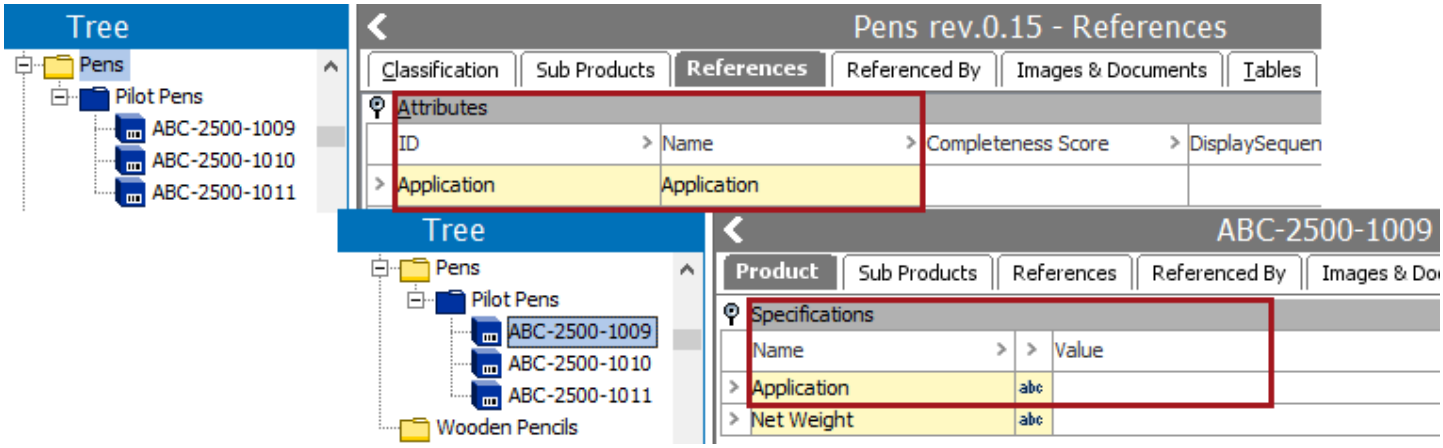
This option in the wizard displays as 'Inheritance of Links = Inherited' and 'Inheritance of Specification Attributes / Data Container Types = Yes' in the editor.

The value of the Basic Products link is inherited from the classification (Pens) to the linked products (ABC-2500-1009, ABC-2500-1010, and ABC-2500-1011).

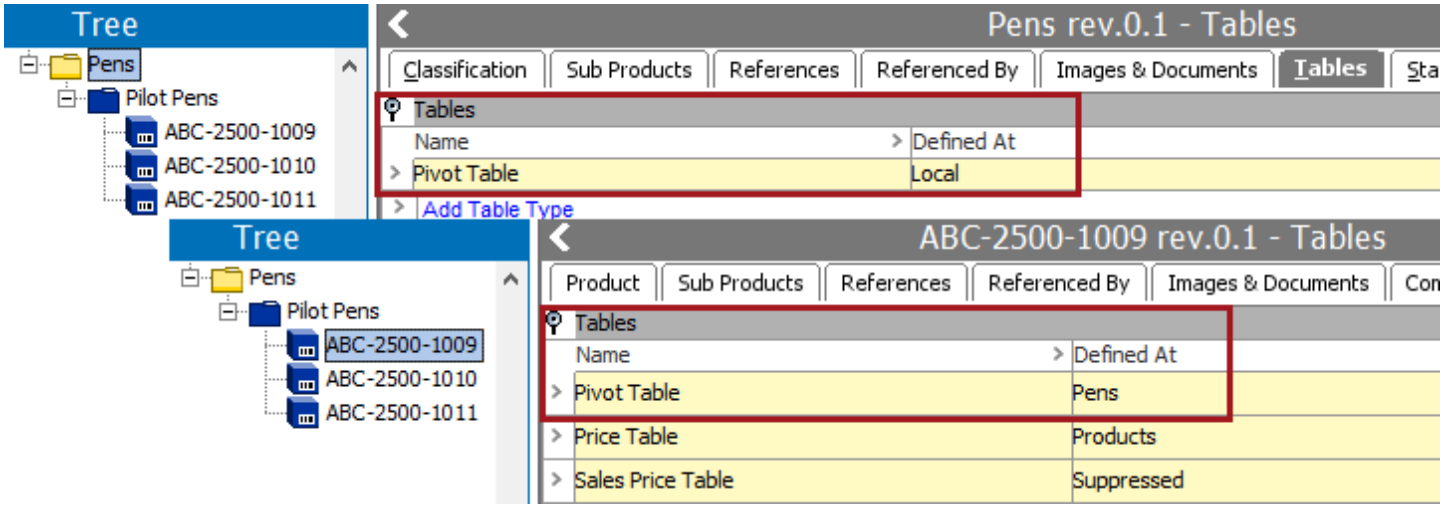
Note: If multiple links are allowed, and a new link of this type is added to a linked product (sub product), the inherited link is removed and only the local link remains.



Specification attributes applied to the classification are inherited to products below the classification. In the example below, the Application attribute displays along with the Net Weight attribute in the Specifications attribute group flipper.



Tables applied to the classification are inherited to products below the classification.

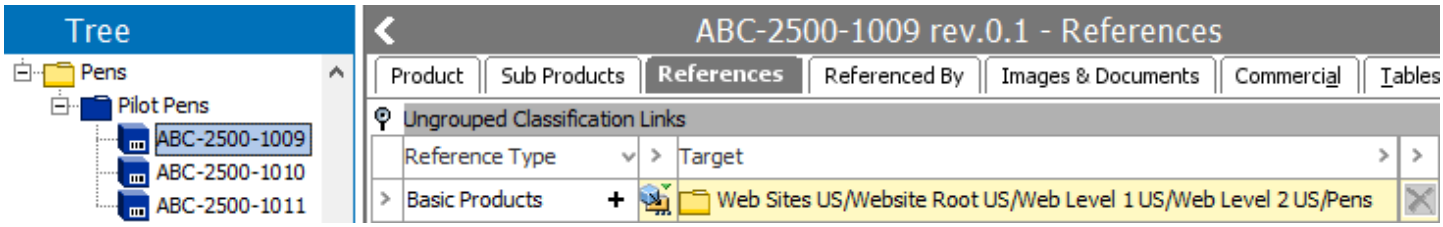


Accumulative Inheritance without Tables and Specification Attributes

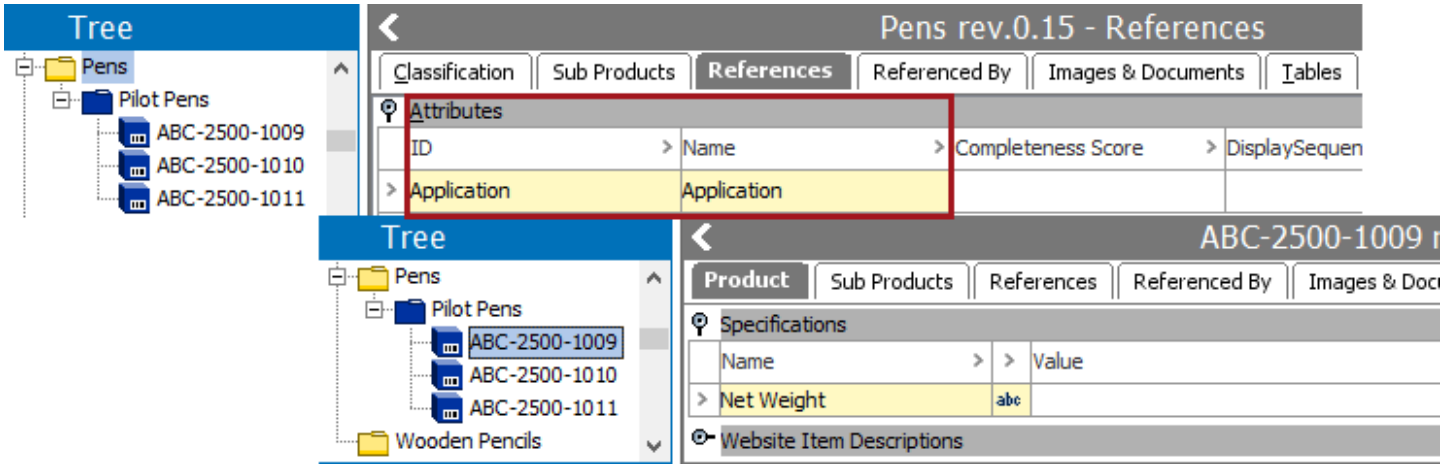
This option in the wizard displays as 'Inheritance of Links = Accumulative' and 'Inheritance of Specification Attributes / Data Container Types = No' in the editor.

The value of the Basic Products link is inherited from the classification (Pens) to the linked products (ABC-2500-1009, ABC-2500-1010, and ABC-2500-1011).

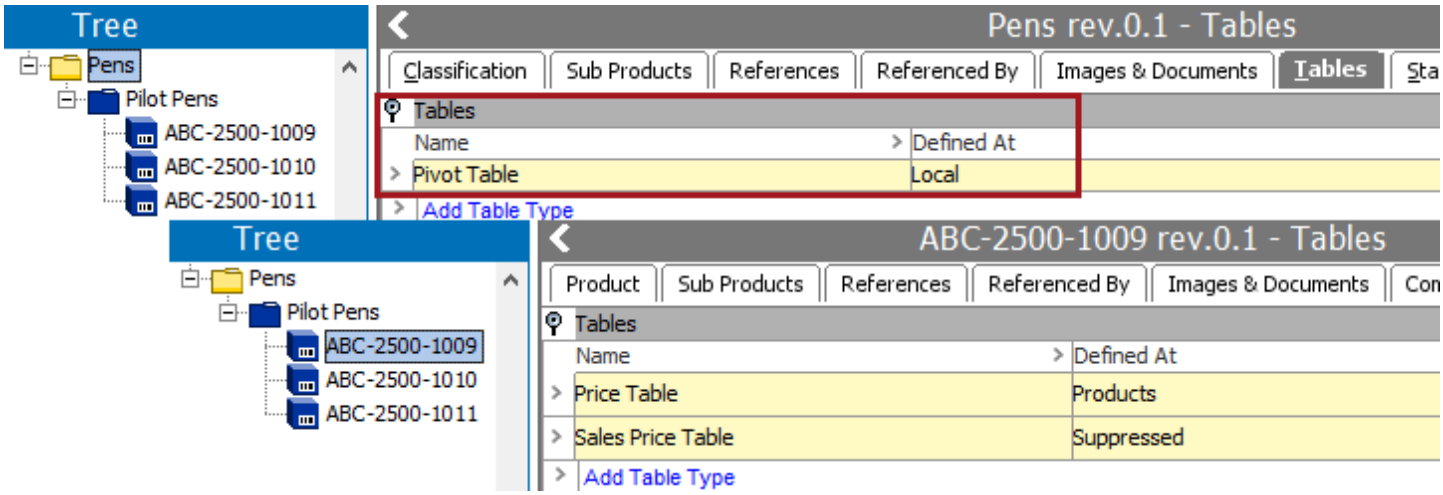
Note: If multiple links are allowed, and a new link of this type is added to a linked product (sub product), the inherited link is retained and the local link is added.



Specification attributes applied to the classification are not inherited to products below the classification. In the example below, if available, the Application attribute would display along with the Net Weight attribute in the Specifications attribute group flipper.



Tables applied to the classification are not inherited to products below the classification.

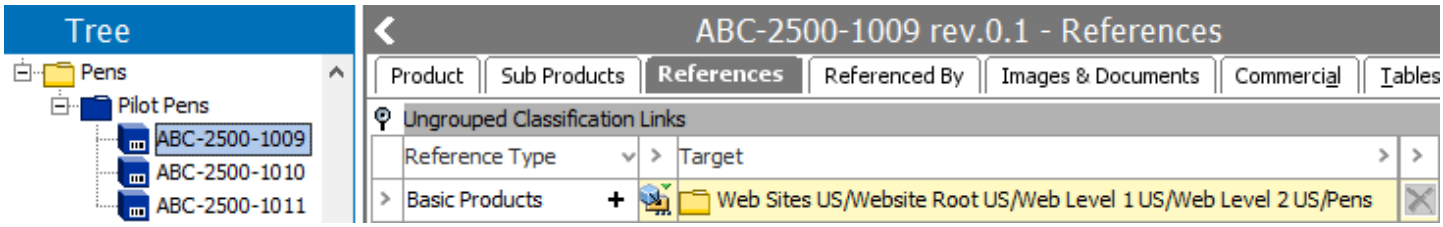


Accumulative Inheritance with Tables and Specification Attributes

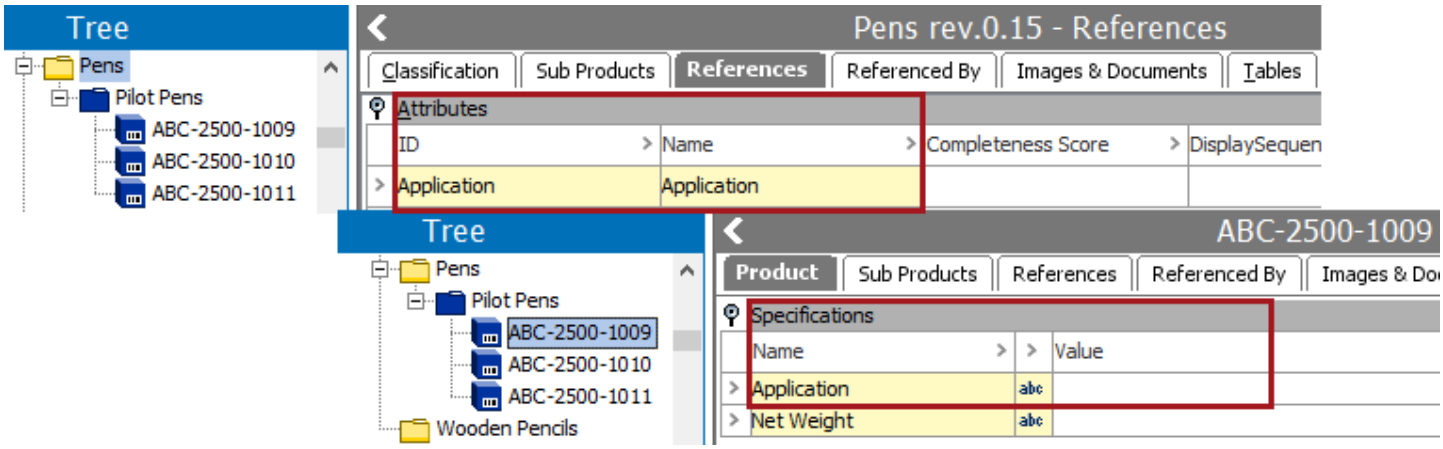
This option in the wizard displays as 'Inheritance of Links = Accumulative' and 'Inheritance of Specification Attributes / Data Container Types = Yes' in the editor.

The value of the Basic Products link is inherited from the classification (Pens) to the linked products (ABC-2500-1009, ABC-2500-1010, and ABC-2500-1011).

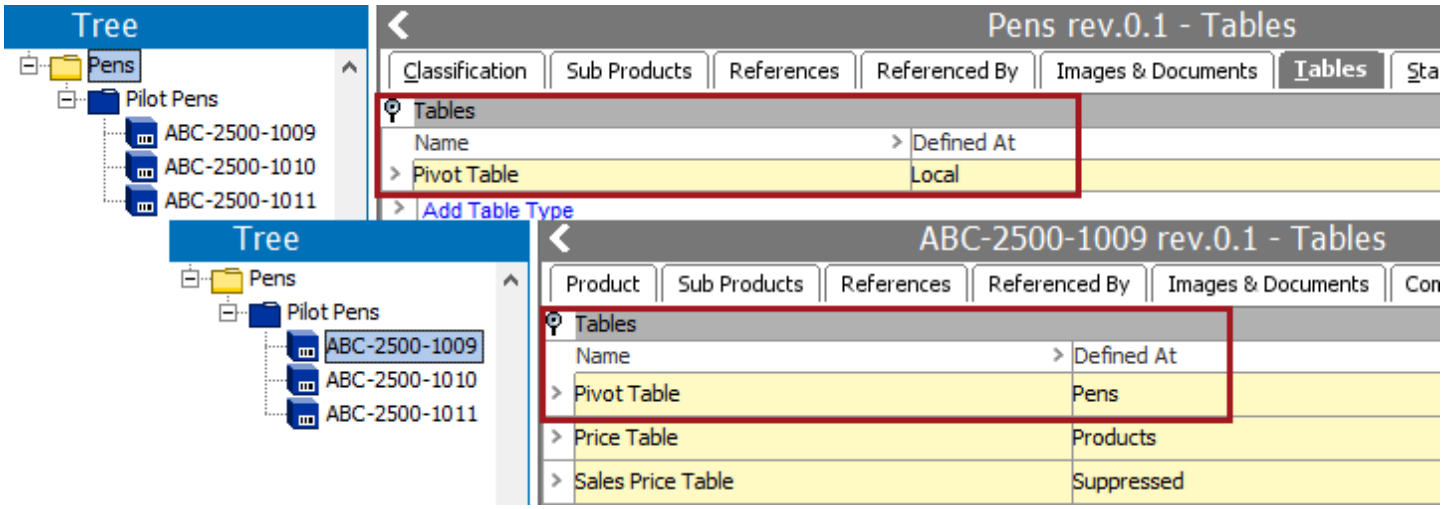
Note: If multiple links are allowed, and a new link of this type is added to a linked product (sub product), the inherited link is retained and the local link is added.



Specification attributes applied to the classification are inherited to products below the classification. In the example below, the Application attribute displays along with the Net Weight attribute in the Specifications attribute group flipper.



Tables applied to the classification are inherited to products below the classification.



In the wizard, you can specify any of the settings for the inheritance of the product to classification link type as defined in **Product to Classification Link Type - Advanced**.

The wizard selections are reflected in the reference editor Inheritance of Links and 'Inheritance of Specification Attributes / Data Container Types' parameters as defined in **Maintaining a Product to Classification Link Type** documentation.

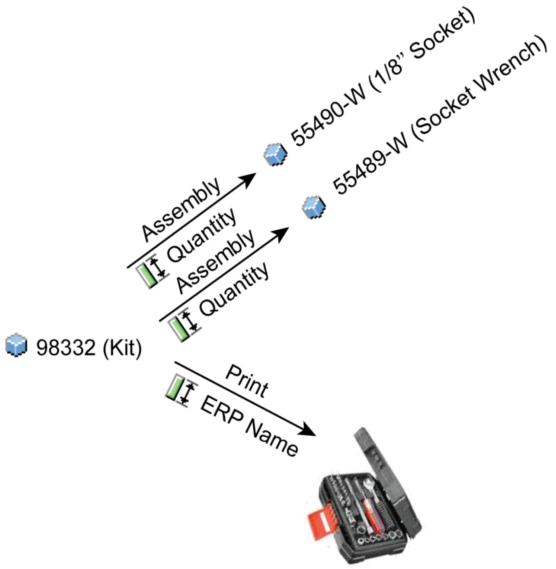
Metadata Attributes on Reference and Link Types

Metadata (description) attributes can be applied to all objects in the System Setup > Reference Types folder, including a Reference type, a Product to Classification Link type, the Classification Attribute link type, and the Product Attribute link type.

Metadata is maintained on the References or Referenced By tabs of the object where the reference or link is applied. Different attributes can be selected for each type of reference or link type.

Example of metadata on a reference or link

Consider product 98332 (KIT), which includes two sockets and is referencing an image to be used for Print. Different metadata attributes are needed for references applied to images and the references applied to products.



- A description attribute named Quantity has been applied the reference type Assembly. This attribute holds number of sockets to be included in the kit.
- A description attribute named 'ERP Name' has been applied the reference type Print. This attribute holds the name of the reference used in an ERP System.

For information on adding metadata to the attribute link types, refer to **Product Attribute Link Type** or **Classification Attribute Link Type**.

Deleting References

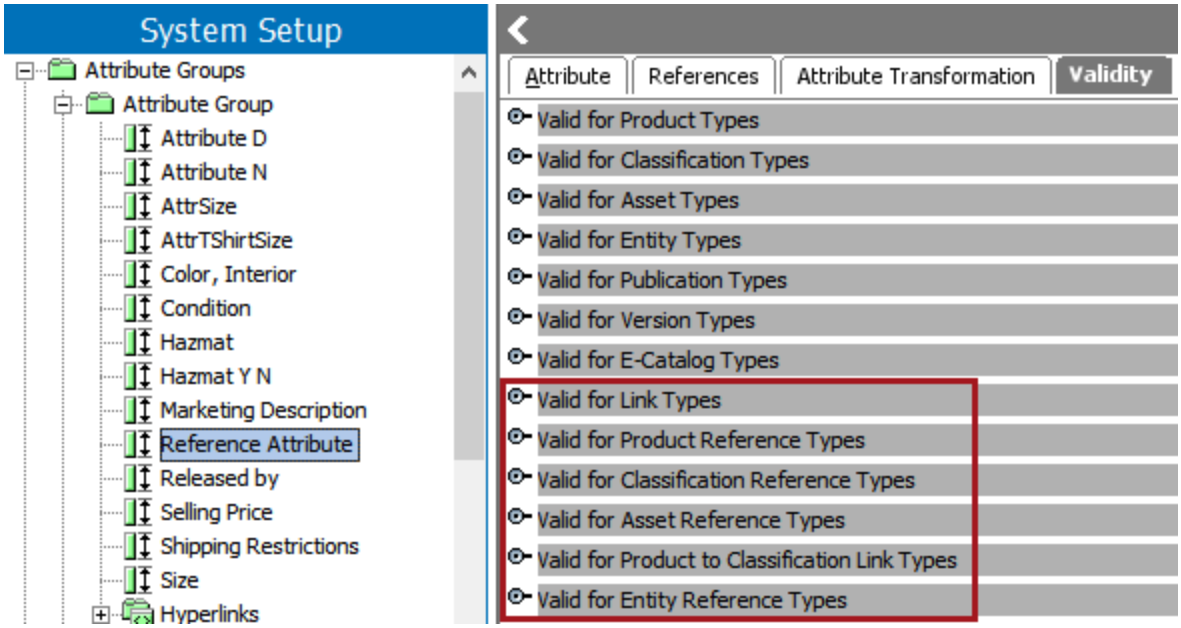
When a reference for an approved object is deleted from the main workspace, the reference metadata is retained (although not displayed). This enables the metadata to be revived when that reference is revived from the Tree recycle bin or when the same reference type is recreated. For example, a reference is deleted from an approved object but not purged from the recycle bin. Subsequently, a reference with the same source and target is created via an import. Since this 'new' reference for the object matches the deleted one, it is actually revived from the recycle bin. In this example, the previously deleted reference and its metadata attribute values are restored.

For more information, on the recycle bin, refer to the **Recycle Bin for Tree** topic in the **Getting Started** documentation.

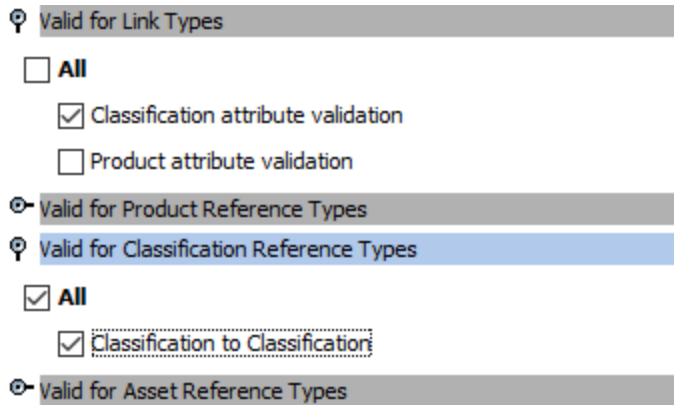
Add a Metadata Attribute

Although the images below show a reference type, the same setup is used for adding metadata on a Product to Classification link type.

1. In System Setup > Attribute Groups > select the description attribute that should be added as metadata on the reference or link. Specification attributes and groups cannot be added as metadata.
2. Open one (or more) reference types flippers or the link types flippers.

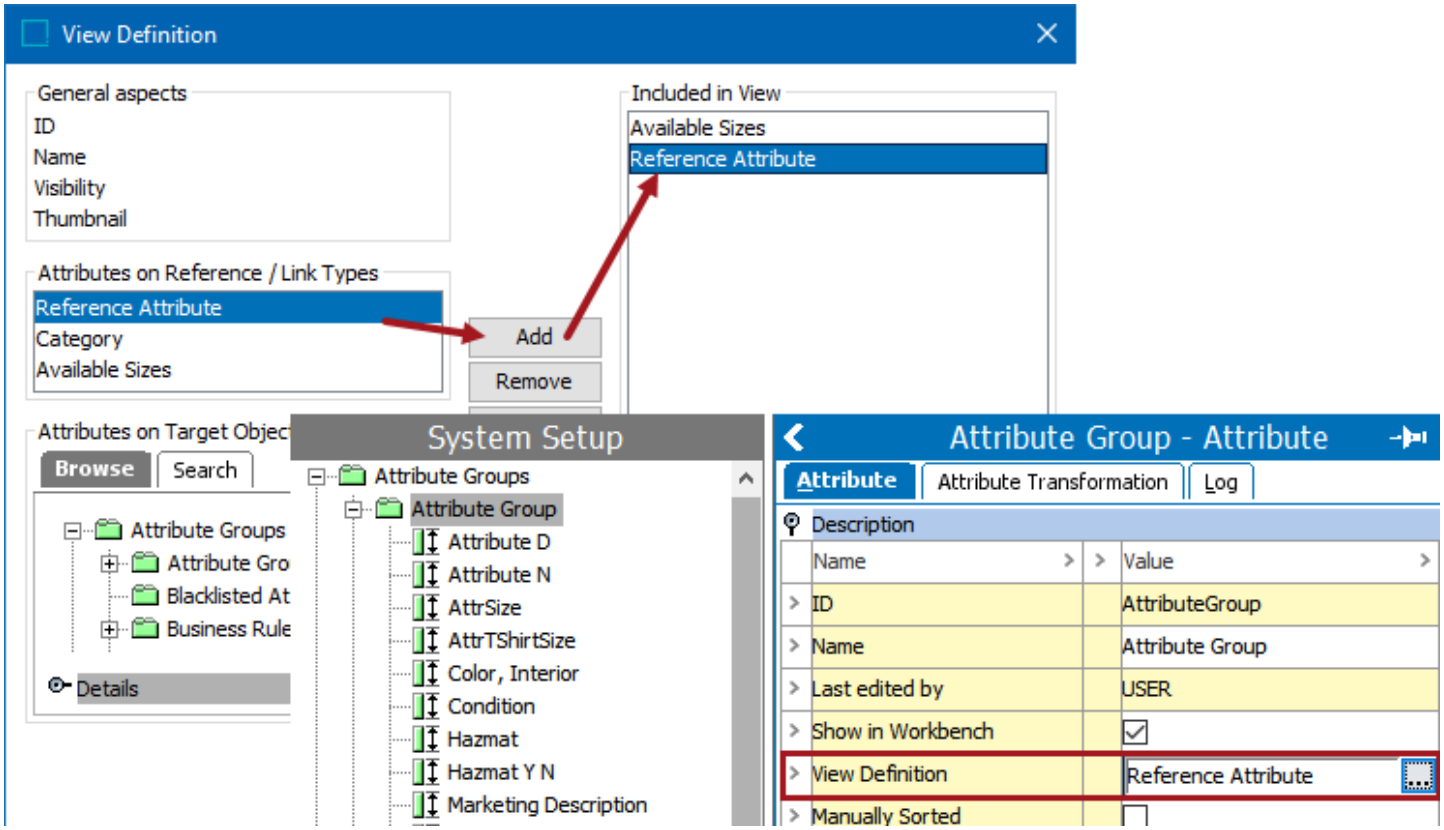


3. Select all reference types and link types that should display the metadata attribute. Checking an option also updates the Attributes flipper of the selected reference or link type.

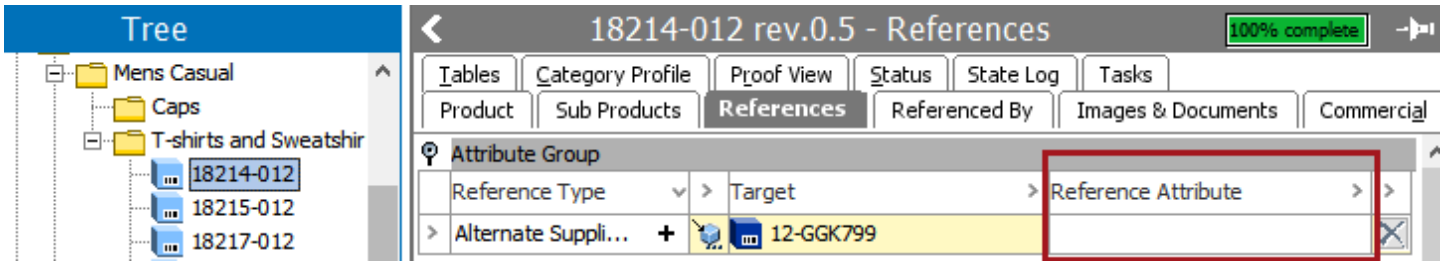


For more information, refer to **Validity on Description Attributes** in the **System Setup**.

4. Add the description attribute from the 'Attributes on Reference / Link Types' section to the attribute group's View Definition so it will display in the object editors as metadata on any reference or link in the group. For detailed steps, refer to **Creating a Customized View** section in the **Attribute Groups** topic of the **System Setup** documentation.



5. Verify that the metadata attribute is available on the reference.



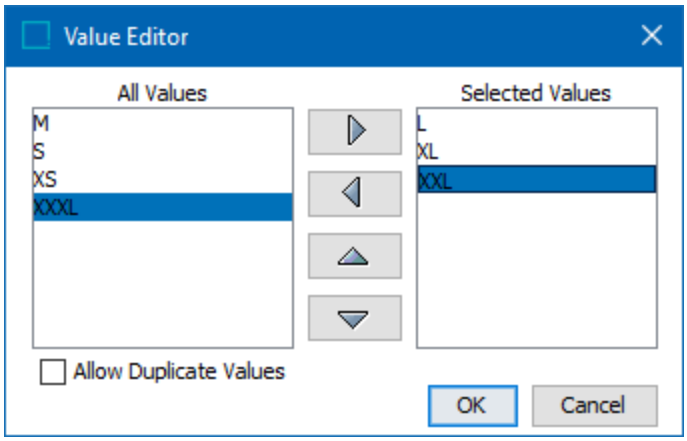
Edit a Metadata Attribute

Although the images below show a reference type, the same setup is used for editing metadata on a Product to Classification link type.

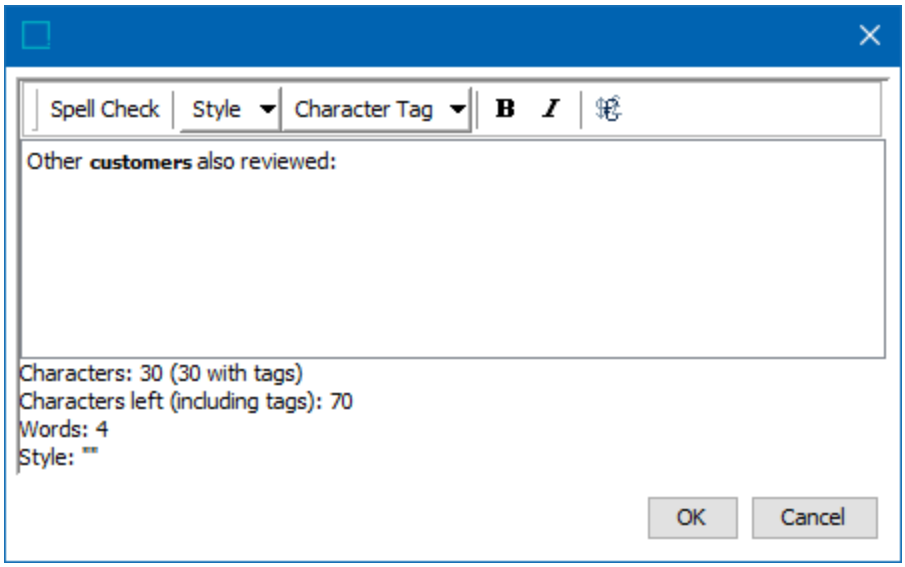
On the **References** tab, double-click an editable field (any white field as shown above) and edit using the available functionality based on the type of the metadata attribute.

- Modify the value directly in the field by adding text or selecting from a dropdown.
- Double-click (or right-click > Edit) to display a value editor.

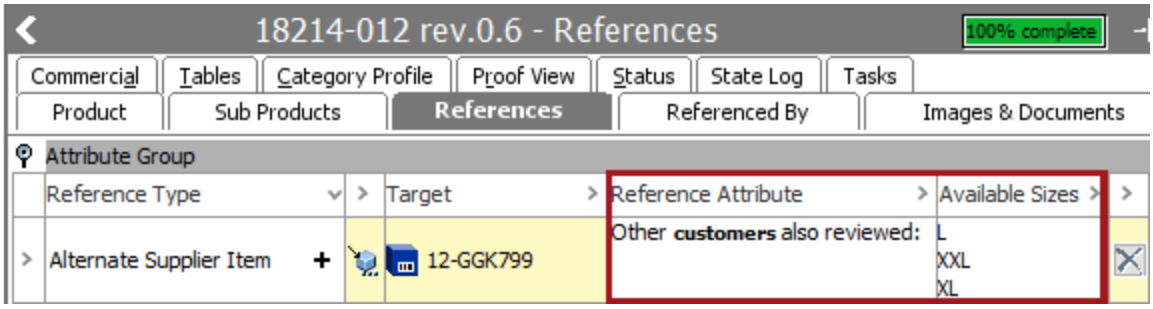
  Choose a value and use the necessary arrow button to include it in the Selected Values list, or to rearrange the order of the values.



  Add or modify text, including styles, character tags, and spell check.



Edits made to metadata on a reference or link are displayed:



Visibility of Reference and Link Types

On dimension dependent references and link types, you can specify the visibility of a reference or link in a specific context for display in the workbench (the Web UI is not effected). Based on the visibility, you can make a single setting and allow it to be inherited by other contexts, make local settings on some contexts, make all contexts have a local setting, or suppress the reference completely for a context.

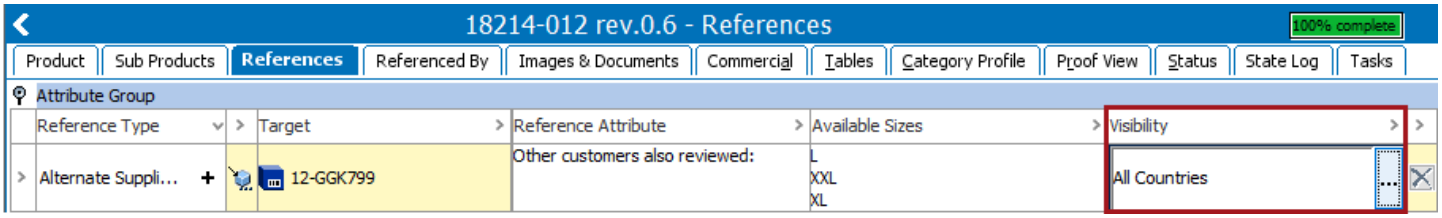
- Making the visibility global means the reference settings are inherited from the global context. For example, when all contexts require the same setting.
- Making the visibility local means the reference does not inherit its settings from the global context. For example, if you want to define attributes on a language-by-language basis.
- Suppressing the visibility means it will not be used in a specific context.

Metadata attribute values are valid globally. However, when a reference is only visible in a local context, it is possible to have a description value that is only visible in that context as well.

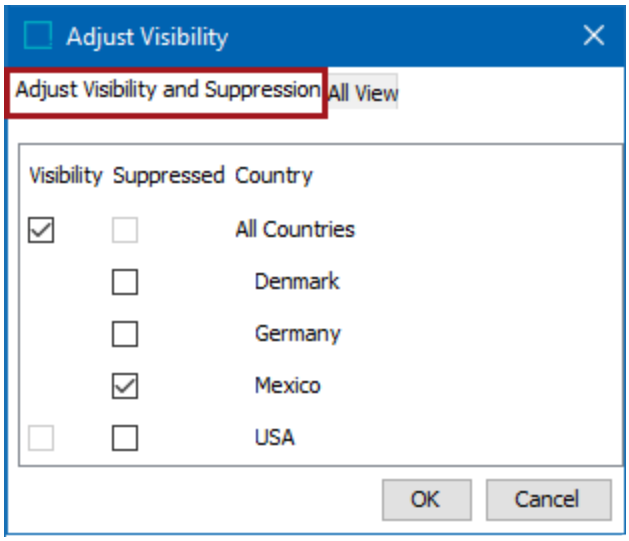
Note: The Visibility column is displayed on a reference when the General Aspect option 'Visibility' is added to the 'Included in View' panel on the View Definition of the attribute group. For more information, refer to the **Add a Metadata Attribute** section of the **Metadata Attributes on Reference and Link Types** documentation.

Setting Reference and Link Type Visibility

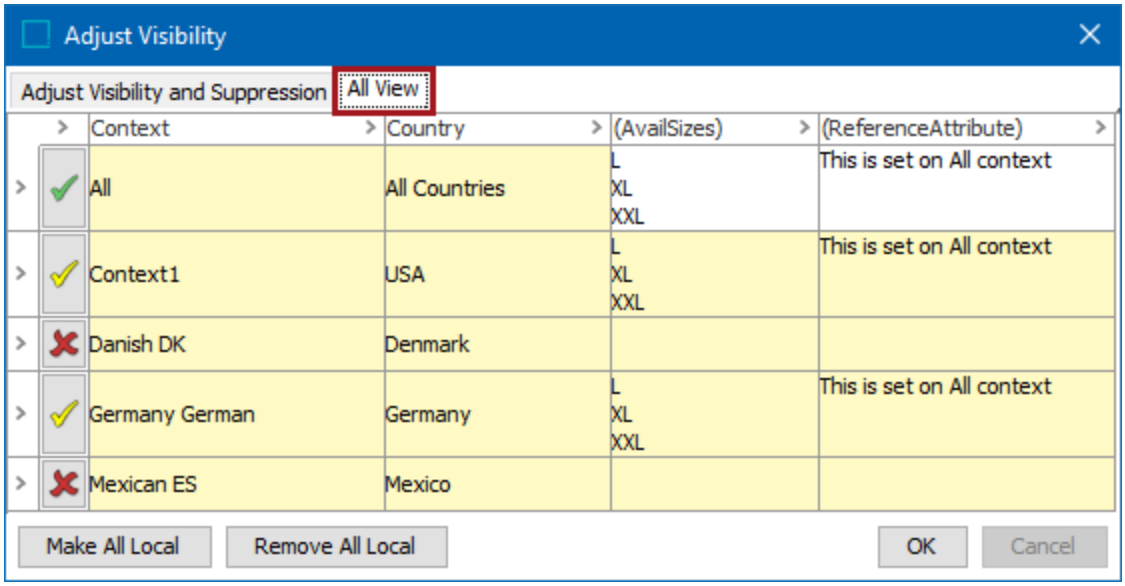
1. In the Tree, select the relevant node, click the **References** tab, and open the flipper that contains the dimension-dependent reference to be edited.



2. Double-click the **Visibility** field to display the ellipsis button (...), and then click the ellipsis button (...). The **Adjust Visibility** dialog displays with the 'Adjust Visibility and Suppression' tab active.

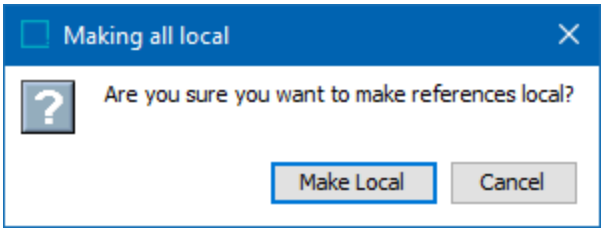


3. In the Suppressed column, check any contexts that should not display the reference.
4. Click the **All View** tab and note the status of the visibility of each context:
   - ✓ indicates that the metadata attribute is local and not being inherited (All). The setting is inherited by the contexts that display a yellow check.
   - ✓ indicates that the contexts inherits the settings of the context with the green check (USA and Germany).
   - ✗ indicates that the reference is suppressed (Mexico), or does not exist in the context (Denmark).

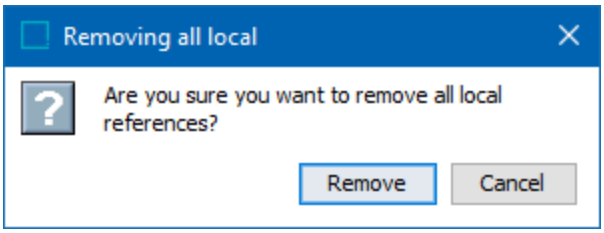


5. Modify the visibility of each required context as needed:
   - Click ✓ or ✗ to make the visibility of a reference local for only the selected context. Assuming the user has privileges to create the reference, the indicator changes to ✓, the reference value field changes to a white background, indicating that the setting can be modified on the selected context.

- Click ✓ to remove the local reference for only the selected context. The indicator changes to ✓, and inheritance is restored from the global context, and the reference value field changes to a yellow background, indicating that the setting cannot be modified on the selected context.
- Click Make All Local to make the visibility of the reference local for all contexts. In the 'Making all local' dialog, confirm that you want to make all local by clicking the **Make Local** button. All check marks turn green except the icon next to the contexts that were previously local (green). Previously local contexts are set with a red X, indicating that the reference no longer appears in those contexts. When the visibility of a reference is set to local, it no longer inherits its settings from the global context. This allows you to specify, for example, attribute values that only apply in the local context.

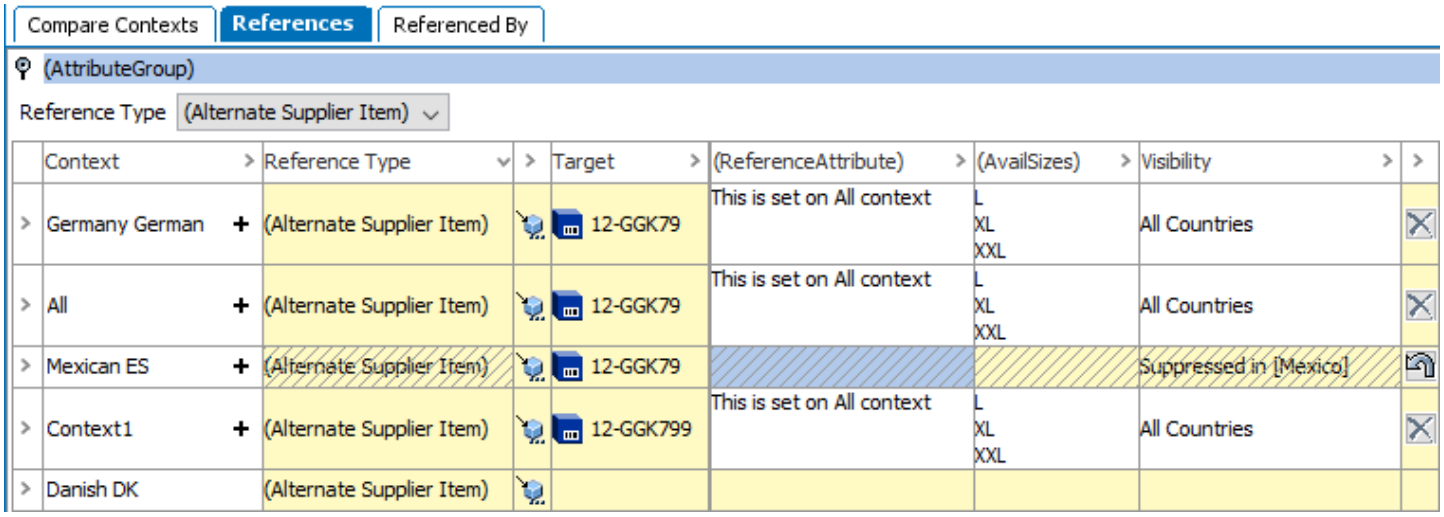


- Click Remove All Local to restore inheritance for all contexts currently local. In the 'Removing all local' dialog, confirm that you want to restore inheritance by clicking the **Remove** button. If a global context is local, all check marks turn yellow except the icon for the contexts that were previously local (green). Previously local contexts are set with a red X, indicating that the reference no longer appears in those contexts. When the visibility of a reference is set to global, it inherits its settings from the global context.

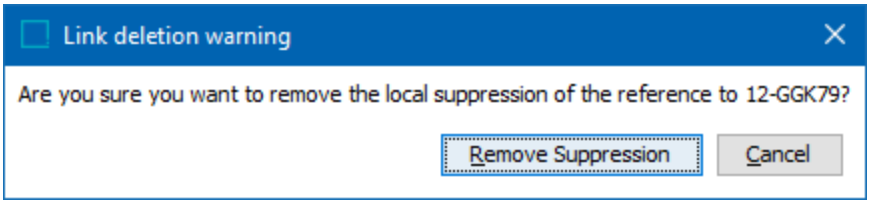


6. Verify the results of the visibility by checking the References page on the object and make any additional changes. Use the Context Mode by clicking in the toolbar.

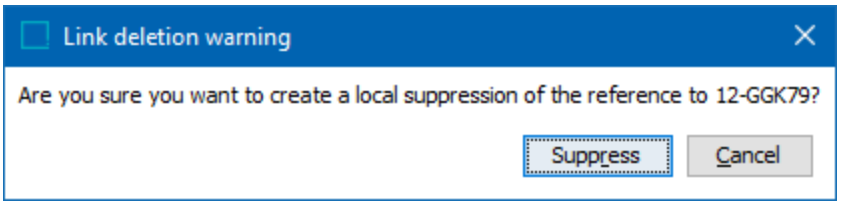
Note: Navigate to View > Target to select the Contexts for the comparison view to display.



- + indicates the reference is allowed for the context. Note that reference is not available for the Danish DK context in the image above.
- indicates that the reference is local and values can be added for metadata.
- indicates that the reference is inherited and values cannot be added for metadata.
- indicates that the reference has been suppressed.
- allows you to remove the suppression for the selected context. In the 'Link deletion warning' dialog, confirm that you want to remove the suppression by clicking the **Remove Suppression** button. Previously set inheritance is restored. Return to the Adjust Visibility dialog to change visibility to local if necessary.



- allows you to remove the current setting and suppress the reference for the selected context. In the 'Link deletion warning' dialog, confirm that you want to create a local suppression by clicking the **Suppress** button.



Reference Types

References allow you to define a connection between two objects in STEP, essentially creating a set of rules for the relationship between the objects. For example, a reference can associate an image with a product, or join multiple addresses with a single company, or connect an object to a classification, among other uses.

The reference type name refers to the target of the reference. For example, Product Reference Types all have a product object as the target. The reference types available allow connections between the objects defined in the table below.

Reference Type	Connections Allowed
Product Reference Types	Classification-to-product Product-to-product Entity-to-product
Image and Document Reference Types	Classification-to-asset Product-to-asset Entity-to-asset
Classification Reference Types	Classification-to-classification Product-to-classification Entity-to-classification
Entity Reference Types	Classification-to-entity Product-to-entity Asset-to-entity Entity-to-entity Publication-to-entity
Context Reference Types	Entity-to-context
Workspace Reference Types	Entity-to-workspace

Consider the following elements when setting up any type of reference:

- Adding a reference to an attribute group allows grouping of references and links, customized views, and added security via user group privileges. For more information, refer to **Attribute Groups for Reference and Link Types**.
- Dimension dependency determines if the reference is available based on the selected dimension point. For more information, refer to **Dimension Dependent Reference and Link Types**.
- Direction identifies one object as the 'source' and the referenced object as the 'target'. For more information, refer to **Direction of a Reference**.
- The only reference type that can display objects as parent / child in Tree is an entity reference type when both objects are entities. For more information, refer to **Entity Reference Types**.
- Metadata attributes on a reference allow description attributes to supply additional information about the reference itself. For more information, refer to **Metadata Attributes on Reference and Link Types**.
- Multiple references are allowed between the same two objects, using the same type of reference, when multiple reference types exist. For more information, refer to **Multiple References for the Same Objects**.
- Inheritance determines if a reference added to a parent object will also be visible on the child object. For more information, refer to **Inheritance Example for a Reference**.
- Dimension dependent references are displayed based on the Visibility setting. For more information, refer to **Visibility of Reference and Link Types**.

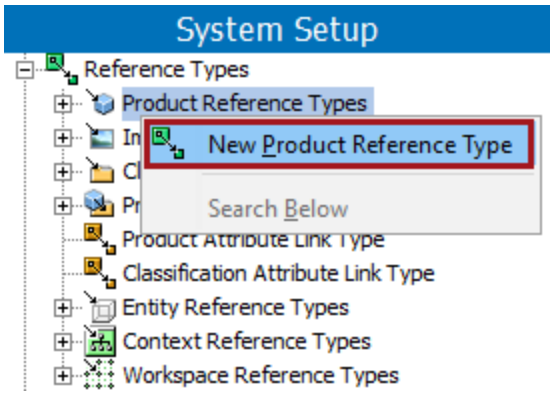
To create a reference type, follow the steps outlined in **Creating a Reference Type**.

To maintain a reference type, follow the steps outlined in **Maintaining a Reference Type**.

Creating a Reference Type

1. In System Setup tab, open the Reference Types node, select the relevant reference type node, right-click the node, and choose the **New** option from the menu.

   The following image shows creating a Product Reference Type, but the process is the same for all reference types.



   You can create the following types of references using the right-click menu option identified below:

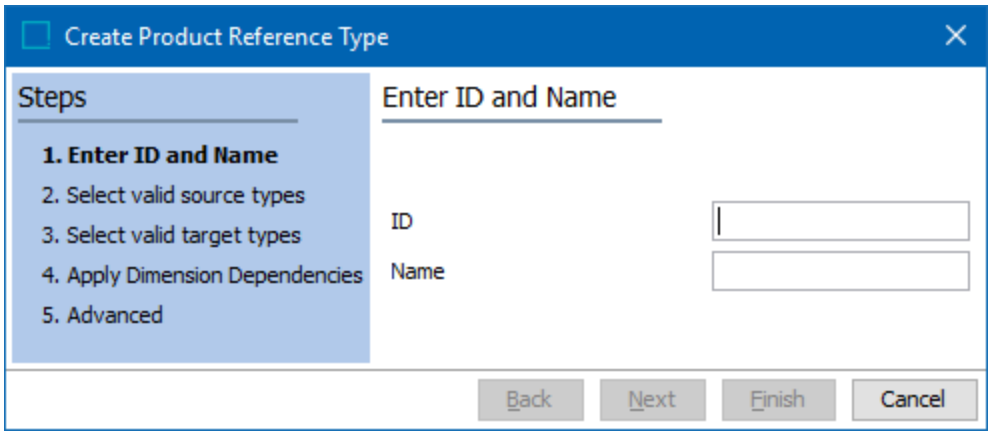
   - Product Reference Type > New Product Reference Type
   - Image and Document Reference Type > New Asset Reference Type
   - Classification Reference Type > New Classification Reference Type
   - Entity Reference Type > New Entity Reference Type
   - Context Reference Type > New Context Reference Type
   - Workspace Reference Type > New Workspace Reference Type

   For information on Product to Classification Link Types, refer to the **Creating a Product to Classification Link Type** topic.

   For information on the attribute link types, refer to the **Product Attribute Link Type** topic or the **Classification Attribute Link Type** topic.

2. Regardless of the reference type selected, the Create Reference Type wizard displays.

   The image below shows a Product Reference Type, but the steps are the same for each reference type.

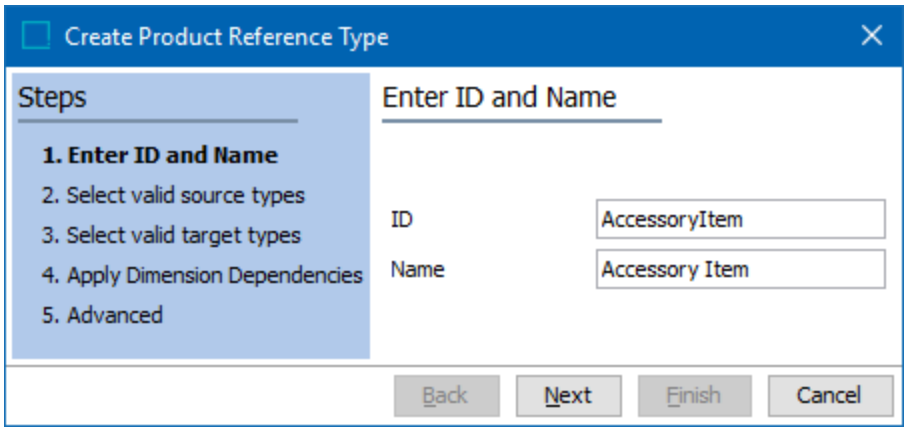


Each reference wizard includes the following steps:

- **Enter ID and Name** allows you to identify the reference.
- **Select Valid Source Types** allows you to choose the types of products valid for this reference.
- **Select Valid Target Types** allows you to choose the alternate classifications valid for this reference.
- **Apply Dimension Dependencies** allows you to define the dimension points that are affected by this reference.
- **Advanced** allows you to configure multiple references, set externally maintained, mandatory, and inheritance for the reference.

Once the reference type exists, create a reference between the two objects as outlined in **Creating a Reference**.

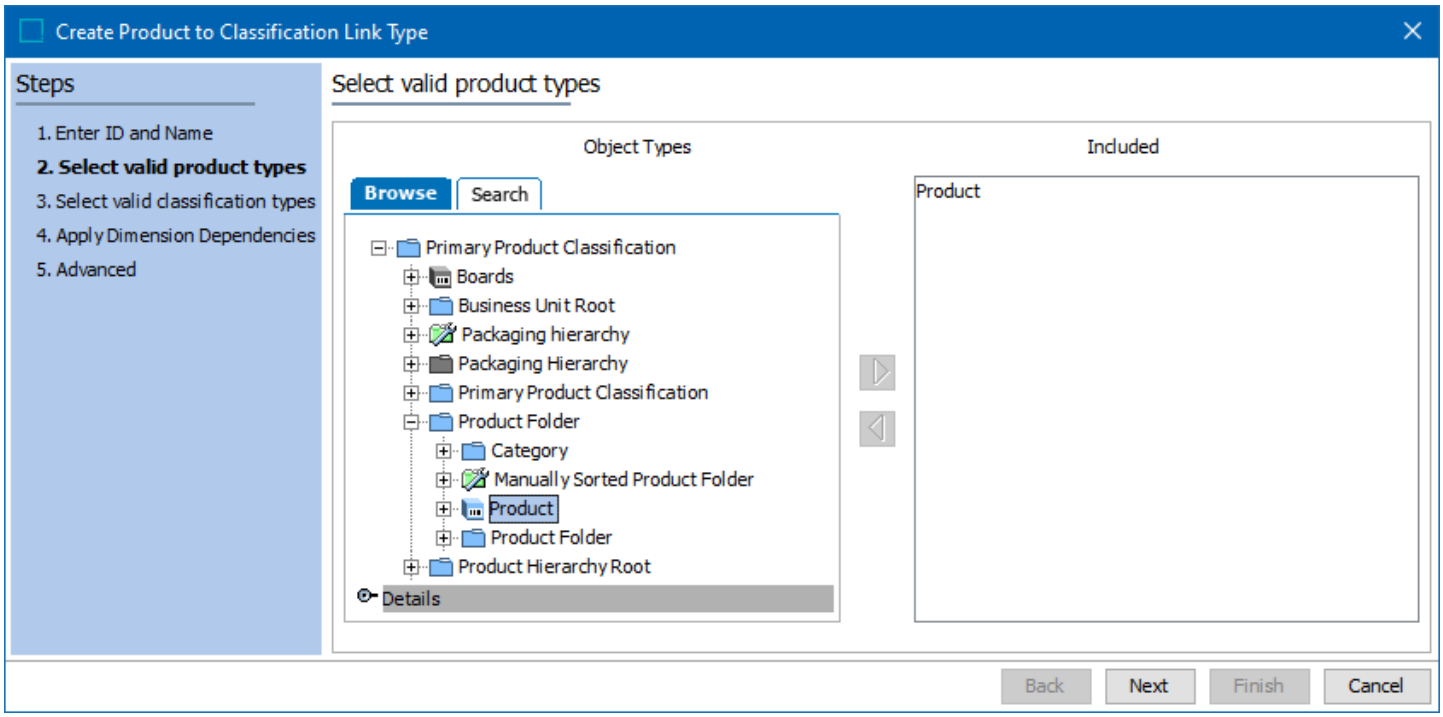
Reference Type - Enter ID and Name



This wizard step is the same for all types of references: Product, Image and Document, Classification, Entity, Context, and Workspace.

1. Enter an **ID** for the reference. Common setup is to use no spaces or punctuation. If the ID is in use for any other configured reference type, an error will display notifying the user that the requested ID is already in use, and the wizard will not progress until a new ID is entered.
2. Enter a **Name** for the reference. Common setup is to repeat the ID with added spaces for readability.
3. Click the **Next** button to display **Reference Type - Select Valid Source Types**.

Reference Type - Select Valid Source Types



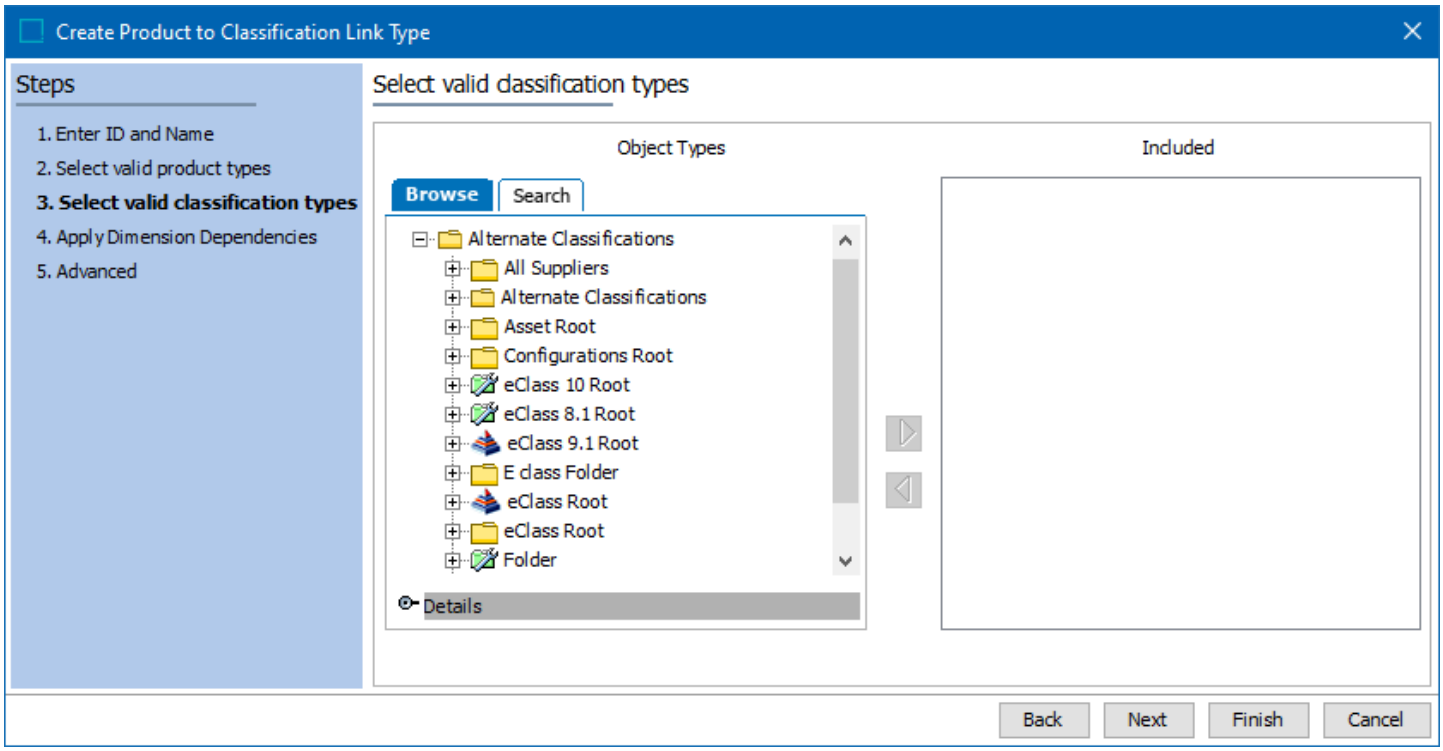
The contents of the Object Types pane displayed in this wizard step show only valid object types based on the selected reference type (Product, Image and Document, Classification, Entity, Context, and Workspace).

1. Browse through the hierarchy to select one or more source object types using the 'Browse' tab, or use the 'Search' tab to type the desired source object types and then select from a dropdown of typeahead-generated options. The 'source' object type selected defines which kinds of objects may reference other objects, i.e., which objects can start the reference. For more information, refer to **Direction of a Reference**. Selecting an item from the Object Types pane enables the right arrow button.
2. Click the right arrow button ( ) to move the selected object type to the Included pane. All objects in the Included pane will be valid for the reference type being created.

   Note: To remove an object type from the Included pane, first select the Included item, and then click the left arrow button ( ).

3. Click the **Next** button to display **Reference Type - Select Valid Target Types**.

Reference Type - Select Valid Target Types



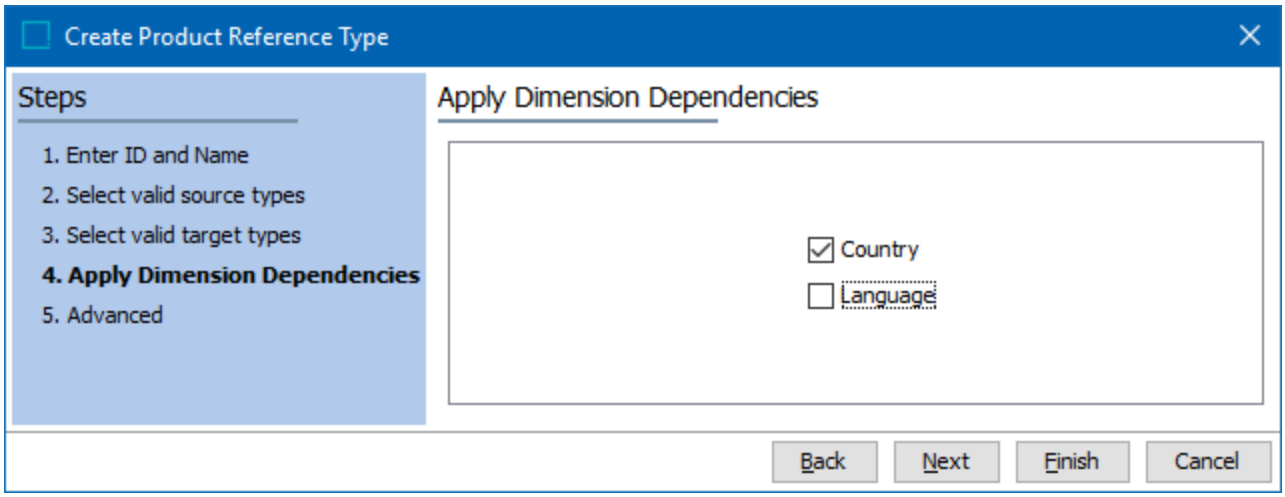
The contents of the Object Types pane in this wizard step displays only valid object types based on the selected reference type (Product, Image and Document, Classification, Entity, Context, and Workspace).

1. Browse through the hierarchy to select one or more target object types using the 'Browse' tab, or use the 'Search' tab to type out the desired target object type and then select from a dropdown of typeahead-generated options. The 'target' object type selected defines which kinds of objects may be referenced, i.e., which objects can end the reference. For more information, refer to **Direction of a Reference**. Selecting an item from the Object Types pane enables the right arrow button.
2. Click the right arrow button ( ) to move the selected object type to the Included pane. All objects in the Included pane will be valid for the reference type being created.

   Note: To remove an object type from the Included pane, first select the Included item, and then click the left arrow button ( ).

3. Click the **Next** button to display **Reference Type - Apply Dimension Dependencies**.

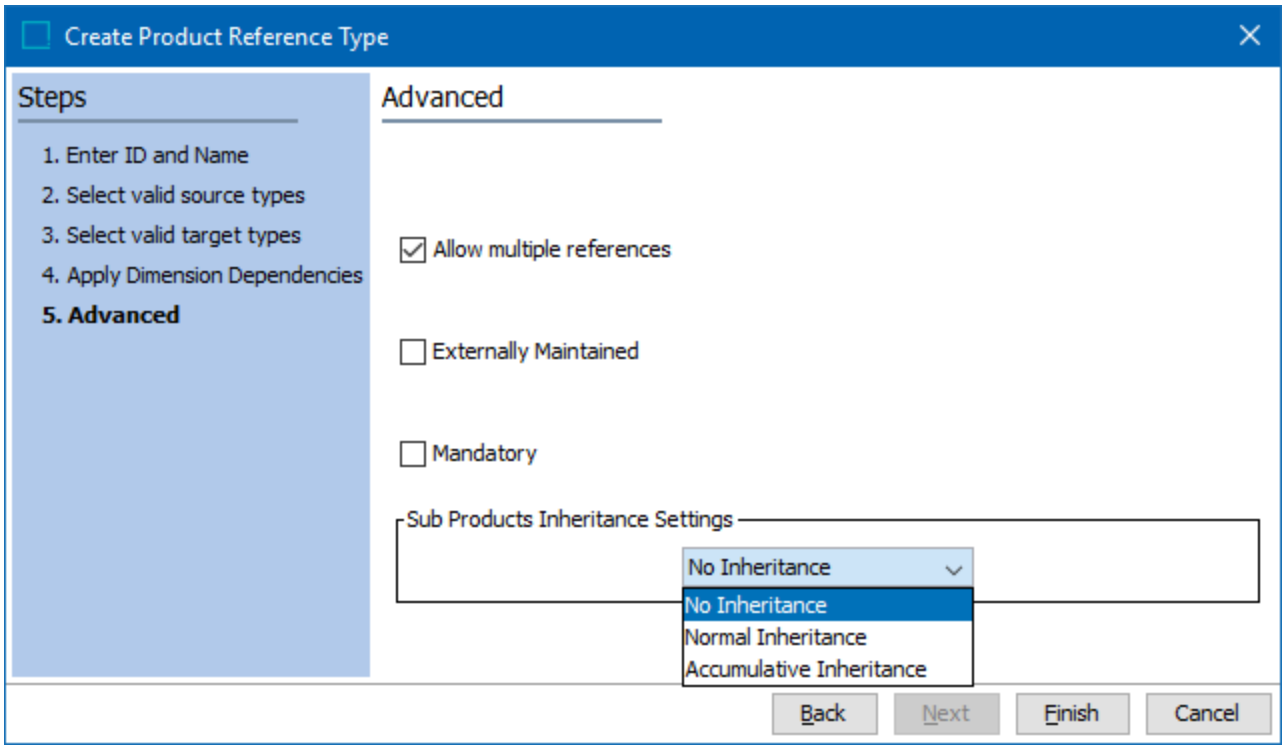
Reference Type - Apply Dimension Dependencies



This wizard step is the same for all types of references: Product, Image and Document, Classification, Entity, Context, and Workspace.

1. If the reference type should be dimension dependent, select a dimension checkbox. Only one dimension is allowed for a reference type. If multiple dimension dependencies are needed, use a separate reference type. For more information, refer to **Dimension Dependent Reference and Link Types**.
2. Click the **Next** button to display **Reference Type - Advanced**.

Reference Type - Advanced



This wizard step is the same for all types of references: Product, Image and Document, Classification, Entity, Context, and Workspace.

1. **Allow Multiple References** determines the number of references of the type can be applied to the source object. For more information, refer to the **Maintaining a Reference Type** documentation.
   - **Checked** means the reference type can reference more than one target from same source.
   - **Unchecked** means the reference type is restricted to a single reference from the same source.

2. **Externally Maintained** determines if adding or modifying a reference of this type affects the Approved parameter on the source object. For more information, refer to the **Maintaining a Reference Type** documentation.
   - **Checked** means adding a reference from a source object to a target object will not required approved to display in the Approved workspace.
   - **Unchecked** means the reference type is controlled by revision control and adding a reference from a source object and/or changing values on attributes applied to the reference on the source object will require approval to display in the Approved workspace.

> **Note:** The source object's approved status is reset (requires approval to display in the Approved workspace) if metadata attribute values are changed on the reference and the metadata attributes are not externally maintained.

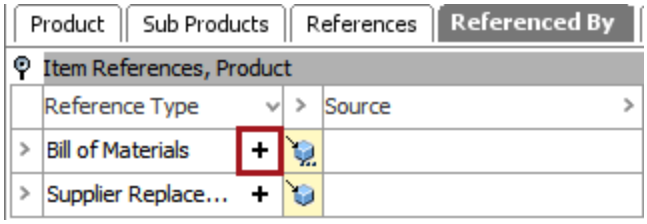
3. **Mandatory** determines if the reference type is required for approval of the source object. For more information, refer to the **Maintaining a Reference Type** documentation.
   - **Checked** means the reference type is required from a source object to a target object before the source object can be approved.
   - **Unchecked** means the reference type for a source object to a target object is optional and does not affect approval of the source object.
4. **Sub Products Inheritance Settings** determines if and how references are displayed on valid child objects below the source, with respect to the Validity settings. For details on inheritance of references, refer to **Inheritance Example for a Reference**.
   - **No Inheritance** means the reference type will not be inherited by the sub products. The reference will only appear on the two referenced objects.
   - **Normal Inheritance** means when creating a reference from a source object to a target object, the reference will be inherited on all valid objects below the source object. Each inherited reference will reference the same target. If multiple references are allowed, and a new reference of this type is added to a sub product, the inherited reference is removed and only the local reference remains.
   - **Accumulative Inheritance** means when creating a reference from a source object to a target object, the reference will be inherited on all valid objects below the source object. Each inherited reference will reference the same target. If multiple references are allowed, and a new reference of this type is added to a sub product, the inherited reference is retained and the local reference is added to the list.
5. Click the **Finish** button to create the reference type.
6. To apply the new reference type to a pair of objects, refer to **Creating a Reference**.

Creating a Reference

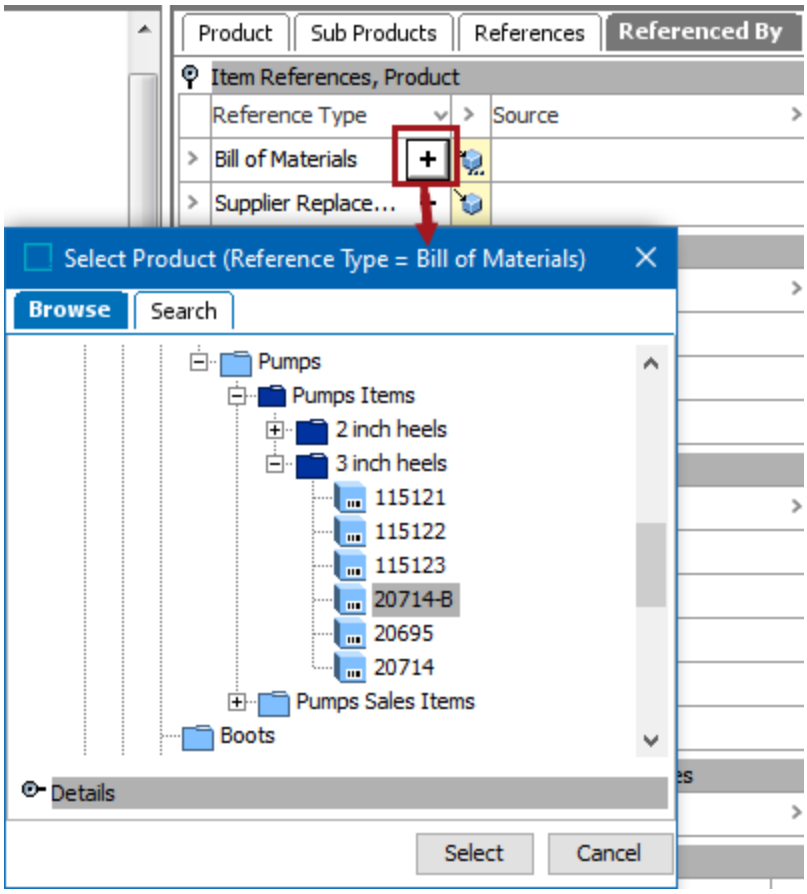
After creating a reference type, you can add that type on an object's References or Referenced By tabs.

To maintain data on the References and Referenced By tabs, refer to the **References Tab** topic and the **Referenced By Tab** topic in the **Getting Started** documentation.

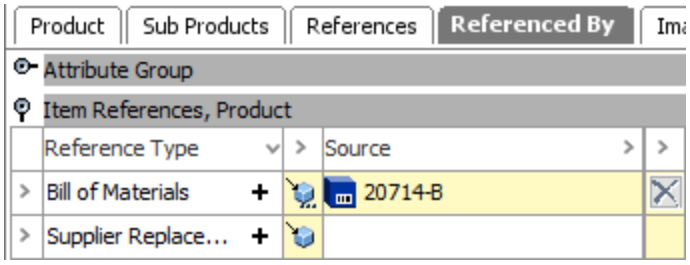
1. To add references to either the **References** or **Referenced By** tab of an object, use one of the following ways to find the reference type in a flipper:
   - If the reference type has been added to an attribute group, it appears under a flipper that is named the same as the attribute group, as shown in the image in the next step.
   - If the reference type is not in an attribute group, it appears under an 'Ungrouped References' flipper, based on the type of reference. For example, product references are under a flipper with the name 'Ungrouped Product References.'
2. Click the plus sign button in the desired reference field. If more than one reference is allowed for the reference type, the plus sign button continues to display after the first reference is added, otherwise it is removed.



3. In the Select Object dialog, find the object that is to be added, and click the Select button. If you know the target ID / Name of the object, use the Search tab to find it quickly using the typeahead functionality to display the options as a dropdown.



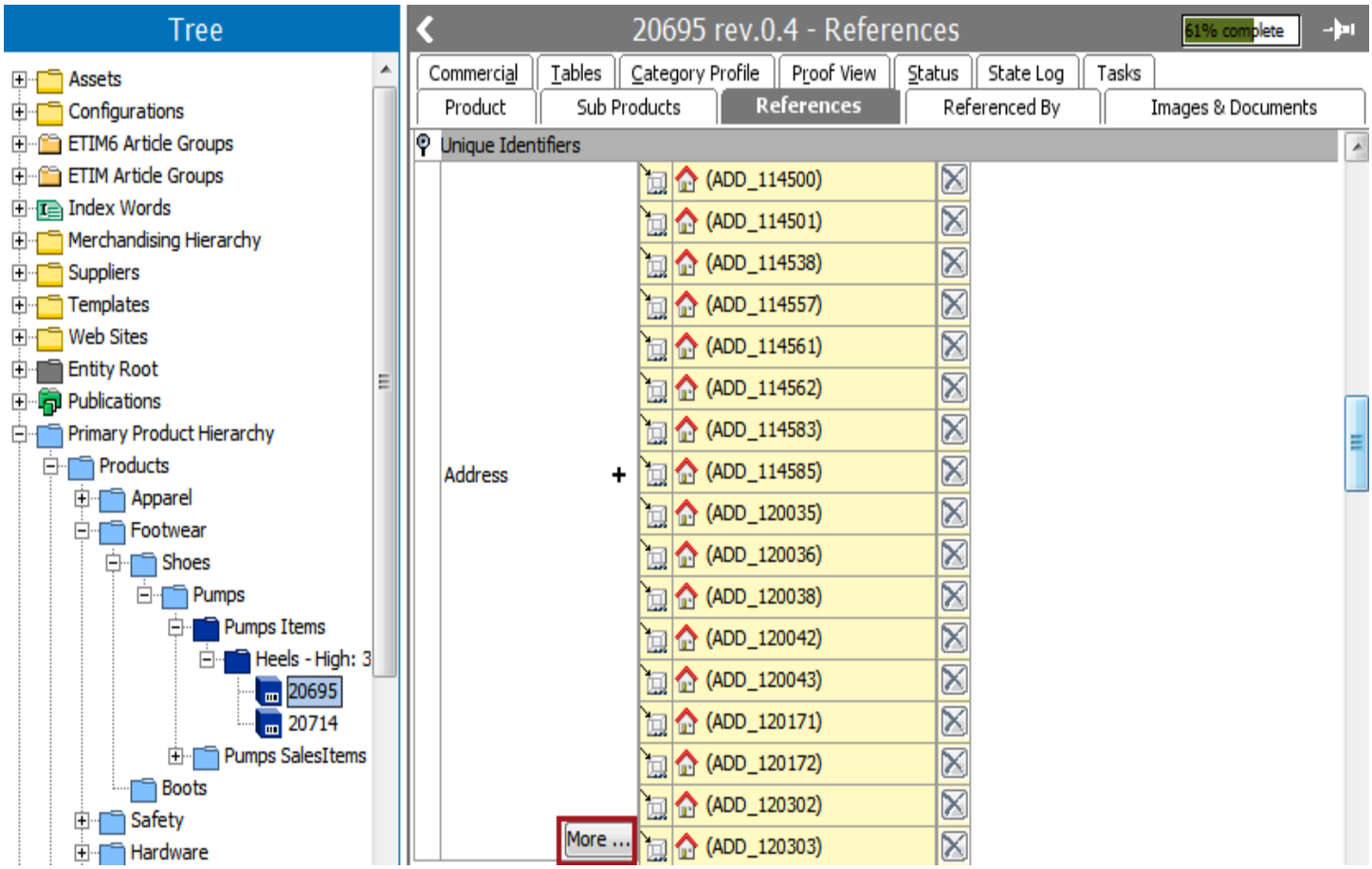
4. Once selected, the object displays as an added reference.



   - To remove a reference, click the X button.

Displaying a large number of references

If more than 50 references of the same type are added, a button labeled 'More...' (More ...) displays, allowing users to expand the list and view 50 additional references.

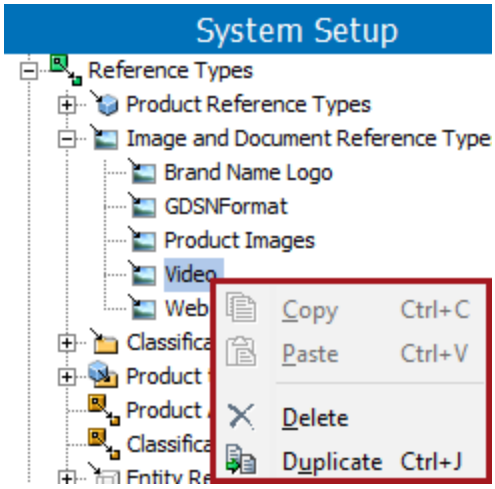


Repeatedly clicking the button doubles the number of references shown each time, until the full set is displayed. Note that if new references are added, they display on the list immediately indicating that they were added properly, though normal functionality will resume if the user presses the 'More...' button again. This means that items may become hidden until the list is fully expanded.

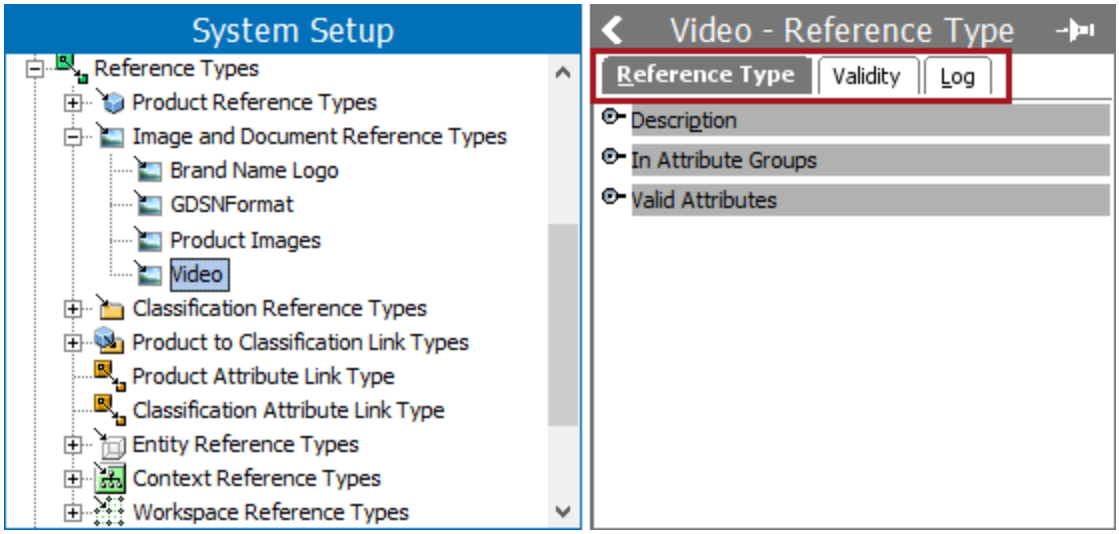
After the list has been fully expanded for the given reference type, it stays expanded until the user refreshes the page or clicks away to another object in workbench.

Maintaining a Reference Type

Select a reference to display the Reference Type editor and make updates to the reference type settings. The right-click menu provides access to copy, paste, delete, or duplicate a reference.



With the few exceptions defined below, the tabs and parameters on a reference are the same, regardless of the type. Each tab on the editor is defined below and includes parameters to maintain a Product, Image and Document, Classification, Entity, Context, or Workspace reference type.

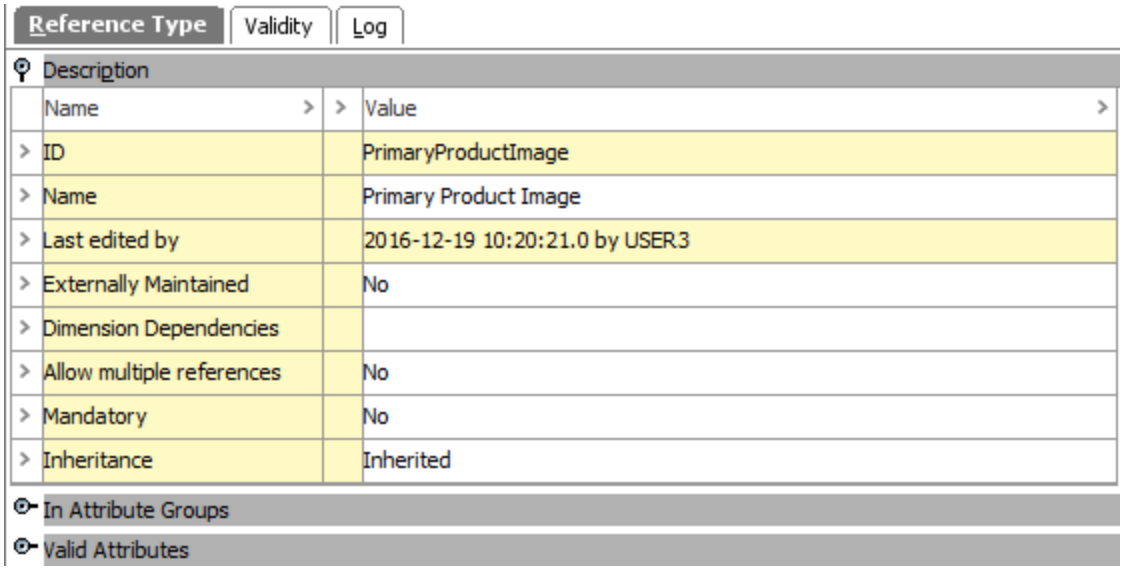


Reference Type Tab

This tab is displayed for the Product, Image and Document, Classification, Entity, Context, and Workspace reference types. It holds basic information within the Description, In Attribute Groups, and Valid Attribute flippers.

Description Flipper

The Description flipper includes basic information to identify the reference. This data is originally set up in the reference type wizard, refer to **Creating a Reference Type** documentation.



All fields except the ID and 'Last edited by' fields can be edited. The method required to edit a parameter in the references seditor is determined by the parameter type:

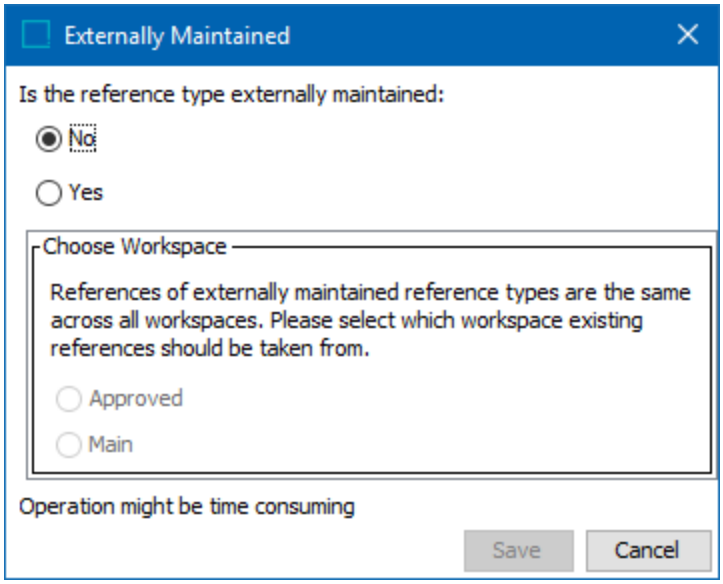
- For **Name**, click into the text box and make the desired changes. The ID and name parameters are set in the **Reference Type - Enter ID and Name** wizard step.
- For **Externally Maintained**, double-click to display a dialog. When using an externally maintained reference between two objects, the reference will automatically be included in all workspaces and the source object will remain in its current approval status.

  While this parameter can be modified, doing so requires special handling. For Oracle databases, this action requires single-update mode (SUM), as defined in the Single-Update Mode topic. For Cassandra databases, this action uses Lock-free Schema Change (LFSC) functionality, as defined in the Lock-free Schema Change topic.

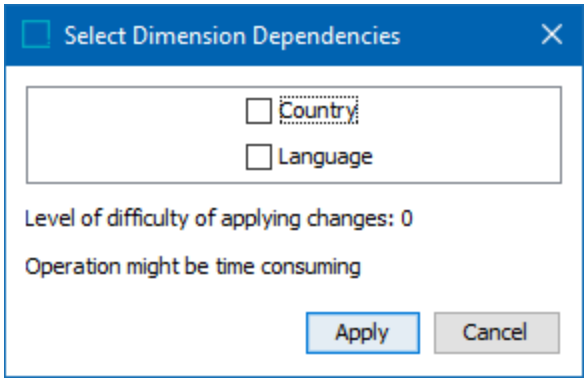
  For example, references to vendor logos are imported from an ERP system and are not under revision control. To address this case, an image reference type named 'Vendor Logo' is set to be externally maintained, which means that:

  - Importing references from products to 'Vendor Logos' using the reference type 'Vendor Logo,' will automatically make the reference available in all workspaces.
  - The approval status of all products will remain unchanged.
  - Changing metadata attribute values on attributes not set to be externally maintained and applied the reference type 'Vendor Logo' will trigger a status change on the products where the vendor logos are referenced from. Approval is required to display the changes in all workspaces.

If a reference type is changed to be Externally Maintained = Yes, and the reference type has been used to reference objects, you must select a workspace. All existing references will be synchronized across all workspaces based on the selected workspace value. The externally maintained parameter is set in the **Reference Type - Advanced** wizard step.



- For **Dimension Dependencies**, double-click to display an ellipsis button (...). Click the ellipsis button (...) to display a dialog that includes the dimension points on your system. Only one dimension can be selected. If more are needed, create separate reference type. The dimension dependencies parameter is set in the **Reference Type - Apply Dimension Dependencies** wizard step.



- For **Allow multiple references**, click the parameter to display the dropdown list of options. Three (3) small dots displayed below the reference icon indicates multiple references are allowed ( ). This parameter is set in the **Reference Type - Advanced** wizard step. For an example of using multiple references, refer to **Multiple References for the Same Objects**.

While this parameter can be modified, doing so requires special handling. For Oracle databases, this action requires single-update mode (SUM), as defined in the Single-Update Mode topic. For Cassandra databases, this action uses Lock-free Schema Change (LFSC) functionality, as defined in the Lock-free Schema Change topic.

For example, a product reference type named 'Part of Kit' is set to be mandatory and is valid for source object types 'Product Family' and target object types 'Articles,' which means that:

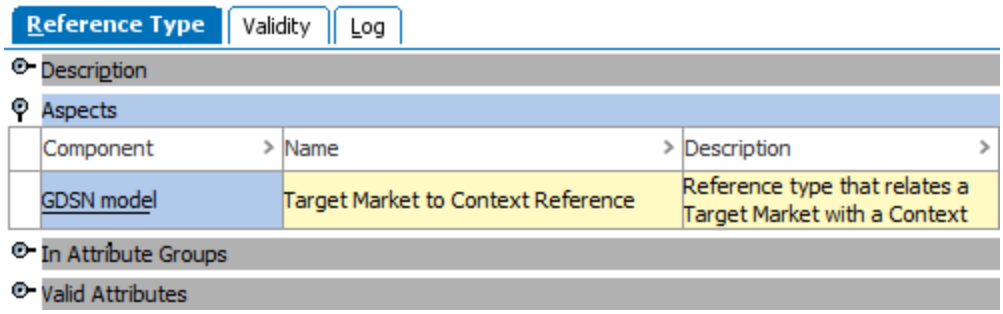
- A reference of type 'Part of Kit' can be established from products with object type 'Product Family' to products with object type 'Articles.'
- A reference of type 'Part of Kit' must exist in order to approve a product with object type 'Product Family.'

- For **Inheritance**, click the parameter to display the dropdown list of options. A green down arrow displayed above the reference icon indicates it is inherited ( ). This parameter is set in the **Reference Type - Advanced** wizard step. For an illustration of inheritance on a reference type, refer to the **Inheritance Example for a Reference** topic.

Aspects Flipper

When an Entity, Context, or Workspace reference is used by a component model, the Aspects flipper is displayed. Component models, like solutions for GDSN or Matching, are housed in the System Setup under the Component Models node. For more information, refer to the **Component Models** topic.

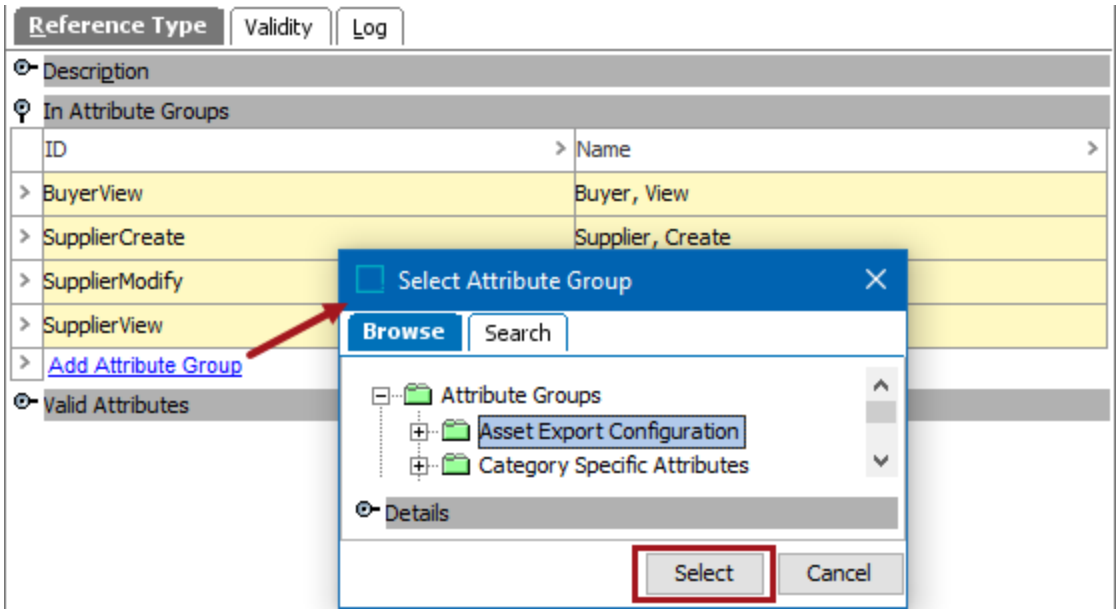
No edit option is available on the Aspects flipper. Changes to component model references must be made directly on the component model. Click the link in the Component column to display the component model using the reference.



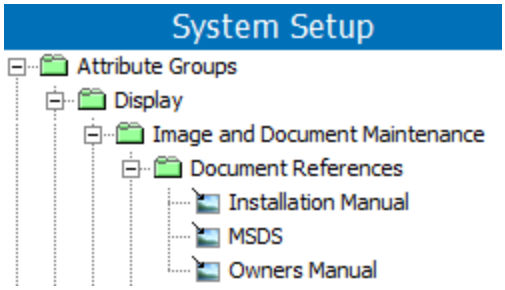
In Attribute Groups Flipper

The 'In Attribute Groups' flipper includes all attribute groups that include the reference. Adding a reference types to one or more attribute groups determines the label of the flipper that displays the reference in an object editor, enables you to set up user privileges to restrict approval of the reference type, and to define a customized view of the reference types in the group. For more information, refer to **Attribute Groups for Reference and Link Types** documentation.

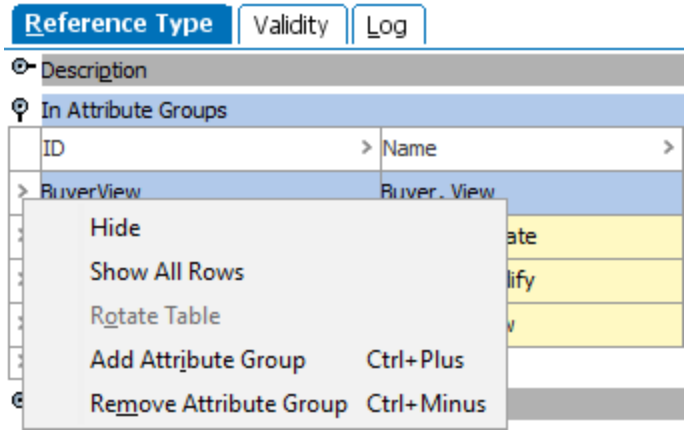
- To add an attribute group, click the **Add Attribute Group** link to display the Select Attribute Group dialog. Choose a group and click the Select button to add the reference to an attribute group.



The reference type is also displayed within the Attribute Groups node on System Setup.



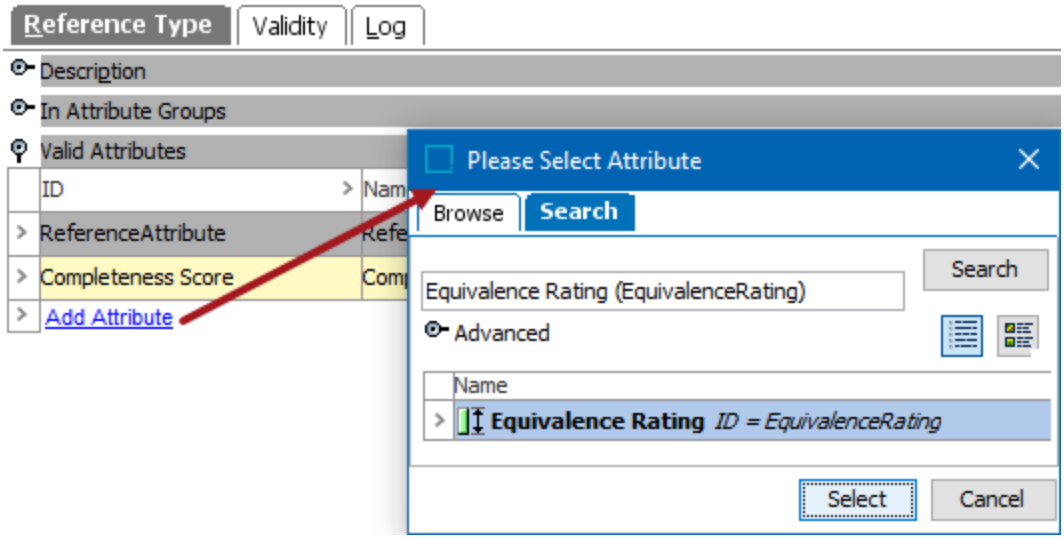
- To modify the attribute groups included or displayed, right-click the arrow to the left of the ID and select an option from the menu.



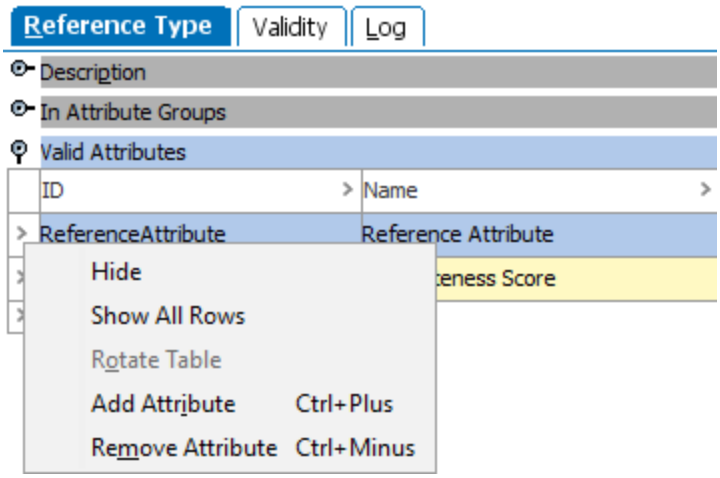
Valid Attributes Flipper

Metadata (description) attributes allow information to be captured on the reference itself to determine when the target object should be used, or to provide additional information about the connection between the objects.

- To add a metadata attribute, click the **Add Attribute** link to display the Select Attribute dialog. Choose a description attribute and click the Select button. The Search tab only returns results for description attributes. A specification attribute cannot be selected.



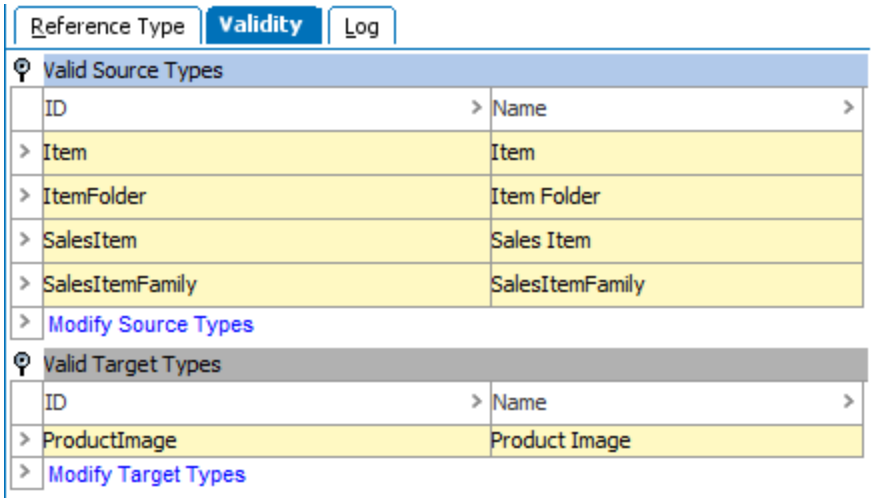
- To modify the metadata attributes included or displayed, right-click the arrow to the left of the ID and select an option from the menu.



For more information, refer to **Metadata Attributes on Reference and Link Types** documentation.

Validity Tab

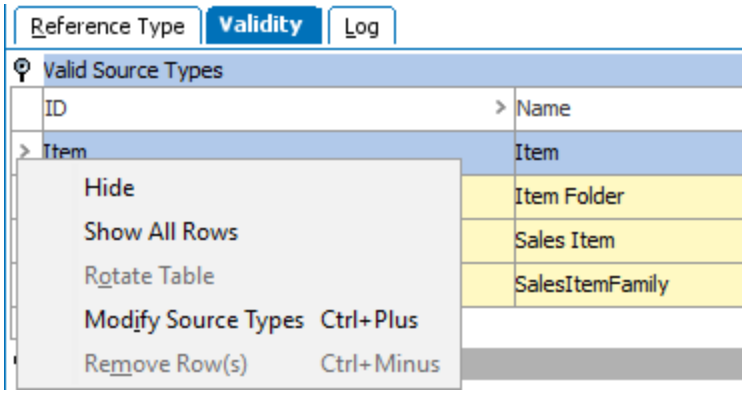
The Validity tab stores the source object types and the target object types allowed on the selected reference type.



- For **Valid Source Types**, any number of source object types can be added, but the object types available are restricted based on the selected reference type. Click the 'Modify Source Types' link to add or remove an object type. This parameter is discussed in the **Reference Type - Select Valid Source Types** documentation.

  Note: When an object type is removed from the list, if a reference of this type already exists for the deleted object type, the links are deleted.

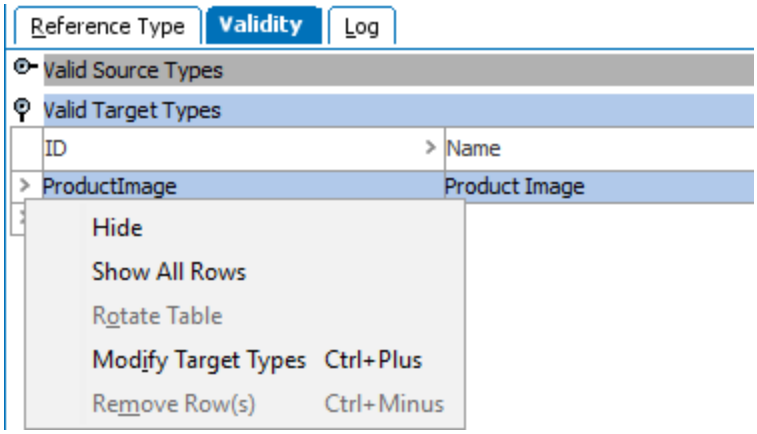
  To modify the object types included or displayed, right-click the arrow to the left of the ID and select an option from the menu.



- For **Valid Target Types**, any number of target object types can be added, but the object types available are restricted based on the selected reference type. Click the 'Modify Target Types' link to add or remove an object type. This parameter is discussed in the **Reference Type - Select Valid Target Types** documentation.

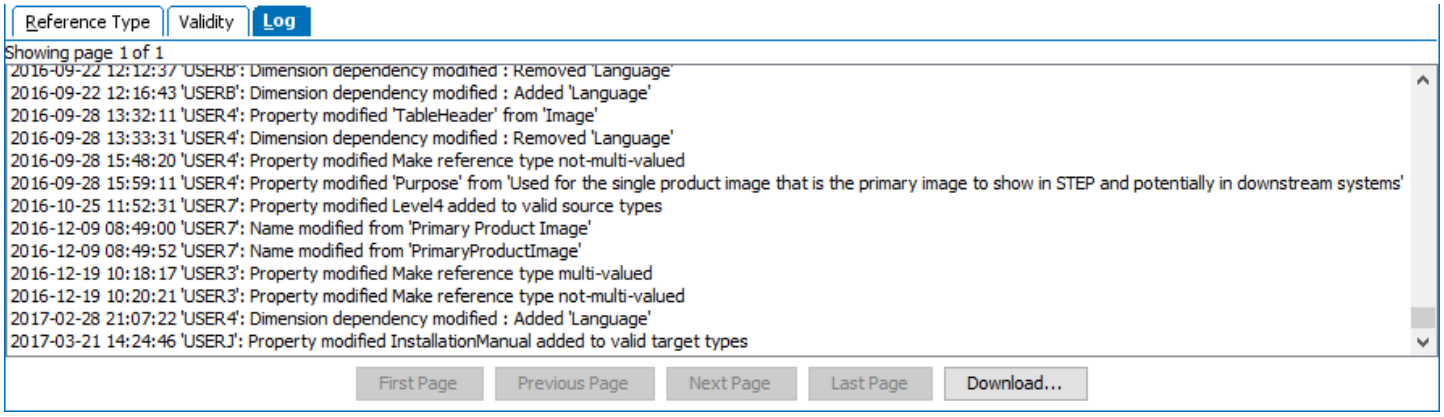
Note: When an object type is removed from the list, if a reference of this type already exists for the deleted object type, the links are deleted.

To modify the object types included or displayed, right-click the arrow to the left of the ID and select an option from the menu.



Log Tab

The Log tab stores the information about the changes that have taken place on the reference type since it was created.



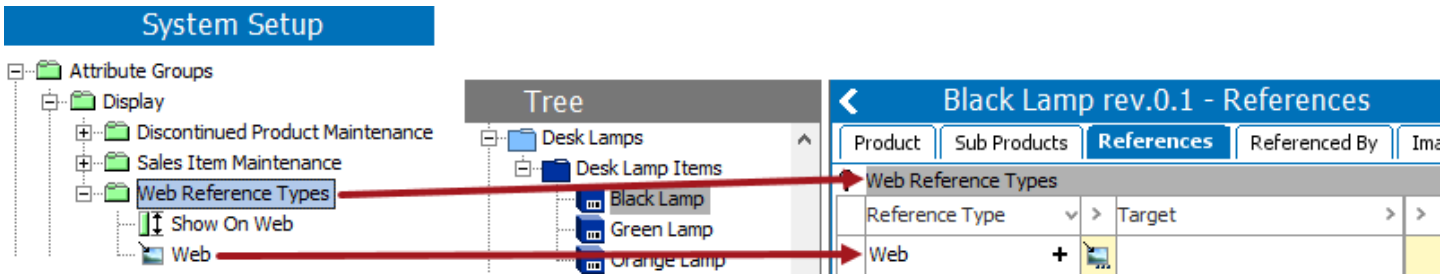
As additional log entries become available and the page is filled, the pagination buttons are enabled. Additionally, you can download the complete log as a zipped text file.

Attribute Groups for Reference and Link Types

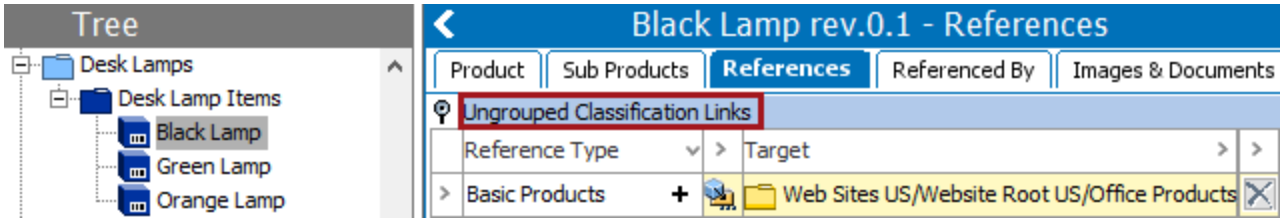
Adding a Reference or Product to Classification Link type to an attribute group provides easy identification, a customized view, and control of approvals via user privileges.

Easy Identification

The name of the attribute group is used as the name of the flipper that displays the reference or link within the object editor. This provides a logical grouping for the references or links.

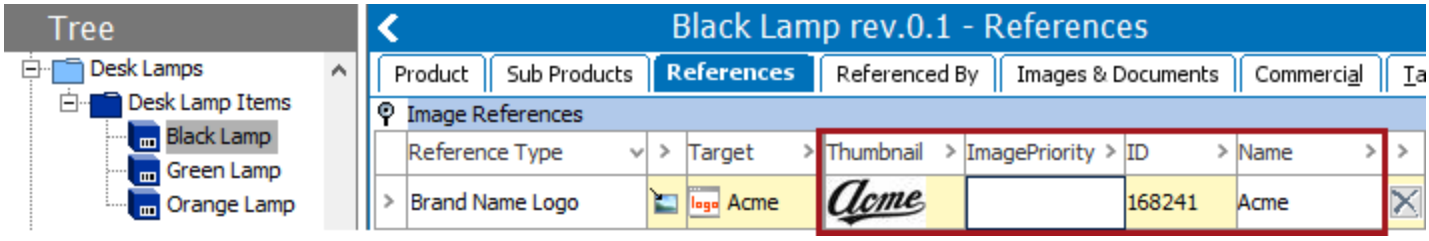


Otherwise, the reference or link displays in a flipper with the 'Ungrouped' label.



Customized View

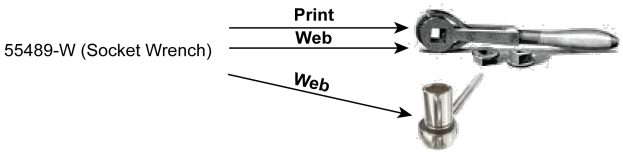
A customized view can be defined on the attribute group of all reference or link types in the group to display additional information on the reference or link. For more information, refer to the **Creating a Customized View** section in the **Attribute Groups** topic of the **System Setup** documentation.



Control of Approvals via User Privileges

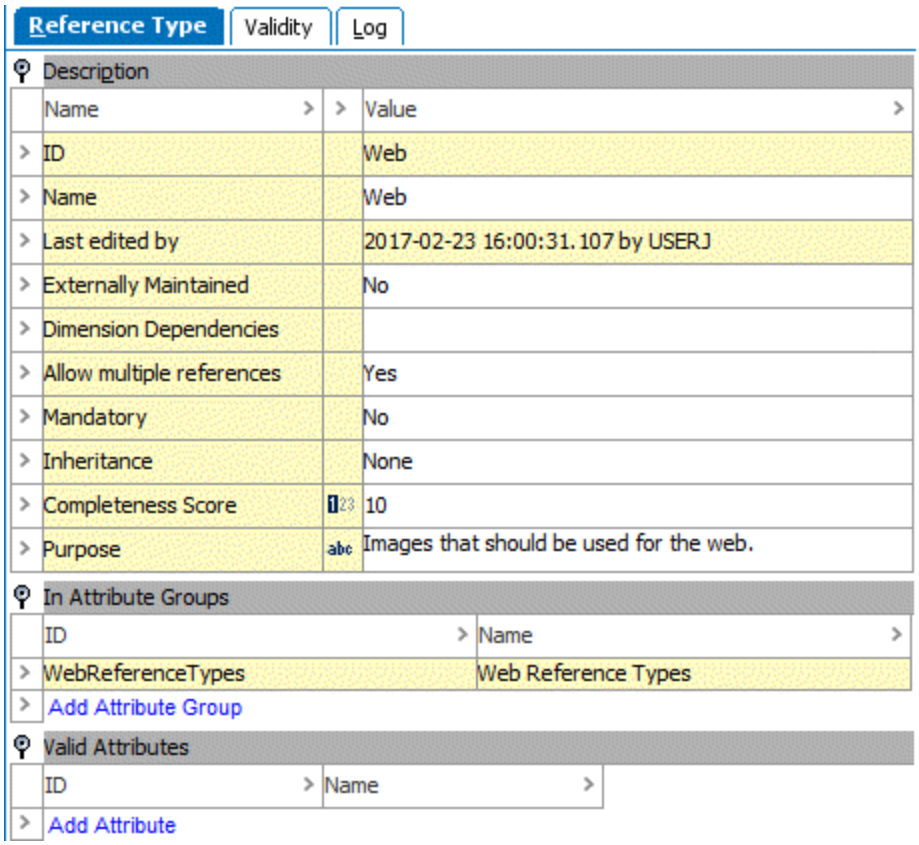
Perhaps most importantly, an attribute group allows you to control user privileges for approval of the reference or link. This means that approval of specific types of references and links is based on the user's access to the attribute group, so that users will only be allowed to approve references or links of the types in the attribute group.

For example, consider a user who should only be allowed to approve references used for the web. As shown below, approving Product 55489-W (Socket Wrench) should also allow approving the images used for web.

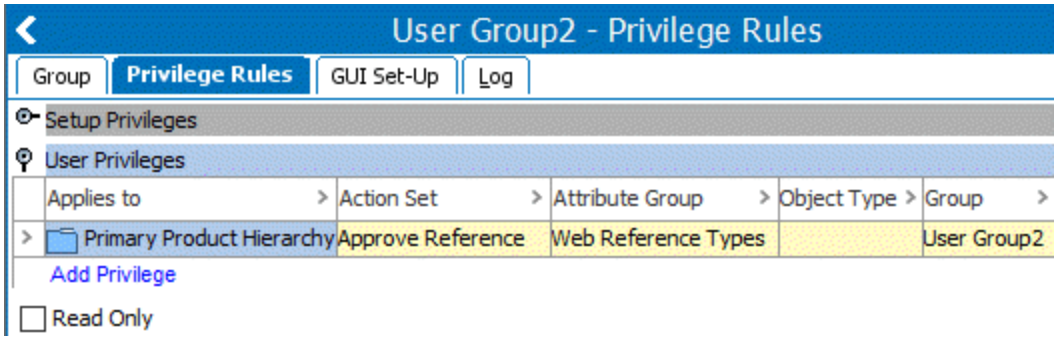


To implement this, the reference type named 'Web' is added to an attribute group named 'Web Reference Types.'

A reference or link type can be added to as many attribute groups as needed by different users with different privileges.



A user privilege is set up to include the 'Approve Reference' privilege for reference types in the attribute group 'Web Reference Types.' For more information about setting up privileges, refer to **Action Sets** in the **System Setup** documentation.



A user with this privilege setup will only be allowed to approve references or links in the attribute group 'Web Reference Types.'

For more information on adding a Reference or Product to Classification Link type to an attribute group, refer to the **In Attribute Groups Flipper** section of:

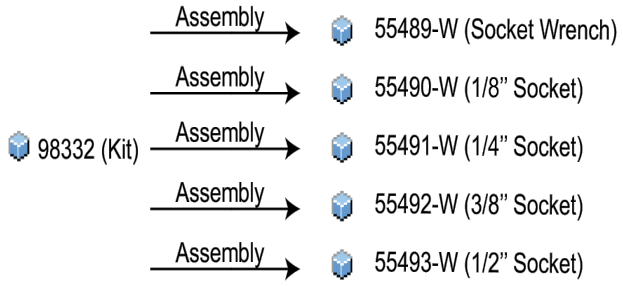
- **Maintaining a Reference Type**
- **Maintaining a Product to Classification Link Type**

Direction of a Reference

Each reference type requires a direction that will identify one object as the 'source,' and another object as the 'target.'

For internally maintained references, directionality is important because it impacts the approval status of the objects involved. The source of the reference gets a change in approval status when the reference is added or removed, while the target approval status remains unchanged. This means that a source object can only be fully approved when all of the objects it references are also approved.

For example, a 'kit' is a set of objects that are sold as a single product. The sellable product has its own order code. Each item in the set of products may also have an order code since they also could be sold as individual products.



In this example, a buyer could purchase only the socket wrench (order code 55489-W), only an individual socket (order code 55491-W), or a kit that includes the socket wrench and five individual sockets (order code 99332). A product reference called Assembly is created to establish the references between the products. The kit (order code 98332) can then reference order code 55489-W, as well as the order codes of the other sockets.

In this case, order code 98332 is the source object, and the component parts order codes (e.g., 55489-W, 55490-W, 55491-W...) are the target objects.

Important: When creating a reference, verify that the 'from' and 'to' are assigned correctly. For example, 55489-W is an 'Assembly' of 98332, but 98332 is not an 'Assembly' of 55489-W.

The direction scheme for references makes it possible to build large kits or assemblies, the component parts of which are themselves assemblies, which themselves comprise of smaller assemblies, and so on. By always having a direction of a reference, i.e., a source / target scheme, the system can support rather complex assemblies.

Dimension Dependent Reference and Link Types

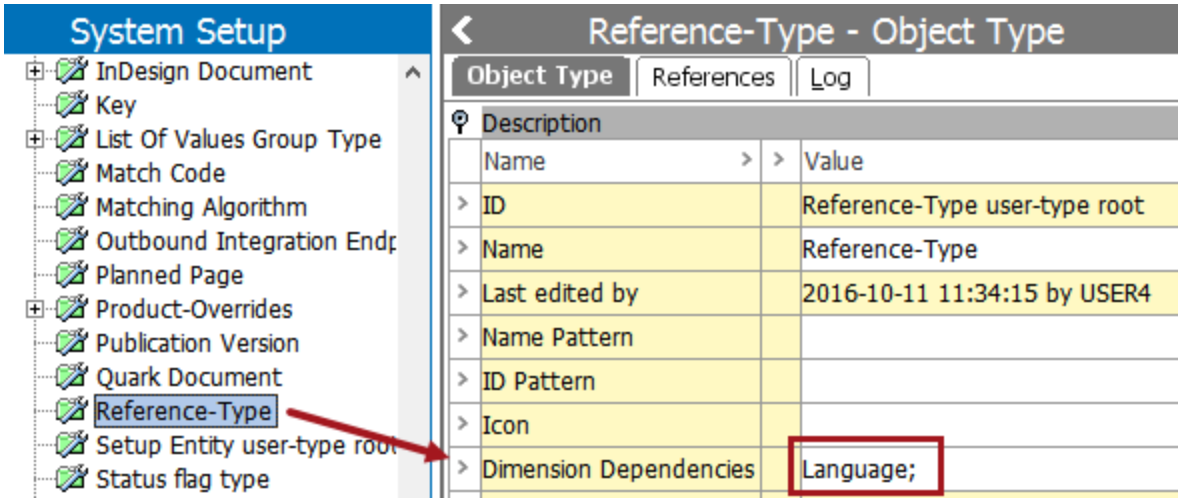
A Reference or Product to Classification Link type can be set up to be dependent on a dimension. Dimension dependency is used to specify the dimension points, and by extension, the contexts, where a reference or link should display or should be suppressed. A reference or link can only be dependent on a single dimension point. If additional dimensions are required, create a new type for the same source and target objects.

When deciding on the need for dimension dependency, consider the following points:

- You are strongly encouraged to give this topic a lot of thought when setting up the STEP system and before a lot of data is migrated in. It is easier to remove a dependency than to add the dependency after references have been created. Refer to the **Adding a Dimension Dependency After Loading Data** topic for more information on what it takes to correct this or to move dimension-dependent references from the All level to a real language or country.
- If you set dimension dependency on an asset reference type, do not use it in conjunction with dimension-dependent assets. Although STEP can handle this scenario, maintaining and troubleshooting is complicated when multiple dependencies are in use. For more information on dimension-dependent assets, refer to the **Asset Dimension Dependencies** section of **Maintaining Assets** in the **Getting Started** documentation.
- Consider using Users and Groups privileges to hide objects by Reference Type, instead of using dimension dependency. For more information, refer to the **Attribute Groups for Reference and Link Types** topic.

Dimension Dependency on the 'Reference-Type' Object Type

Dimension dependency can be added on the 'Reference-Type' object type, which is located under System Setup > Object Types & Structures > Basic Object Types.



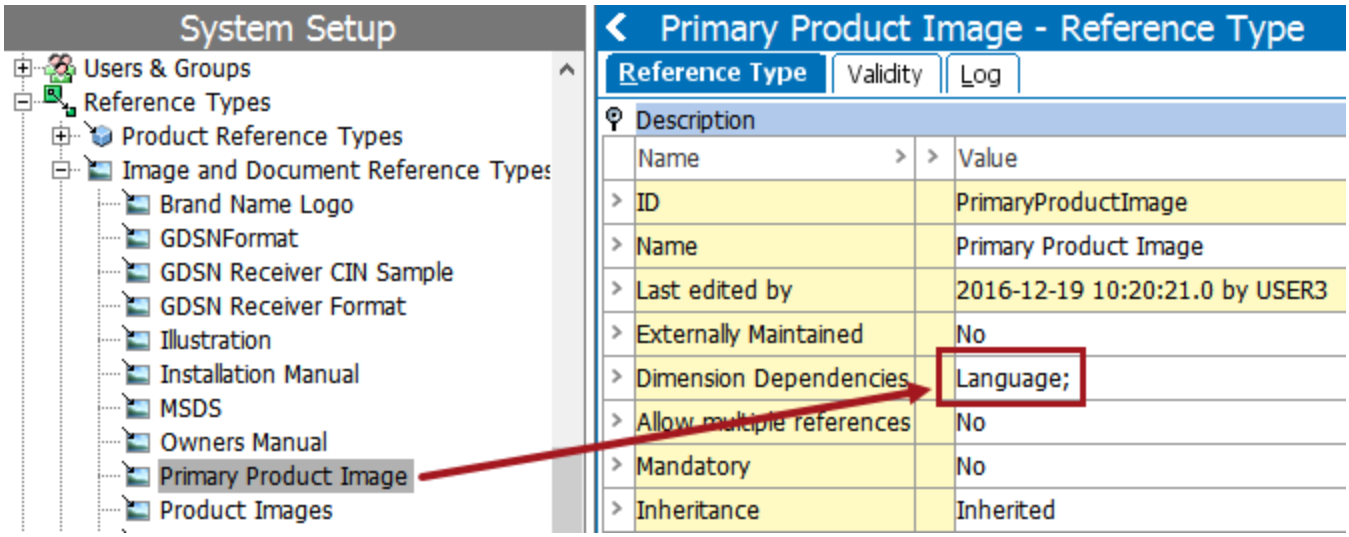
Using the Dimension Dependencies parameter on the Reference-Type object type is a global setting that enables translation of reference type names and requires that all reference type names be translated. Translated

reference type names are useful on websites where viewers want to display information in their own language. For example, 'Installation Guide' could be the reference type and the link that appears when someone needs to download a PDF version of a document.

Setting a Reference-Type object type dimension dependency does not affect the dimension dependencies between referenced objects.

Dimension Dependency on a Reference Type

Setting the Dimension Dependencies parameter on a reference type adds dimension dependency on the reference between objects. This can be useful for a global website structure where not all products are sold in all countries, or where documents vary by language or country and users only want to display the appropriate versions.



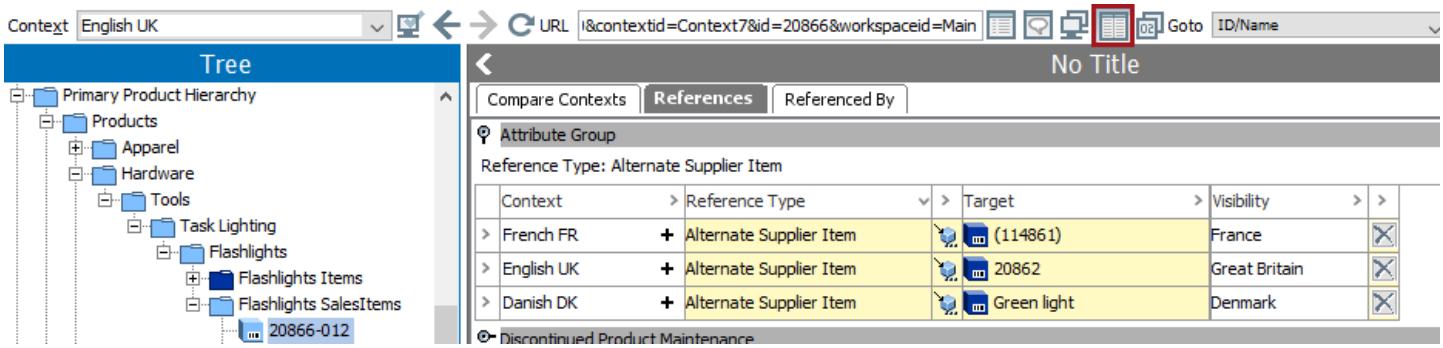
This is not a typical setup because the References / Referenced By tabs can become difficult to manage due to the layout required when viewing multiple contexts.

One scenario where this setup would be useful might be when there are 20 documents in STEP, one for each of the 20 countries where a product is sold. A dimension-dependent reference would make it possible for a user working in a country context to only display the document that is used for that country since the rest would be filtered from view.

For information on managing when a dimension dependent reference is available, refer to the **Visibility of Reference and Link Types** section.

Viewing Dimension Dependent Values

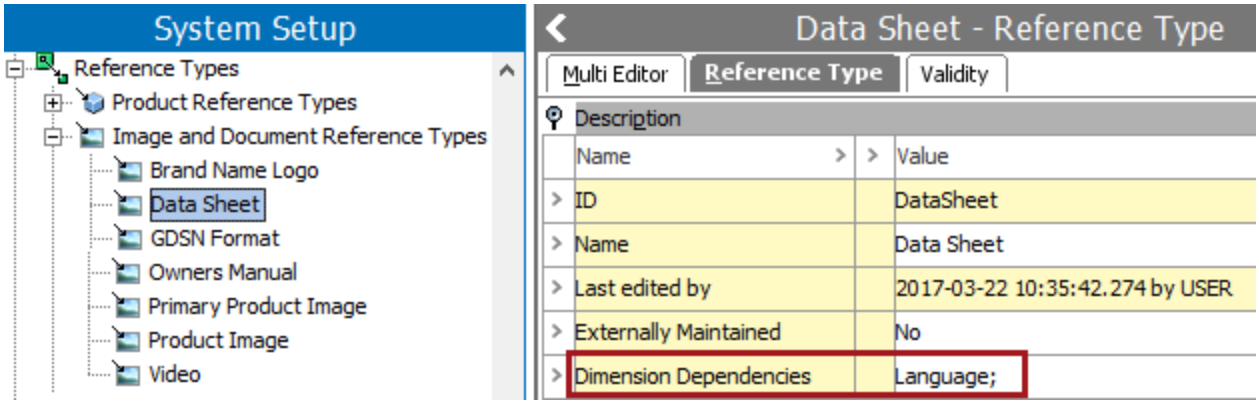
When dimension dependency is applied to a reference type, values can be applied based on the selected dimension. For example, the following reference is dependent on the Country dimension, so each country can have a different setting. The Context view displays all values for each country, based on the targets selected from the View > Target menu option.



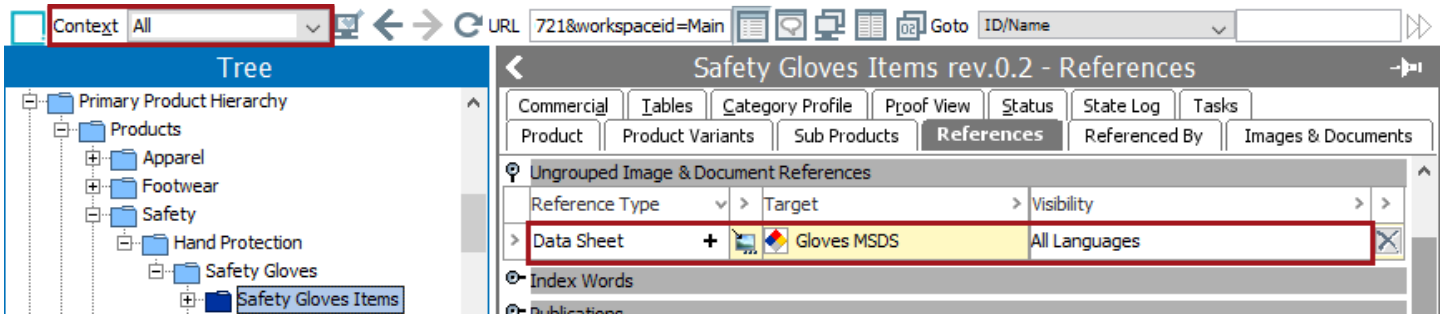
Dimension Dependent Reference Example

Consider a product that needs a 'Data Sheet' reference. The reference should be linked to the product for all languages except the English. Use the following steps to accomplish this:

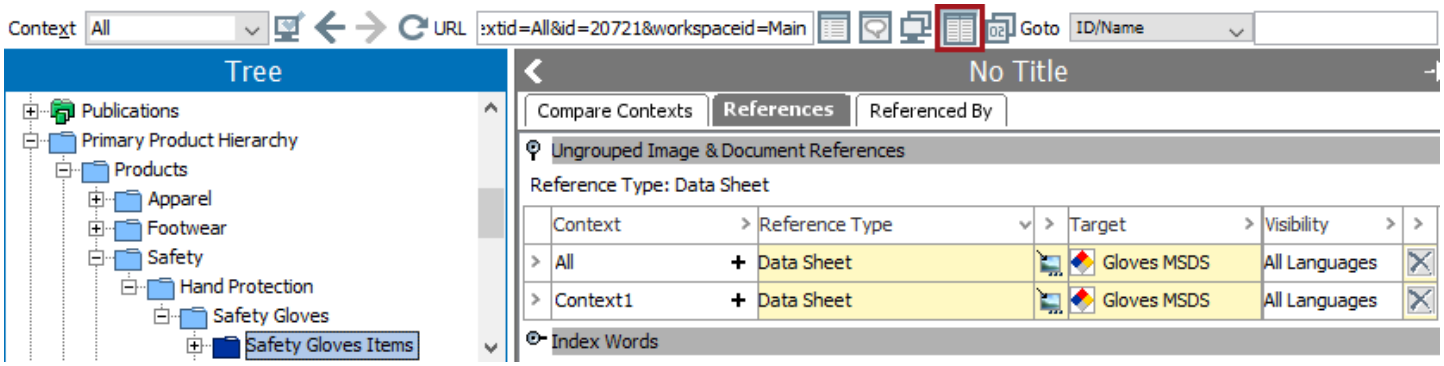
1. Create a reference type named 'Data Sheet' and set it to be language dependent.



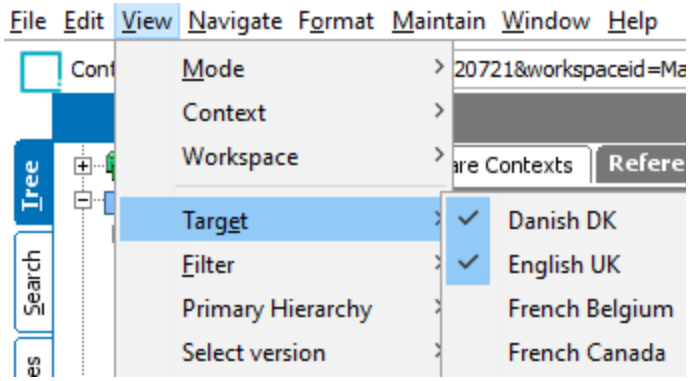
2. Select the 'All' context, add a Data Sheet reference. The reference is inherited to all languages.



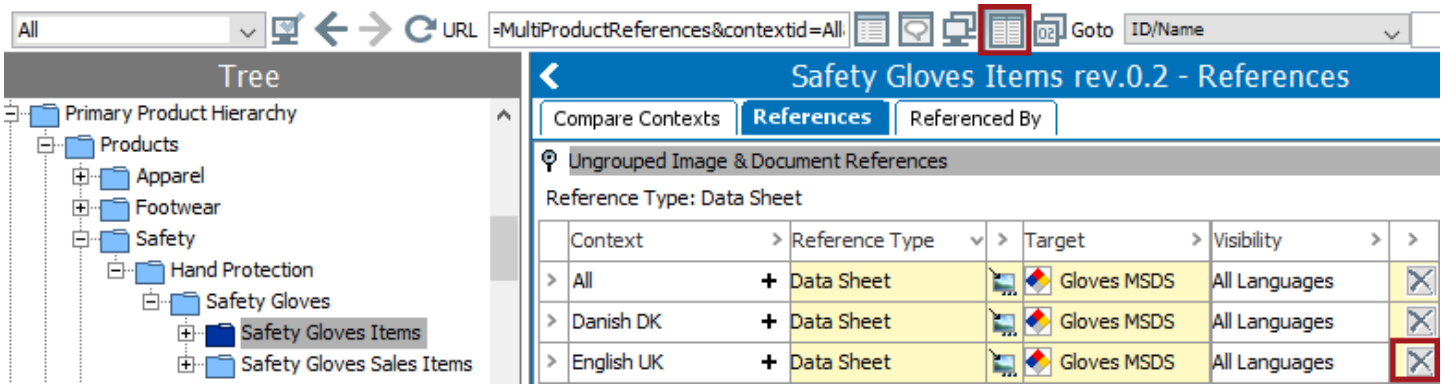
3. Display the References tab in Context Mode by clicking in the toolbar.



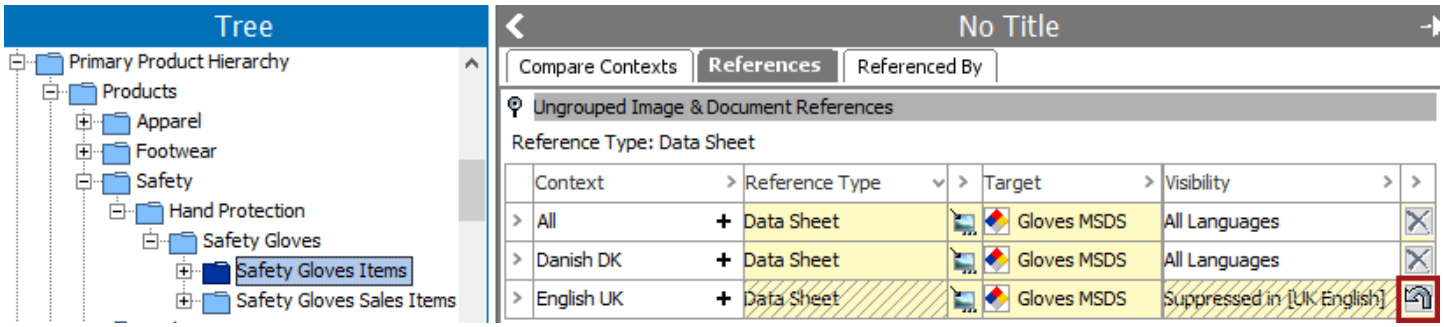
4. Navigate to View > Target and select the Contexts for the comparison view to display.



5. Click the X button to suppress the reference for the English language.



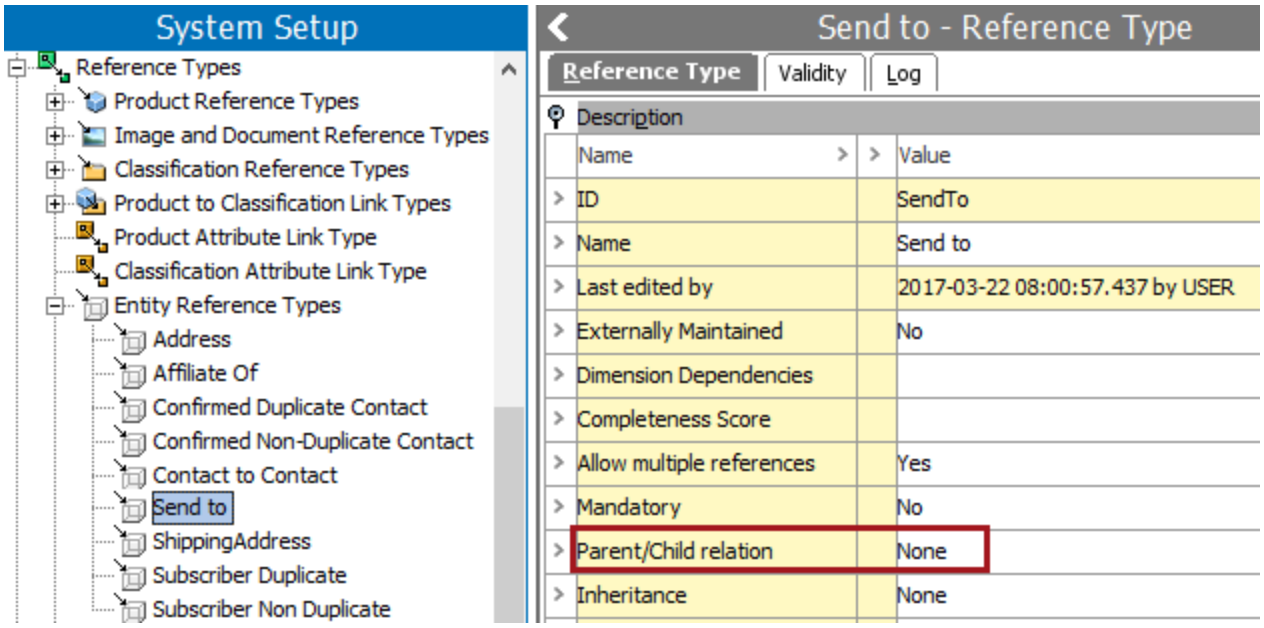
6. The suppressed reference type now appears shaded. If necessary, the reference can be restored by clicking the undo button on the shaded row.


Tree
Primary Product Hierarchy
Products
Apparel
Footwear
Safety
Hand Protection
Safety Gloves
Safety Gloves Items
Safety Gloves Sales Items
No Title
Compare Contexts
References
Referenced By
Ungrouped Image & Document References
Reference Type: Data Sheet
Context
Reference Type
Target
Visibility
All
Data Sheet
Gloves MSDS
All Languages
Danish DK
Data Sheet
Gloves MSDS
All Languages
English UK
Data Sheet
Gloves MSDS
Suppressed in [UK English]

Entity Reference Types

When an entity reference type has only entity object types for source and only entity object types for target, the 'Parent/Child relation' parameter is available. This allows an aggregated display of all entity-to-entity reference types in the Tree hierarchy navigator.

Note: If another super type (e.g., products or classifications) is present on the Validity tab of the reference, the parameter is not available.



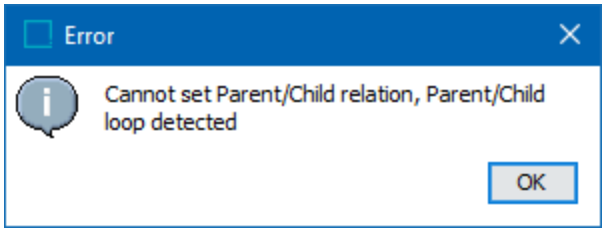
The **Parent/Child Relation** field includes these options, which are illustrated in the 'Parent/Child Relation Example' section below:

- **None** means entity-to-entity references are not aggregated.
- **Source as parent, Target as Child** means entity-to-entity references are aggregated below the source entity (where references originate).
- **Target as parent, Source as Child** means entity-to-entity references are aggregated below the target entity (where references end).

When setting the Parent/Child Relation field, be aware of these items:

- Use different icons for each entity object type to make the hierarchy overview easier to understand. Refer to the **Object Type Icons** section of the **System Setup** documentation.
- Aggregating references enables **Copy**, **Paste**, **Drag**, and **Drop** between entity hierarchies. STEP will automatically apply the reference at the new position.

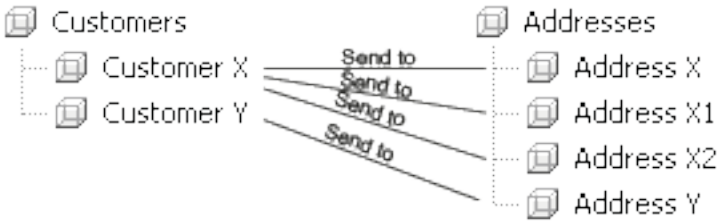
- Entity objects types can be set up to be globally revisable or internally revisable. For more information about this functionality, refer to the **Revisability on Entity Object Type** documentation.
- STEP prevents you from setting the Parent/Child Relation field if the objects that are parent and child of the reference already have a true parent / child relationship via the data model. If either object type appears under the object type References tab > Parents flipper, an error is displayed and a parent/child relation is not allowed.



Entity to Entity Parent/Child Relation Example

Consider an example that includes the following data: a Customers entity hierarchy, an Addresses entity hierarchy, and a 'Send to' reference type which is used to link each customer to its relevant address(es).

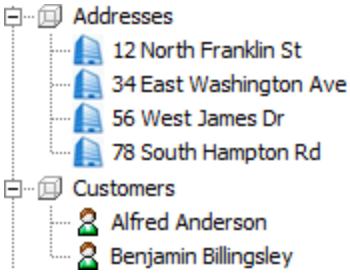
The image below shows the following relationships: Customer X has three Addresses, and Customer Y has one Address. Each of the Addresses (target) are referenced from Customer (source) using the 'Send to' reference type.



This same data can be displayed differently on the Tree, based on the 'Parent/Child Relation' parameter setting in the 'Send to' reference editor. Customer is the source and Address is the target since a reference is created from a customer to an address.

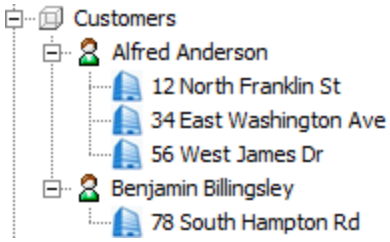
None

On the Tree, expanding the Customers entity hierarchy displays only customer objects, and expanding the Addresses entity hierarchy displays only address objects, as shown in the image below:



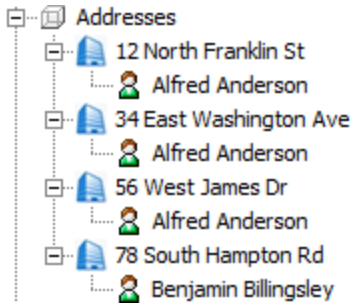
Source as parent, target as child

On the Tree, expanding the Customers entity hierarchy displays all referenced Address entities, as shown in the image below:



Target as parent, source as child

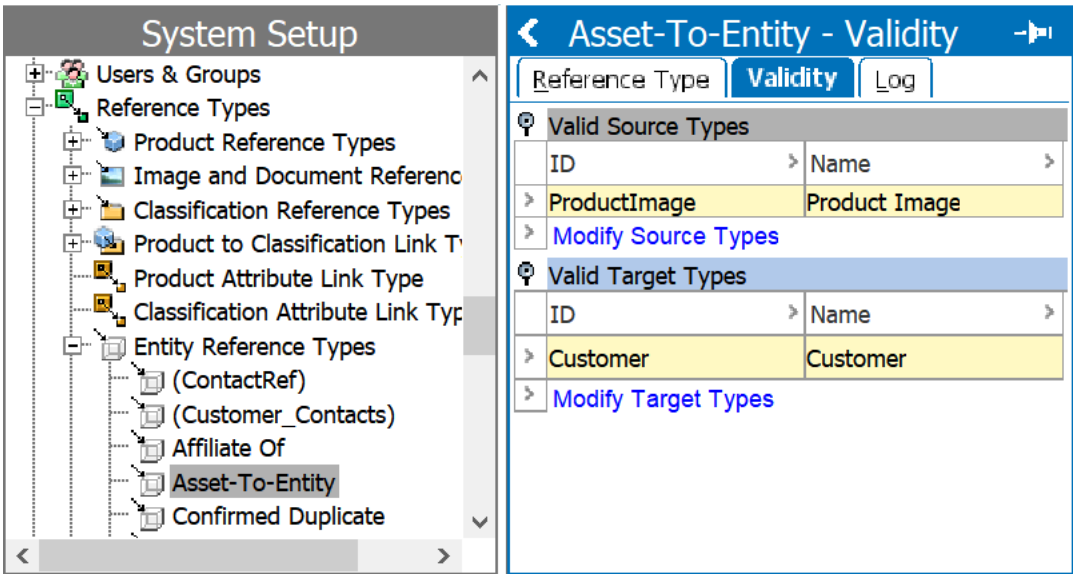
On the Tree, expanding the Customer entity hierarchy displays all referenced Address entities, as shown in the image below:



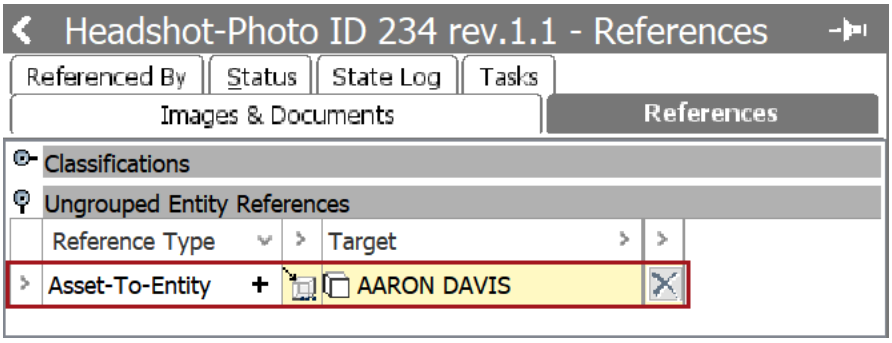
Asset to Entity Reference Example

When configured, an asset can reference an entity. A use case for this would be when a customer needs to take a photo identification (Photo ID) of all of their members, and then create a reference from the Photo ID to the member's name. To set up an Asset to Entity reference type, follow the directions below:

1. Create the Asset-to-Entity reference type. For more information on creating a reference type, follow the steps outlined in the **Creating a Reference Type** topic in this documentation.
2. Under the Validity tab, set an asset as the Valid Source Types and set an entity as the Valid Target Types. In this example, Product Image is the source and Customer is the target.



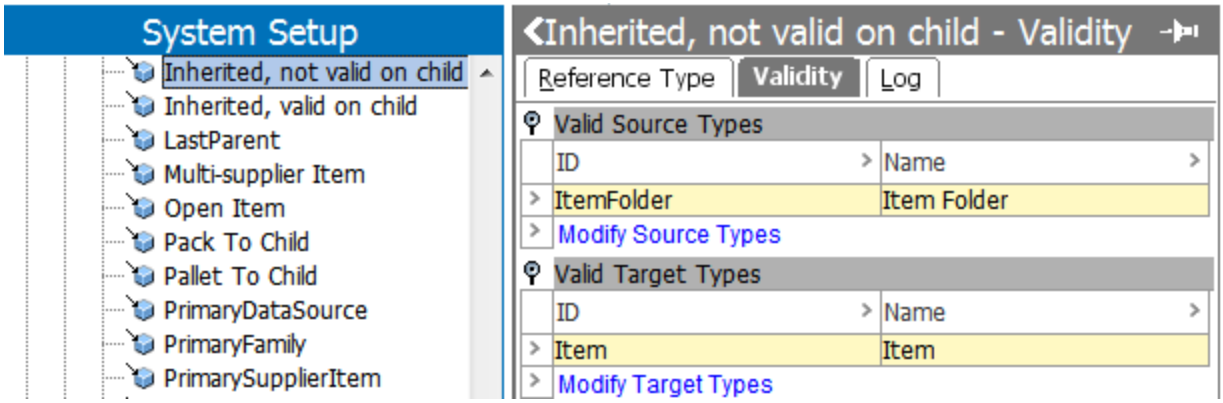
3. Now, when a customer takes a photo ID of one of their members, they can navigate to the Reference tab on the asset, and select the appropriate entity reference. In this example, an image is linked to a member's name.



Inheritance Example for a Reference

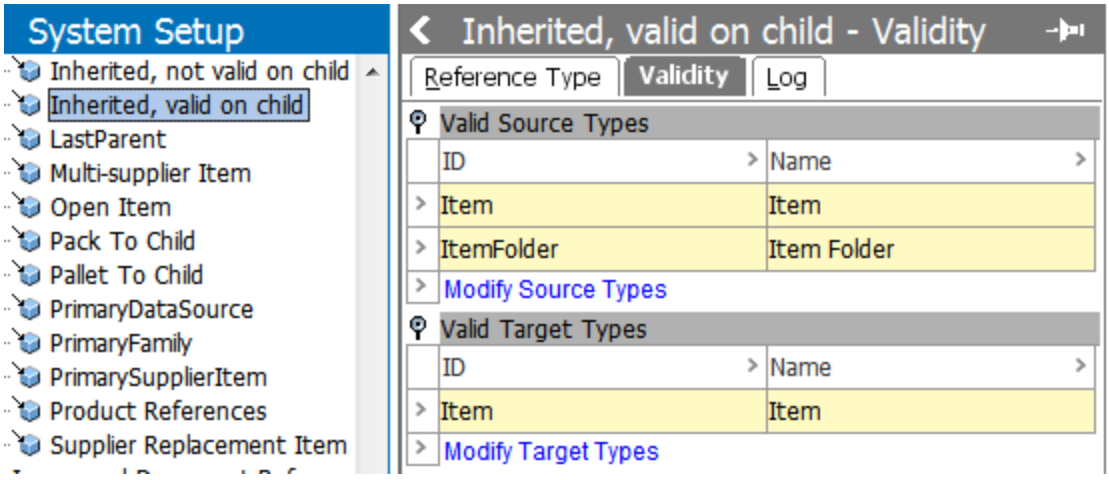
Before defining types of inheritance on references, it is important to keep in mind the valid sources and targets for a reference. If a reference is valid on an object, it can also be edited there. However, a reference that is not valid on an object can still be visible on the object, due to the reference being inherited from a parent.

For example, consider a case where an 'Item Folder' object type has valid child object types called 'Item.' A reference is created called 'Inherited, not valid on child' that has the following validity:



The child object type is a valid target of the reference, but not a valid source object.

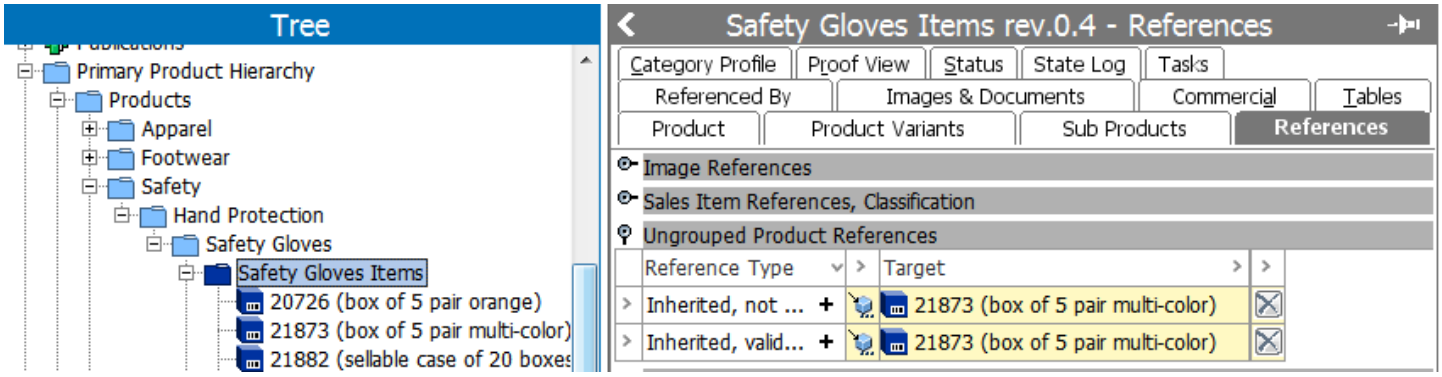
In contrast, a second reference is created called 'Inherited, valid on child' that has the child object valid as both a source and a target of the reference:



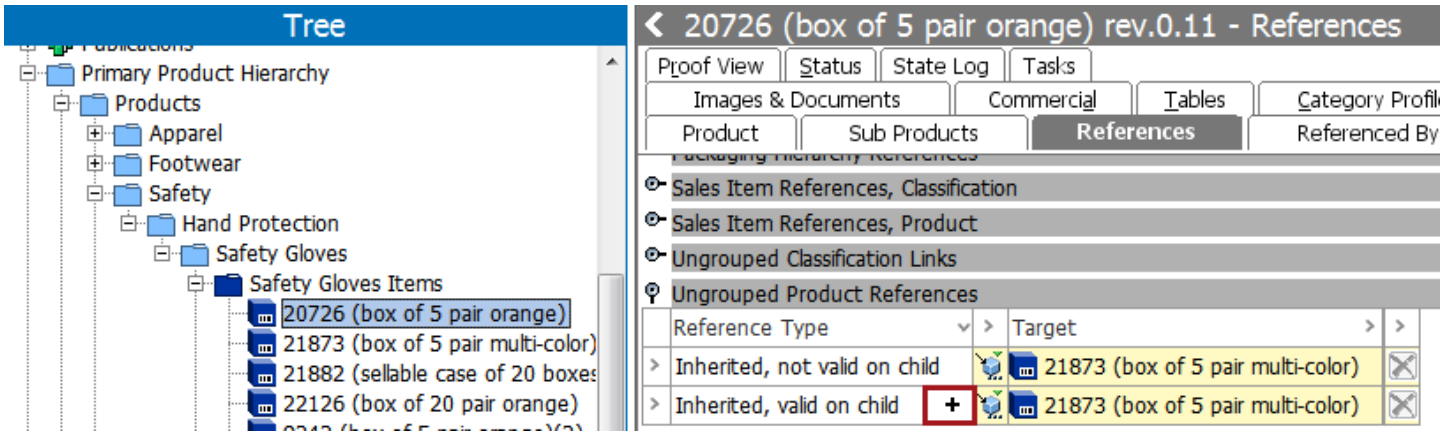
When both references are set with inheritance, any reference added to the parent (Item Folder object) will also be present on the child (Item object).

Note: Inheritance is indicated by the small green down arrow above the reference type icon ( ). The three (3) dots below the icon indicates that multiple references of this type are allowed.

Parent object:

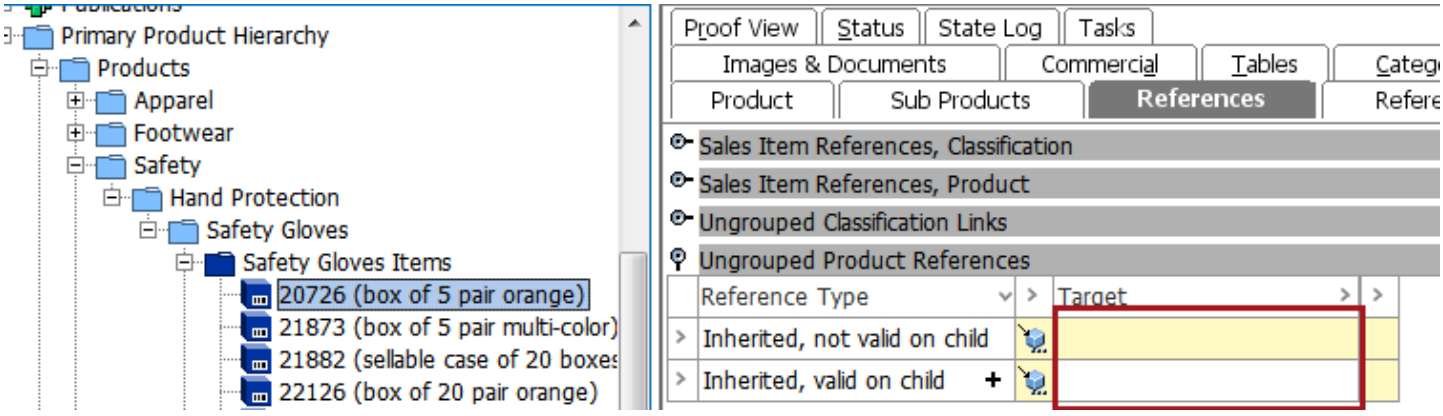


Child object:



Note that only the reference that is also valid on the child has a [+] available, indicating it is editable.

This is perhaps better illustrated when the references are removed:



Notice that the inherited references are displayed / not displayed on the child object based on presence / absence of a referenced target on the parent. However, only references that also have the child object as a valid source of the reference are also editable on the child object.

In the wizard, you can specify different settings for the inheritance of reference types (No Inheritance, Normal Inheritance, and Accumulative Inheritance) as defined in **Reference Type - Advanced**.

The wizard selections are reflected in the reference editor Inheritance parameter (None, Inherited, Accumulative) as defined in **Maintaining a Reference Type** documentation.

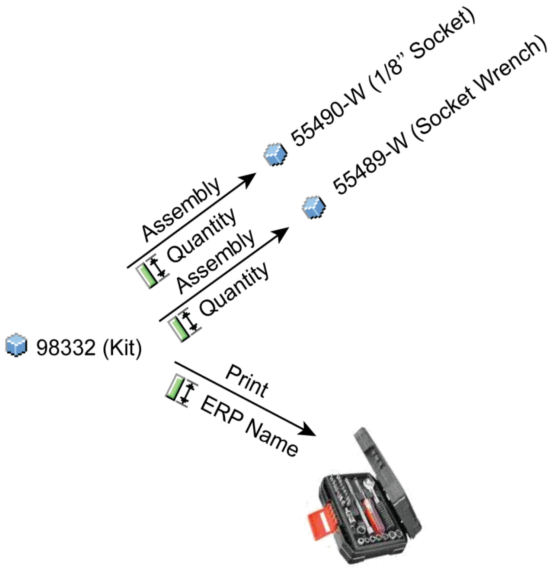
Metadata Attributes on Reference and Link Types

Metadata (description) attributes can be applied to all objects in the System Setup > Reference Types folder, including a Reference type, a Product to Classification Link type, the Classification Attribute link type, and the Product Attribute link type.

Metadata is maintained on the References or Referenced By tabs of the object where the reference or link is applied. Different attributes can be selected for each type of reference or link type.

Example of metadata on a reference or link

Consider product 98332 (KIT), which includes two sockets and is referencing an image to be used for Print. Different metadata attributes are needed for references applied to images and the references applied to products.



- A description attribute named Quantity has been applied the reference type Assembly. This attribute holds number of sockets to be included in the kit.
- A description attribute named 'ERP Name' has been applied the reference type Print. This attribute holds the name of the reference used in an ERP System.

For information on adding metadata to the attribute link types, refer to **Product Attribute Link Type** or **Classification Attribute Link Type**.

Deleting References

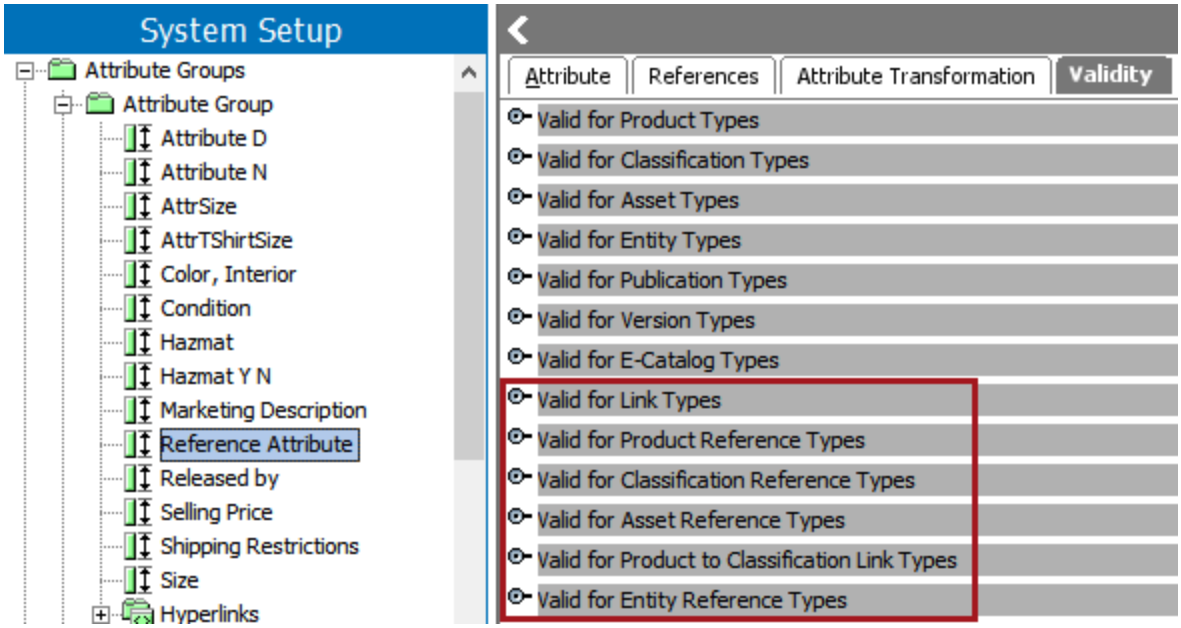
When a reference for an approved object is deleted from the main workspace, the reference metadata is retained (although not displayed). This enables the metadata to be revived when that reference is revived from the Tree recycle bin or when the same reference type is recreated. For example, a reference is deleted from an approved object but not purged from the recycle bin. Subsequently, a reference with the same source and target is created via an import. Since this 'new' reference for the object matches the deleted one, it is actually revived from the recycle bin. In this example, the previously deleted reference and its metadata attribute values are restored.

For more information, on the recycle bin, refer to the **Recycle Bin for Tree** topic in the **Getting Started** documentation.

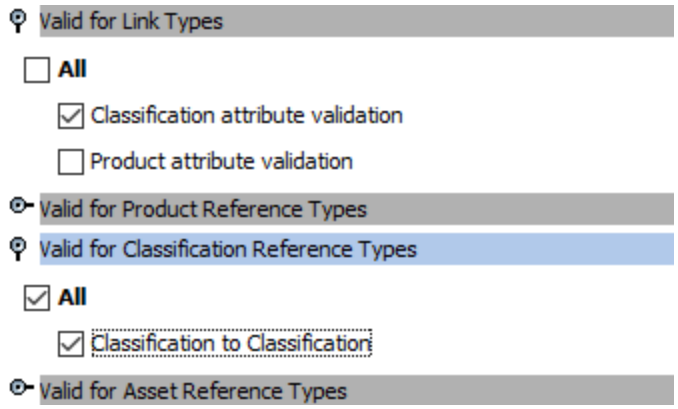
Add a Metadata Attribute

Although the images below show a reference type, the same setup is used for adding metadata on a Product to Classification link type.

1. In System Setup > Attribute Groups > select the description attribute that should be added as metadata on the reference or link. Specification attributes and groups cannot be added as metadata.
2. Open one (or more) reference types flippers or the link types flippers.

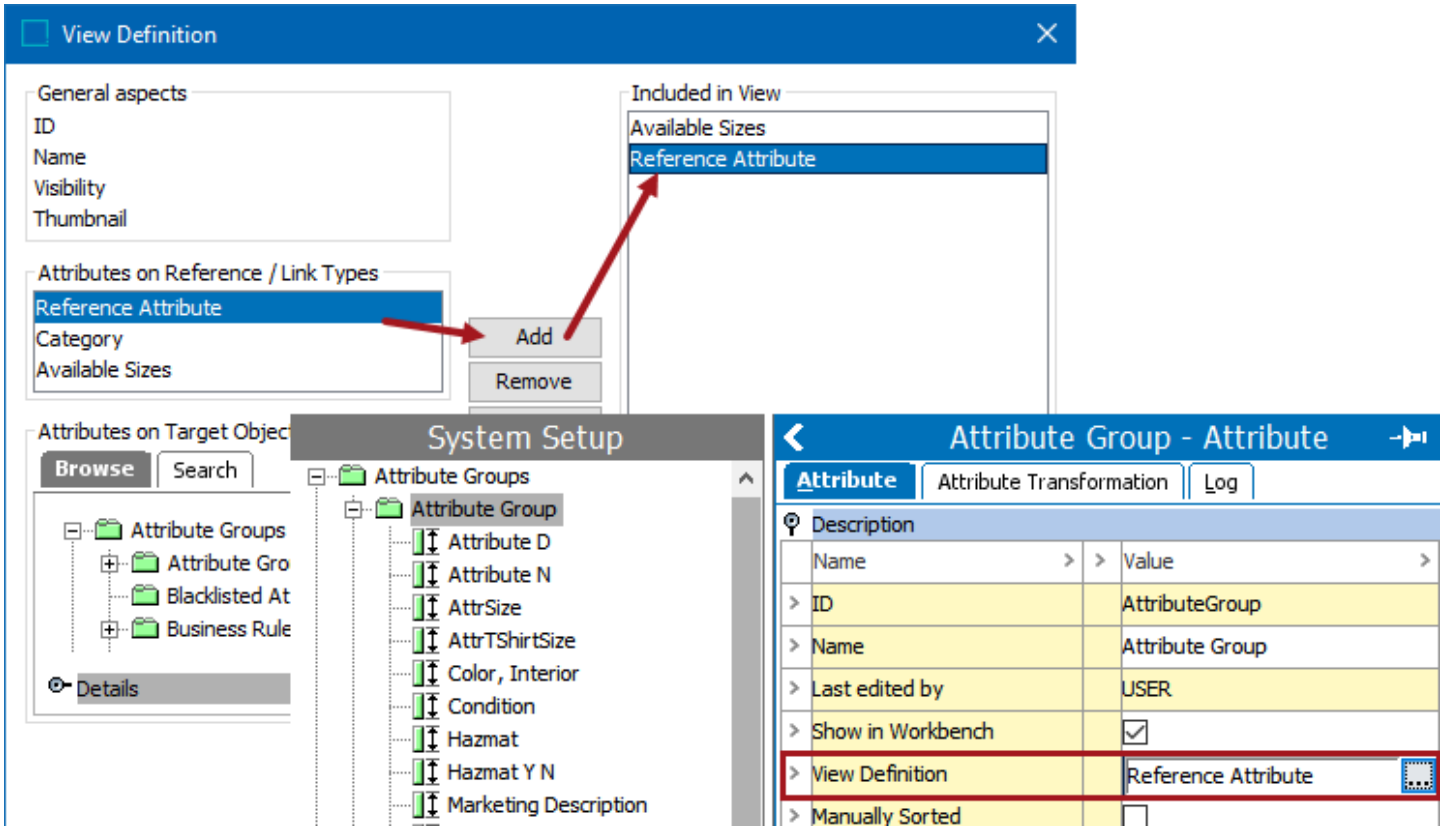


3. Select all reference types and link types that should display the metadata attribute. Checking an option also updates the Attributes flipper of the selected reference or link type.

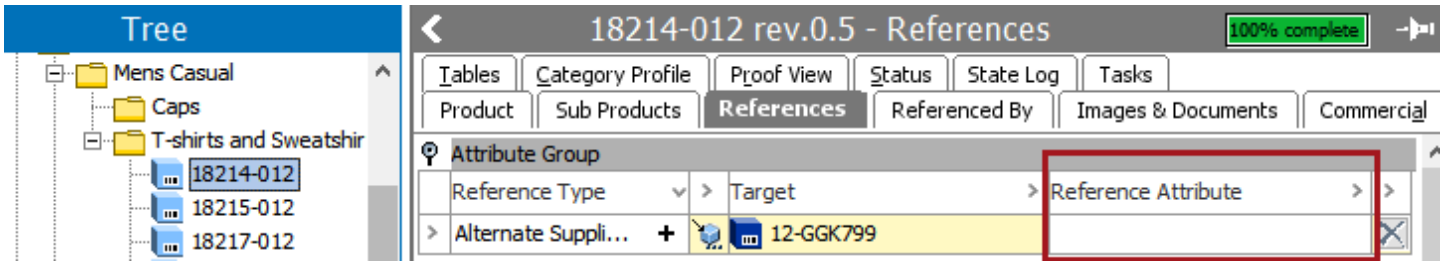


For more information, refer to **Validity on Description Attributes** in the **System Setup**.

4. Add the description attribute from the 'Attributes on Reference / Link Types' section to the attribute group's View Definition so it will display in the object editors as metadata on any reference or link in the group. For detailed steps, refer to **Creating a Customized View** section in the **Attribute Groups** topic of the **System Setup** documentation.



5. Verify that the metadata attribute is available on the reference.



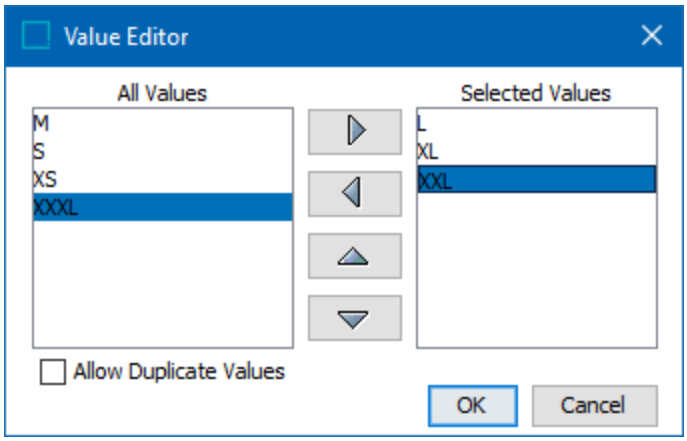
Edit a Metadata Attribute

Although the images below show a reference type, the same setup is used for editing metadata on a Product to Classification link type.

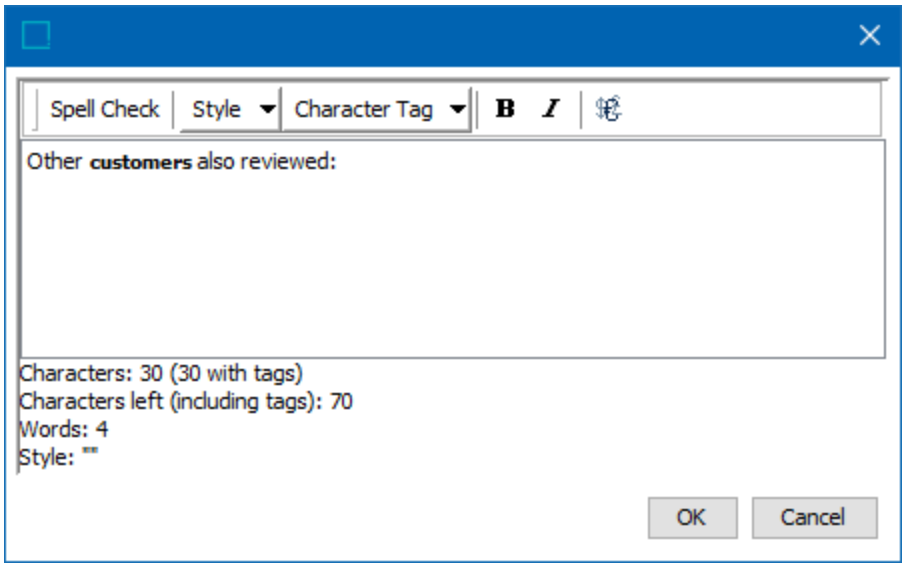
On the **References** tab, double-click an editable field (any white field as shown above) and edit using the available functionality based on the type of the metadata attribute.

- Modify the value directly in the field by adding text or selecting from a dropdown.
- Double-click (or right-click > Edit) to display a value editor.

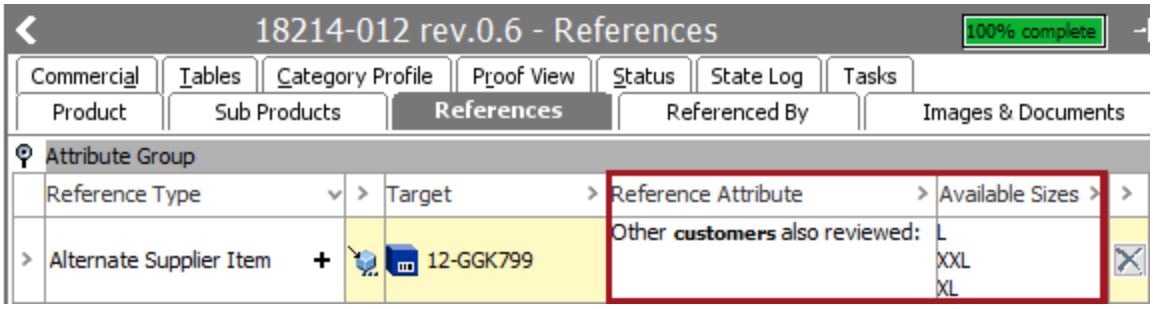
  Choose a value and use the necessary arrow button to include it in the Selected Values list, or to rearrange the order of the values.



  Add or modify text, including styles, character tags, and spell check.



Edits made to metadata on a reference or link are displayed:



Multiple References for the Same Objects

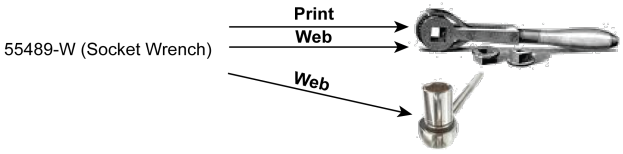
It is possible to have multiple references of the same type between the same two objects, by creating a separate reference type for each need. Typically, such references may also have different restrictions applied. In this way, the same product could be linked to the same image by multiple product-to-asset references.

For example, a socket wrench with order code 55489-W should be represented by a single image for print, and should be represented by multiple images for web.

To establish such restrictions, two (2) asset reference types are created:

- The asset reference type named 'Web' allows multiple references to any number of images.
- The asset reference type named 'Print' only allows a single reference to a single image.

As shown in the following image, the same wrench image is referenced with asset reference type Print and with asset reference type Web from the socket wrench product 55489-W.

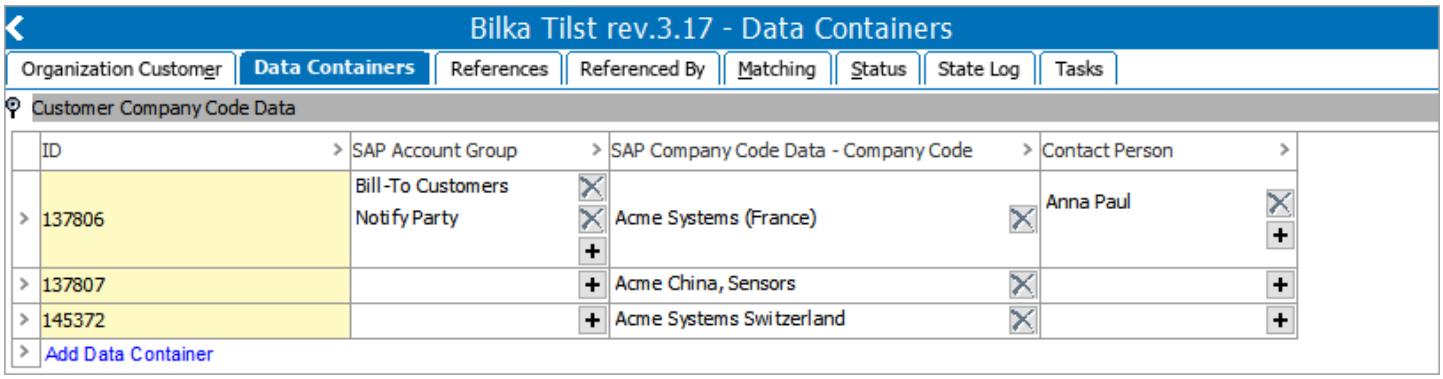


For more information, refer to the **Allow multiple references** parameter section of **Maintaining a Reference Type** documentation.

References on Data Containers

References to other objects can be stored on both single and multi-valued data containers. The supported reference types include: Entity Reference Type, Product Reference Type, Classification Reference Type, and Image and Document Reference Type.

Whenever a data container type is selected as the source object, any references of the relevant type are stored and displayed on the Data Containers tab of the object that holds the data container rather than that object's References tab.



For more information on data containers, refer to the **Data Containers** topic in the **System Setup** documentation.

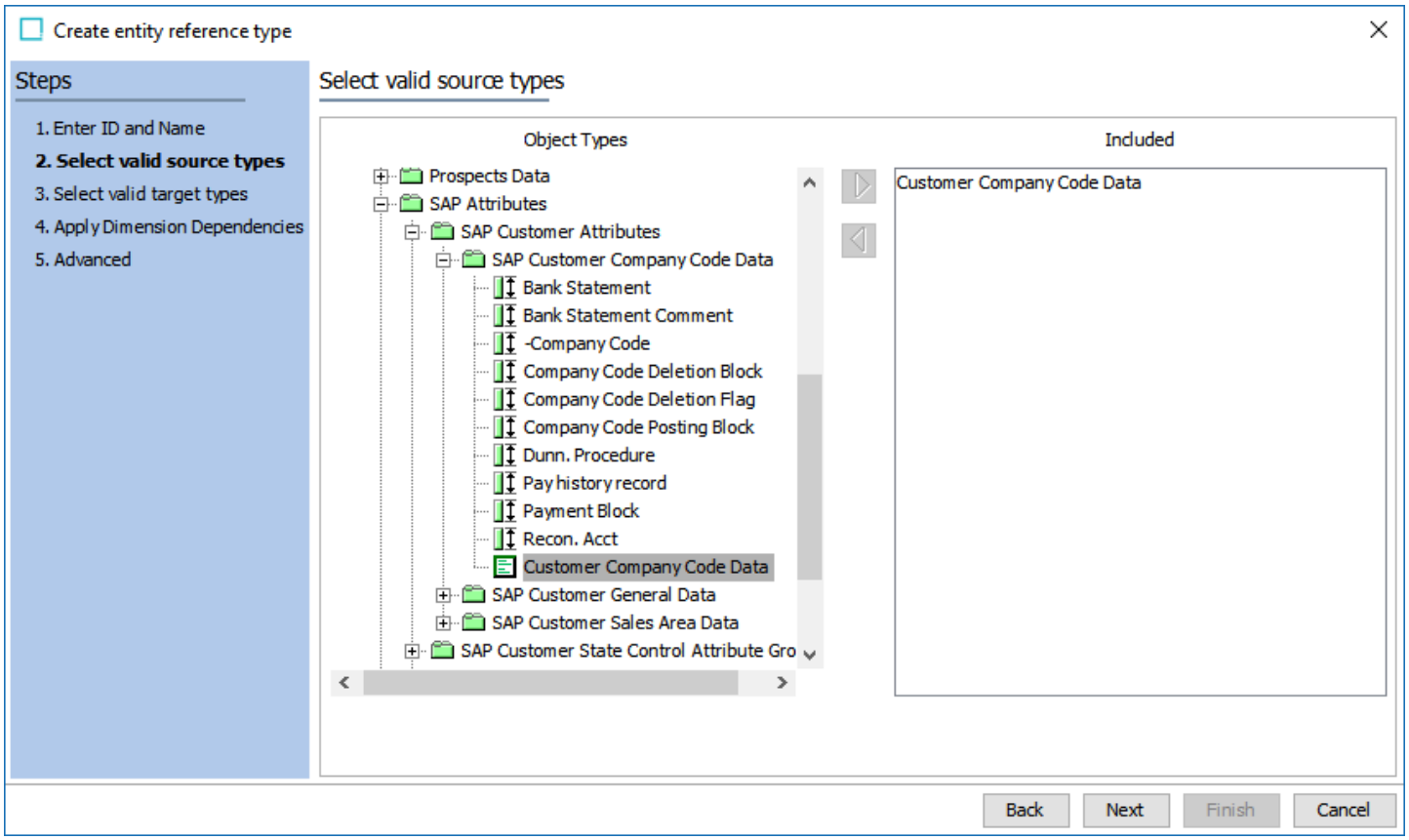
References on data containers can also be displayed in the Web UI via the Globally Configured Data Container component. For more information, refer to the **Data Containers in Web UI** section of the **Web User Interfaces** documentation.

Configuring a Reference Type with a Data Container Type as Source Object

The process for creating a reference type for use in data containers differs slightly from the normal reference type configuration steps. For more general information on creating reference types, refer to the **Creating a Reference Type** section of this documentation.

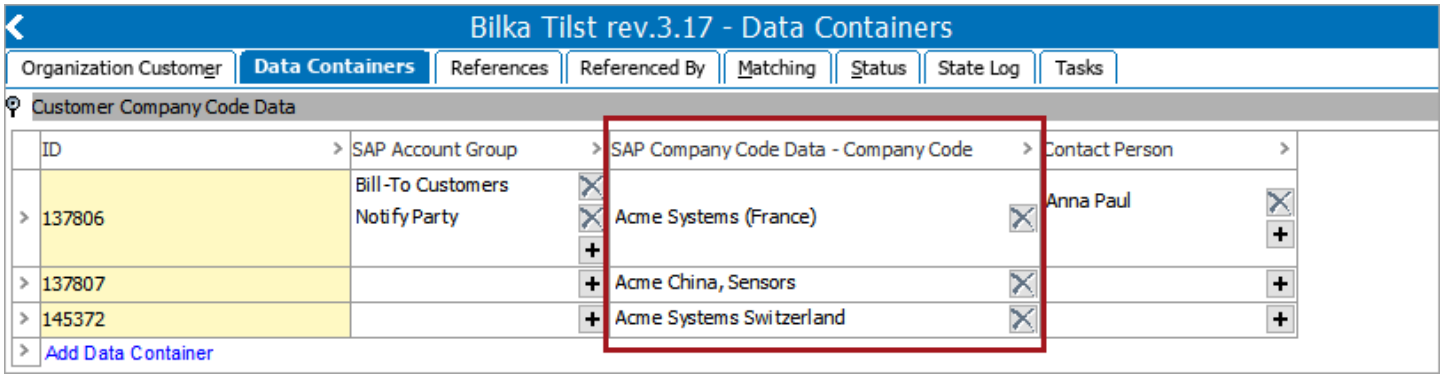
Caveats specific to this kind of reference type include:

- On the second step of the **Create entity reference type** wizard, select a data container type(s) as the object type.



- No configuration is available on the fourth step of the wizard, as this kind of reference type cannot be dimension dependent.
- On the fifth step of the wizard, inheritance settings are not available.

Once the reference type has been created, a column for the reference type will appear on all valid data containers in the workbench.

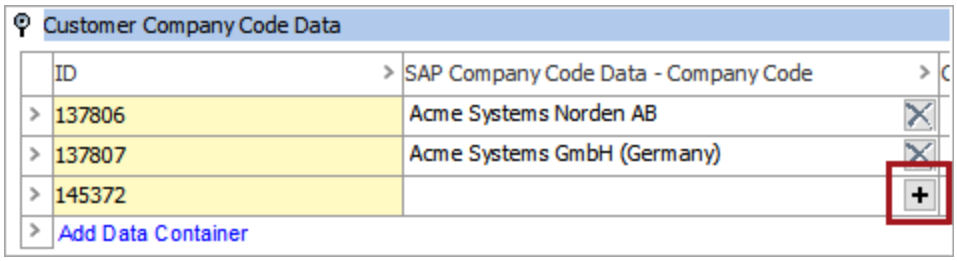


Important: Reference types that use a data container as a source cannot have metadata attributes on them. If a reference type already has metadata allowed on it, it cannot also have a data container configured as a source.

Editing References on Data Containers

References on data containers are maintained within the Data Containers workbench tab.

1. To add a reference, navigate to the cell of the relevant reference type and click the + button.



2. In the window that appears, browse or search for the desired object and click **Select**.

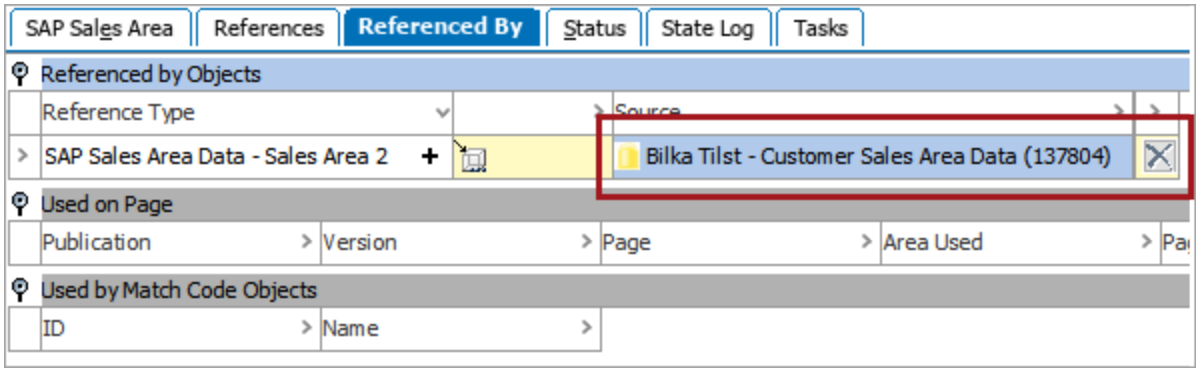
To delete a reference, click the button and confirm the deletion.

For more information on editing data containers, refer to the **Adding and Maintaining Data Container Instances** section of the **System Setup** documentation.

Viewing Data Container References via Referenced By Tab

These references may be viewed on the Referenced By tab of the target object, which includes the name of the data container and the object it belongs to.

Note: Using data containers to reference other objects is the only way a single object can reference another object multiple times.



Visibility of Reference and Link Types

On dimension dependent references and link types, you can specify the visibility of a reference or link in a specific context for display in the workbench (the Web UI is not effected). Based on the visibility, you can make a single setting and allow it to be inherited by other contexts, make local settings on some contexts, make all contexts have a local setting, or suppress the reference completely for a context.

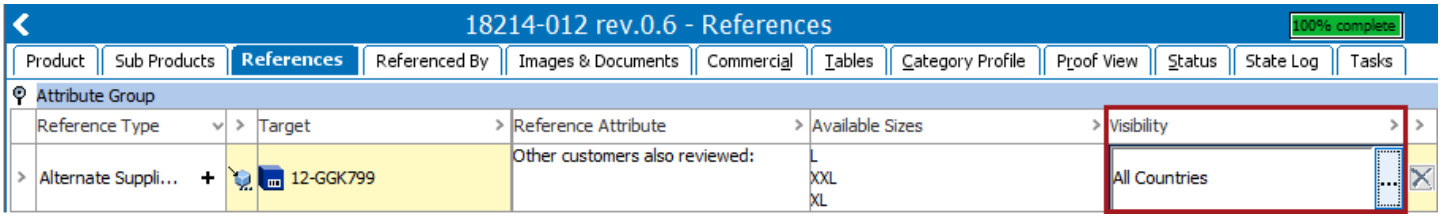
- Making the visibility global means the reference settings are inherited from the global context. For example, when all contexts require the same setting.
- Making the visibility local means the reference does not inherit its settings from the global context. For example, if you want to define attributes on a language-by-language basis.
- Suppressing the visibility means it will not be used in a specific context.

Metadata attribute values are valid globally. However, when a reference is only visible in a local context, it is possible to have a description value that is only visible in that context as well.

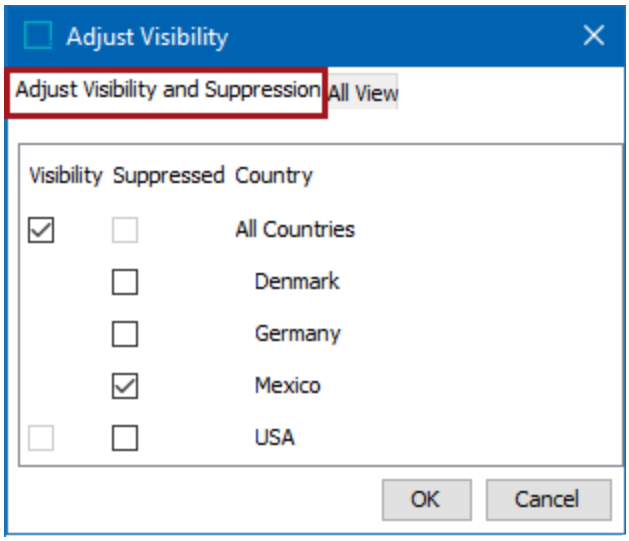
Note: The Visibility column is displayed on a reference when the General Aspect option 'Visibility' is added to the 'Included in View' panel on the View Definition of the attribute group. For more information, refer to the **Add a Metadata Attribute** section of the **Metadata Attributes on Reference and Link Types** documentation.

Setting Reference and Link Type Visibility

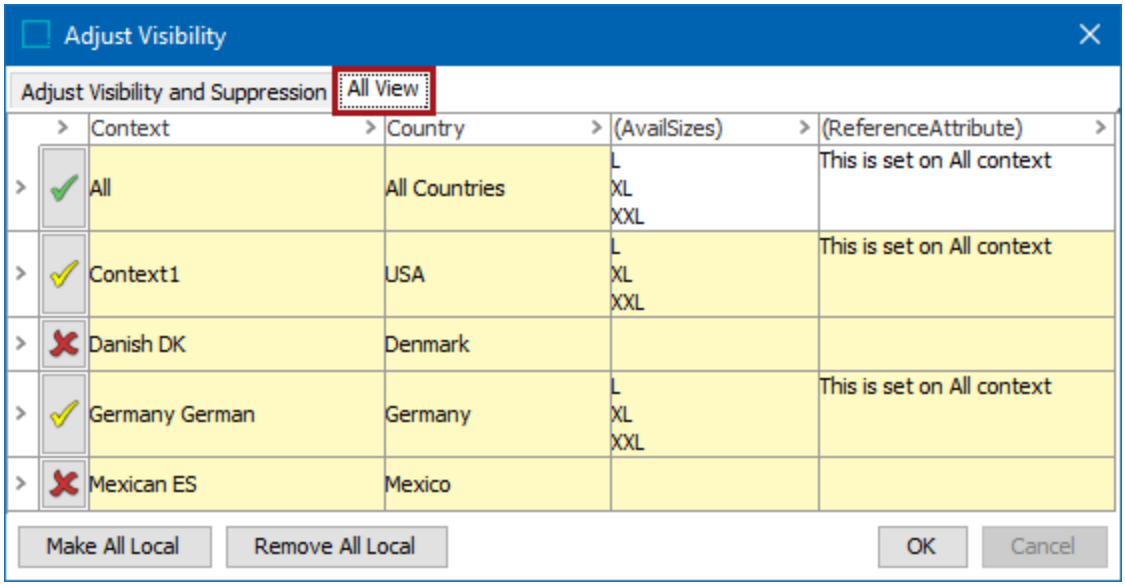
1. In the Tree, select the relevant node, click the **References** tab, and open the flipper that contains the dimension-dependent reference to be edited.



2. Double-click the **Visibility** field to display the ellipsis button (...), and then click the ellipsis button (...). The **Adjust Visibility** dialog displays with the 'Adjust Visibility and Suppression' tab active.

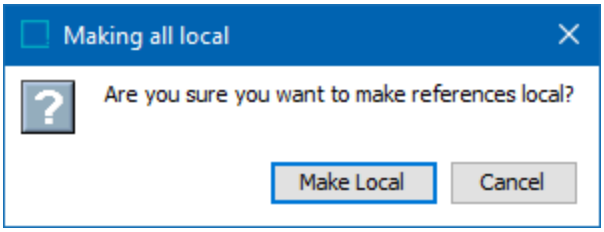


3. In the Suppressed column, check any contexts that should not display the reference.
4. Click the **All View** tab and note the status of the visibility of each context:
   - ✓ indicates that the metadata attribute is local and not being inherited (All). The setting is inherited by the contexts that display a yellow check.
   - ✓ indicates that the contexts inherits the settings of the context with the green check (USA and Germany).
   - ✗ indicates that the reference is suppressed (Mexico), or does not exist in the context (Denmark).

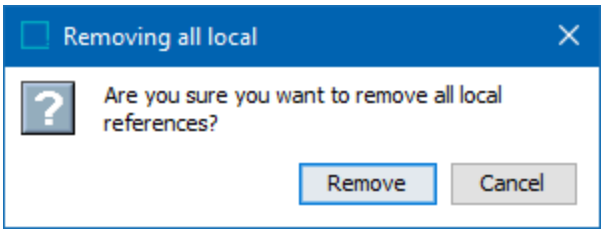


5. Modify the visibility of each required context as needed:
   - Click ✓ or ✗ to make the visibility of a reference local for only the selected context. Assuming the user has privileges to create the reference, the indicator changes to ✓, the reference value field changes to a white background, indicating that the setting can be modified on the selected context.

- Click ✓ to remove the local reference for only the selected context. The indicator changes to ✓, and inheritance is restored from the global context, and the reference value field changes to a yellow background, indicating that the setting cannot be modified on the selected context.
- Click Make All Local to make the visibility of the reference local for all contexts. In the 'Making all local' dialog, confirm that you want to make all local by clicking the **Make Local** button. All check marks turn green except the icon next to the contexts that were previously local (green). Previously local contexts are set with a red X, indicating that the reference no longer appears in those contexts. When the visibility of a reference is set to local, it no longer inherits its settings from the global context. This allows you to specify, for example, attribute values that only apply in the local context.

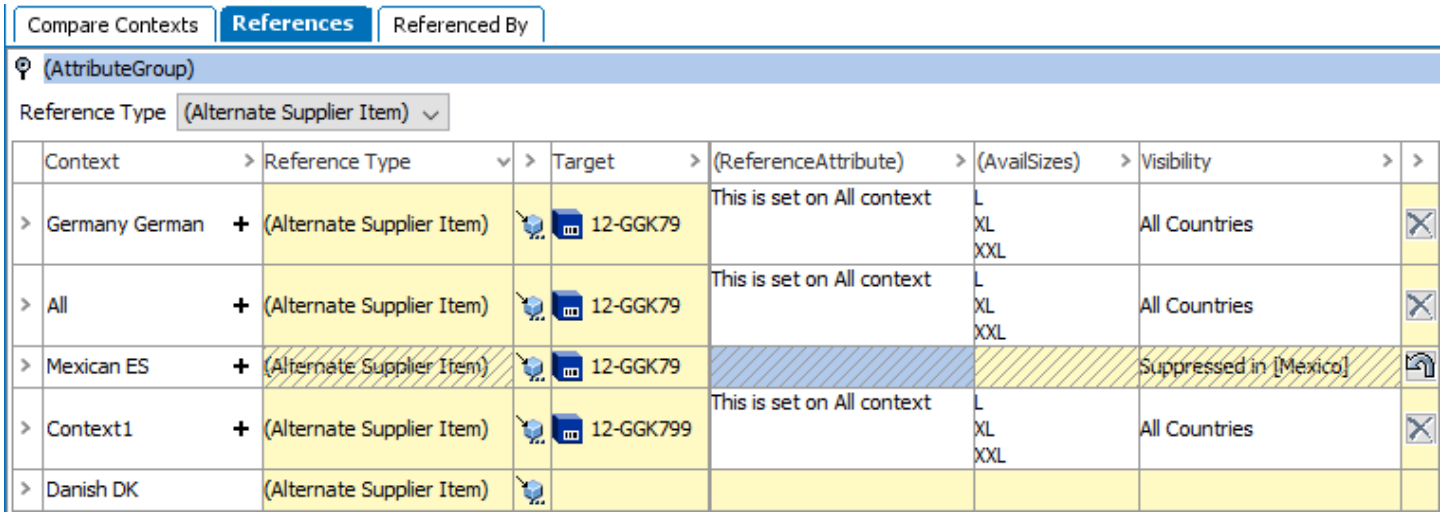


- Click Remove All Local to restore inheritance for all contexts currently local. In the 'Removing all local' dialog, confirm that you want to restore inheritance by clicking the **Remove** button. If a global context is local, all check marks turn yellow except the icon for the contexts that were previously local (green). Previously local contexts are set with a red X, indicating that the reference no longer appears in those contexts. When the visibility of a reference is set to global, it inherits its settings from the global context.

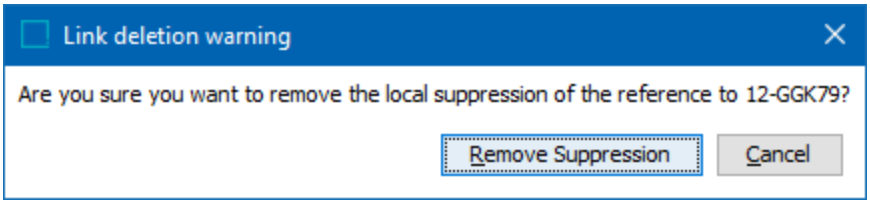


6. Verify the results of the visibility by checking the References page on the object and make any additional changes. Use the Context Mode by clicking in the toolbar.

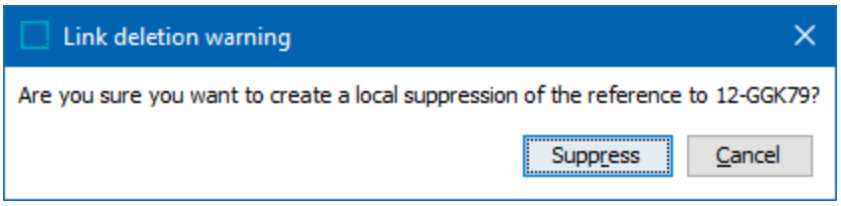
Note: Navigate to View > Target to select the Contexts for the comparison view to display.



- + indicates the reference is allowed for the context. Note that reference is not available for the Danish DK context in the image above.
- indicates that the reference is local and values can be added for metadata.
- indicates that the reference is inherited and values cannot be added for metadata.
- indicates that the reference has been suppressed.
- allows you to remove the suppression for the selected context. In the 'Link deletion warning' dialog, confirm that you want to remove the suppression by clicking the **Remove Suppression** button. Previously set inheritance is restored. Return to the Adjust Visibility dialog to change visibility to local if necessary.



- allows you to remove the current setting and suppress the reference for the selected context. In the 'Link deletion warning' dialog, confirm that you want to create a local suppression by clicking the **Suppress** button.



Revisions

In STEP, historical versions of objects are stored as revisions, providing a historical 'snapshot' of an object. All versions of a revisable object are automatically preserved. Each time a change is made by a different user, a numbered revision is created and logged. Revisions allow users to revert back to a previous version of a revisable object, identify who has made changes to an object (including what changed and when), and support overall auditing functionality within the system.

Revisions are maintained for the following object types: business rules, workflows, integration endpoints, products, entities, classifications, assets, standard standalone event queues, and Web UI configurations. Although each of these object types have their own unique features, the overall functionality of creating and maintaining revisions is universal across objects.

Revisions and Approvals

While *revisions* and *approvals* are related, they should not be confused.

- Objects that are *workspace revisable* are subject to approvals and approving an object automatically generates a revision, and different values can exist per workspace. For more information on approving objects, refer to the **Approval of Objects** section of the **Getting Started** documentation.
- Objects that are *globally revisable*, such as System Setup objects like workflows or business rules, are *not* subject to approval and the values are the same for all workspaces. This means that they can have revisions made, but only via the processes described in the **Generating Revisions** topic.
- Objects that are *unrevisable*, such as event processors, have no revisions and cannot be reverted. Only the current set of values exist and there is no Status tab on the object editor for unrevisable objects.
- Most object types are either strictly workspace revisable, or strictly globally revisable, with no option to change the revisability handling. The exception to this is entity object types, which have a Revisability parameter that allows for configuration of the revisability type. More information on this, refer to the **Revisability on Entity Object Type** topic within this guide.

Important: It is critical to consider revision handling for each system. Implement appropriate processes to purge old revisions and ensure that the number of revisions does not exceed the expected capacity of the system, which can cause performance issues.

The following topics explain how to work with revisions:

- **Comparing Revisions**
- **Generating Revisions**
- **Maintaining Revisions**

- **Reverting to Past Revisions**
- **Timing for Automatic Revisions**

Comparing Revisions

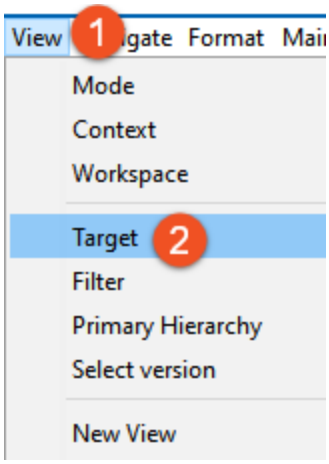
Users may compare revisions on an object within the Revision view. For instance, if a user needs to understand how an attribute on a object has changed over the course of five revisions, the five relevant product revisions can be viewed at once on the same screen.

Revision history can also be displayed in Web UI. To learn more, refer to the **Multi Revision Screen** topic in the **Web User Interfaces** documentation.

To enable revision comparing in workbench:

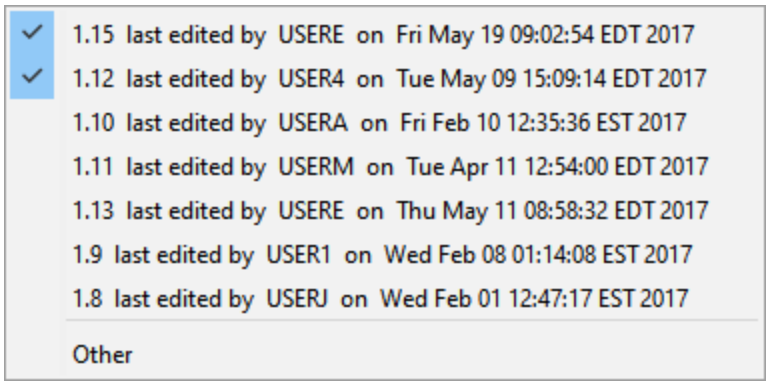
1. With the object selected, click the Revision mode button from the workbench menu bar. The two most recent revisions for that object are displayed.

2. To view additional revisions, select 'View' from the toolbar, and then select 'Target'.

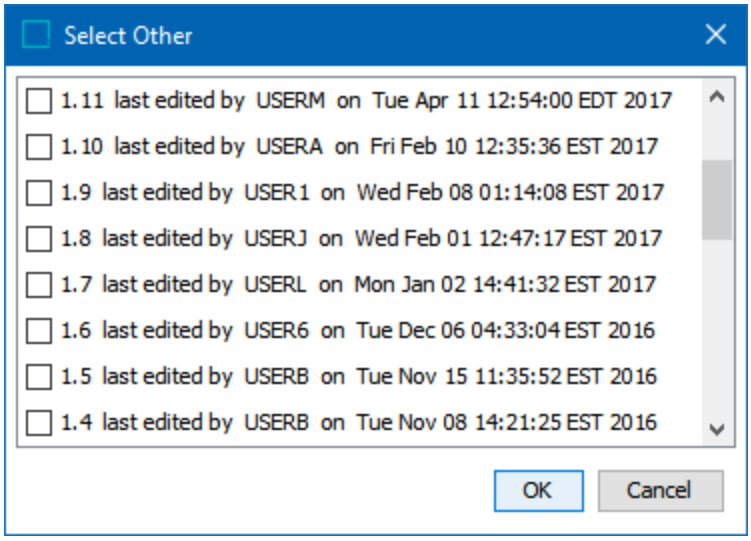


> **Note:** Target cannot be selected unless the object is being viewed in an appropriate mode, like Revision mode.

3. In the dropdown, select a revision from the eight most recent revisions listed or the 'Other' option. A check marks indicates a revision being displayed.
   - To add a single additional revision, click any unchecked revision.
   - To remove a revision, uncheck the revision.

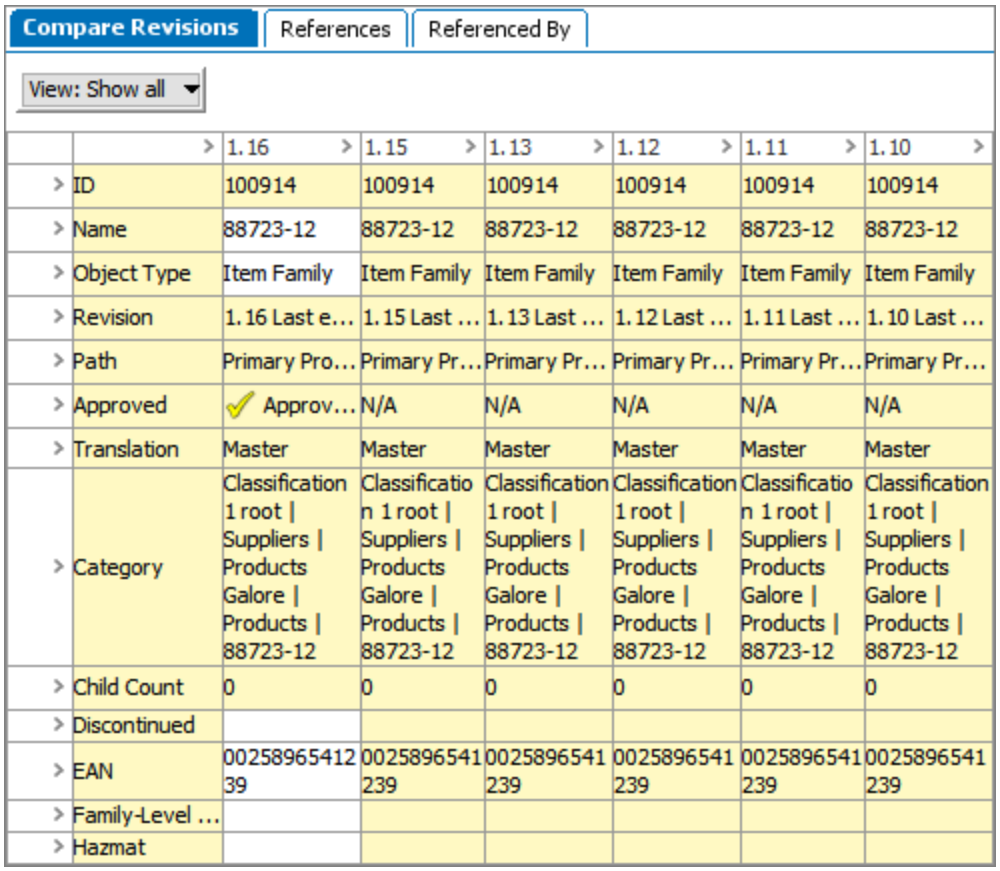


- To add or remove multiple revisions, click the 'Other' option to display a list of all revisions. Select all required revisions and click the **OK** button to display them in the comparison view.



Note: When more revisions are added than can be displayed on the screen, a scroll bar displays allowing access to all revisions.

4. Review the displayed revisions on the Compare Revisions tab.



		1.16	1.15	1.13	1.12	1.11	1.10
	ID	100914	100914	100914	100914	100914	100914
	Name	88723-12	88723-12	88723-12	88723-12	88723-12	88723-12
	Object Type	Item Family	Item Family	Item Family	Item Family	Item Family	Item Family
	Revision	1.16 Last e...	1.15 Last ...	1.13 Last ...	1.12 Last ...	1.11 Last ...	1.10 Last ...
	Path	Primary Pro...	Primary Pr...	Primary Pr...	Primary Pr...	Primary Pr...	Primary Pr...
	Approved	✓ Approv...	N/A	N/A	N/A	N/A	N/A
	Translation	Master	Master	Master	Master	Master	Master
	Category	Classification 1 root | Suppliers | Products Galore | Products | 88723-12	Classification 1 root | Suppliers | Products Galore | Products | 88723-12	Classification 1 root | Suppliers | Products Galore | Products | 88723-12	Classification 1 root | Suppliers | Products Galore | Products | 88723-12	Classification 1 root | Suppliers | Products Galore | Products | 88723-12	Classification 1 root | Suppliers | Products Galore | Products | 88723-12
	Child Count	0	0	0	0	0	0
	Discontinued						
	EAN	0025896541239	0025896541239	0025896541239	0025896541239	0025896541239	0025896541239
	Family-Level ...						
	Hazmat						

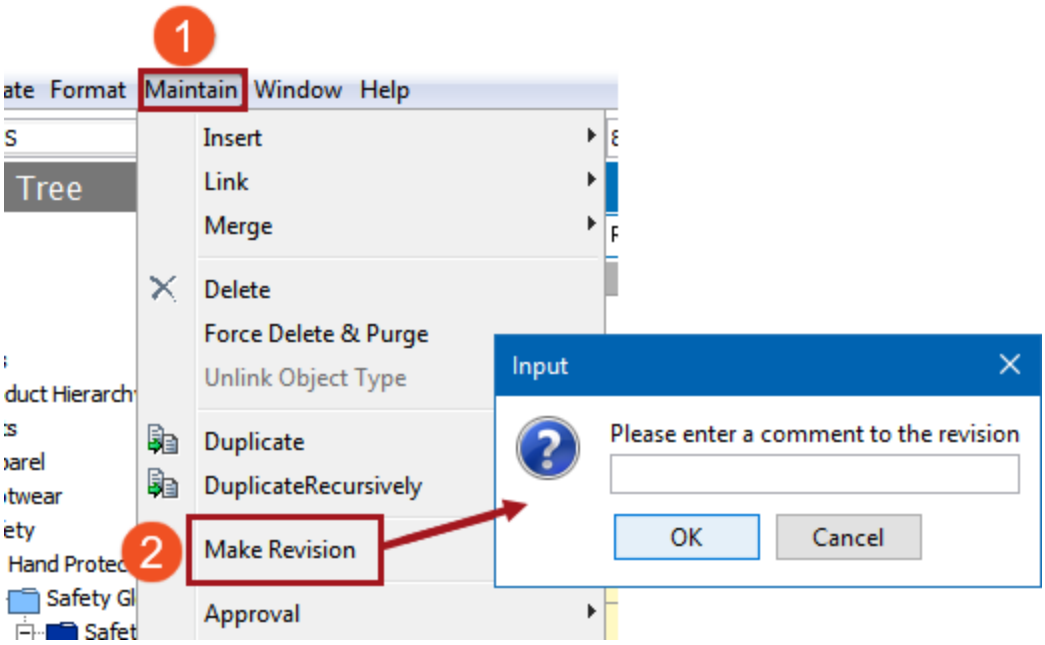
Generating Revisions

A new revision is *not* created for every change to an object, thus STEP does not have traceability on the field level. This means that not *all* historical values on an object are stored as they may have differed *between* revisions, and the values are only stored *at* revisions. If the same user is making continuous edits to an object, these are not captured as a revision until the object is approved, the automatic revision threshold expires, or another user makes changes to the object.

For more information, refer to the **Important considerations for revisions section** below.

A revision can be created in the following ways:

- Automatically upon creation of a new workspace revisable object.
- Automatically upon approval of a workspace revisable object.
- Automatically each time a change is made by a different user, or when any change is made following an approval. For assets, when the digital media file associated with an asset in STEP is changed, this generates a revision on the asset object.
- Automatically when a user makes a change and the current revision is older than a configurable threshold, even if the same user also made the previous change. For more information, refer to the **Timing for Automatic Revisions** topic.
- Manually, from Maintain menu > Make Revision. Enter a comment and click **OK**. Manual revisions are also referred to as a major revision.



Note: Revisions can be created when the data is perfect, in preparation for future unexpected changes. Creating a manual revision allows you to revert back to perfect data. Manual creation of revisions must be done for one node at a time; it is not possible to create revisions manually in bulk.

Important considerations for revisions

- Externally maintained data and calculated data are exceptions to the revision generation options mentioned. Changes to the value of an externally maintained or calculated attribute value on an object do *not* generate a revision for that object, do *not* change the approval status for the object, and are *not* retained as part of the revision history of the object.
- When objects that are part of the revision history for another object are deleted, these are *not* retained with the revision history. For example, if an object had an attribute value populated at the time of a revision, and subsequently that attribute is deleted from STEP, reverting to the previous revision will *not* include a value for that attribute as the attribute no longer exists. Among other examples, the same applies for workflows that included business rules that are subsequently deleted, objects that referenced other objects or assets that were subsequently deleted, or reference and link types when deleted.

Maintaining Revisions

Planning for maintenance and cleanup of revisions is a critical step for all implementations and is best to be carried out early on in the setup of any system.

Any revision can be permanently removed from STEP using a purge option. Once a revision is purged it cannot be recovered. The following methods are available for purging revisions and are defined below:

- Automatic purging of revisions
- Manually purging multiple revisions
- Manually purging a single revision

A revision cannot be purged if it is the latest revision or if it is being used by STEP, for example, in an event processor or OIEP.

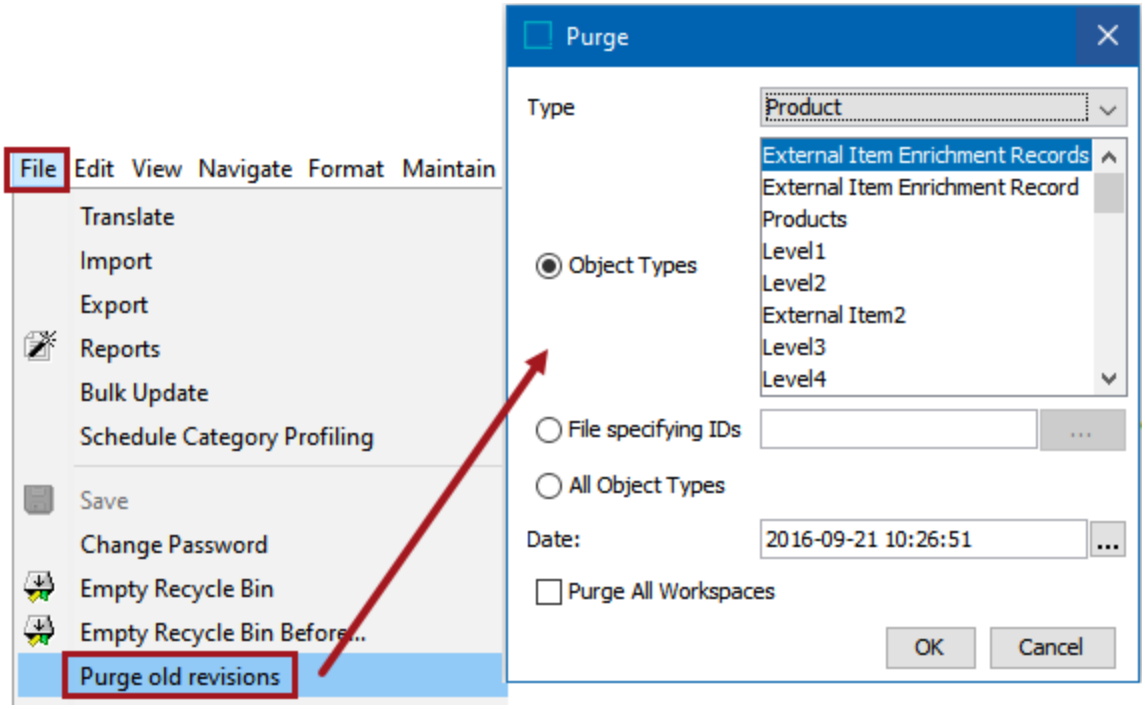
Automatic Purging of Revisions

The Revision Management event processor can be used to aid in cleanup and it is recommended that this be set up on all systems. For more information on this event processor, refer to the **Revision Management Processing Plugin Parameters and Triggers** topic in the **System Setup** documentation.

Manually Purging Multiple Revisions

This manual revision cleanup option is recommended for ad hoc cleanup only. Additional automatic revision cleanup processes should also be in place.

1. On the File menu, select **Purge old revisions** to display the Purge dialog.



2. For the **Type** parameter, select the single type of object for which revisions should be purged. Selecting any type filters the subsequent Object Types selection accordingly.

   The available selections are Product, Classification, Asset, DTP Documents, and System Configuration.

3. Select one of the following options to specify the revisions to be purged:
   - **Object Types:** Select this radio button and select one or more object types in the list to have revisions purged for all objects of the selected type(s). Multiple object types can be selected using Ctrl + Click. The available selections are filtered using the Type dropdown above.
   - **File specifying IDs:** Select this radio button to load a .txt file (with one ID per row) of the objects that should have revisions purged. Revision purging will be carried out only for those objects where a matching STEP ID can be found.

     Take care using this option as STEP IDs are only unique within each object super type (e.g., Products, Classifications, etc.). For example, if an asset and a product can have the same STEP ID, but if the 'Product' object type is selected from the Type dropdown, then only the product would have its revisions purged. However, because both the asset and the product share the same ID, the user needs to pay attention to the 'Type' selected, or the wrong revisions could be accidentally purged.

   - **All Object Types**: Select this radio button to have revisions purged across all objects in STEP within the 'Type' chosen from the dropdown menu.

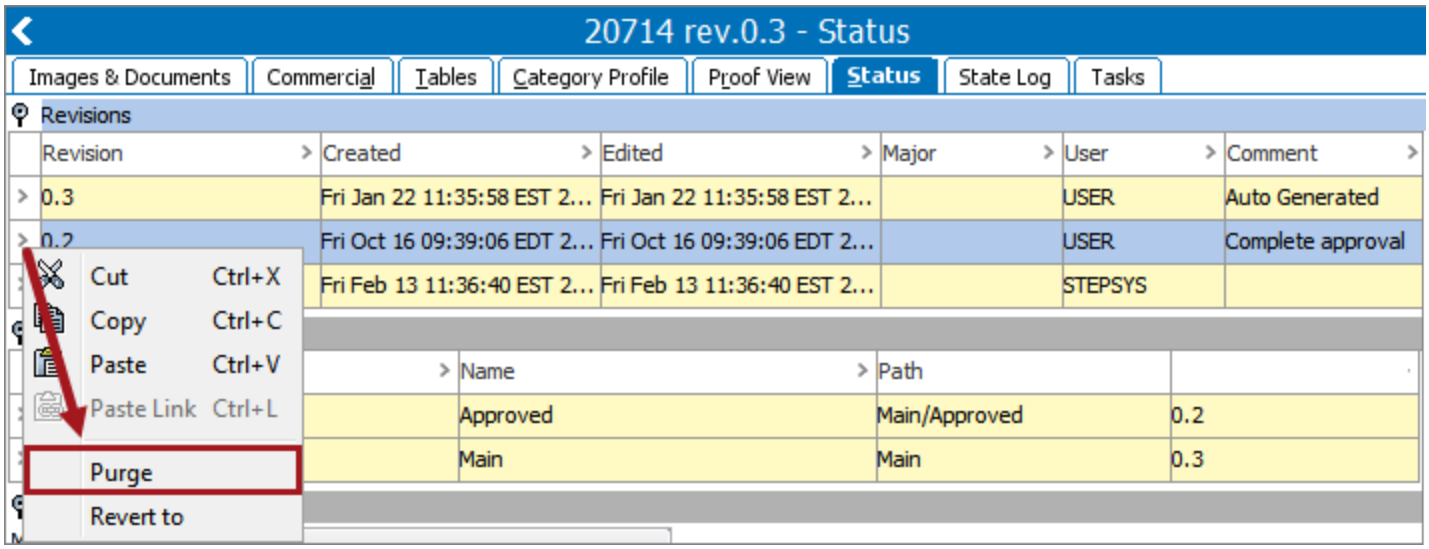
4. For the **Date** parameter, after selecting one of the three radio button options, specify up to what date / time the revisions should be purged. If no revision meets the date exactly, it will keep the most recent revision. For example, if the user selects today, but the last revision was yesterday. The system would keep yesterday's revision because it is most recent.

5. For the **Purge All Workspaces** parameter, if checked, revisions made in all workspaces are purged, for example in the Approved and Main workspaces. If unchecked, revisions are only deleted from the current workspace. For more on workspaces, refer to the **Workspaces** topic in the **System Setup** documentation.
6. Click **OK** to perform the purge as configured, or click **Cancel** to close the dialog.

Manually Purging a Single Revision

This manual revision cleanup option allows a single revision to be purged. Additional automatic revision cleanup processes should also be in place.

1. Open the Status tab of the object.
2. Click the arrow on the revision to be removed.
3. From the menu, select **Purge**. The selected row is removed from the system.



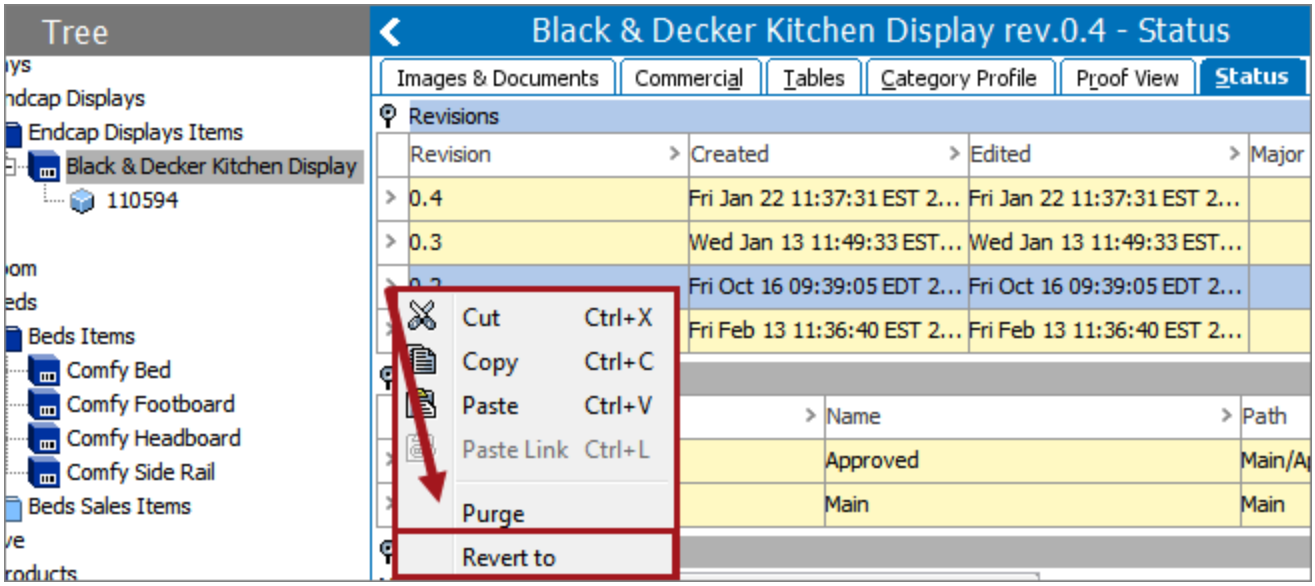
Reverting to Past Revisions

Reverting to a past revision generates a *new* revision that matches the one reverted to. It does not discard any intermediate revisions, nor is any audit trail lost.

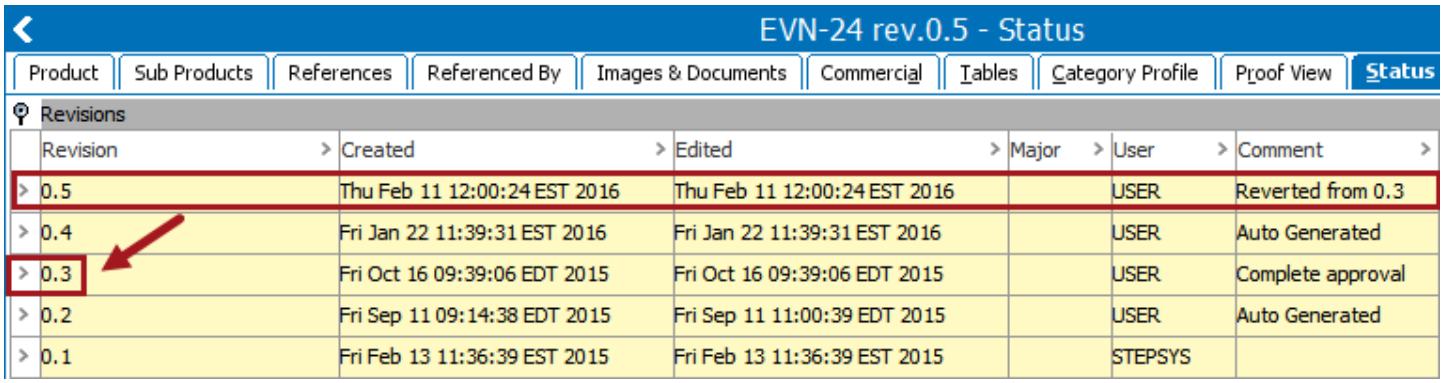
Important: To revert back to a revision successfully, all configurations applied to the object must still be in place. For example, when reverting to a previous version of an integration endpoint, all related attributes, references, and business rules must still exist, otherwise the revived endpoint may not work as intended.

To revert to a past revision:

1. In the object editor, open the Status tab.
2. Click the arrow next to the desired revision to display a menu.
3. Click the **Revert to** option.



To track the history of the object, an automatic comment includes the revision of the object that has been reverted.


EVN-24 rev.0.5 - Status
Product
Sub Products
References
Referenced By
Images & Documents
Commercial
Tables
Category Profile
Proof View
Status
Revisions
Revision
Created
Edited
Major
User
Comment
0.5
Thu Feb 11 12:00:24 EST 2016
Thu Feb 11 12:00:24 EST 2016
USER
Reverted from 0.3
0.4
Fri Jan 22 11:39:31 EST 2016
Fri Jan 22 11:39:31 EST 2016
USER
Auto Generated
0.3
Fri Oct 16 09:39:06 EDT 2015
Fri Oct 16 09:39:06 EDT 2015
USER
Complete approval
0.2
Fri Sep 11 09:14:38 EDT 2015
Fri Sep 11 11:00:39 EDT 2015
USER
Auto Generated
0.1
Fri Feb 13 11:36:39 EST 2015
Fri Feb 13 11:36:39 EST 2015
STEPSYS

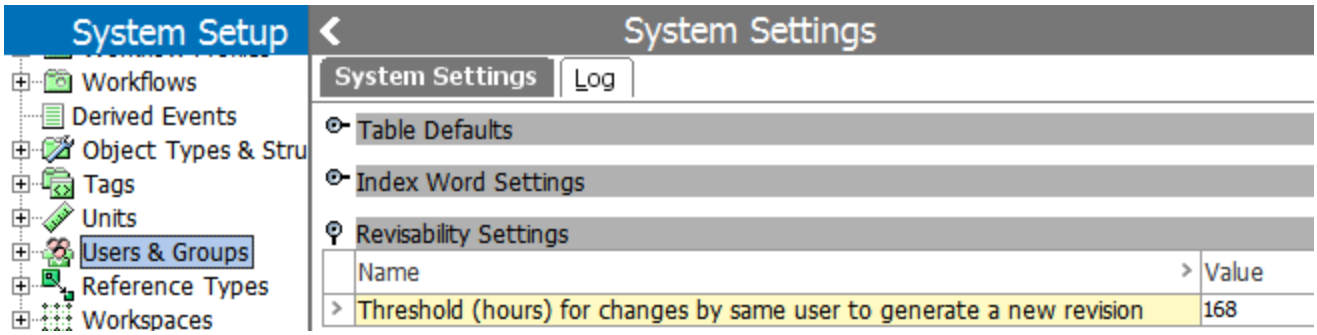
Timing for Automatic Revisions

By default, the system creates a revision on an object if a user makes a change to the object and the time from when the object was first touched after the last revision was made is greater than the timing threshold. This is particularly useful in cases where an object is primarily maintained by a single user and would not otherwise have a revision made without that user choosing to do so manually. The threshold functionality ensures that changes are recorded, without creating an excessive number of revisions.

The global default number of hours for all revisable objects is 168, or one week, before a revision is created. If any user acts on the object during the time frame specified by the threshold parameter, a revision is made when the time is exceeded. If no one acts on the object during that time, no revision is made.

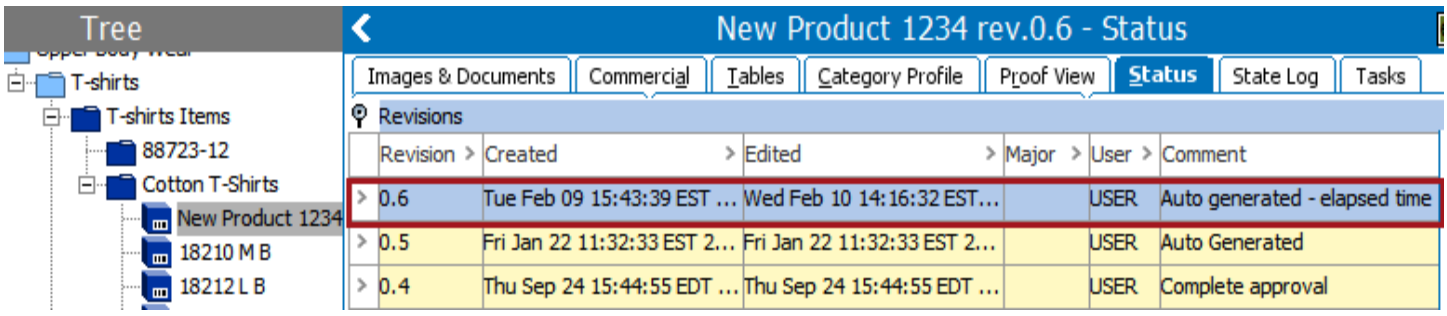
The number of hours can be changed in **System Setup** > **Users and Groups** > **Revisability Settings** flipper. Update the 'Threshold (hours) for changes by same user to generate a new revision' parameter.

- The minimum allowed hours is 24, and there is no maximum.
- If the parameter value is blank, the auto-revision functionality is disabled, and all revisions must be made manually or will be made due to different users modifying the revisable object.



Important: Set the parameter *at or above* the 168 (one week) default to prevent creation of an excessive number of revisions.

When an object gets a revision due to reaching the threshold parameter value, it is noted with 'elapsed time' on the object's Status tab > Comment column.

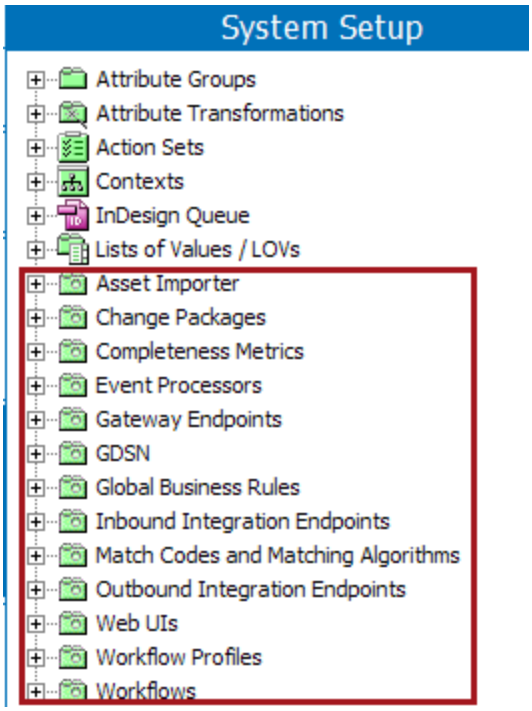


Revisions are created before the set number of hours expires using the manual method or other automatic methods, as described in the **Generating Revisions** topic.

Setup Groups

Setup groups are special folders, which need to be configured to allow for holding of Integration Endpoints, business rules, Web UI configurations, workflow configurations, etc.

They are essentially the root nodes to create the system setup configurations. You can define and refine your setup groups to group the system setup configurations. These are helpful when you want all the Integration Endpoints, business rules, Web UI, workflows etc., to be grouped under respective parent groups (or folders). Additionally, there are predefined setup groups which can be edited. These are explained in later sections. An example of some setup group folders are pictured below:



Note: When setting up privileges on a user group, it is possible to apply an 'Action Set' to only have effect on a specific setup group. The general setup of privileges, and a description of all actions, can be found in the **Action Sets** section of the **System Setup**. A sample of how setup groups can be used together with privileges will be illustrated later in this section.

The following 'Setup Actions' are setup group specific, and can be used on user groups to define in which setup group a user is allowed to maintain or view Integration Endpoints.

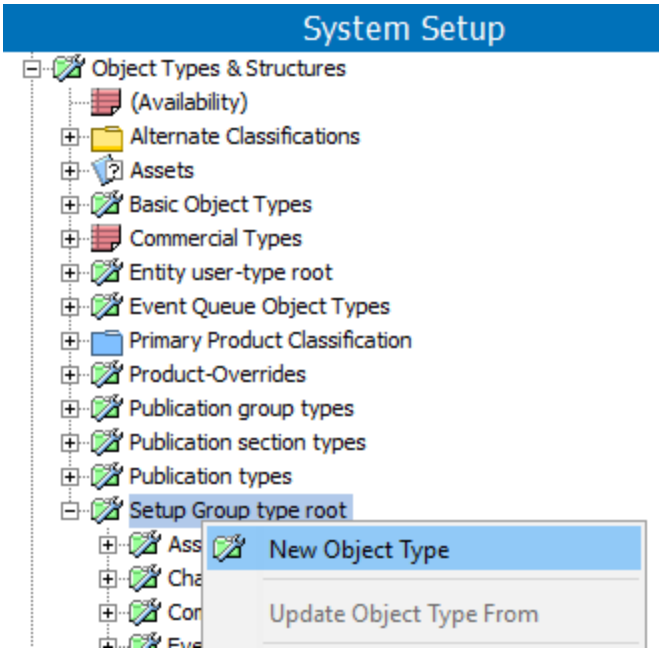
Setup Actions	Description
View Setup Groups	Users with this action applied will be able to view setup groups.
Maintain Setup Groups	Users with this action applied will be able to create and delete setup groups. They are also able to use the cut, copy and paste actions.

Creating Setup Group Object Types

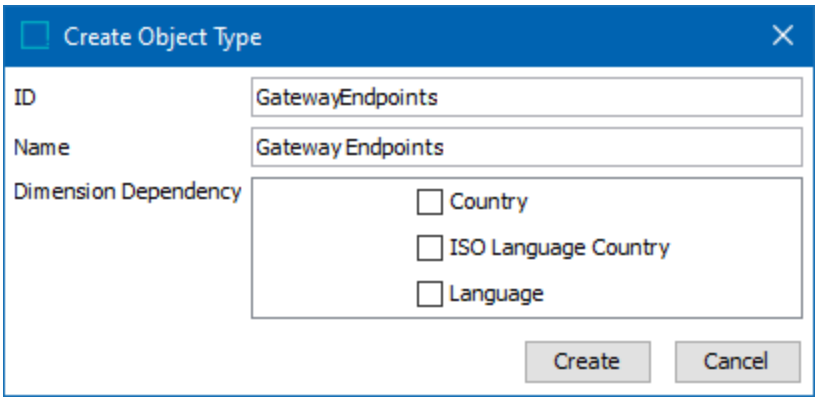
Before you can create any configuration in System Setup, you need to create one or more Setup Groups and define in which Setup Group a specific object type (e.g., integration endpoints, business rules, Web UI configurations, status flags, workflow configurations) is allowed to be created.

In the sample below, a Setup Group Object Type is created to be used to hold Integration Endpoints.

1. In **Object Types & Structures** in **System Setup**, right-click **Setup Group type root** and click **New Object Type**.



2. Add an **ID**, **Name** and click **Create**.

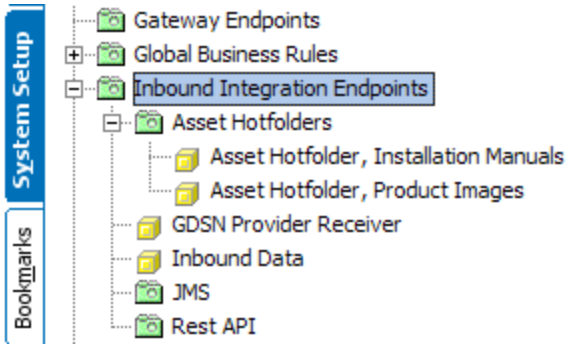


Note: The IDs can be auto generated for setup group creation. Refer to the **Autogenerate Using Name Pattern and ID Pattern** topic in the **System Setup** documentation.

The **Setup Group** displays as a child in the **Setup Group type root**.

3. Repeat these steps to create additional object types.

The sample below illustrates a hierarchy of setup group object types. A **Setup Group** named **Integration Endpoints** has been created, and contains a setup group object type named Asset Hotfolder, JMS, and Rest API.



By creating different Setup Groups, you can maintain the respective integrations under respective setup groups.

Next, refer to the **Creating Setup Groups in System Setup** topic.

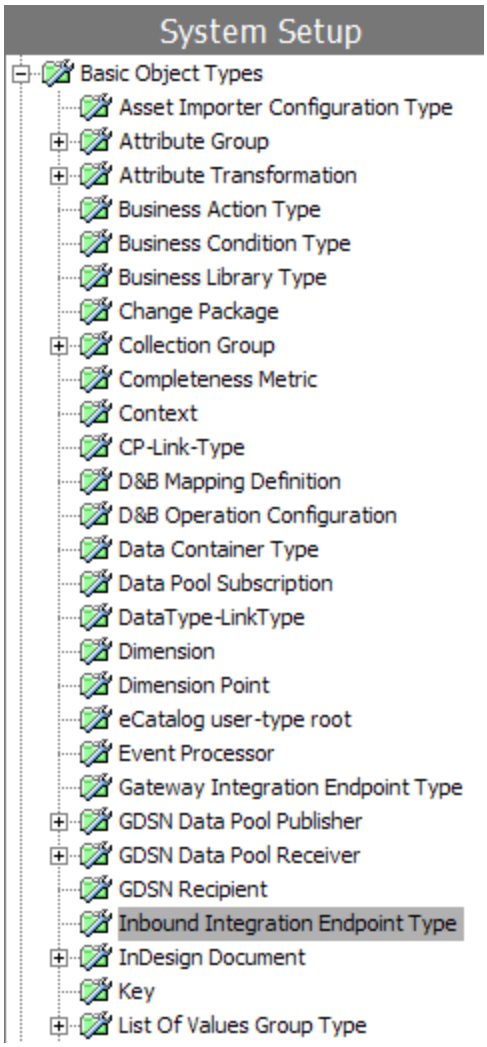
Defining Type of Objects to be Stored in Setup Groups

Before a Setup Group can hold object types, you need to select an object type to create a setup group. Object types are located under System Setup > Object Types & Structures > **Basic Object Types**. A few of the object types that can be selected to make setup groups from are listed below:

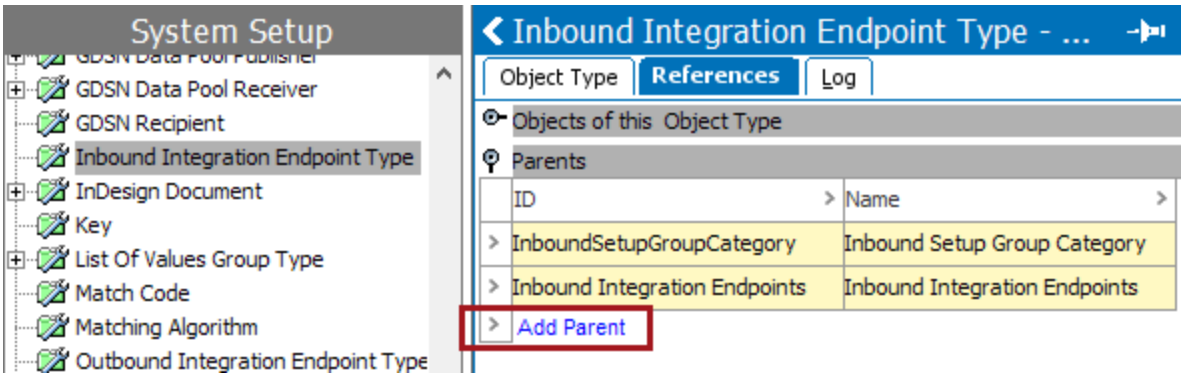
- Business Action Type
- Business Condition Type
- Business Library Type
- Inbound Integration Endpoint Type
- Outbound Integration Endpoint Type
- Web UI Configuration Type
- STEP Workflow Type

The example below illustrates how to set up a setup group to hold inbound integration endpoints. The same steps can be used for all of the other object types that can created as setup groups to hold other child objects.

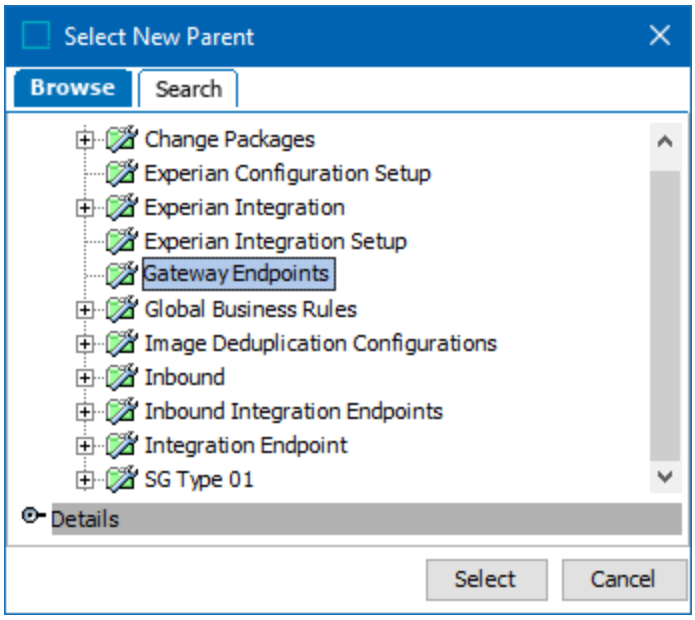
1. In **Object Types & Structures** > **Basic Object Types** > click **Inbound Integration Endpoints**.



2. In the **Inbound Integration Endpoint Type** editor, click the **References** tab and **Add Parent**.



3. In the 'Select New Parent' dialog search or browse for 'Setup Group Types' to link the object type into. Select the relevant **Setup Group** and click **Select**.



Below is an example list of Basic Object Types that could be added as parents for any setup group depending on the requirements:

- Asset Importer Configuration Type
- Business Action Type
- Business Condition Type
- Business Library Type
- Change Package
- Completeness Metric
- Event Processor
- Gateway Integration Endpoint Type
- Inbound Integration Endpoint Type
- Match Code
- Matching Algorithm
- Outbound Integration Endpoint Type
- Web UI Configuration Type

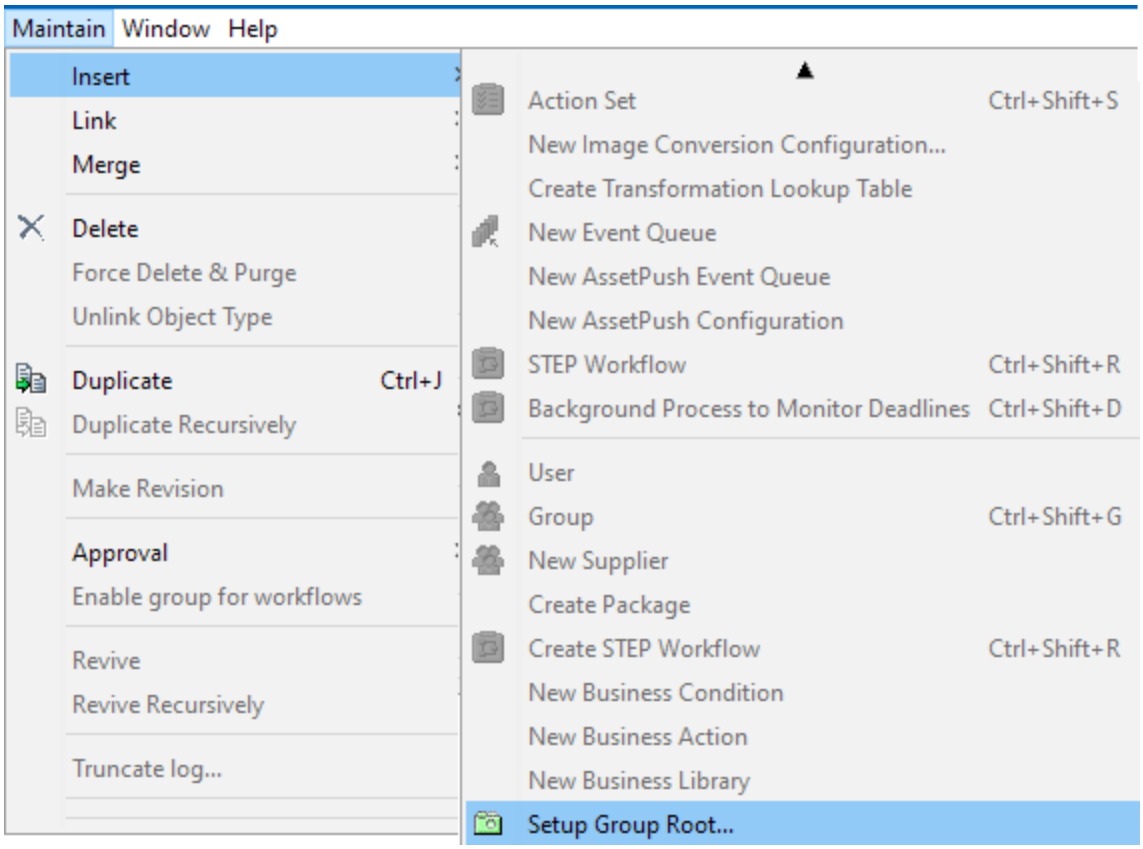
Creating Setup Groups in System Setup

After creating setup group object types, as defined in the **Creating Setup Group Object Types** topic, create the setup groups as defined below.

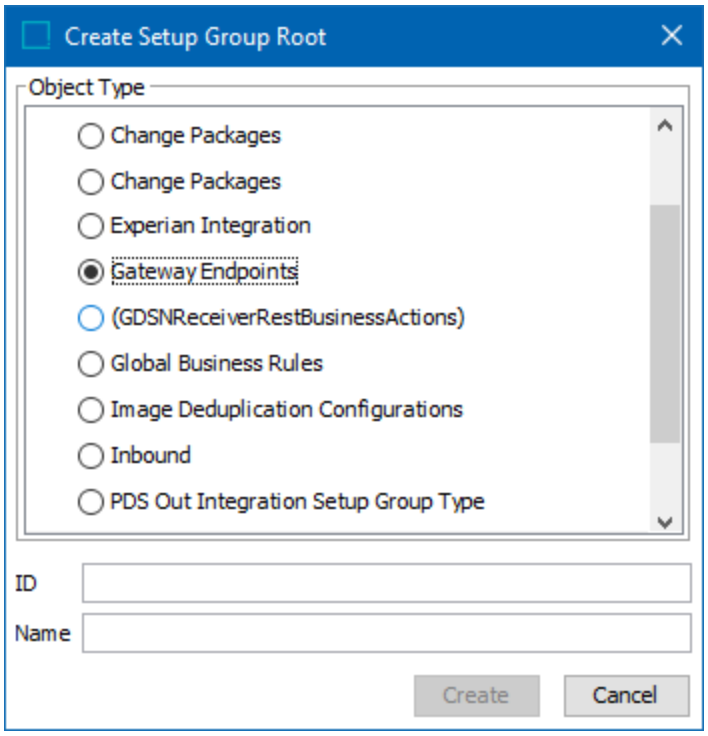
Setup Groups can be used to hold integration endpoints, business rules and/or Web UI configurations.

Note: You must have already created a Setup Group Object Type and have specified which type of Object the Setup Group should hold.

1. In workbench, click the **System Setup** tab, and select any object in the System Setup hierarchy.
2. In main menu, click **Maintain**, and **Insert** > **Setup Group Root**.

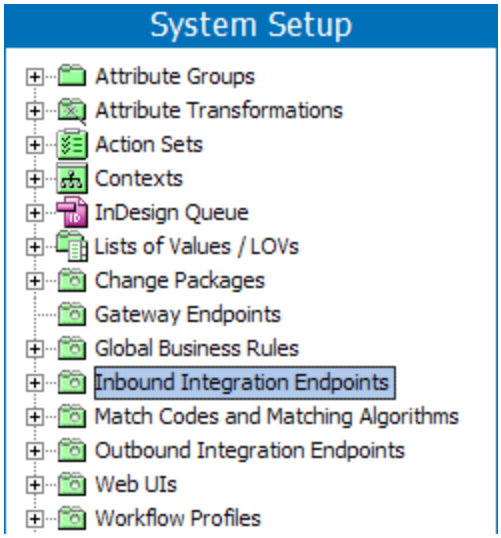


A **Create Setup Group Root** dialog appears.



3. Add an **ID**, **Name** and click **Create**.

   A Setup Group is created and will appear as a node in the System Setup hierarchy. The Setup Group is ready to be used for Integration Endpoints.



Note: An auto ID pattern can be specified for the setup group. Refer to the Autogenerate Using Name Pattern and ID Pattern topic in the System Setup documentation.

Once the setup group root is created, right-click and create the respective configuration under it.

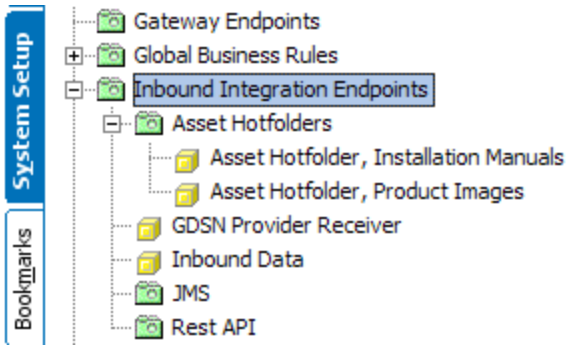
Setting Up Privileges Example

In this example, two user groups will be created.

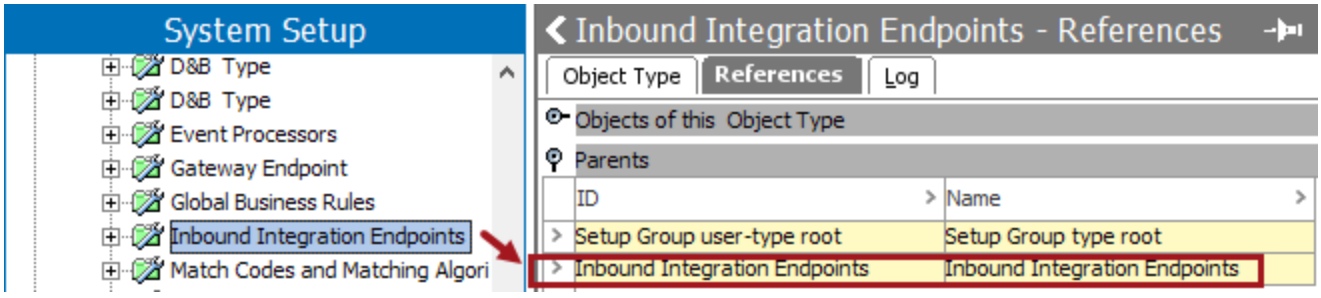
- One user group created will be named **View Setup Group and Integration Endpoints**. Users linked into this group will be granted the privilege to view Setup Groups and Integration Endpoints.
- The other user group created will be named **Maintain Setup Group and Integration Endpoints**. It will inherit the privileges applied to the **View Setup Group and Integration Endpoint** user group. Users linked into this group will be granted the privilege to maintain setup groups and Integration Endpoints in the setup group named hotfolders.

Note: This sample of privilege setup can only be used to link existing users into one of the two user groups. Users will have to exist in other user groups, where they grant the privilege to log on the workbench. It is beyond the scope of this guide to describe this functionality. For more information about Action Sets, refer to **Action Sets** in the **System Setup**.

A structure of the setup groups could be as illustrated below.



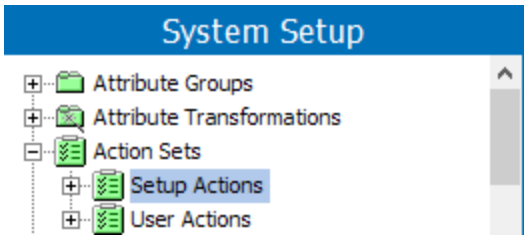
To be able to create additional setup groups that are able to hold Integration Endpoints below the **Integration Endpoint** setup group folder, the **Setup Group type root** 'Integration Endpoints' must have itself added as a parent. This same concept applies to all setup groups. Refer to the screenshot below.



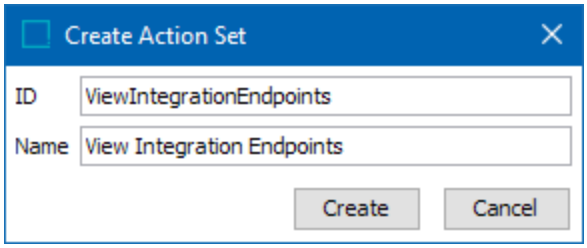
For more on how to maintain object types, refer to the **Maintaining Object Types** documentation in the **System Setup** documentation.

Privilege Setup Steps

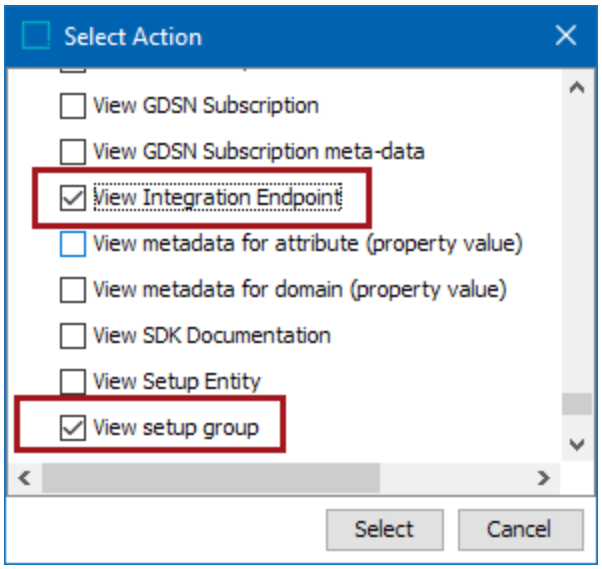
1. Go to System Setup > Action Sets > **Setup Actions**.

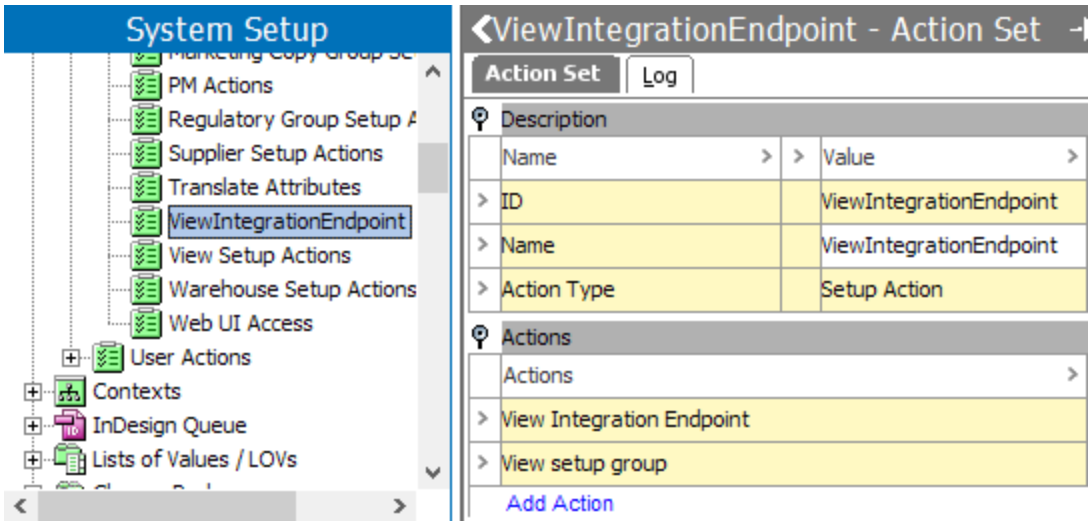


2. Right-Click and select **New Action Set**. Add an ID, Name, and click **Create**.

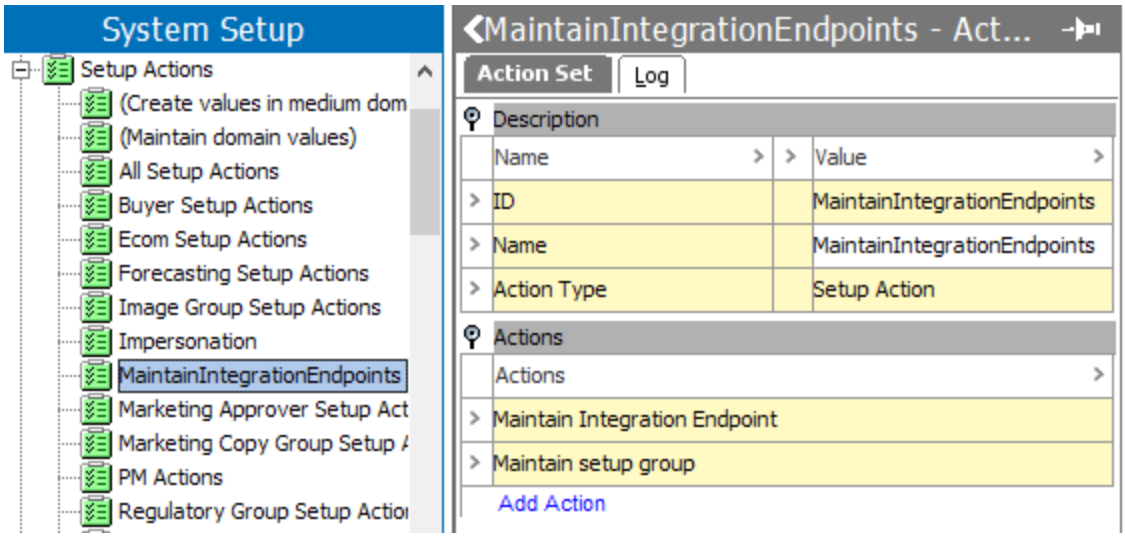


3. Select the newly created action and in the Action Set tab, click **Add Action**.
4. In the Select Action dialog, check **View Integration Endpoint** and **View Setup Group** and click **Select**.

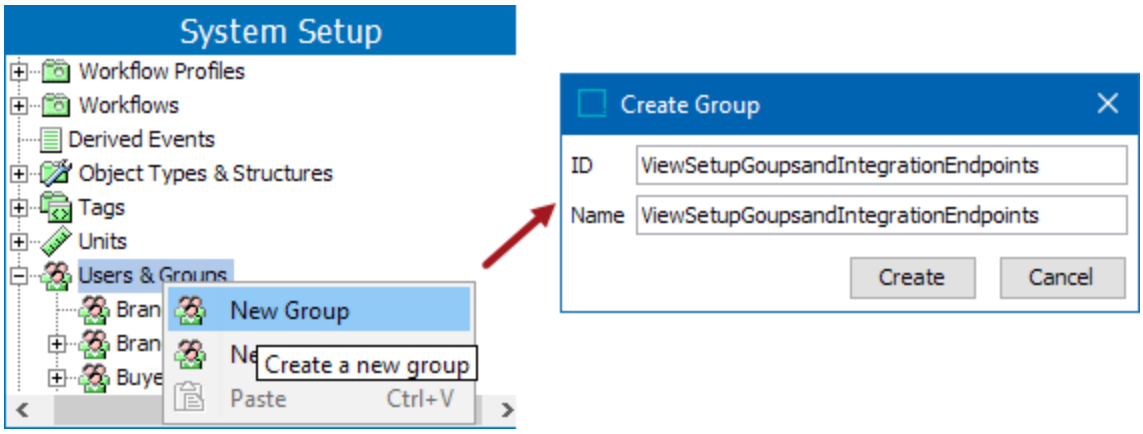




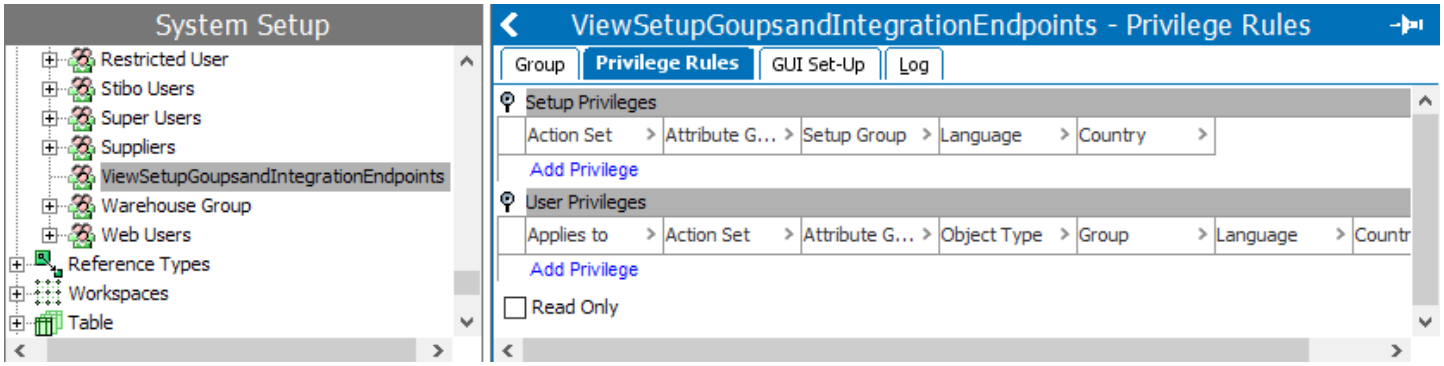
5. Repeat step 1-5 and create another Action Set containing the actions **maintain setup group** and **maintain integration endpoint**.



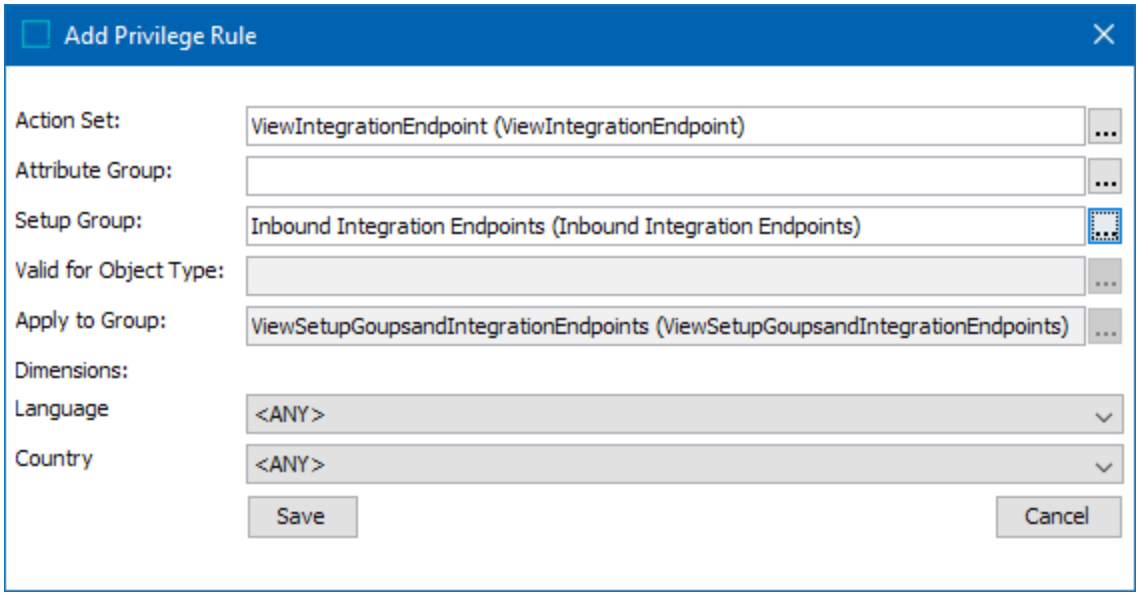
6. Go to the **Users & Groups** node, right-click and select **New Group**. Add an ID, Name, and click **Create**.



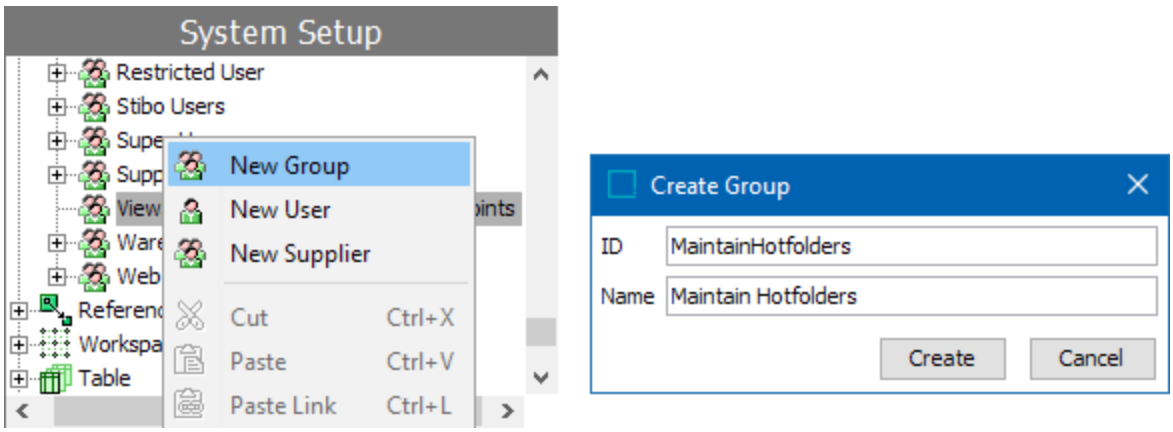
7. In **User Group editor**, click **Privilege Rules** tab.



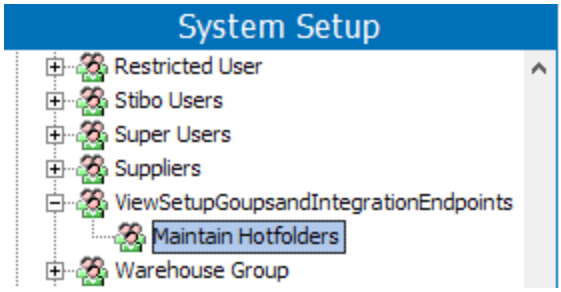
8. Under the **Setup Privileges** flipper, click **Add Privilege**. The Edit Privilege Rule dialog displays:



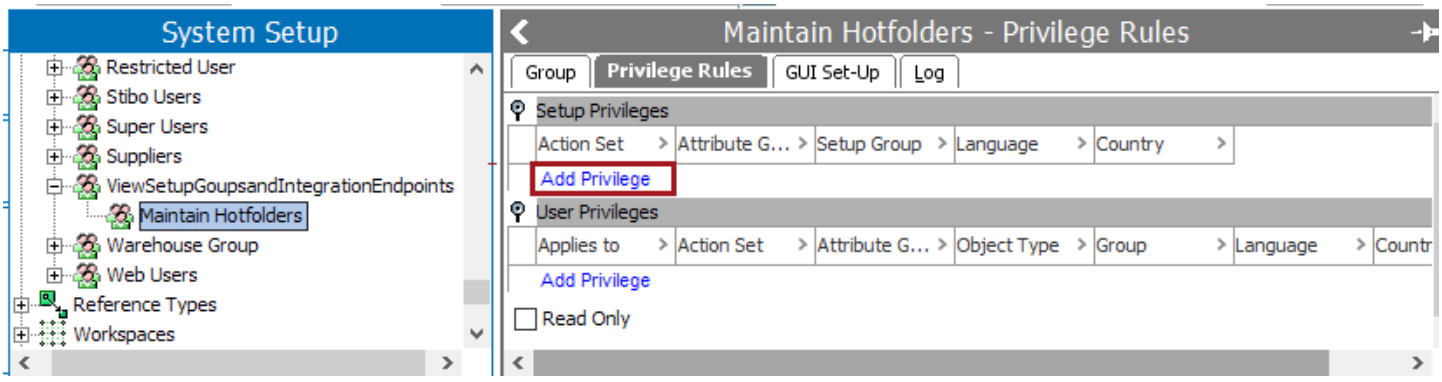
9. In the **Action Set** field, apply the **View Integration Endpoint** Action Set.
10. In the **Setup Group** field, apply the Setup Group named **Inbound Integration Endpoints**. Click Save when finished.
11. Next, in Users & Groups, select and right-click the group just created: **View Setup Groups and Integration Endpoints**. Select **New Group**. Add the ID, Name, and click **Create**.



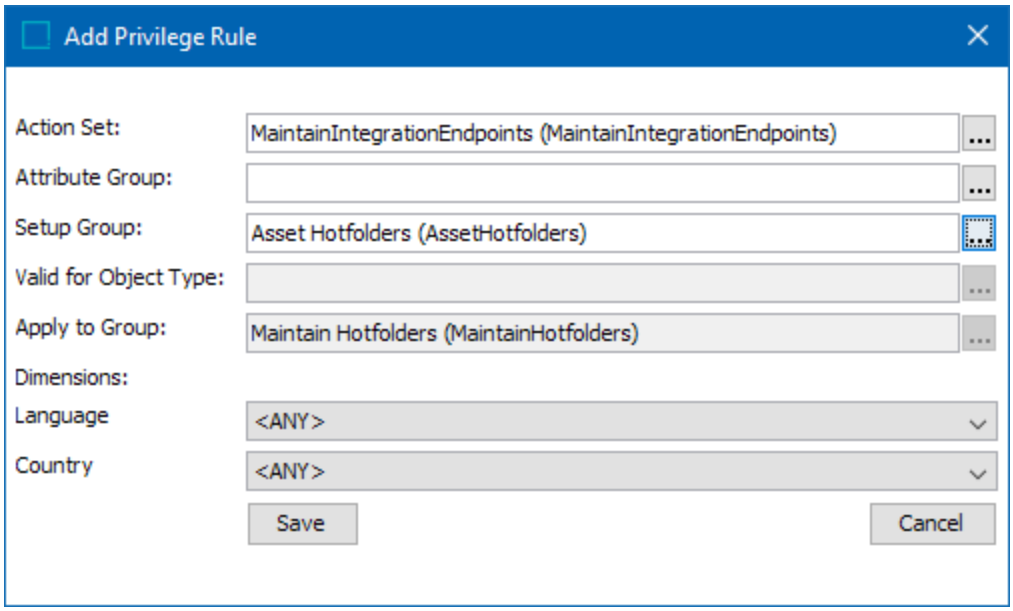
The new user group will appear below the user group **View Setup Groups and Integration Endpoints**.



12. Click the Privilege Rules tab. Under the **Setup Privileges** flipper, click **Add Privilege**.



13. In the **Action Set** field, apply the Action Set **Maintain Integration Endpoints**.



14. In Setup Group, apply the setup group **hotfolder**.

    Users linked into the User Group **View Setup Group and Integration Endpoint** will only be granted the privilege to view Setup Groups and Integration Endpoints. Users linked into **Maintain Integration Endpoints**, will be granted the privilege to maintain Setup Groups and Integration endpoints in the setup group 'hotfolder'.

Note: The above is an example to set the User Privileges and does not necessarily mean that the only actions mentioned in the example are sufficient for a user to work on STEP. The user should also have other actions defined to work.

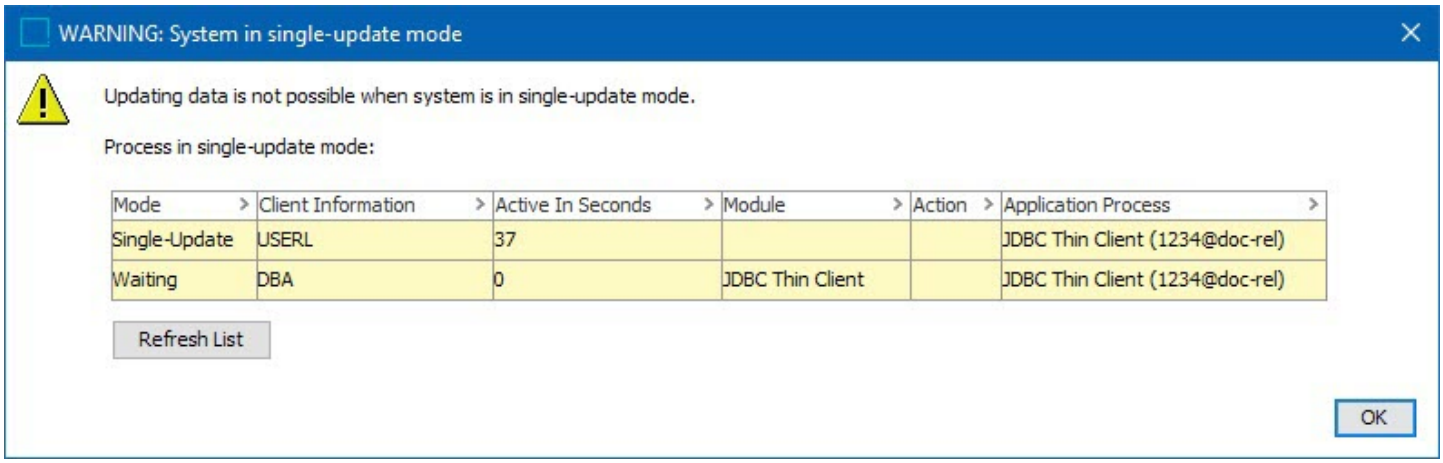
Single-Update Mode

Certain system operations (i.e., GUI updates, data import) can corrupt data if they are run at the same time that a different user is updating the database.

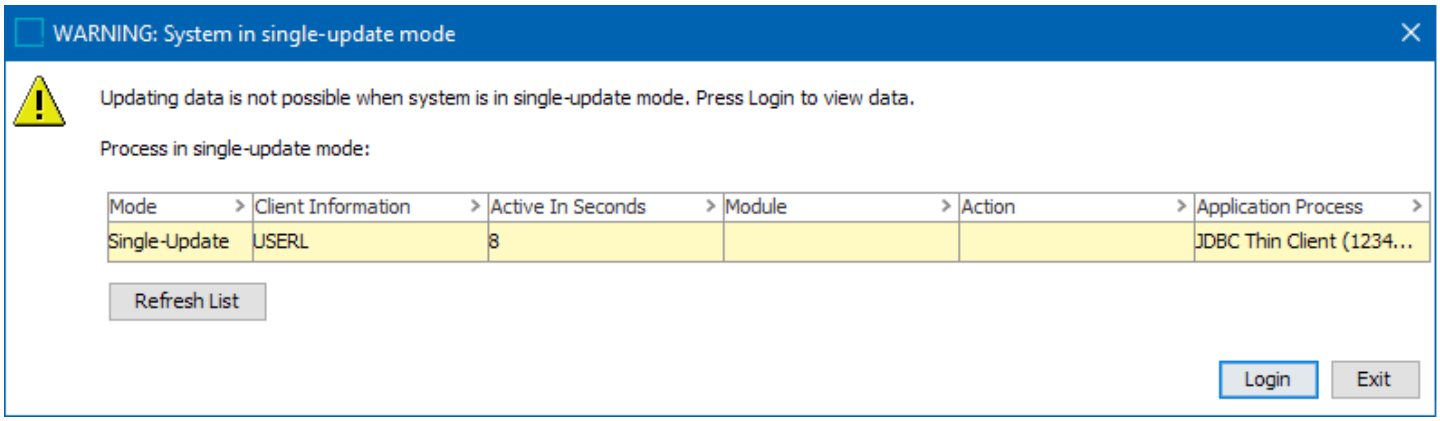
Important: Systems running a Cassandra database use **Lock-free Schema Change (LFSC)** functionality. Systems running an Oracle database, by default, use Single-Update Mode (SUM)—documented below. There is an option to run LFSC if using Oracle, and that option is outlined in the Lock-free Schema Change topic. Customers with huge amounts of data can benefit from LFSC, because on those systems with LFSC enabled, it is often very hard to get into SUM. When in SUM, it can block the system for long periods of time.

The system enters single-update mode when operations that can affect data elsewhere in the system are performed. When STEP enters single-update mode, only the connection that is in single-update mode can update the database.

A connection can only enter single-update mode if no other connection in the system is in single-update mode. If it is not possible for the system to enter single-update mode, or if a user tries to make changes or update when another connection is in single-update mode, a warning message displays.



Additionally, if you log on to the system while it is in single-update mode, a warning displays.



The warning displays information about which connection is currently running in single-update mode. While the user not in single-update mode cannot change data, they can still view data.

Note: The importer will only allow entry into single-update mode if attribute 'SingleUpdateMode' on root tag 'STEP-ProductInformation' is 'Y'. Otherwise single-update mode operations would be ignored during import.

Operations that Cause Single-Update Mode

The following operations will cause the system to enter single-update mode.

- Deleting a workspace, as defined in the Maintaining Workspaces topic
- Adding or deleting dimension dependencies, as defined in the Dimension Dependent Attributes topic
- Changing externally maintained on attributes, as defined in the Externally Maintained Attributes topic
- Changing attributes to use or not to use LOV, as defined in the Editing Validation Rules topic
- Changing attributes to or from being Full Text Indexable, as defined in the Search Functionality topic in the Getting Started documentation
- Changing attributes to or from being multi valued, as defined in the Validation Rules topic
- Activating or deactivating unique keys, as defined in the Activating and Deactivating Keys topic
- Changing reference types to or from being externally maintained, as defined in the Maintaining a Reference Type topic
- Changing reference types to or from being multi valued, as defined in the Maintaining a Reference Type topic
- Changing product to classification link types to or from being externally maintained, as defined in the Maintaining a Product to Classification Link Type topic
- Changing or moving product to classification link types (for example, when you move one type to another type), as defined in the Maintaining a Product to Classification Link Type topic

- Changing product to classification link types to or from being multi valued, as defined in the Maintaining a Product to Classification Link Type topic
- Merging LOVs (unless neither LOV is in use by an attribute), as defined in the Merging LOVs topic
- Removing object types, as defined in the Deleting an Object Type topic
- Unlinking object types, as defined in the Unlinking Object Types topic
- Changing the revisability setting of an entity object type, as defined in the Revisability on Entity Object Type topic
- Changing the validity of a data container type for an entity type, as defined in the Setting Up Data Container Types in Workbench topic
- Changing data container types to or from being multi valued, as defined in the Setting Up Data Container Types in Workbench topic
- Changing the Owns Product Links setting on classification object type as defined in the Owns Product Links on Alternate Classifications Object Type topic
- Changing the Reference Target Lock Policy on object types, as defined in the Reference Target Lock Policy on Object Types topic
- Using the Attribute Value Migration functionality for attribute values that were created on pre-8.1 STEP systems, as defined in the Attribute Value Migration topic

Single-Update Mode Examples

The following examples are not intended to describe all scenarios in which the Single-Update Mode (SUM) is triggered, but are listed to illustrate some possible issues that SUM may introduce.

Example 1: Add / Remove a Dimension Dependency

If a user adds or removes a dimension dependency at the same time someone else is manipulating data that uses that is dimension dependency, then there is a risk of introducing inconsistent data in the database for the particular data that is being manipulated.

Note: Only the concurrently manipulated data is at risk.

For example, adding a dimension dependency to an attribute while data for this attribute is simultaneously being imported could result in inconsistent data. One way this might occur is if the importer caches the attribute's dimension dependency but does not notice the new dimension dependency has been applied until a number of seconds have elapsed. In that interim period, the values written for this attribute will have the wrong dimension dependencies.

Example 2: Merge Attributes

If one user is manipulating values on an attribute while a different user is merging that attribute, then there is a risk that inconsistent data may be introduced. This applies to all attributes participating in the merge.

Note: Only the concurrently manipulated values are at risk.

One example of how this might occur is if one user is importing values into the primary attribute at the same time another user is merging a different attribute into the same primary attribute. The merge operation might find a value of the secondary attribute to merge into the primary attribute, and at the same time, the other operation might create a new value for the same product for the primary attribute. These two values might be visible in same workspaces / contexts and be in conflict.

Another potential scenario where this could occur is when one user is importing values into an attribute that is about to be deleted by another user's operation. The import succeeds because the secondary attribute was still present as the second user's process was initiated. However, once the merge is complete, the imported values are deleted with the attribute, thus the merge operation is unable to merge the values because the system did not detect the values in time.

Example 3: Changing the Property of an Attribute

This example covers the following four operations:

a. Change the 'Externally Maintained' flag of an attribute (i.e., store the historic values of an attribute or not)
b. Change an attribute to or from using LOV validation
c. Change an attribute to or from being a BLOB (Binary Large OBject). That is, making an attribute free text searchable or by changing its value length past the 100 bytes boundary
d. Change an attribute to or from being multi-valued

Changing one of these properties at the same time as another user is manipulating values of the attribute might result in inconsistent data.

Note: Only the concurrent manipulated values are at risk.

For example, changing one of these settings of an attribute while at the same time importing data for this attribute could lead to inconsistent data being imported for the attribute. The importer might have cached the original property of the attribute and not noticed the change until after a few seconds. In these few seconds, values written for this attribute will have an incorrect state, and these values will not be remedied by the batch operation since it has already moved past this point in the database table.

Guidance for Preventing SUM Activation

To avoid entering single-update mode when changing attribute definitions, the following procedure can be used:

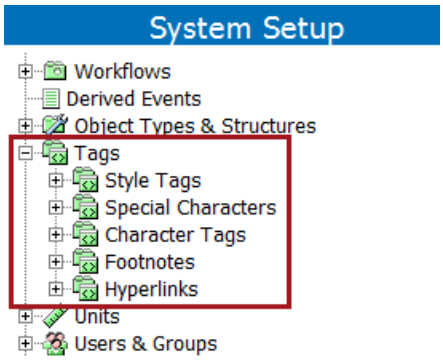
- Create a new attribute (Attribute B) with the same desired attribute definition (including the changes from the origin attribute, Attribute A).
- Use Bulk Update in the STEP Workbench to copy all attribute values from Attribute A to Attribute B. For more information on using bulk update functionality, refer to the Bulk Updates topic within the Getting Started documentation.
- Switch the IDs of Attribute A and Attribute B. To do this, navigate to either attribute on the System Setup tab of the workbench. Right-click on the attribute and select 'Switch Attribute IDs'. In the resulting dialog, select the attribute that the selected attribute should swap IDs with.

If a user attempts the above actions without entering into single-update mode then errors in data could occur.

Tags

A 'tag' is a markup notation used to indicate specific formatting or special characters. A tag is identified by a unique tag name, and is available to be inserted into text based attributes in both workbench and Web UI.

Tags are maintained in System Setup in the Tags folder.



All tags in STEP are 'media neutral.' This means that data entered into and maintained in the STEP system is independent of whatever media it delivers exported files to. There are no embedded codes within the data that are specific to any one type of media, such as HTML. This means that STEP solves the issue of users having to enter media-specific command codes within the data stream. In this way, the same attribute could be output to any media and provide the necessary command codes that are relevant to that output media.

STEP supports several different types of output, including but not limited to InDesign, Microsoft Word, web applications, and any number of custom applications.

Tag Systems in STEP

There are two systems of tags in STEP:

- 'Paired tags' (such as style tags, hyperlinks, and footnotes) have a separate start and stop tag, e.g., <bold>xxxx</bold>.
- 'Unpaired tags' (such as special character and character tags) do not have a separate start and stop tag. Instead they are 'self-contained', e.g., <in/> or <ft/>.

For every STEP tag created the user can define what the appropriate corresponding command codes are for different media outputs. For example, the <bold> </bold> tags may be converted to and for an HTML3 output format, <ct:Bold> and <ct:> for the InDesign output format, or the tags could be stripped out entirely for a custom output format.

Types of STEP Tags

These are the main tag types:

Special Character

Special Characters are Unicode characters, which in some cases need to be formatted. Examples are the Greek characters α β γ. These characters are valid Unicode characters and can be entered into any text element or into product data. To make these characters output to a printer or to output properly in, for example, InDesign, a formatting has to be set up.

Character Tags

Character tags allow users to maintain STEP tags within the system and convert them to one or more characters used in special fonts upon exporting the data. Sometimes these characters are known as Dingbats. For example, they can be used to export non-Unicode characters (or any other character or characters that are not Unicode characters) such as a telephone ☎ or a special arrow ➔.

Style Tags

Style tags apply changes to how text looks. For example, it can make plain black text bold, blue, or can format text as a list with bullets or numbers. Style tags must have an opening and closing tag, for example, <bolditalic> </bolditalic>. Style tags are used with STEP Tables in order to apply styling to the contents of table cells.

Footnotes

Footnotes are used in STEP Tables only to add an additional piece of information to attribute values when the attributes are used. If footnotes are added to attribute values outside of a STEP Table, they will not output expected result. Footnotes are added / edited within the Rich Text Editor, so using these options will open that dialog. They are also required in order to use the Footnote Transformation within STEP tables. For more information, refer to the **Tables** documentation.

Hyperlinks

Hyperlinks are used to define the formatting of hyperlinks when they are used in attributes with the value base type as 'text'. The hyperlink can either precede, come in the middle of, or come after the designated text.

Note: Hyperlink tags are not attributes with the validation base type of a 'URL'. Attributes with the validation base type of a URL do not allow for any text other than a URL in the value field.

Working With Tags

Follow these topics to use tags in STEP:

1. Create tags - refer to the **Creating Tag Groups and Tags** topic in this documentation.
2. Configure tags properly - refer to the **Configuring Tag Definitions** topic in this documentation.
3. Establish proper output formatting - refer to the **Configuring Tag Output Formatting** topic in this documentation.
4. Understand more about tags in attribute values - refer to

- the **Special Character Tags** topic.
- the **Character Tags** topic.
- the **Style Tags** topic.
- the **Hyperlink Tags** topic.

5. Make tags visible in Web UI - refer to the Enable Tag Conversion parameter of the **Attribute Value Component** topic in the **Web User Interfaces** documentation.

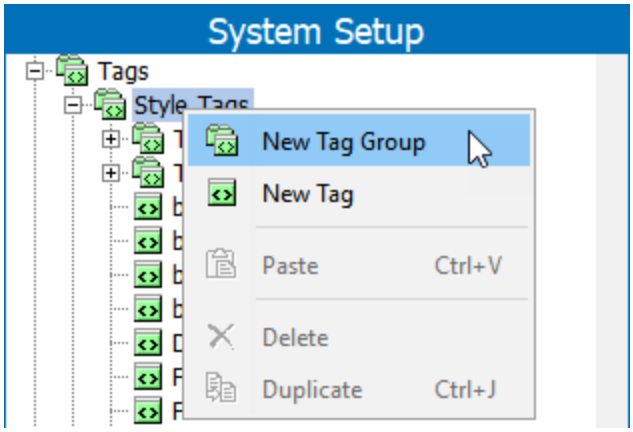
Creating Tag Groups and Tags

When creating tags, it is often helpful to first put them in tag groups. This can allow for better organization and stronger control when combined with user privileges.

Tag Groups

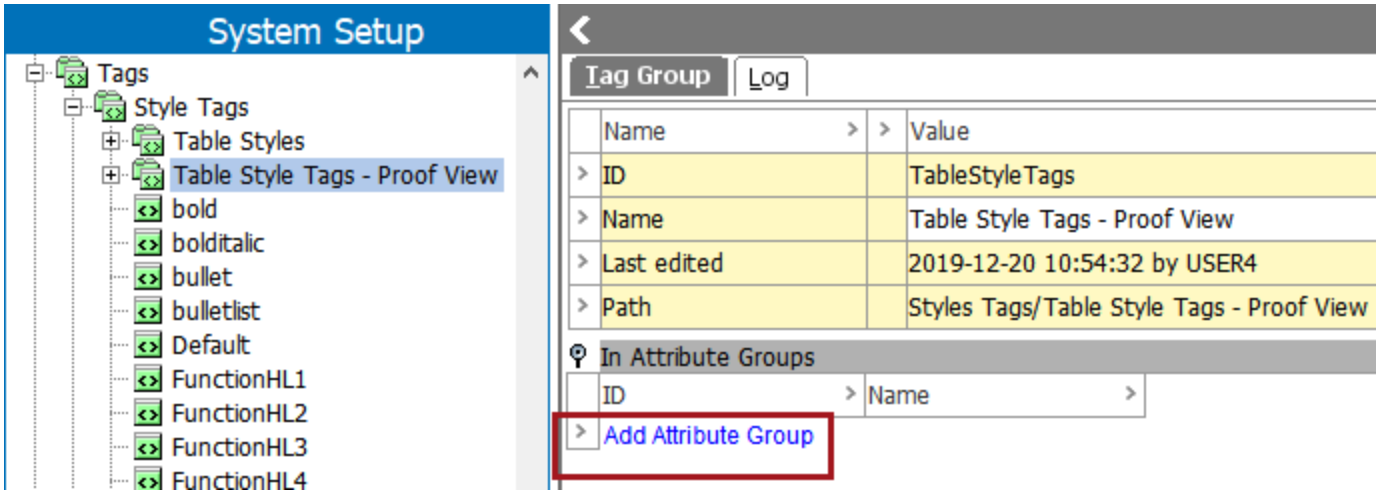
Follow the steps below to create a tag group under one of the types of tags:

1. In **System Setup**, right-click special Characters, Style Tags, Character Tags, Footnotes, or Hyperlinks.
2. In the menu, select **New Tag Group**.



3. Add an **ID** and **Name**, then click **Create**.

The Group can be linked into an attribute group and used in combination with privileges to restrict users in maintaining and/or using certain tags.



The specific privileges available for tighter control over tag usage are 'Use tag' and 'Maintain tags'. Refer to the **Users and Groups** section of this documentation for more information on how to set up privilege groups.

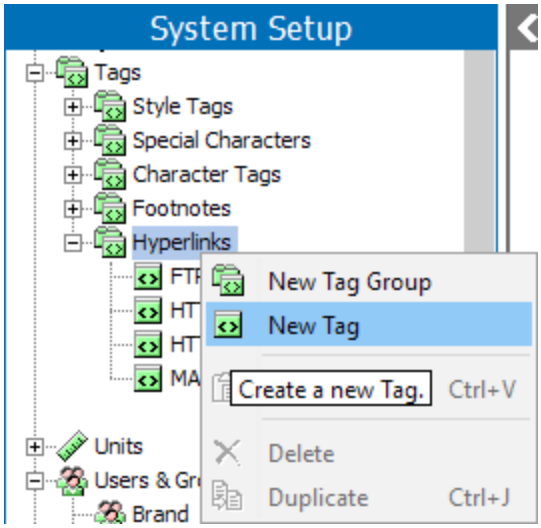
Tags

The method to create the various tags are generally the same, although there are some special considerations as defined below.

Important: *All* STEP tags are case-sensitive. When loading files with attribute values that include STEP tags, they must exactly match how the tag was set up.

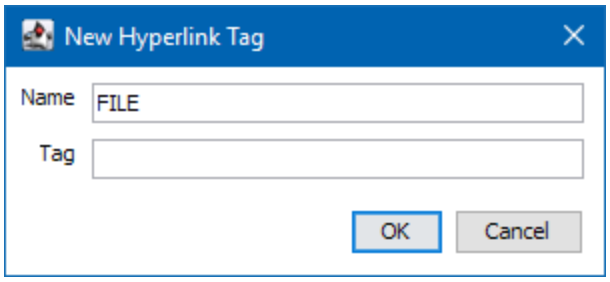
Follow the steps below to create a tag:

1. Go to the **System Setup** tab, expand **Tags**.
2. Right-click on the desired tag type, then select **New Tag**.

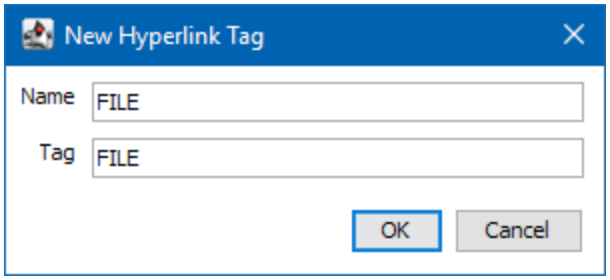


3. In the dialog that appears, enter a display **Name** for the tag. The name can be up to 80 characters long, and can include spaces.

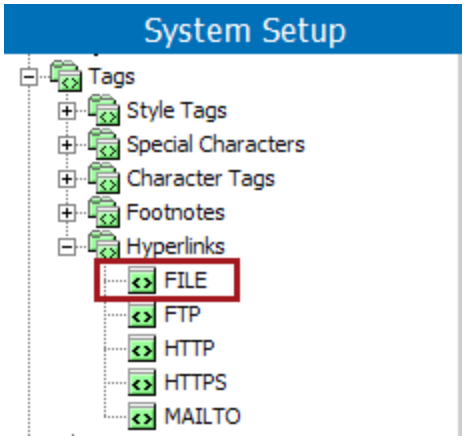
Note: The Name displays in the list of tags in System Setup, and it is recommended practice to make the Name the same as the intended Tag, as sometimes users mistake the Name for the Tag (which defines what the tag is). For style tags, use the Rendering parameter to give a visual indicator to the operator that a Style Tag has been applied.



4. In the **Tag** field, enter a tag. The tag will be used, for example, in a document when importing files using STEP tags. Spaces and the special characters < (less than), > (greater than), or / (forward slash) are not permitted in the tag.



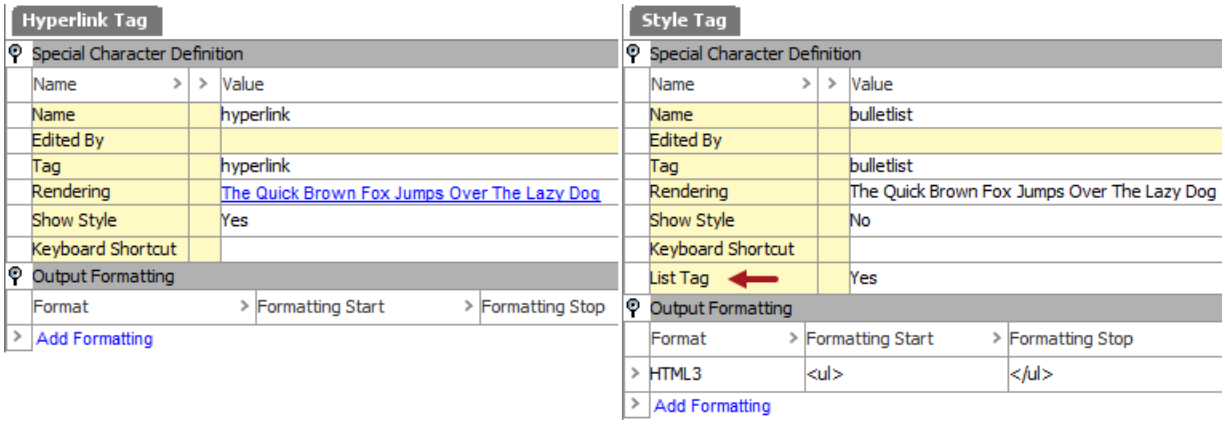
5. Click **OK**. The tag is created, and is available in the hierarchy.



6. Configure and define rendering of the tag as defined in the **Configuring Tag Definitions** topic in this documentation.

Configuring Tag Definitions

It is possible to configure and render tags differently so that users are more visually able to tell the difference between the different tag types used while in STEP. Generally, configuring tags is the same regardless of the type.



On the Tag tab (a Hyperlink and a Style tag are shown above), the Special Character Definition flipper includes the following editable parameters:

- **Name** - displays the name of the tag. The name can have a maximum of 80 characters. Spaces between words are allowed.
- **Tag** - enter only one word. Spaces and the special characters: Less than, '<', Greater than, '>', and the forward slash '/' are not allowed in the tag field. The tag will be used for example, in a document when importing files using STEP tags.

  Important: Because it can get confusing if the name field, which is what is displayed in the UI, is different than the tag, it is recommended to keep both the name and the tag itself the same.

- **Rendering** - for hyperlinks, character tags, and style tags, refer to the **Rendering** section below.
- **Show Style** - specify whether or not the tag is shown in the dropdown list when a user is editing an attribute value. Select 'Yes' to make the tag available, and selecting 'No' will make the tag unavailable for selection on all dropdown lists available in STEP.
- **Keyboard Shortcut** - specify a keyboard shortcut to use to insert the tag.
- **List Tag** - for style tags only, 'Yes' defines the start and end of an entire bullet or numbered list for HTML output. For example, the style will indicate the use of the <ul> … HTML tags. For more information, refer to the **Configuring tags for a list** section below.

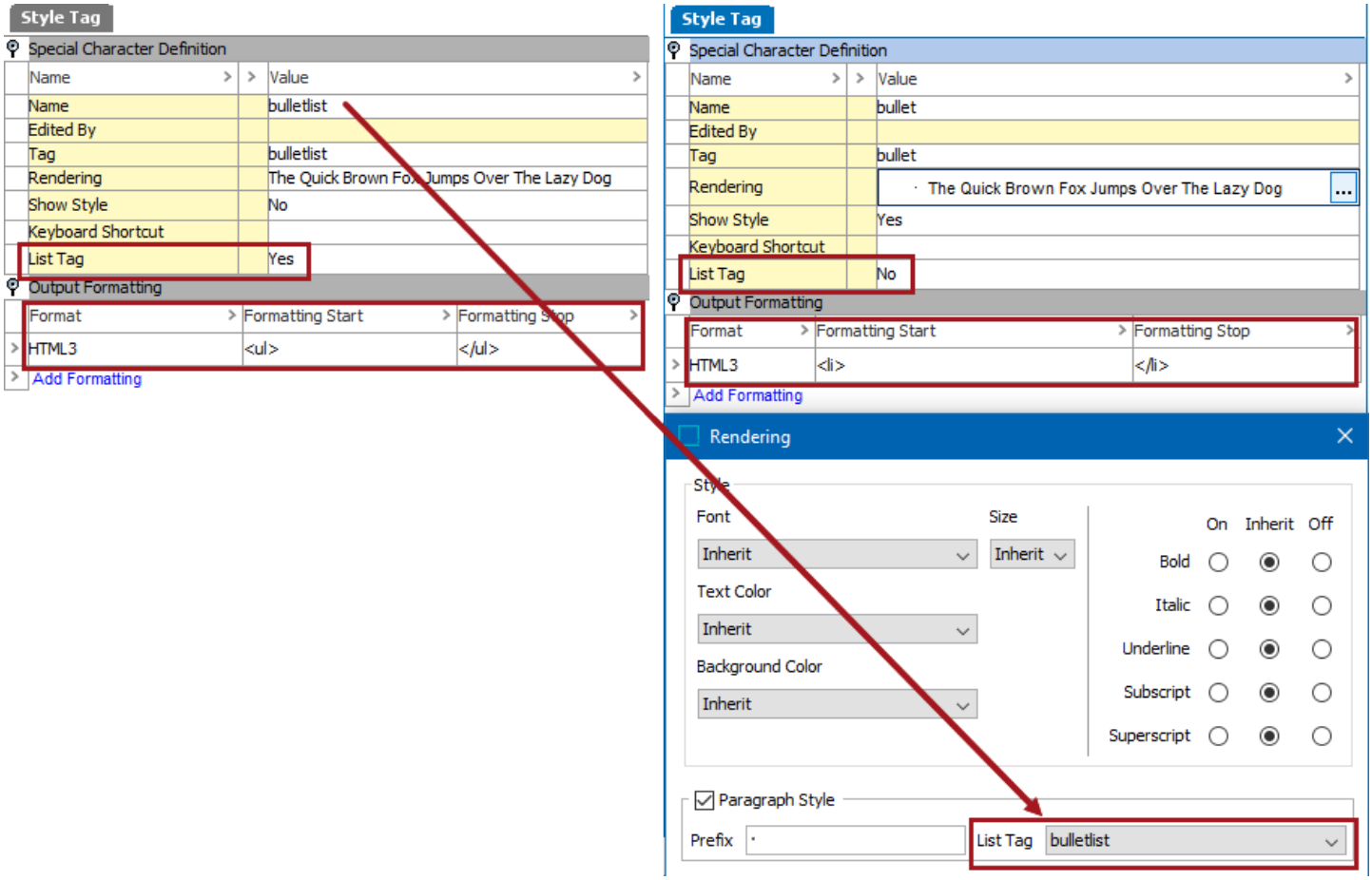
Multiple level / nested level lists are not allowed using this method. However, a conversion to HTML can specify a numbered list (such as is done by an … command), and that will cause a numbered list to display on the web.

After completing the Special Character Definition flipper parameters, format the output as defined in the **Configuring Tag Output Formatting** topic in this documentation.

Configuring tags for a list

A list requires two tags:

- one tag defines the start and the end of the entire list; List Tag parameter = Yes; … tags are defined
- a second tag defines the individual items in the list; List Tag parameter = No; … tags are defined



For example, in the image above, the 'bulletlist' tag includes the tags that surround the entire list. And the 'bullet' tag defines how items in the list are formatted, and identifies the 'bulletlist' tag as the list wrapper.

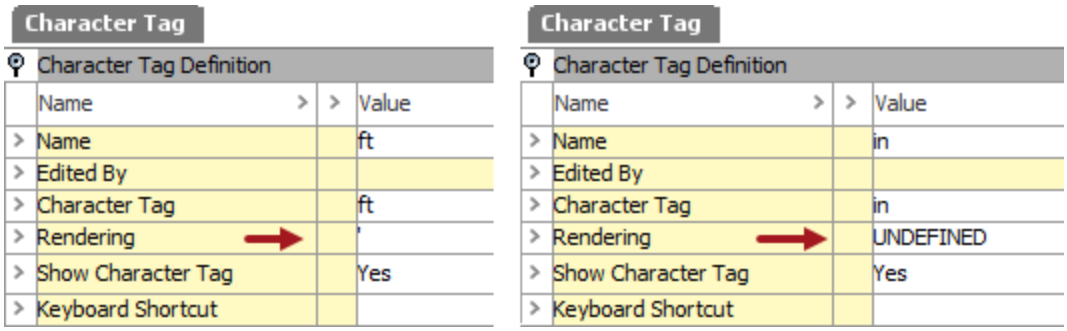
For details, refer to the **Rendering** section below.

Rendering

The Rendering parameter within a tag definition displays how the tag will be displayed within STEP and for downstream systems.

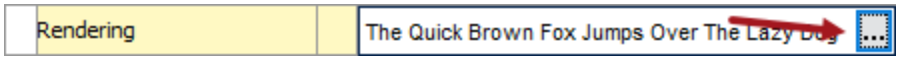
Character Tags

To determine how a character tag is rendered, enter character(s) directly into the value field, otherwise UNDEFINED is displayed. For example, the tag for 'foot' (ft) is defined, but the tag for 'inches' (in) is not defined.

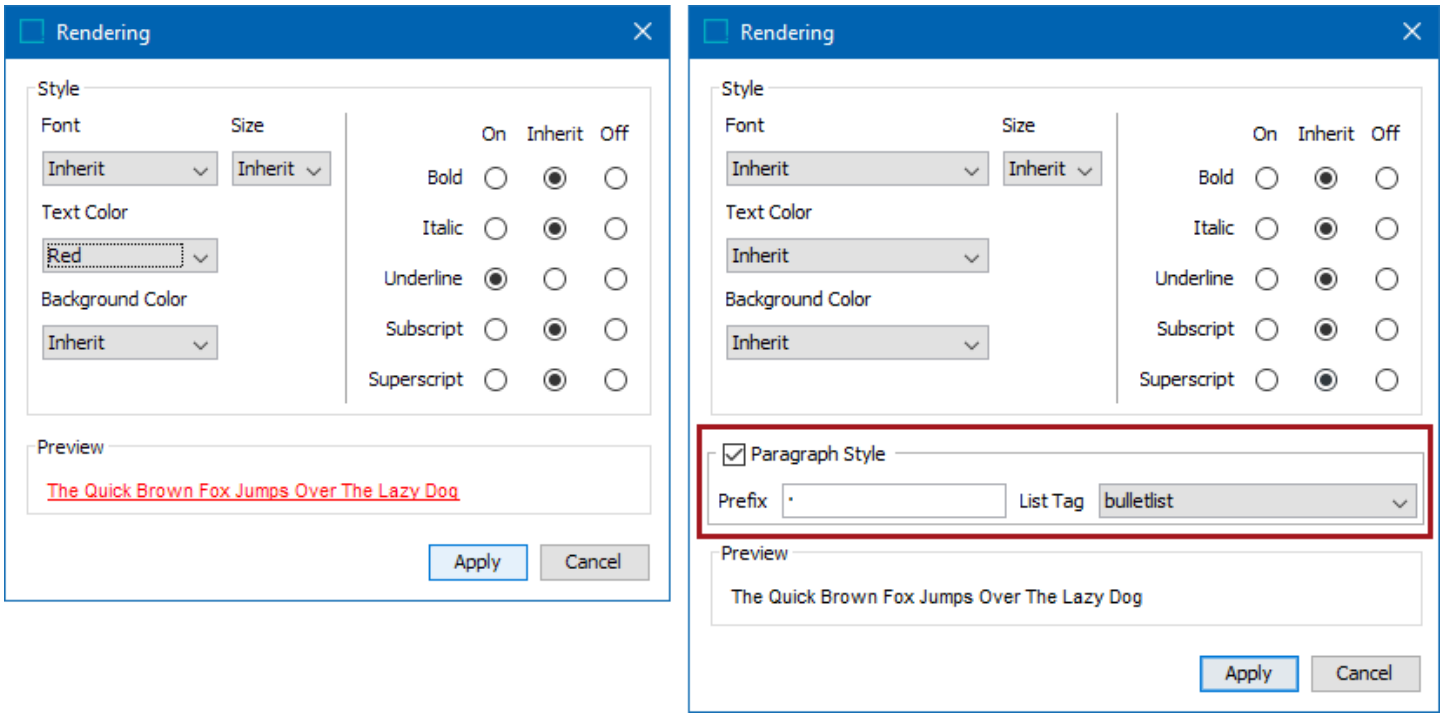


Hyperlinks and Style Tags

To define how a Hyperlink or a Style Tag is rendered, click the Rendering value field to display an ellipsis button.



Click the ellipsis button (...) to open the appropriate Rendering dialog. Below, a hyperlink tag is shown first, and a style tag rendering dialog (with the additional Paragraph Style group) is shown second.



Style Settings

By default, a tag inherits all settings, but a number of styling options can be set to modify the look of the text. When configuring the Rendering parameter for a hyperlink or style tag, the Preview section of the Rendering dialog shows how a tag is set to display in the user interface.

For both hyperlinks and style tags, use the Style area to define the following style settings:

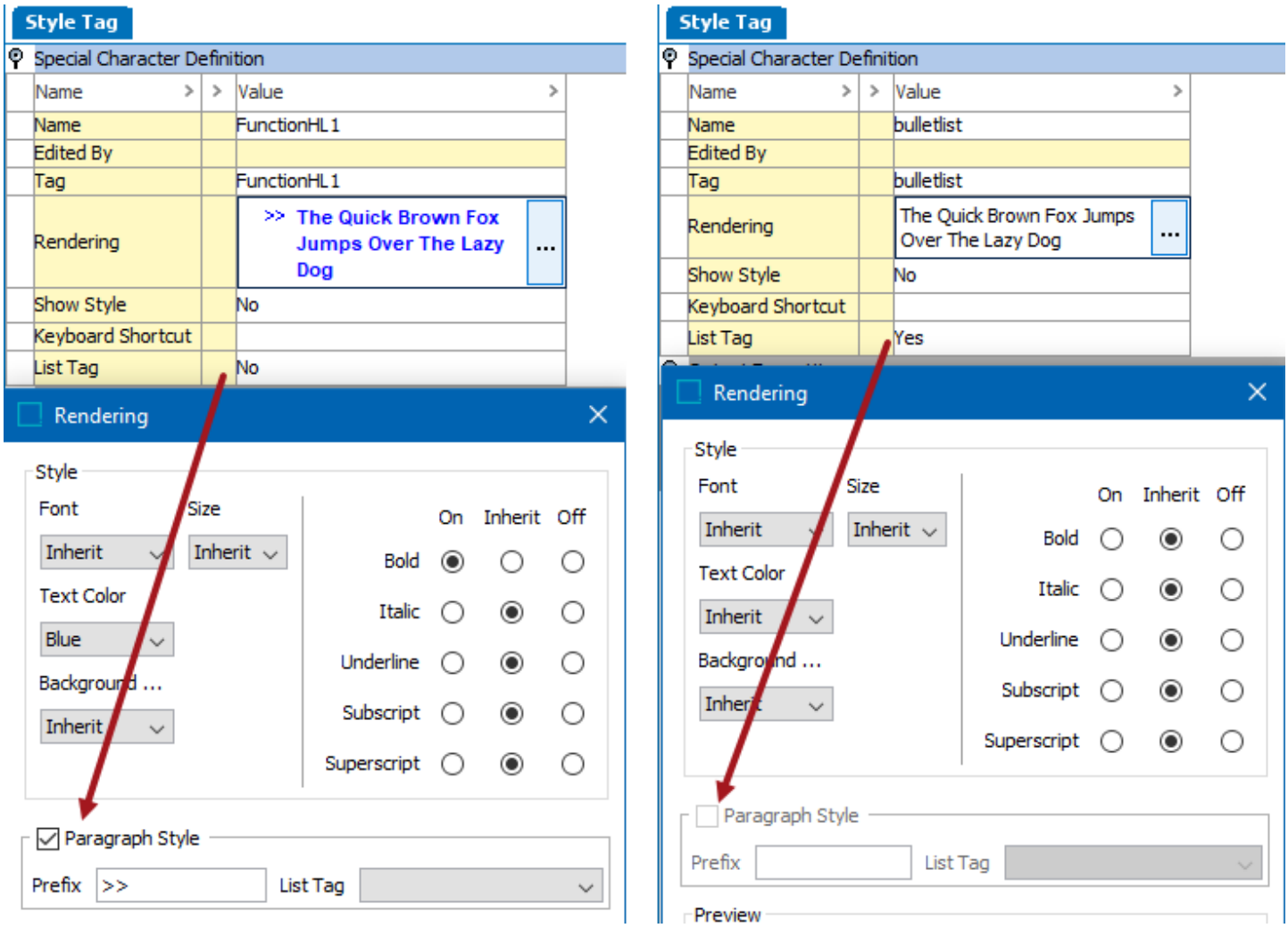
Style	Description
Font	Select a font from the fonts installed on the computer to be used in the rich text editors, or choose **Inherit** to use the font from the parent.
Size	Select a size from the list of available font sizes to be used in the rich text editors, or choose **Inherit** to use the size from the parent.
Text Color	Select a color from the list of standard text colors, or choose **Inherit** to use the color from the parent.
Background Color	Select a color from the list of standard background colors, or choose **Inherit** to use the color from the parent.
Bold, Italic, Underline, Subscript, Superscript	Click the **On** radio button to apply the selected style tag, the **Inherit** radio button it take the style from the parent, or the **Off** radio button to turn the styling off.

Paragraph Style Settings

The Paragraph Style parameter group determines styling for a paragraph. This allows adding introductory text or characters to every paragraph within an attribute value.

Follow these steps to configure the Paragraph Style section:

1. Set the 'Paragraph Style' checkbox as follows, based on the tag's Definition flipper List Tag setting:
   - If **No**, check the 'Paragraph Style' checkbox to add text that will be displayed on each paragraph.
   - If **Yes**, leave the 'Paragraph Style' checkbox unchecked.



2. When available, in the 'Prefix' parameter, enter a character or string of text to be used as prefix for a paragraph or for the bullet list, such as >> or •.
3. When required, define the style for the surrounding bullet list tags in the 'List Tag' parameter, select the style tag created to start and end an entire bullet list (the <ul> … tags).

   For details on implementing list styles, refer to the **Styling lists** section of the **Style Tags** topic.

4. Click the **Apply** button.

Configuring Tag Output Formatting

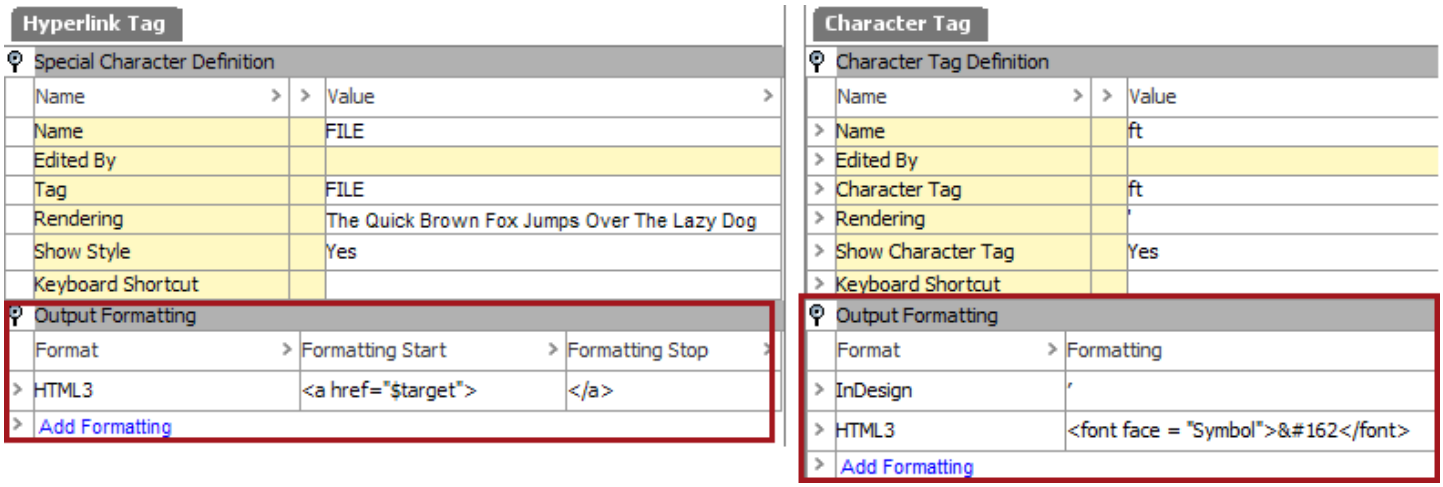
Because all STEP tags are media neutral, a conversion of the STEP tag can be set up to accommodate the requirements of downstream systems. The conversion is based on the Output Formatting flipper in the tag and the Tag Conversion parameter in the output tool. Both elements are defined below.

Output Formatting Flipper

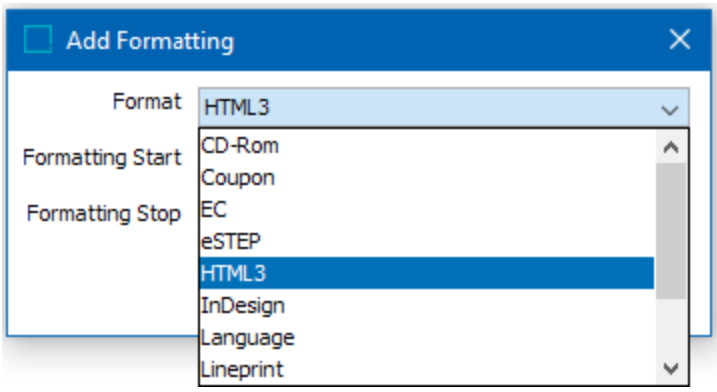
Multiple output formats can be added to each tag to accommodate the requirements of the different systems receiving and being exported to. With valid STEP tags formatted, data coming into STEP will import correctly as well.

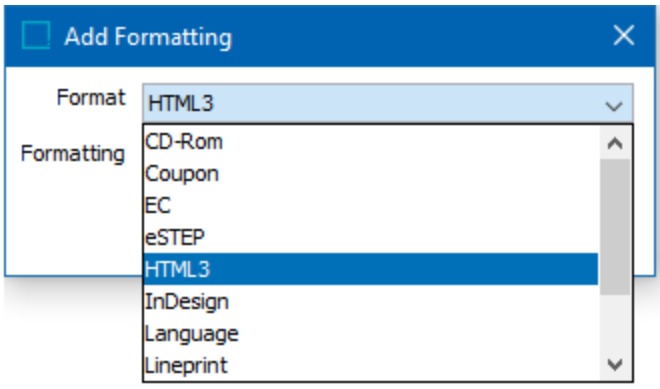
Note: STEP ***does not*** check for the validity of HTML code in the Output Formatting area. Nor does it check for HTML code when it is entered into attribute values as a text string. It ***will*** convert any of the four special characters of <, >, &, and " to the predefined HTML entities in order to comply with XML standards.

The steps below apply to all STEP tags when formatting.



1. On a tag editor, open the Output Formatting flipper and click the **Add Formatting** link.
2. For the **Format** parameter, choose an output format from the dropdown menu. This is just a name and no predefined set of codes is being chosen. The name allows the user to set up one or more different tag conversions to meet the requirements of different downstream systems or applications.

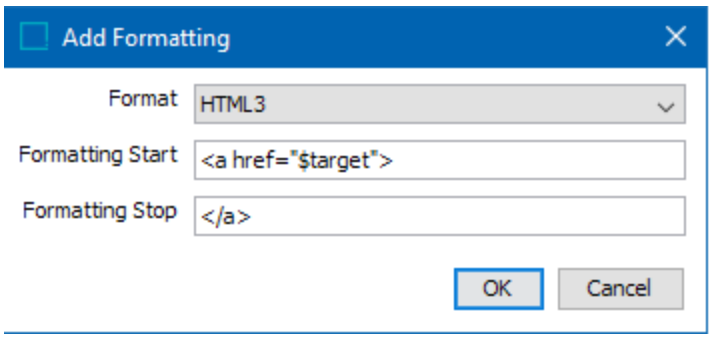


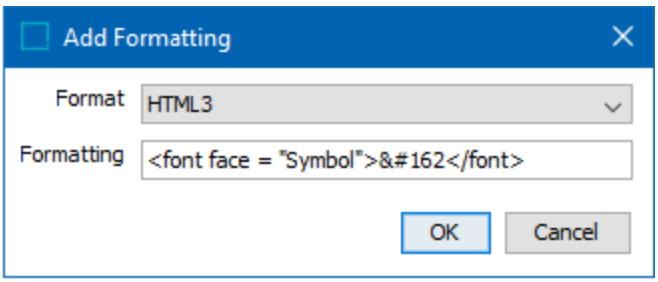


For a web application the output format name of 'HTML3' is usually selected, and output formatting is set up to convert all the STEP media neutral tags to appropriate HTML tags.

3. Enter the appropriate formatting information as follows:
   - the **Formatting Start** parameter start tag for the selected output format name in and the end tag in
   - the **Formatting Stop** parameter if adding formatting for style tags, footnotes, and hyperlinks.
   - the **Formatting** parameter, for special characters and character tags only, is needed to be entered.

   In this example, because it is common to have a website link as a hyperlink, and users want the hyperlink to the website to work when the attribute is exported, the following start and stop tags are used.





4. Click **OK** to add the formatting, or **Cancel** to return to the tag editor.

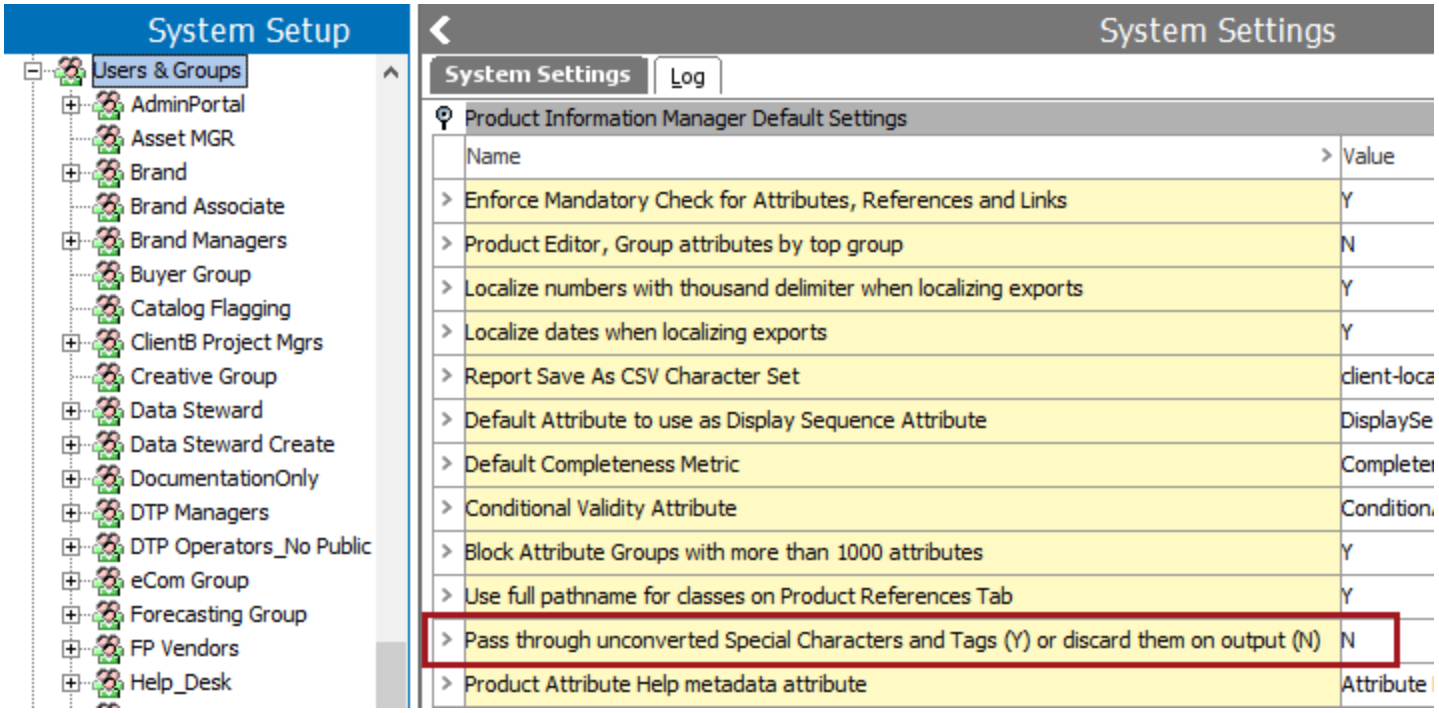
   The format and formatting / tags display in the table.

5. On System Setup, click the Users and Groups node, and open the Product Information Manager Default Settings flipper and find the **Pass through unconverted Special Characters and Tags (Y) or discard them on output (N)** parameter.

   Set the parameter as follows to handle formats when no Formatting entry exists:

   - **N** results in style tags, character tags, and special characters being stripped out upon output.
   - **Y** results in style tags, character tags, and special characters being output as STEP Tags.

For more information, refer to the **Product Information Manager Default Settings** in the **System Setup** documentation.

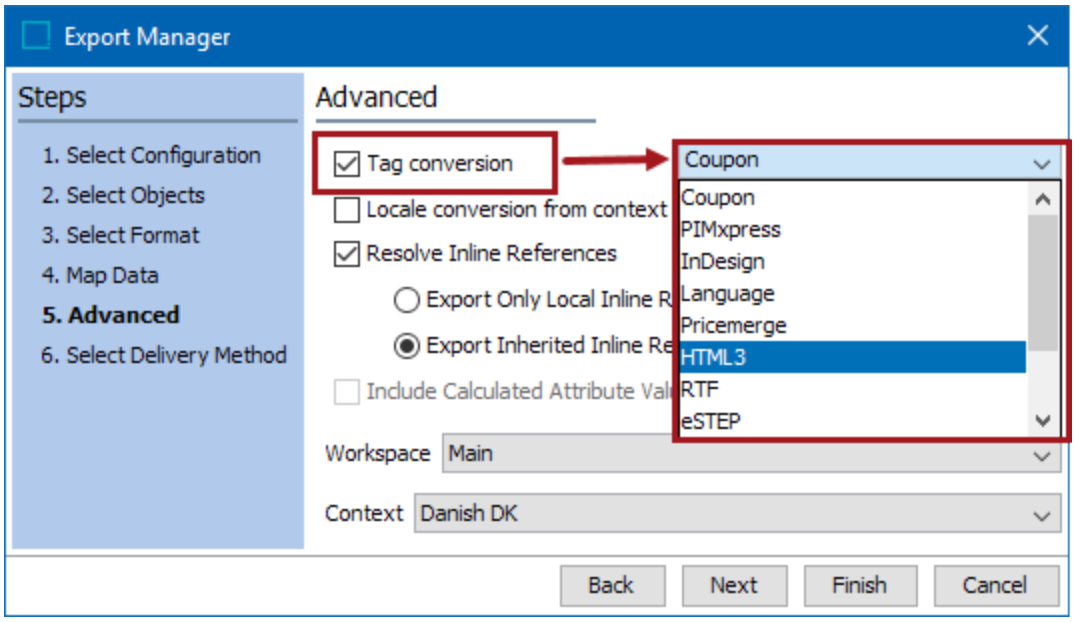


InDesign Output Formatting

For more information, refer to the **Publication Template Layout, Formatting, and Styles** topic in the **Publisher (Adobe InDesign Integration)** documentation.

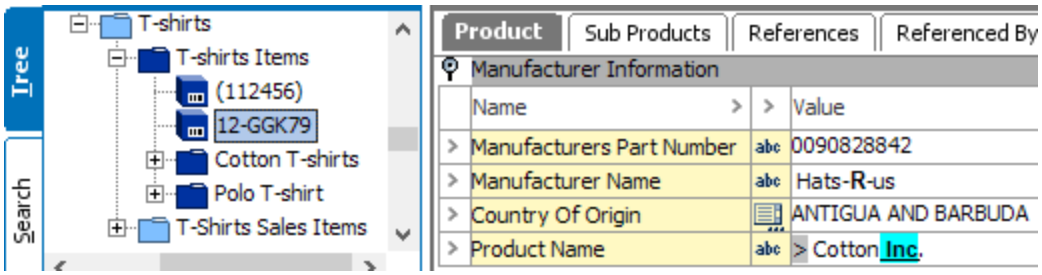
Tag Conversion Parameter

The tag conversion parameter in the Export Manager or the outbound integration endpoint (OIEP) output tools determines how the exported tags are processed by downstream systems. The conversion options available are defined in the Output Formatting flipper within the tag editor.



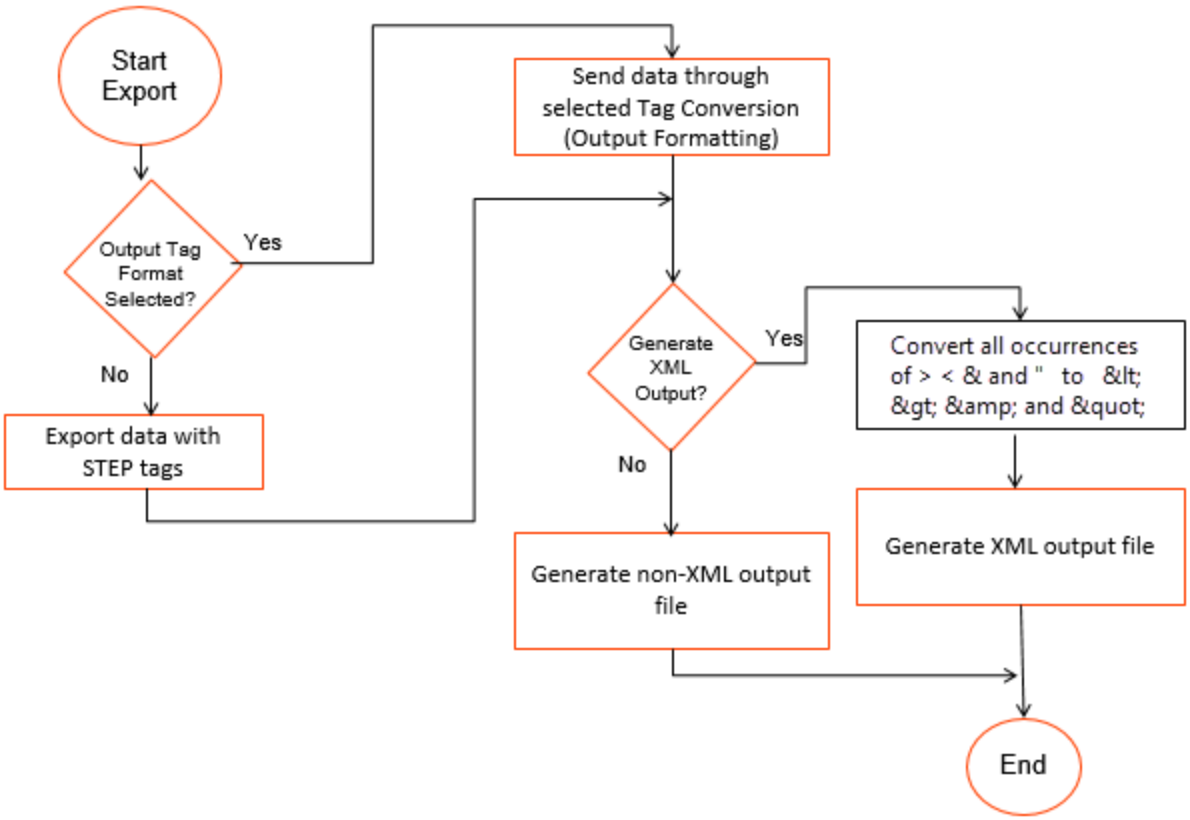
For more on output tools, refer to the **Export Manager** and the **Outbound Integration Endpoints** topics in the **Data Exchange** documentation.

The picture and table below shows an example of the difference if the tag conversion is checked or not checked when exported to excel using HTML3 formatting in this case.



Tag Conversion	Manufacturer Name	Product Name
Checked	Hats-R-us	> Cotton Inc.
Unchecked	Hats-<Bold_C>R</Bold_C>-us	<gt/> Cotton<FILE target="http://google.com"> Inc</FILE>.

When outputting XML files, the conversion of < and > characters, etc., comes after it has gone through tag conversion. So for XML output, you cannot force a < or a > unless a custom solution is in effect.



The same is true for importing data into STEP. If the data being imported into STEP does not have valid STEP tags, the data will not import correctly. This applies to data that contains both valid and invalid tags. If an imported attribute value contains an invalid tag, the entire attribute value will fail to import properly.

Important: Opening a STEPXML file within a standard web browser does not present the content exactly as it will be displayed on a website. STEP delivers XML-compliant files for web applications. STEP does not deliver HTML files for direct use on a website.

Note: Using HTML names for special characters, such as ™ or ©, is generally not supported, with these exceptions shown in the table below.

The XML specification allows for HTML Names to be used (usually to denote characters such as ™ or © -- trademark and copyright symbols). STEP supports only four HTML Names within an XML file. They are as follows:

Name	Symbol	Predefined Entities / Character Entity Reference	Unicode number
double quotation mark	"	"	Unicode 0022
ampersand	&	&	Unicode 0026
less-than sign	<	<	Unicode 003C
greater-than sign	>	>	Unicode 003E

Note: STEP ***does not*** check for the validity of HTML code in the Output Formatting area. Nor does it check for HTML code when it is entered into attribute values as a text string. It ***will*** convert any of the four special characters of <, >, &, and " to the predefined HTML entities in order to comply with XML standards.

Although STEP does not support HTML names other than those listed above, it does support HTML codes on importing data files that use the format &#nnnn; or &#xhhhh; where *nnnn* is the code point in decimal form, and *hhhh* is the code point in hexadecimal form. The 'x' must be lowercase in XML documents. The *nnnn* or *hhhh* may be any number of digits and may include leading zeros. The *hhhh* may mix uppercase and lowercase, though uppercase is the usual style. Using characters in the ranges &#0; to &#31; and &#127; to Ÿ should be avoided since they are not Unicode characters.

Special Character Tags

Special Characters are not really 'tags' per se, but this feature provides the ability to convert a single Unicode character in STEP to one or more characters on output. It is important to know that not all Unicode characters are available in all fonts. Consult the web if there is a question about a particular font style.

Special characters are characters that are pasted into a text element or a data cell, but where the character as it displays on the screen is not available in a normal font on the print output device.

Note: In the ASCII character set, only the characters from the space character through the tilde character are available for object IDs. These are Decimal 32 to Decimal 126, or Hexadecimal characters 20 to 7E.

The following standard special characters are predefined and represent characters that are not visible in the Rich Text Editor in the STEP Workbench. For example, when the ENTER key is pressed in the Rich Text Editor, the special character Line Feed (LF) is automatically inserted, though it is invisible to the editor.

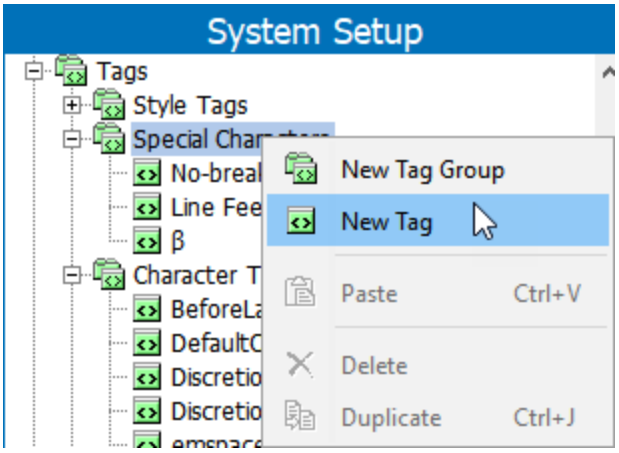
Standard Special Characters	Description
No-break Space (NBSP)	'No-break Space' character is used to prevent splitting a line at a space
Line Feed (LF)	Line Feed (LF) is a hard return

Note: Media-specific formatting (e.g., HTML or InDesign) must be set up for these special characters in STEP in order for the output systems to interpret the characters correctly.

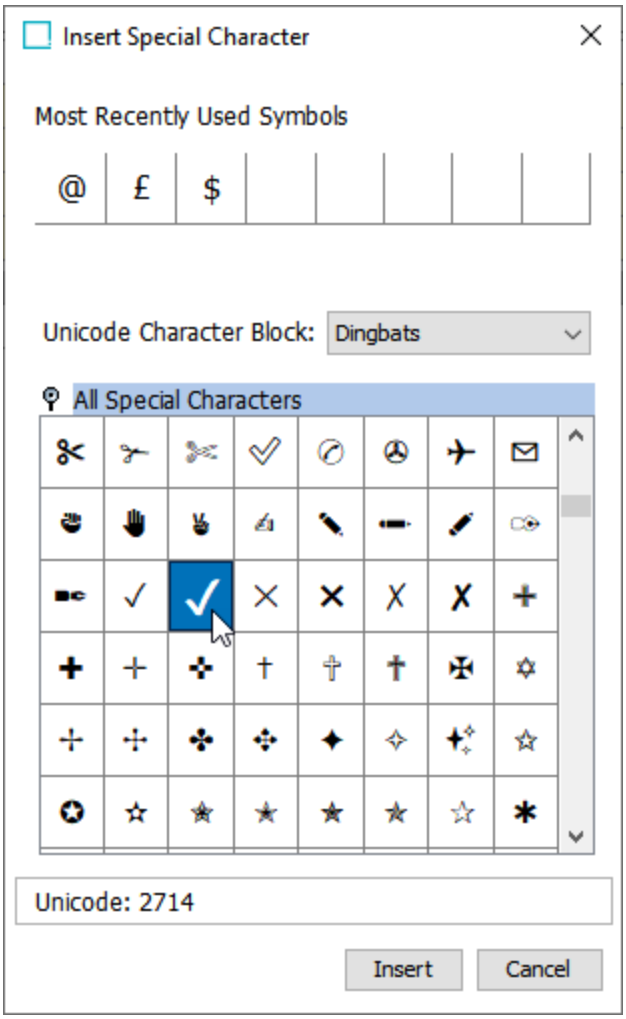
Creating a Special Charter

While the method to create the various tags are generally the same, the fields for creating a special character tag are a bit different.

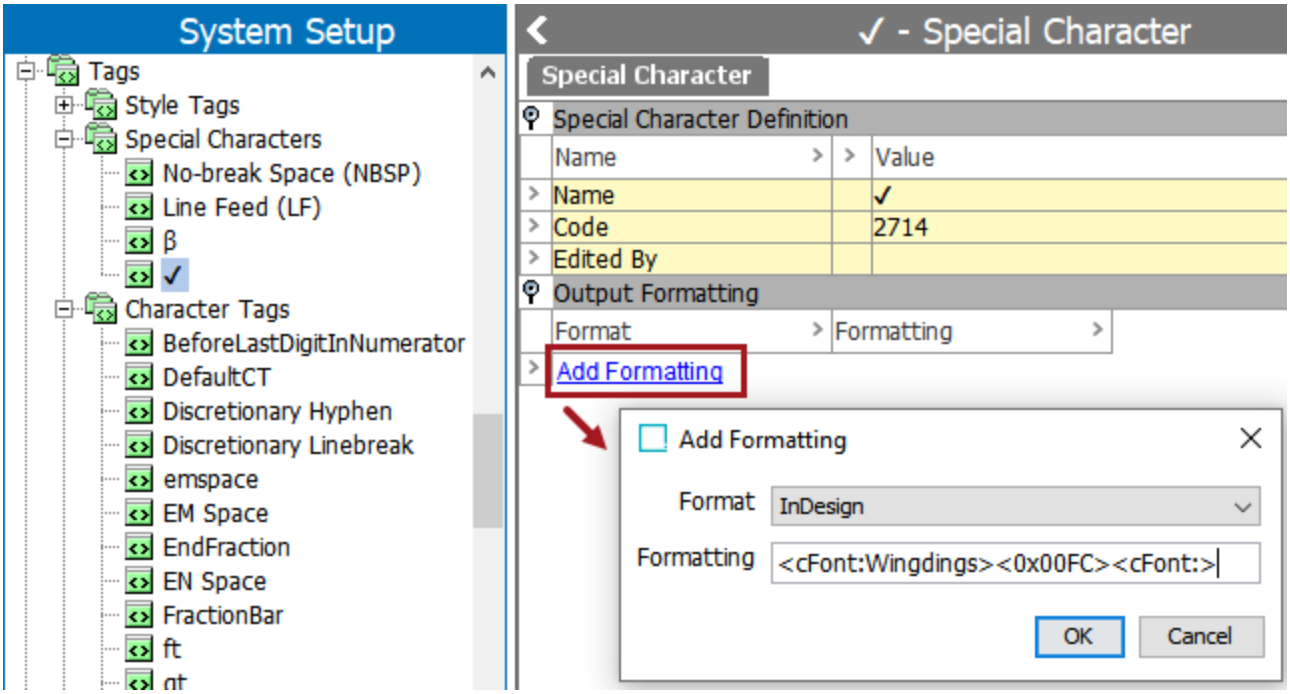
1. Click on the Special Characters fold, and select **New Tag**.



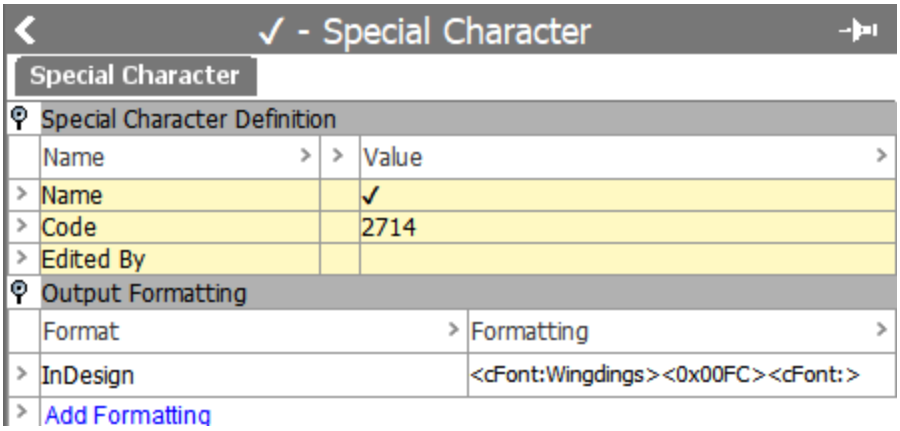
2. Navigate to the desired Special Character, select it, and click **Insert**.



3. Click **Add Formating** to bring up the **Add Formatting** dialog and format as needed.



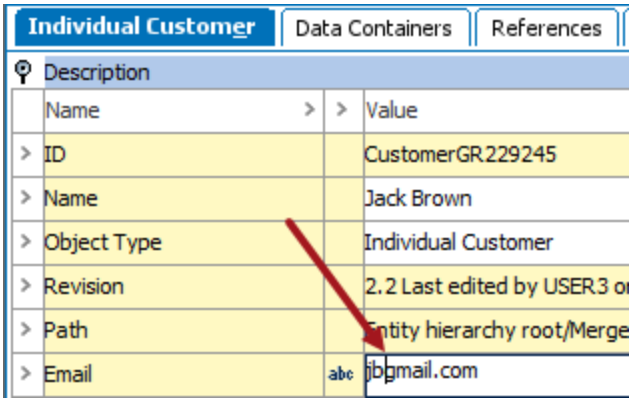
4. Click OK when finished for formatting.



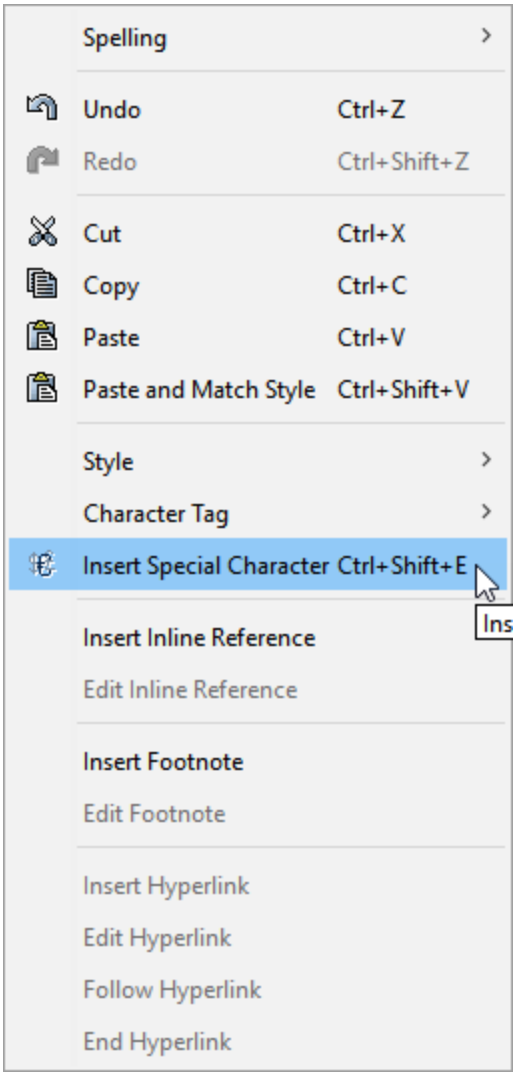
Inserting a Special Character in an Attribute

Use the following steps to insert a special character into an attribute field.

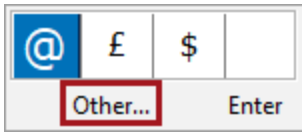
1. In an attribute value field, position the cursor where the special character should be.



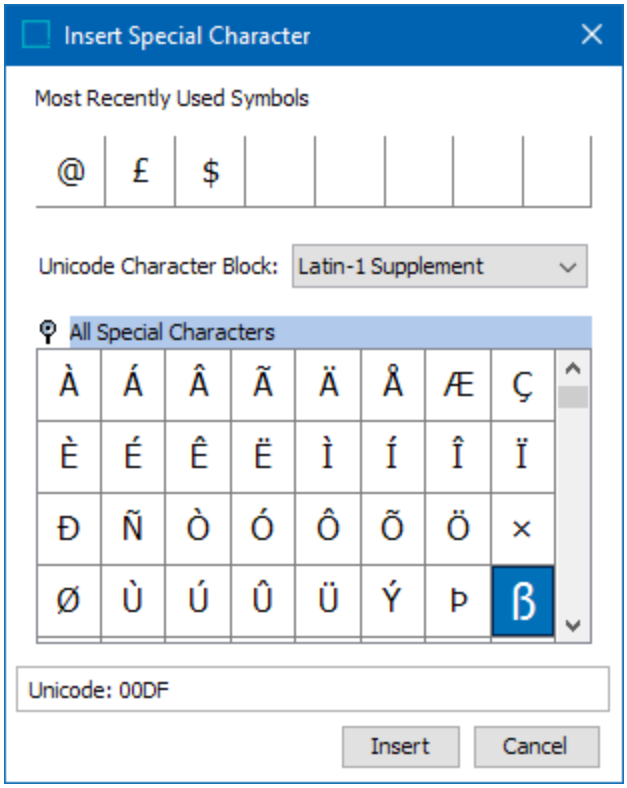
2. Right-click and choose the 'Insert Special Character' option.



- If special characters have been used previously, a dialog displays with a small number of the most recently used symbols. If the required character is displayed, click the character to add it to the value, or to display additional options, click the **Other...** option (or press the Enter keyboard key).



- On the 'Insert Special Character' dialog, choose a Unicode Character Block from the dropdown, and select a special character.



- Click the **Insert** button to insert the special character, or click the **Cancel** button to return to the object editor.

  When inserted, the selected character is displayed in the value of the attribute where added.

Character Tags

Character tags are not paired, meaning that they do not require a opening and closing tag. For all character tags, the character(s) entered in the Rendering parameter display in the workbench GUI with a gray background. For example, >.

Because there are several thousand special characters available on many different types of fonts, it may be necessary to create a tag name (such as 'telephone'), then access that specific character in that font in the character conversion table. Consult the web for more available special characters.

Note: When importing tags into STEP, the syntax must conform with STEP protocol. Valid formatted STEP tags allow data to be imported correctly.

< and > Characters

Recommended practice is to set up tag entries for 'less than' <lt/> and 'greater than' <gt/> characters along with their rendering. This enables a user to enter the < or > directly on the keyboard. STEP will take this single keystroke and immediately converts that to the STEP tag <lt/> or <gt/>, and shows in the workbench as the single character (background of gray). However, this is only useful for those cases where a user wishes to display the characters of greater than or less than as a symbol within a attribute values. Example: >40mg

Although the < and > characters are allowed in an object ID, it is not recommended practice. If these character tags are entered within an object's name, STEP allows them and saves them as the STEP character tags <lt/> and <gt/>. However, this may cause confusion when using the Search or Advanced Search functions in STEP. Additionally, if data is imported via an XLS file, and these characters are used in the object names, the system throws an error, though it will still load the data and will transform the < and > characters to an <lt/> or < gt/>.

Important: In the STEP UI, do not type a STEP tag directly, such as <bold>. STEP converts the less than (<) and the greater than (>) characters into separate tags instead of applying a style of bold to a string of text. The correct approach is to apply the specific function for inserting the appropriate character tag.

Importing < and > Characters

Importing the 'less than' and 'greater than' characters successfully depends on the format being used. Improperly formatted tags can result in unexpected results including warnings in the BGP Execution Report or ignored characters.

Importing an XML format requires the following:

- **<lt/>** indicates the 'less than' tag (<)
- **<gt/>** indicates the 'greater than' tag (>)

Importing a non-XML format requires the following:

- **<lt/>** indicates the 'less than' tag (<)
- **<gt/>** indicates the 'greater than' tag (>)

& and " Characters

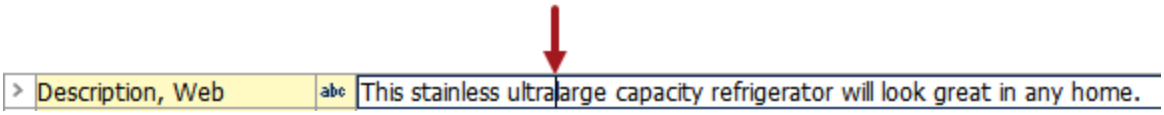
The & (ampersand) and the " (double straight quote) characters are 'automatic' when converting to on output. An accepted industry standard is to use the *&* and *"* when these characters occur in a text stream in XML.

However, do not enter *& and "* directly into STEP attribute values in the workbench or Web UI as it does not give the desired results. Instead, enter & and " directly from the keyboard.

Insert a Character Tag

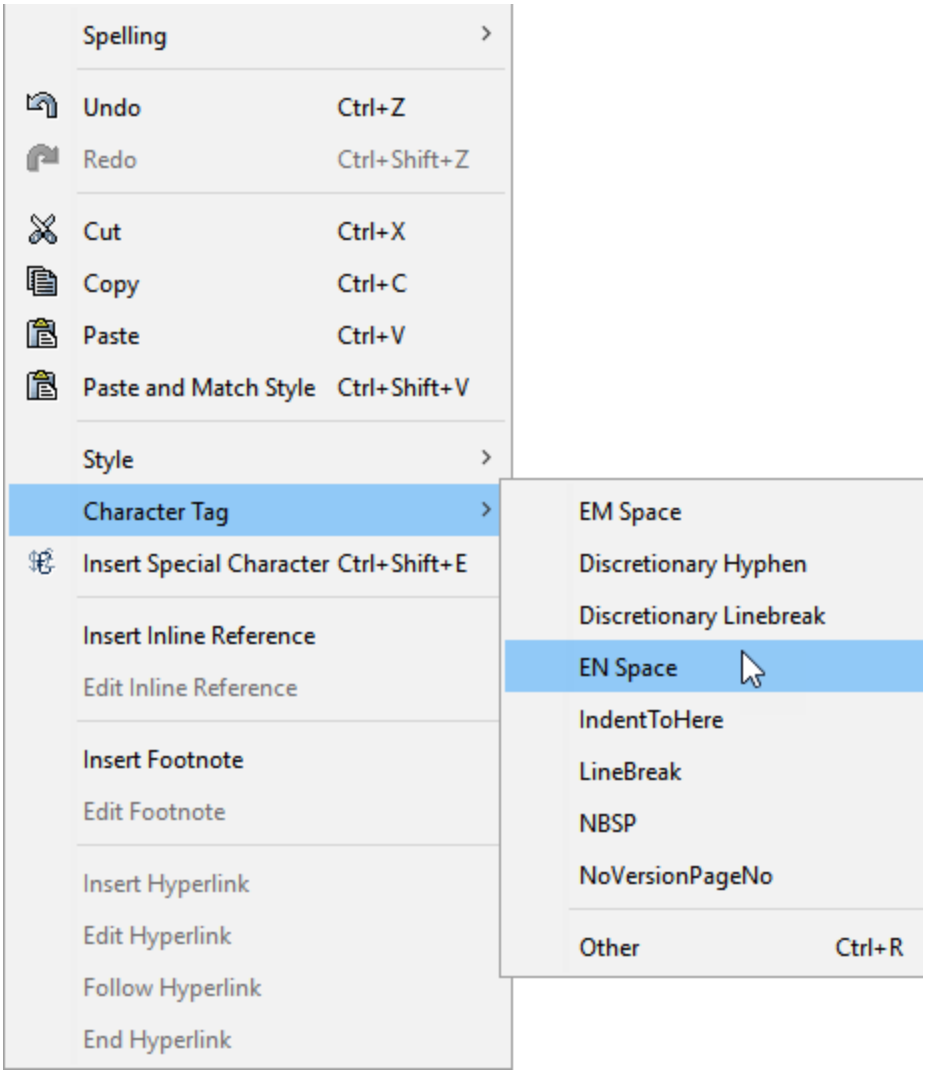
Use the following steps to implement a character tag.

1. In an attribute value field, position the cursor where the special character should be placed.

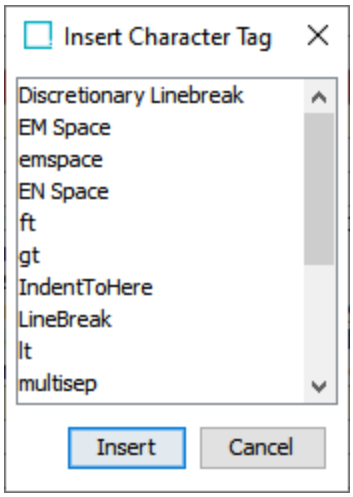


2. Right-click and choose the **Character Tag** option.

- A list of recently used character tags displays for selection.

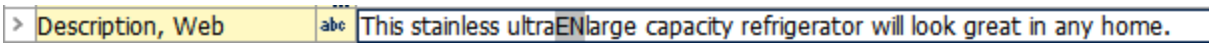


- If the desired character tag is not in the list, click **Other**, and the **Insert Character Tag** dialog displays, showing a complete list of all character tags created in the system.



Select the desired character tag from the Insert Character Dialog, and click **Insert**.

The tag is applied and visible in the editor.



Style Tags

Style tags use paired tags to change how text looks. The system automatically inserts the symbols < / >.

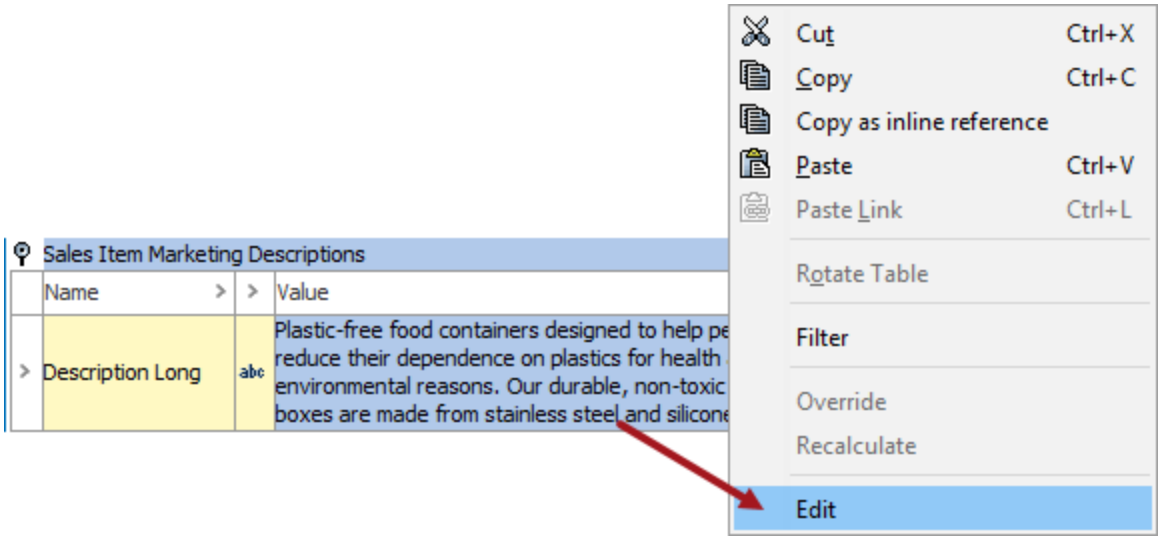
Style tags cannot be used within an object's name, but can be used to define how to display part of an attribute value (such as a word or two within a paragraph), or that the complete value should be displayed as a list. The functionality for creating bullets is an accommodation in STEP that allows lists to be produced correctly for HTML output. Since InDesign has no such stringent requirements, the special handling is just ignored.

Insert a Style Tag

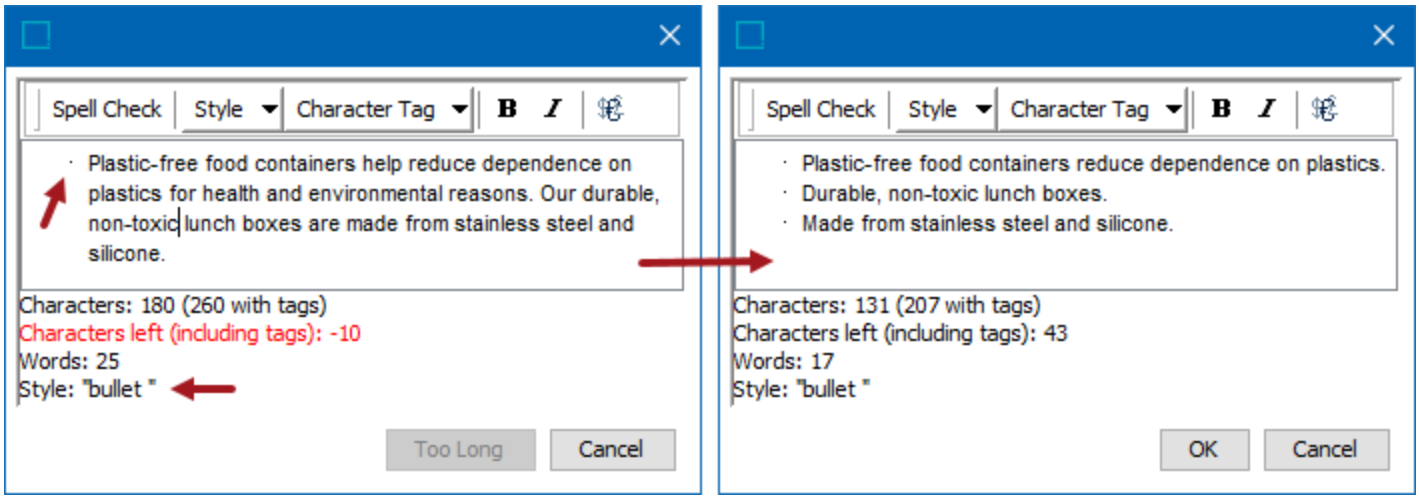
The following methods are available: styling lists, styling individual words, and styling multiple words.

Styling lists

1. Verify the two style tags required for a bullet list already exist, refer to the **Configuring tags for a list section** of the **Configuring Tag Definitions** topic.
2. Click the attribute value field that requires a list format, right-click, and choose **Edit** to display the large editor.



3. In the large editor, click into the text, click the Style and apply the individual bullet item style, then update the text by pressing the **Enter** for each bullet item.

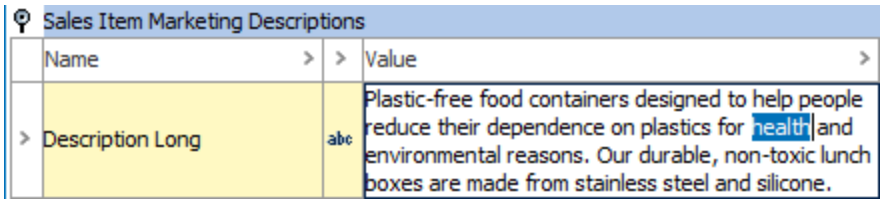


4. Click **OK** to apply the changes.

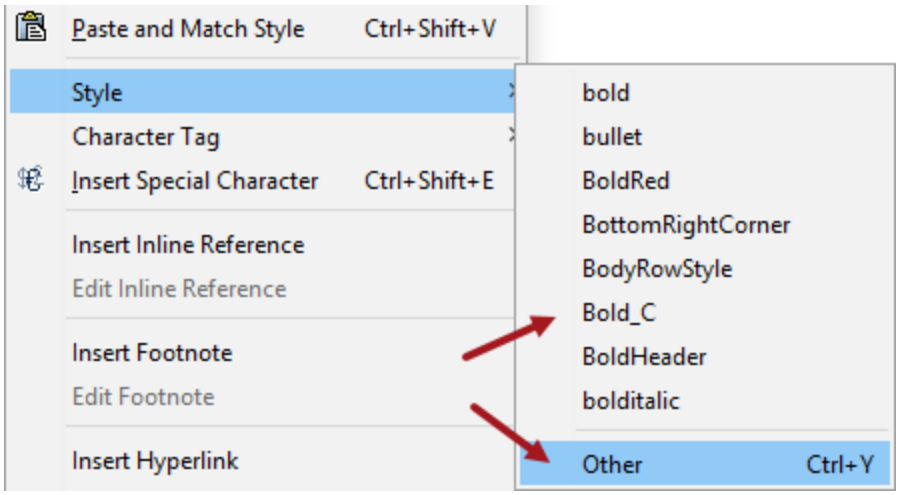
For details on options in the large editor, refer to the **Styling multiple words** section below.

Styling individual words

1. In an attribute value field, select the text for the style tag.

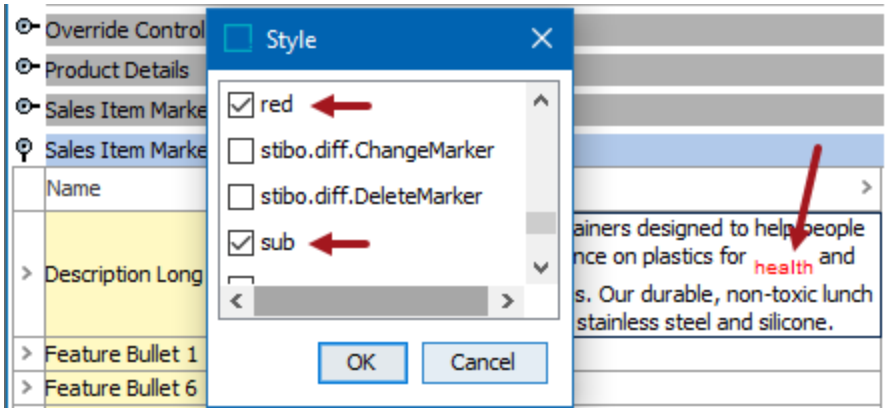


2. Right-click, highlight the 'Style' option, and choose a style as follows:
   - Select from the list of recently used tags. Only one style can be applied at a time.
   - Click the **Other** option to display a Style dialog with all styles, as shown in the following step.



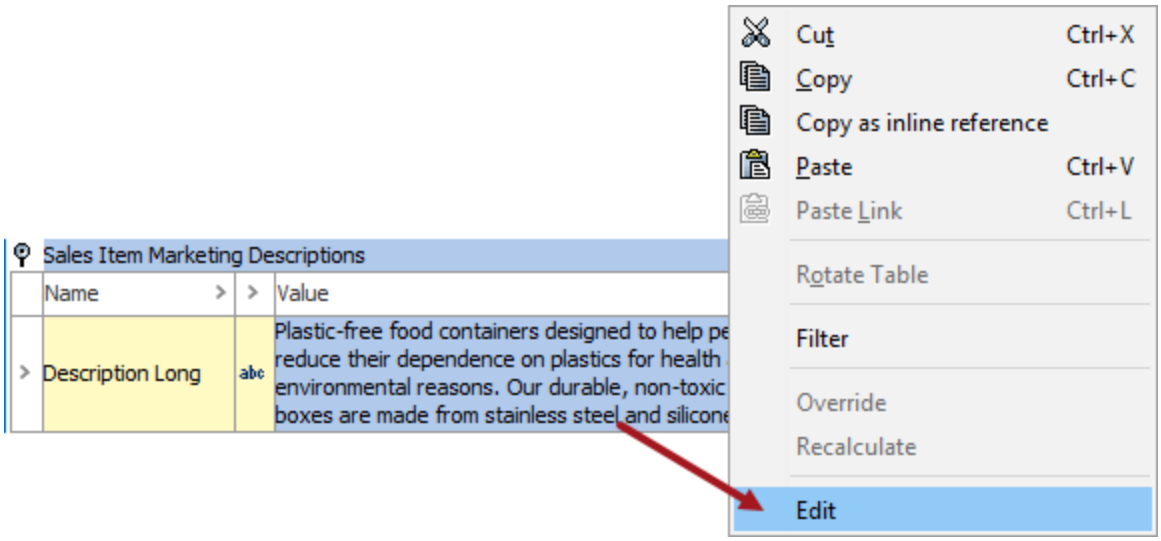
3. In the Style dialog, select one or more styles. Click **OK**.

   In this example, the 'red' (color) and 'sub' (subscript) styles are selected, and the original selection is updated to show both styles.

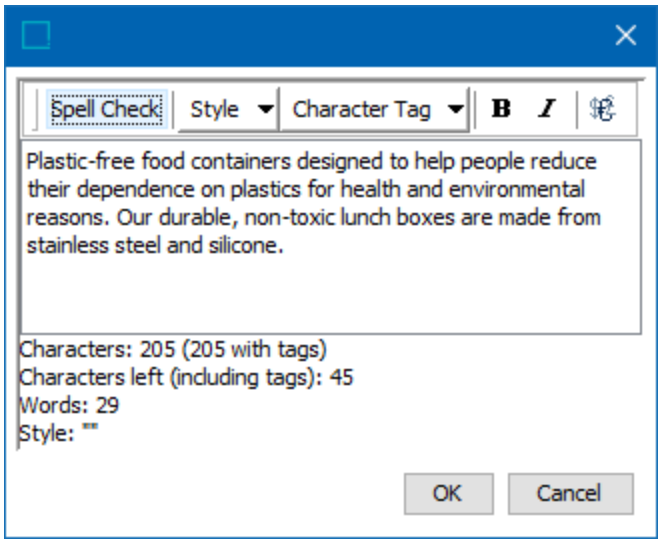


Styling multiple words

- Click the value field, right-click and choose **Edit** to display the large editor.

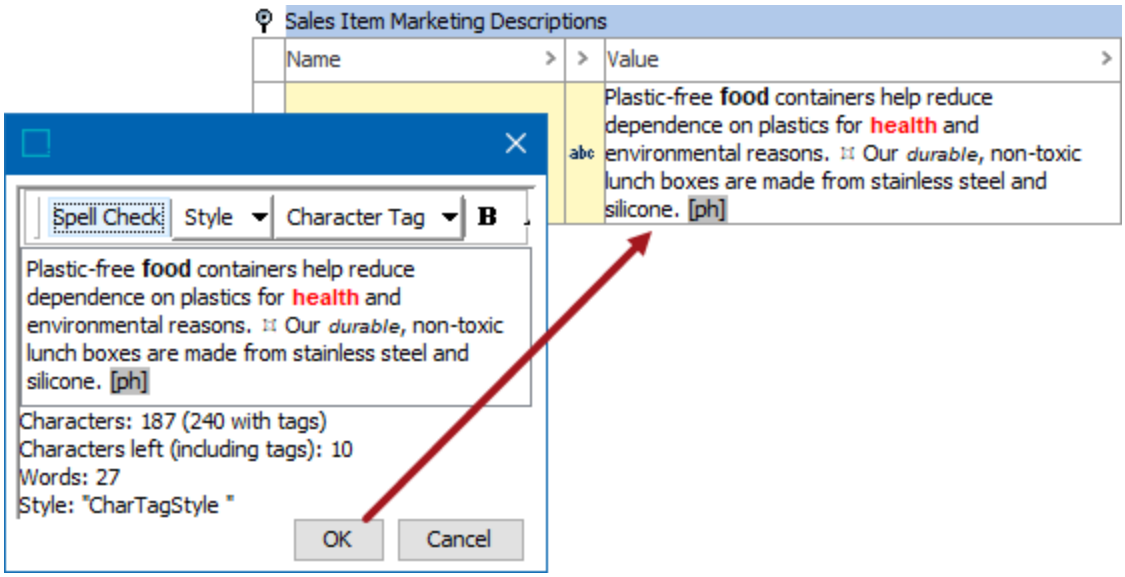


2. In the large editor, select the text to be styled and apply the appropriate tags as follows. Additional options are defined below:



- **Spell Check** - click to highlight incorrectly spelled words in red / italics.
- **Style** - select text and use the dropdown to apply one or more style from the available style tags.
- **Character Tag** - position cursor at the point where the character should be added and use the dropdown to insert the character.
- **B** - select text and click the button to bold the selection.
- *I* - select text and click the button to add italics to the selection.
- - position cursor at the point where the special character should be added and use the dropdown to insert the special character.
- To remove a style, select the styled text and either uncheck the applied style, or click the bold or italics button to remove it, or delete the text and retype it.
- The 'Characters left (including tags):' information warns the user when the text exceeds the limit. When the limit is exceeded, the OK button text is replaced with the text 'Too Long' and the changes cannot be saved.
- The 'Style:' information displays the tags applied at the point of the cursor (as shown in other images in this topic).

3. Click **OK** to apply all styling changes and review the effect in the object editor.


Sales Item Marketing Descriptions
Name
Value
Plastic-free food containers help reduce dependence on plastics for health and environmental reasons. Our durable, non-toxic lunch boxes are made from stainless steel and silicone. [ph]
Spell Check
Style
Character Tag
B
Plastic-free food containers help reduce dependence on plastics for health and environmental reasons. Our durable, non-toxic lunch boxes are made from stainless steel and silicone. [ph]
Characters: 187 (240 with tags)
Characters left (including tags): 10
Words: 27
Style: "CharTagStyle "
OK
Cancel

Hyperlink Tags

When creating hyperlink tags, the setup depends greatly upon the user's needs. A user may find it useful to create a hyperlink for each of the format types of hyperlinks: FILE, MAILTO, FTP, HTTP, and HTTPS. This way the hyperlinks can be rendered differently on-screen to help with visual recognition, as STEP does not have a 'check' to make sure that the proper type of hyperlink was applied.

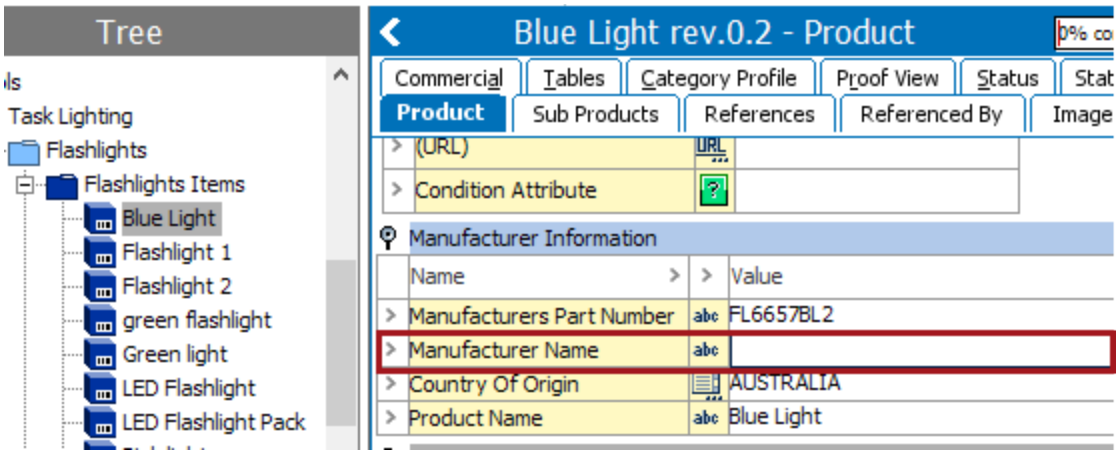
For print, these tags may be used on PDF documents created in InDesign. If the reader opens the PDF and clicks on a hyperlink in the PDF, they are then directed to the relevant external website.

Important: For information on creating and configuring hyperlink tags, refer to the **Creating Tag Groups and Tags** and **Configuring Tag Definitions** topics in this documentation. Once setup, the hyperlink tag will also require an output format. For more information, refer to the **Configuring Tag Output Formatting** section of this documentation.

Insert a Hyperlink

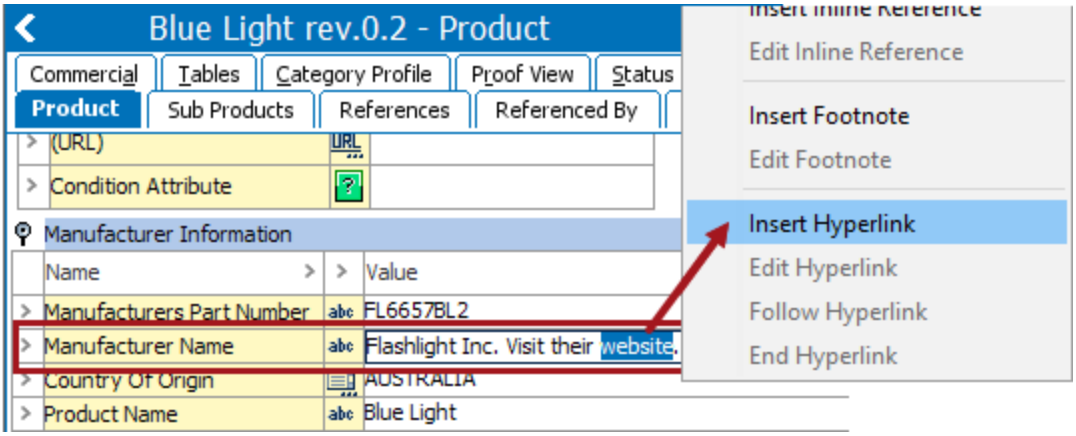
Use the following steps to implement a hyperlink.

1. Navigate to the desired object in STEP and click into the attribute with the validation base type of text.

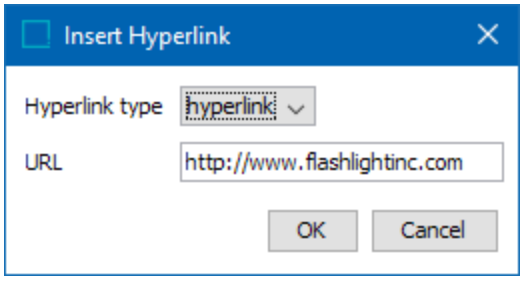


2. In the attribute field, enter the required text, including the text to be used for the hyperlink.
3. Highlight the hyperlink text, right-click, and choose **Insert Hyperlink** from the menu.

   In this example, 'website' will be the hyperlink text.



4. On the 'Insert Hyperlink' dialog, leave the 'Hyperlink type' dropdown set to 'hyperlink.' In the URL parameter type the required URL and click **OK**.



Note: If the URL is for a public folder in the user's intranet, enter the folder path.

The rendering that was specified for the hyperlink is displayed, as shown below.

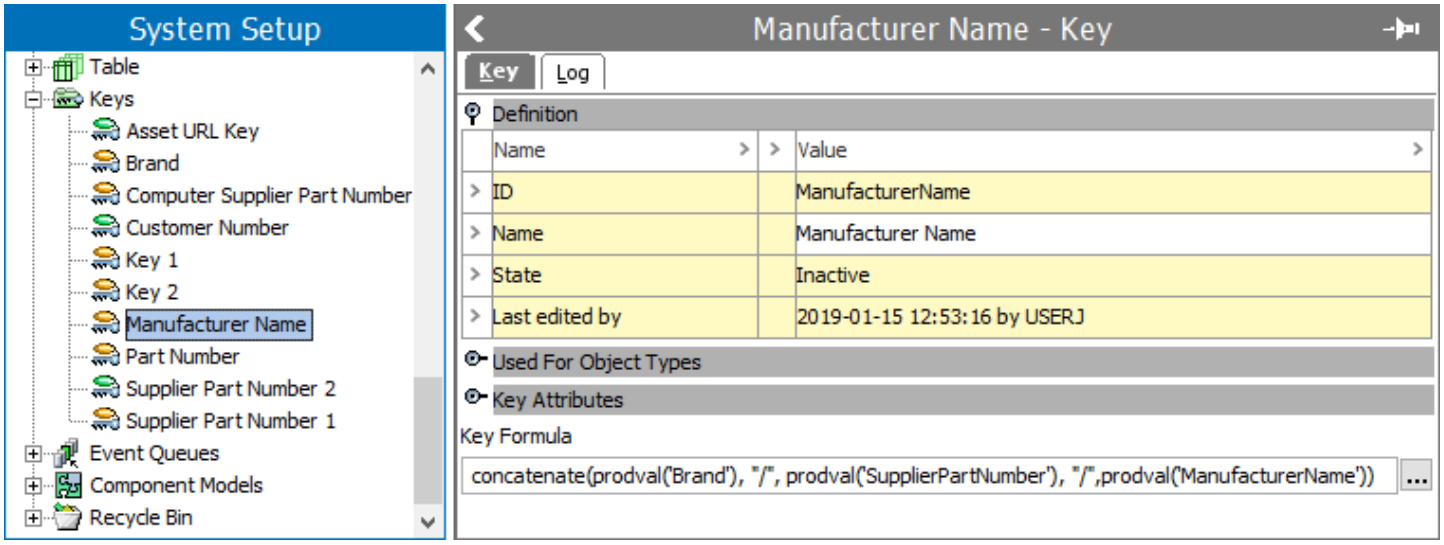
5. Click right after the hyperlink and select, **End Hyperlink**. This ensures that any text added after the hyperlink does not then become part of the hyperlink.

6. Right-click the hyperlink and select **Follow Hyperlink** to verify the hyperlink is configured correctly.

If the link is configured correctly, the URL is displayed. Otherwise, remove the hyperlink and repeat these steps.

Unique Keys

When a STEP ID is not available (such as with imported data) or when it is not an ideal unique identifier (i.e., external systems need to update data in STEP), Keys can be implemented. A key is a unique database entity composed of (transformed) object data, and represents a specific object in the STEP system. Because no two objects can have the same key, they provide an alternative method for identifying objects. The terms 'key' and 'unique key' are used interchangeably and both indicate an identifier that cannot be duplicated.



The idea behind the STEP Key concept is that an external system can identify an object in STEP, not via its ID or URL, but by using one or more attribute values. Thus, a Key in STEP can be a string representation of an object that is unique for a specific key definition.

Keys are especially useful when STEPXML is delivered to websites or ERP systems that do not have the STEP ID of the exported products and need a specific, unique ID. For more information on exporting STEPXML, refer to the **STEPXML Format** section of the **Data Exchange** documentation.

Note: To edit a key, it must be in the deactivated state. Keys that are in the activated state cannot be edited. For more information regarding activating or deactivating keys, refer to the topic **Activating and Deactivating Keys** in the **Unique Keys** documentation.

Defining Keys

Each key has a formula that defines what object data is used and how it is combined and transformed.

A key definition has an ID, a state, and specifies the following:

- One or more object types that the key applies to (product, entity, classification and asset object types only).
- One or more attributes whose values are used in constructing keys for instances of the selected object type (s).
- A STEP function used for generating / calculating the key.

Key Attribute Considerations

As there needs to be no more than one calculated key (string) per object covered by the key definition, a number of restrictions apply to the attributes used for calculating the keys.

Because a key must be the same in all contexts and workspaces, the selected attributes must comply with the following:

- must be valid for the selected object types.
- must be externally maintained (values should be the same across all workspaces).
- must be single valued, and when specification attributes are used, the values must be local.
- must not be dimension dependent (values should be the same across all contexts).
- must not be calculated, as the update of a single value in STEP could lead to the system potentially having to re-calculate millions of keys.
- length must not exceed 1,000 characters.
- if a validation base type list of values (LOV) is used, then the LOV must not be dimension dependent and the length must not exceed 1,000 characters.

Once an attribute is used in a key definition, the properties will be locked and cannot be changed as long as the key definition exists. To unlock the attribute, the key must be deactivated.

For more information on deactivating keys, refer to the **Activating and Deactivating Keys** section of the **System Setup** documentation.

Key Example

Examples of key formulas and their resulting values are included below.

In this example, two product object types have the following attributes values:

Product A:

- Manufacturer Part Number (MPN): 100-440-0.750-3434-A
- Universal Product Code (UPC): 155488876964
- Brand: Acme Ltd.

Product B:

- Manufacturer Part Number (MPN): TSR-1002
- Universal Product Code (UPC): 887554522477
- Brand: Ajax

Key Formula Example

```
concatenate(prodval('Universal Product Code (UPC)'), lower(left(prodval('Brand'),
4)), substitute(prodval('Manufacturer Part Number (MPN)'),'-',''))
```

In this example, the values for the Manufacturer Part Number, Universal Product Code, and Brand of the product are concatenated to form a key. The generated keys would be as follows:

155488876964acme10044007503434A (Product A)

887554522477ajaxTSR1002 (Product B)

Key Formula Example

```
concatenate(upper(left(prodval('Brand'),3)),'-', prodval('Universal Product Code
(UPC)'), '-', upper(substitute(prodval('Manufacturer Part Number (MPN)'), '-','')))
```

Again, the values for the Manufacturer Part Number, Universal Product Code, and Brand of the product are concatenated to form a key. This time, however, the brand names are abbreviated and appear at the start of the formula, and the other two values are separated by a hyphen. The generated keys would be as follows:

ACM-155488876964-10044007503434A (Product A)

AJA-887554522477-TSR1002 (Product B)

Important Notes

- If values for attributes used in the key definition are missing on objects, those objects are ignored and no key is generated for them.
- Attributes used in keys must have values assigned to the objects which should be identified via a key. Inherited values cannot be used. That is, if you have an attribute value entered at the parent level of a product, that inherited value cannot be used to create a key for a child product. The attribute value must be assigned to the child product directly.
- For example, if you have data for books and you determine that the books could be uniquely identified with one attribute, ISBN, then you could have a calculation for this particular attribute value.

Creating and Deleting Keys

When creating a key, the user defines what object data is used and how it is combined and transformed. Multiple keys can be created and inactive or active in the system. More than one key can be valid for the same object type at the same time.

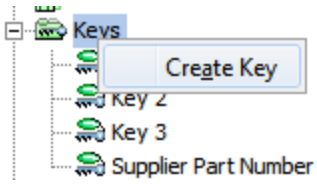
Prerequisites

It is expected that anyone creating a STEP Key is familiar with the **Defining Keys** section of the **Keys** topic within this guide.

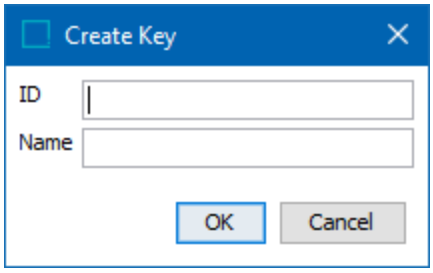
Create a Key

Below are steps to create a key.

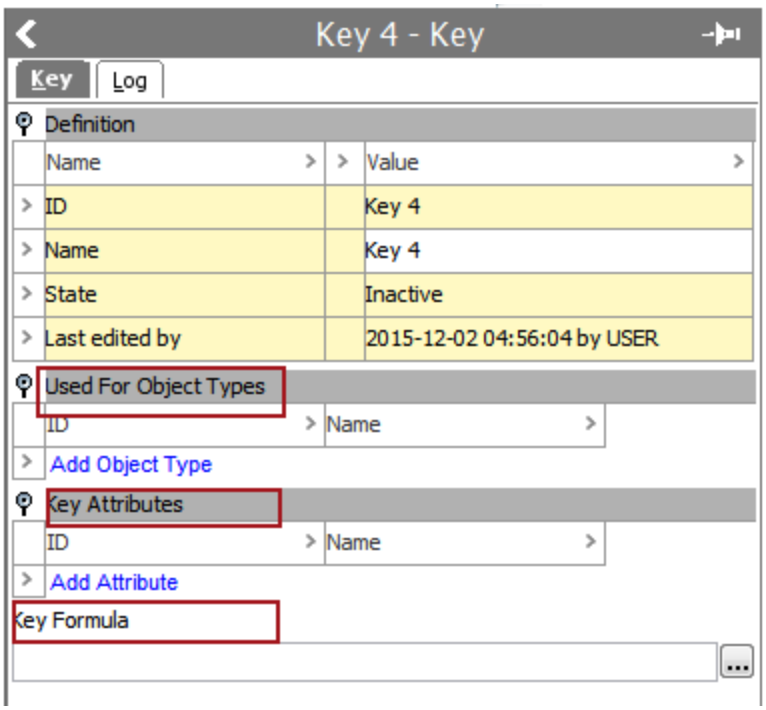
1. Go to **System Setup** > Right-click **Keys**, and then click **Create Key**.



2. In the Create Key dialog enter an **ID** and a **Name** for the key, and then click the **OK** button.



3. Navigate to the **Key tab** of the newly created key.



4. Expand the **Used For Object Types flipper**, click the **Add Object Type** link. Browse or search for the object types to be valid for the key.

   Note: Key functionality does not work with product overrides. If a product override object type is selected, then an Error dialog will display.

5. Expand the **Key Attributes flipper** > Click the **Add Attribute** link > Browse or search for the attributes to be used in the key formula.

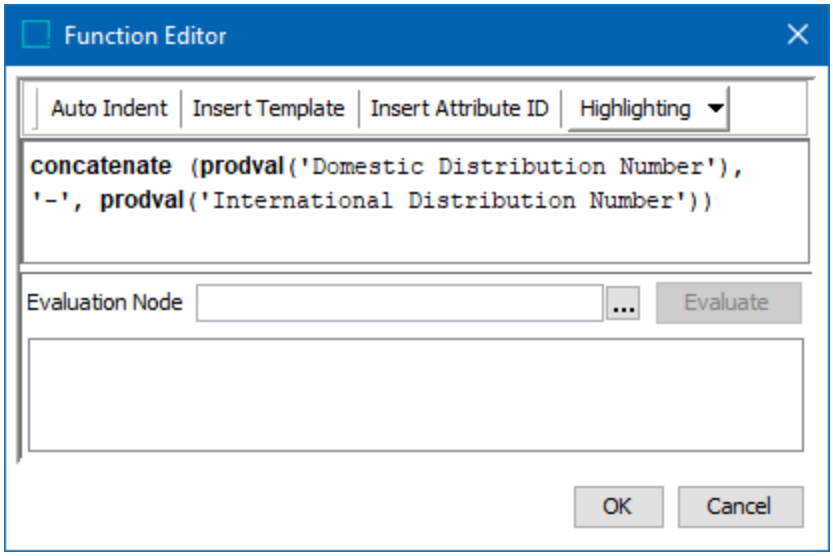
   Note: A number of restrictions apply to the attributes used for calculating the keys. For more information, refer to the **Defining Keys** section of the **Keys** topic within this guide.

6. In the 'Key Formula' field, click the ellipsis button (...) and the Function editor dialog will display. Define the key formula so that the object data will be properly combined and transformed.

   The following are valid functions:

   - `stepid`()
   - `prodval`()
   - All text functions: `concatenate`, `replace`, `upper`, `lower`, `left`, and more.
   - All number functions: `- +, -, *. /, round, trunc`, and more

Important: When writing the STEP Function, only the value extraction and string manipulation functions will be available. Thus, you can combine and manipulate the key attribute values but not e.g., let the key include the ID of a parent or similar.



Note: It is recommended practice to always evaluate your formula on the Function editor by using a sample object on which the key could be implemented using the "Evaluate Node" option before activating the Key. For more information about the Function editor, refer to the **Using Function Editor** section of the **Resource Materials** online help.

Once a key is created, it must be activated before it can be used. For more information, refer to the **Activating and Deactivating Keys** topic within this guide.

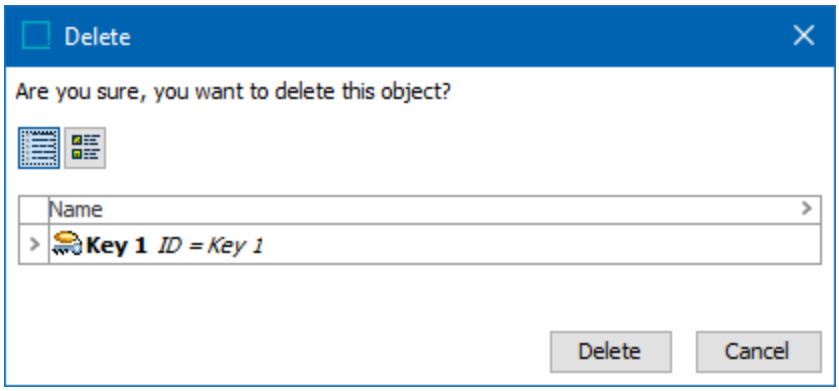
Optionally, before activating the key, use the Check Key function to confirm the setup of the STEP Key. For more information, refer to the **Checking Keys** topic within this guide.

Note: To edit a key, it must be in the deactivated state. Keys that are in the activated state cannot be edited. For more information regarding activating or deactivating keys, refer to the topic **Activating and Deactivating Keys** in the **Unique Keys** documentation.

Delete a Key

A key must be deactivated before it can be deleted. Below are steps to delete a key, after it has been deactivated.

1. Go to System Setup > Expand Keys > Right-click the relevant key > Click **Delete Key**, and the Delete dialog will display.



2. Click the **Delete** button.

Activating and Deactivating Keys

When a Key is first configured, it will be inactive and must be activated to take effect. The activation is performed by a background process that calculates and stores keys for the affected objects, and only allows the key to become active if the keys can be created for all specified object types.

Keys will only be generated for objects that have local values for all key attributes. For the objects that do not have local values for all attributes and for new objects added later, keys will be generated once all key attributes have local values.

Once a key has been activated, in the workbench, key attribute fields with values will be read-only and only users with a special 'Modify unique key value' privilege can update the value (Edit menu > 'Edit Unique Key Values'). It will not be possible to update the value via an import or via the APIs.

Prerequisites

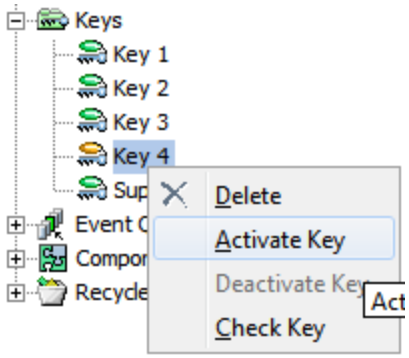
It is expected that anyone activating a STEP Key is familiar with the **Defining Keys** section of the **Keys** topic within this guide.

Activate a Key

For Oracle databases, this action requires single-update mode (SUM), as defined in the Single-Update Mode topic.For Cassandra databases, this action uses Lock-free Schema Change (LFSC) functionality, as defined in the Lock-free Schema Change topic.

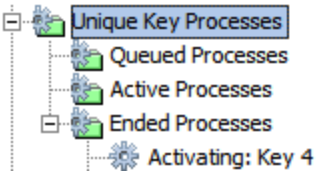
Below are steps to activate a key.

1. Go to System Setup > Expand Keys > Right-click the relevant key > Click **Activate Key**.



A background process is started that tries to generate keys for all objects of the specified object types. If identical keys are generated for two or more objects, this is reported as errors in the Execution Report. The generated key and the conflicted objects are listed in the report.

2. To view the Execution Report, in **Background Processes**, expand **Unique Key Processes**, and then select the relevant completed process.



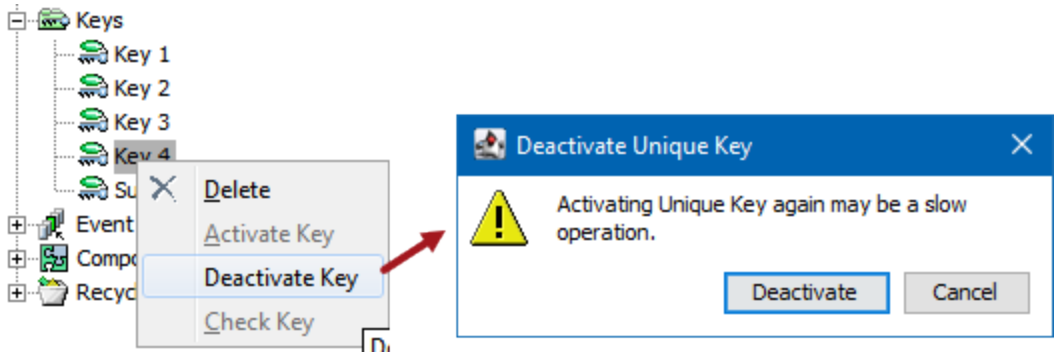
Keys are not generated for objects with missing key attribute values. Once values are supplied for all key attributes of an object, keys are generated on the fly.

When a key has been activated, it is no longer possible to edit the values on the key attributes, unless you have set up special user privileges. However, you must deactivate the key first.

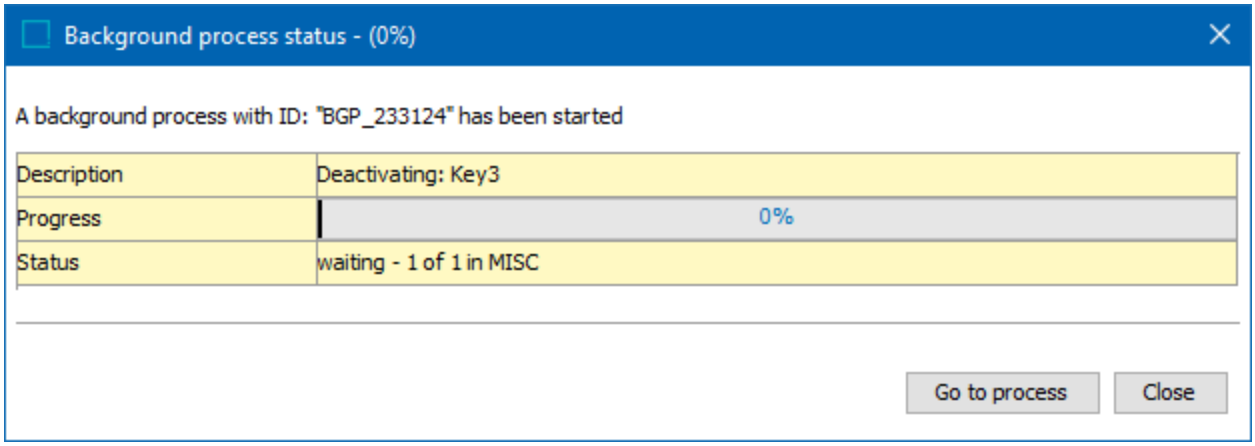
Deactivate a Key

For Oracle databases, this action requires single-update mode (SUM), as defined in the Single-Update Mode topic.For Cassandra databases, this action uses Lock-free Schema Change (LFSC) functionality, as defined in the Lock-free Schema Change topic.

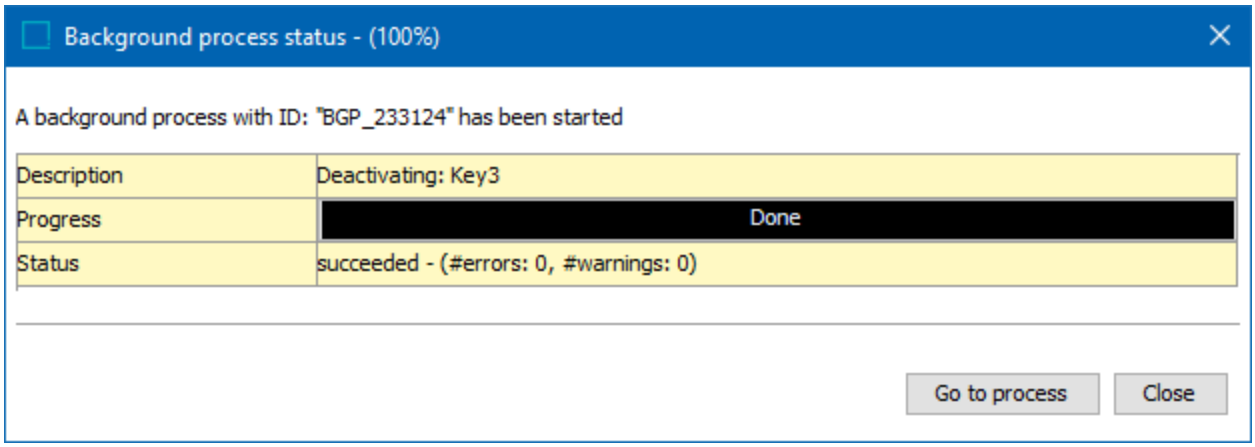
1. In **System Setup**, expand **Keys**, right-click **the relevant key**, select **Deactivate Key**, and the Deactivate Unique Key dialog will display.



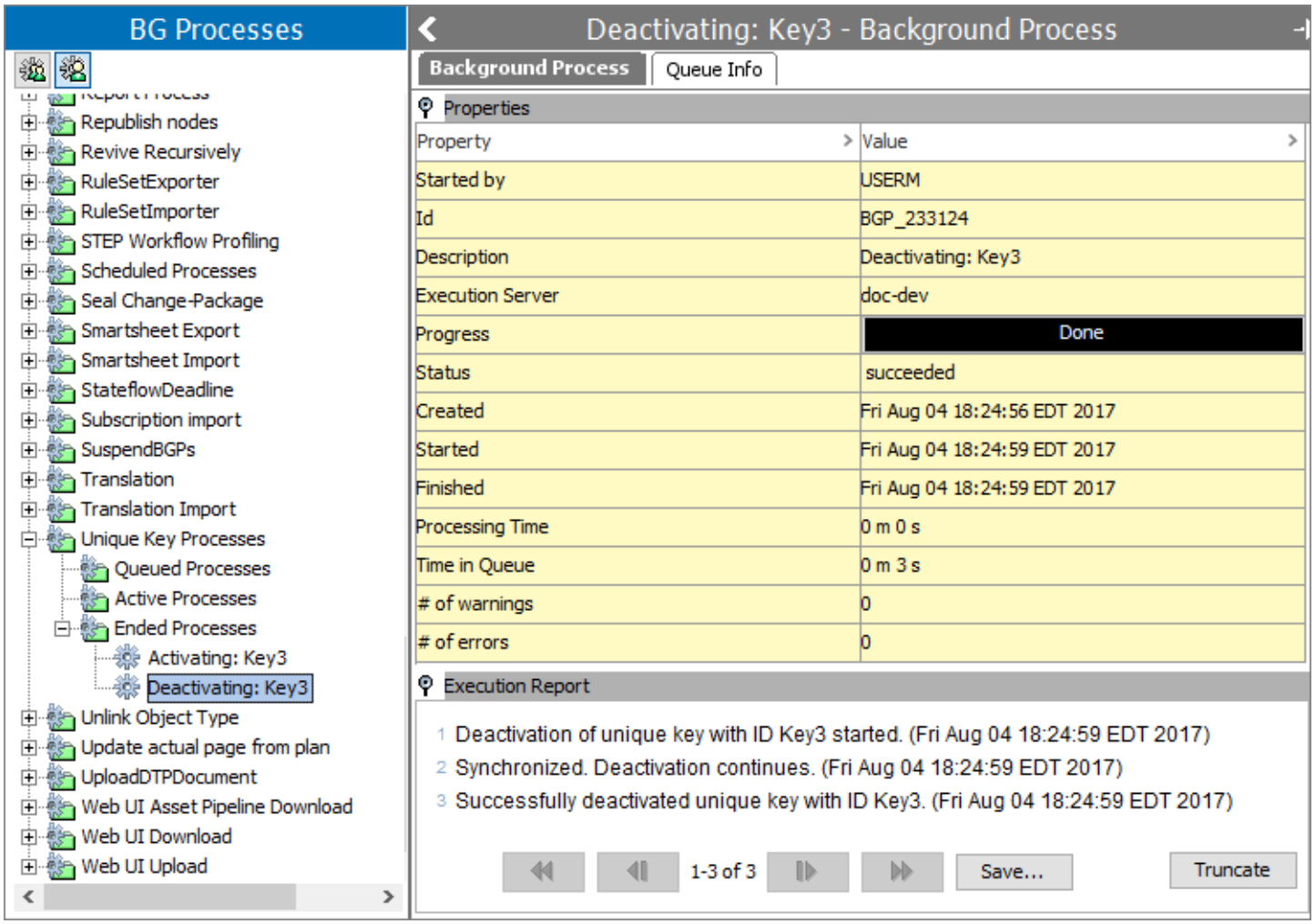
2. Click the **Deactivate** button, and the Background process status dialog will display. A BGP will start and attempt to deactivate the key.



3. Once the BGP has completed, the Background process status dialog will display as 'Done' (as shown below).



4. Optionally, click the **Go to process** button to view the Background Process Execution Report.

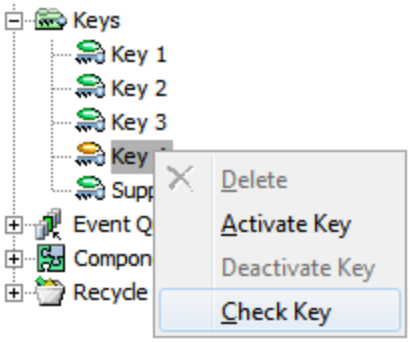


Note: Keys with values made without In-Memory can cause errors when running with In-Memory. To fix this, deactivate and then reactivate the keys.

Checking Keys

You can check deactivated keys for errors.

- In **System Setup**, expand **Keys**, right-click the relevant key, and then choose **Check Key**.



A background process is started that tries to generate keys for a maximum of 5,000 objects of the specified object types.

If identical keys are generated for two or more objects, this is reported as errors in the Execution report. The generated key and the conflicted objects are listed in the report.

- To view the Execution report, in **Background Processes**, expand **Unique Key Processes**, and then locate the relevant completed process.

If there are any conflicts, redefine the key or modify the object data.

Creating Objects with Active Keys

Once a key has been activated the following options are available for creating and/or updating objects:

- STEPXML
- Web Services APIs
- Web UI Simple Importer
- Workbench

STEPXML

Once a key has been activated, external systems can identify objects in STEP (with generated Keys) via their resolved key values or by providing values for the key attributes. In the example below, the key 'EAN' is active, and Sales Item Product objects can now be updated by external systems that only know the EAN of an object and not its STEP ID.

In STEPXML a special 'KeyValue' element is available but it is also possible to identify a Sales Item by providing the value for the EAN attribute. Both STEPXML snippets shown below would update the existing Sales Item with EAN 6725372937625.

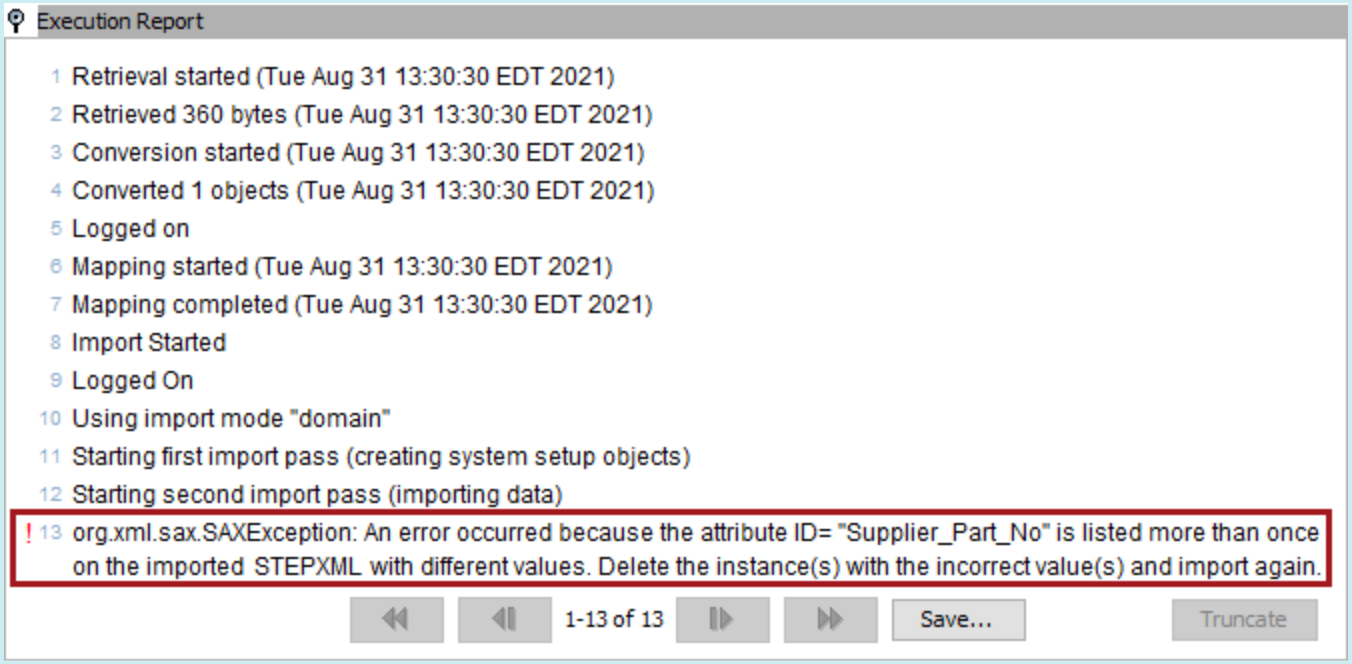
```
<?xml version="1.0" encoding="utf-8"?>
<STEP-ProductInformation ContextID="GL" WorkspaceID="Main">
  <Products>
    <Product>
      <KeyValue KeyID="EAN">6725372937625</KeyValue>
      <Values>
        <Value AttributeID="HE Color">Black</Value>
      </Values>
    </Product>
  </Products>
</STEP-ProductInformation>
```

```
<?xml version="1.0" encoding="utf-8"?>
<STEP-ProductInformation ContextID="GL" WorkspaceID="Main">
  <Products>
    <Product>
```

```
5           <Values>
6             <Value AttributeID="EAN">6725372937625</Value>
7             <Value AttributeID="HE Color">Black</Value>
8           </Values>
9         </Product>
10      </Products>
11    </STEP-ProductInformation>
```

Note: If no object with the specified key exists, STEP will try to create a new object and thus Object Types selected for key definitions should have Auto ID configured. Apart from this, successful creation depends on parent information and Object Type information being supplied in the file. The KeyValue element data is only used for matching and you cannot set a key using it. Also, if there is a mismatch between the KeyValue value and actual attribute values, the attribute? values take precedence.

When creating new objects via a STEPXML import file, if the same unique key value exists more than once, the system will ignore the duplicate unique key, skip object creation of the duplicate, and proceed with the import. Additionally, if different unique key values exist for the same object in a STEPXML file, no object is created and an informative error message displays letting the user know how to fix the problem before importing again.



For Generic XML and the tabular formats, STEP IDs can be left out and an object identified via values for key attributes. Because the 'Identify Destination' step of the Import Manager does not support Keys and objects, items in this step incorrectly can be identified as being new.

For more information about creating objects using STEPXML, refer to the **Create Objects in STEPXML** topic within the **STEPXML Format** documentation.

Web Services APIs

Both SOAP APIs and REST APIs have key requests available. Refer to the respective sections below for details.

SOAP APIs

For the SOAP API a 'queryByKey' request is available:

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:ns="http://stibo.com/step/ws/step/1.0"
xmlns:ns1="http://stibo.com/step/ws/types/1.0">
  <soapenv:Header/>
  <soapenv:Body>
    <ns:queryByKeyRequest>
      <ns:accessContext>
        <ns1:userName>******</ns1:userName>
        <ns1:password>******</ns1:password>
      </ns:accessContext>
      <ns:keyConditions>
        <ns1:keyExternalID>EAN</ns1:keyExternalID>
        <ns1:key>6725372937625</ns1:key>
        <ns1:type>product</ns1:type>
      </ns:keyConditions>
    </ns:queryByKeyRequest>
  </soapenv:Body>
</soapenv:Envelope>
```

REST APIs

Similarly, for REST, an “objectbykey” resource is available:

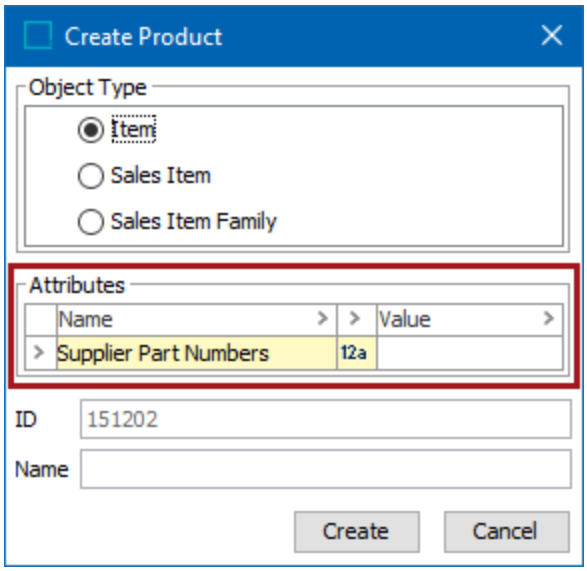
```
GET http://[host]/restapi/objectbykey/EAN/6725372937625?context=Context1&workspace=Main
```

Web UI Simple Importer

New objects with active keys can be created and/or updated using the Simple Importer Widget within Web UI. For more information, refer to the **Simple Importer Widget** topic within the **Using a Web UI** documentation.

Workbench

When you use the workbench to create new products of an object type for which active keys exist, the Create Product dialog includes editors for supplying values for key attributes.



The attribute value field can be left blank in which case no key will be generated. As mentioned above, a Key will be generated (and the editor field locked) once a value has been set.

When you have entered all values, STEP tries to generate a key for the product. If this fails because the key is already being used by another product, a dialog is displayed with information about the problem.

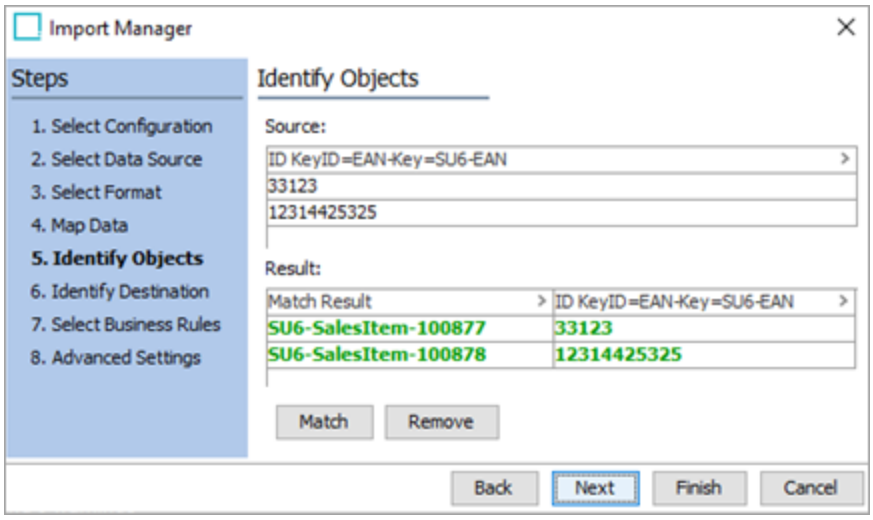
When a product of an object type for which an active keys exists is imported, a key is generated provided that all key attributes are populated. Any key conflicts are reported in the Execution report, and the new product will not be created.

Note: A product can be created without entering the key attribute value, and the value can be added later.

Matching Keys During Import

When you import updates to an object type with active keys, you do not have to include the ID in Excel, CSV, and XML files, provide the object type and values for all key attributes are included.

The Identify Objects step of the Import Manager wizard reports the matched objects with the respective STEP IDs in green (as shown below).



The following STEPXML shows the KeyValue tag as well as the individual values that are combined to build the key.

```
<STEP-ProductInformation ExportTime="2013-09-15 16:16:26" ExportContext="GL"
ContextID="GL" WorkspaceID="Main">
  <Products>
    <Product UserTypeID="KeyBProdType" ParentID="UniqueKeyImport">
      <KeyValue KeyID="KeyB">ValAvalBvalC</KeyValue>
      <Name>keyprodXMLImpChanged</Name>
      <Values>
        <Value AttributeID="UniqueKeyImportAttC">valC</Value>
        <Value AttributeID="ImportAtt">valA</Value>
        <Value AttributeID="UniqueKeyImportAttB">valB</Value>
        <Value AttributeID="UniqueKeyImportAttA">ValA</Value>
      </Values>
    </Product>
  </Products>
</STEP-ProductInformation>
```

Deferred Cross References

It is possible to create objects during import using only a key value, and not using STEP IDs (e.g., product ID, classification ID, entity ID). It is also possible within the same STEPXML file to create a reference between new objects that do not yet exist in STEP. However, this scenario requires deferring cross reference creation.

Deferring cross reference creation allows the importer to create the new objects being referenced, while postponing creation of the references until the required objects exist. To avoid an error when importing a STEPXML file that contains new objects as well as new cross references, the following two criteria must be met:

- The data import must be done in Domain Mode, as defined in the **General Advanced Settings** section of the **Import Manager - Advanced Settings** topic within the **Data Exchange** documentation.
- The target object of the imported cross reference can be identified by only one active key, as defined in the **Unique Keys** topic.

Consider the following example XML:

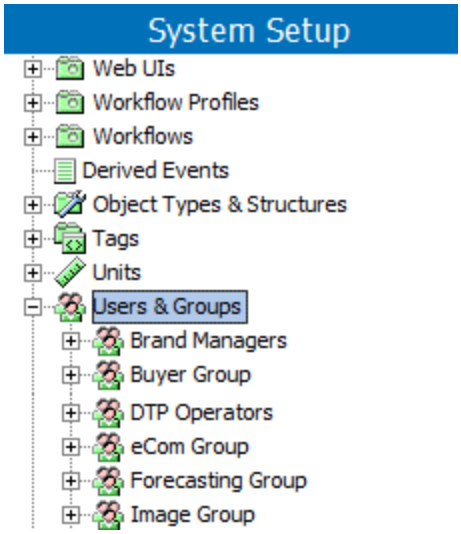
```
<?xml version="1.0" encoding="UTF-8"?>
<STEP-ProductInformation ContextID="GL" WorkspaceID="Main" UseContextLocale="false">
  <Entities>
    <Entity UserTypeID="Company" ParentID="Division">
      <KeyValue KeyID="MainKey">1</KeyValue>
      <Name>Group 1</Name>
    </Entity>
    <Entity UserTypeID="Company" ParentID="Division">
      <KeyValue KeyID="MainKey">123456789</KeyValue>
      <Name>Group 2</Name>
      <EntityCrossReference Type="PrimaryCrossRef">
        <KeyValue KeyID="MainKey">93403</KeyValue>
      </EntityCrossReference>
    </Entity>
    <Entity UserTypeID="Company" ParentID="Division">
      <KeyValue KeyID="MainKey">93403</KeyValue>
      <Name>Group 3</Name>
      <EntityCrossReference Type="PrimaryCrossRef">
        <KeyValue KeyID="MainKey">1</KeyValue>
      </EntityCrossReference>
    </Entity>
  </Entities>
</STEP-ProductInformation>
```

In this example, the three entities are named Group 1, Group 2, and Group 3. Assume that none of these entities exist in STEP. Notice that Group 2 has a cross reference to Group 3 using a KeyValue, and that Group 3 has a cross reference to Group 1, also using a KeyValue.

Since none of the entities exist, the cross-references between these non-existing objects must be deferred.

Users and Groups

Users and Groups are maintained from the workbench in System Setup > **Users & Groups**.



In the Users & Groups hierarchy, you can create STEP Roles and Authorizations to determine who can access the STEP system and what they are able to do or not do as a User in the Workbench, Web UI, or DTP client. A Group containing these roles and authorizations is a set of one or more Users. An example of User Groups setup based on roles and authorizations can be found in the image above. All Users that are members of a specific Group share the Privilege Rules that are applied to that Group. While it is possible to assign a User to more than one Group, privileges are accumulative so this is not recommended practice as it makes it difficult to define what Privileges a User actually has.

Some of the reasons STEP Roles and Authorizations are created in Users and Groups are:

- It allows for the for the proper setup of system access for Users that will be using STEP so that Users only have the rights and privileges they need.
- It gives others the ability to add Users to existing groups based on the type of access required.
- It ensures data quality and integrity by preventing accidental or malicious changes made by people who should not have access.

Note: Every user must be a member of a group because all permissions are controlled via groups.

Group Membership

The members of a group ideally perform the same or very similar roles within the database environment. The organization of Users and Groups should then reflect the responsibilities that are associated with the corresponding roles within the business.

An example of three User Groups could be:

- Normal User

An operator belonging to the **Normal User** Group may typically be working with data entry and does not have the complete knowledge of the system. It thus makes sense to restrict the rights of this type of operator.

- Super User

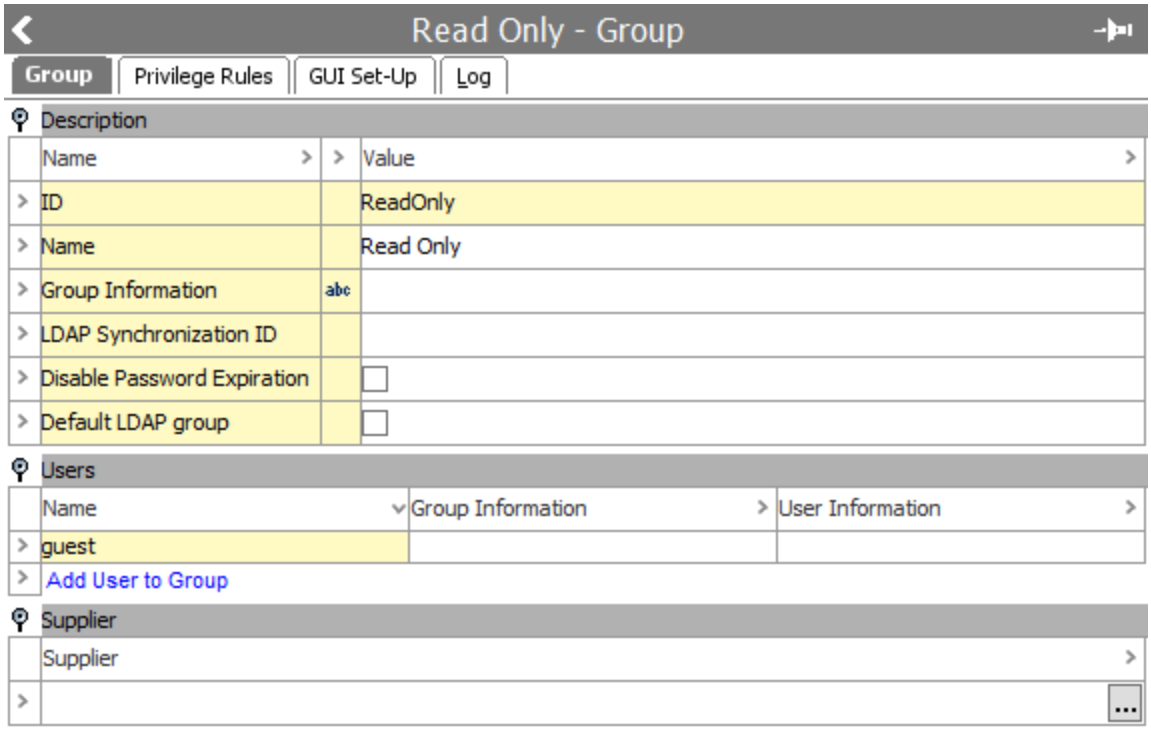
A member belonging to the **Super User** Group is typically an operator who in addition to data entry also is working with system setup and higher-level maintenance.

- Read-Only

The **Read-Only** Group will typically include operators that have an interest in viewing information but have no permissions to perform any editing operations.

Working with User Groups

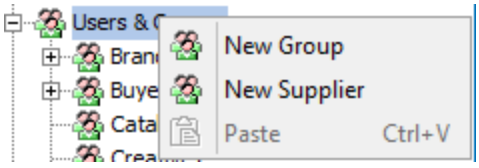
This section explains how to create and delete User Groups. While always containing the ID and Name attributes, the User Group tab will look different based upon the what system settings and attributes are configured and set up on your STEP system. For more information, refer to the **Privilege Rules** topic and the **GUI Setup** topic.



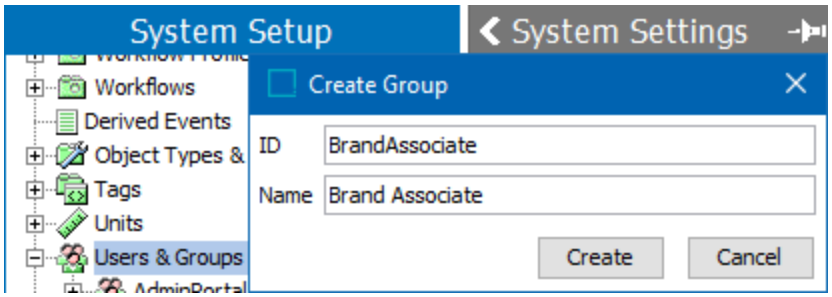
Creating a User Group

Groups are created in System Setup > **Users & Groups**.

User Groups can be created for Internal Users and Suppliers by right-clicking the Users and Groups root node. It is important to create and name User Groups by the function and roles the Users under that group will be performing.



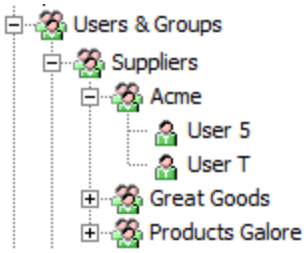
To create a New Group, right-click on the Users and Groups root not and select **New Group**. Enter the ID and Name and click 'Create.' The new group appears in the Group Editor. At this point, Privilege Rules will need to be defined for the group and Users added. For more information, refer to the **Privilege Rules** topic. For more information about creating a user, refer to the **Creating a User**.



Passwords can be configured to not expire for a User Group via the Group tab. If the Disable Password Expiration box is checked / enabled, the passwords for the users in that specific group will not expire. This setting overrides the password expiration on the global setting.

Creating a Supplier Group is done the same way, but it is more common to create a Supplier Group 'root node' for the supplier groups to be brought under as shown in the example below.

The Privilege Rules would be applied at this Supplier Group 'root node,' and these Privilege Rules would apply to all Supplier Sub-Groups and Users residing within the hierarchy.

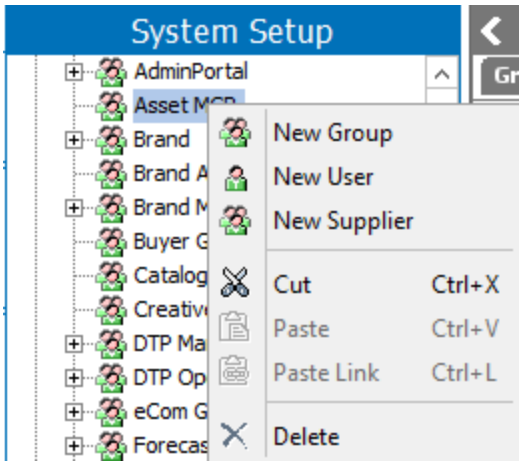


Note: A supplier user who is linked into multiple supplier groups can view all the supplier hierarchies they are a member of. However, supplier users cannot view any products or assets that are linked into multiple suppliers' hierarchies.

Deleting a Group

If a Group needs to be deleted, all that is required is to right-click on that group and select **Delete**.

Note: All Users must be removed from the Group to be deleted in order to delete that Group.


System Setup
AdminPortal
Brand
New Group
New User
New Supplier
Cut Ctrl+X
Paste Ctrl+V
Paste Link Ctrl+L
Delete

Working with Users

STEP can only be accessed by authenticated users. This section contains information needed to work with Users in Users and Groups from the STEP Workbench. Information detailed in this topic includes:

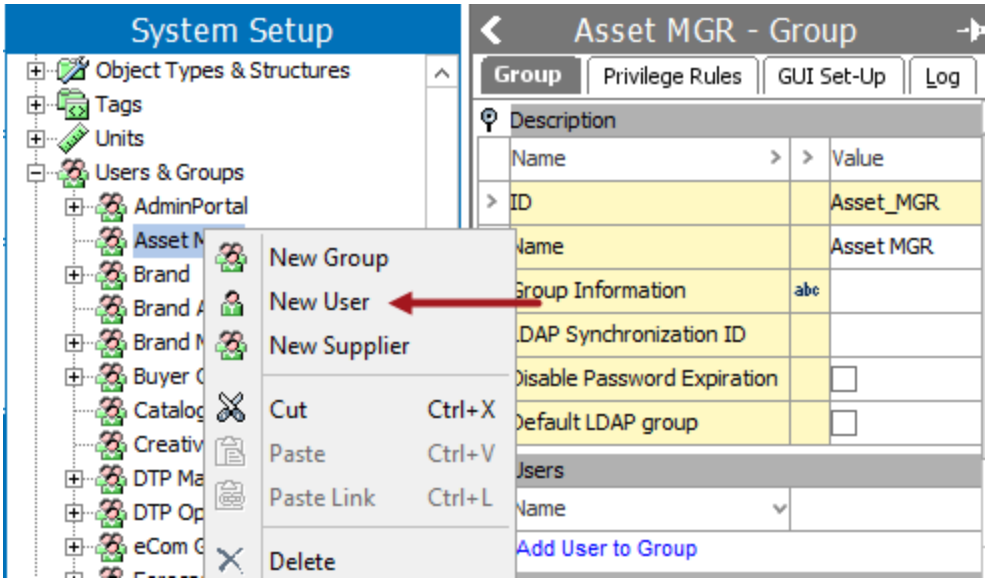
- Creating a user
- Adding a user to a group
- Duplicating a user
- Removing a user from a group
- Deleting a user

For how to change a user password, refer to the **Changing a User Password** topic.

Creating a User

Once user groups and their associated privilege rules have been defined, users can be created.

1. Right-click on the user group and select **New User**.

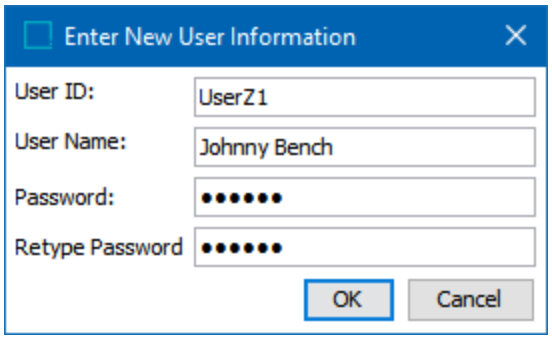


2. In the dialog box, add the following information:

   - **User ID** -The ID that the user will use to sign into the STEP Workbench or Web UI. The user ID is not case sensitive, and it is recommended not to use special characters.

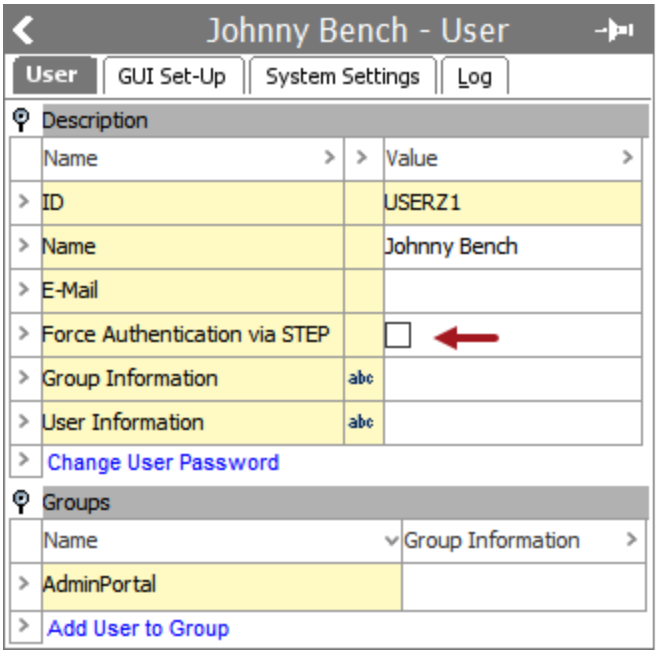
     All user IDs must be unique as this is the ID that is used to track everything that is done in the STEP Workbench or the Web UI.

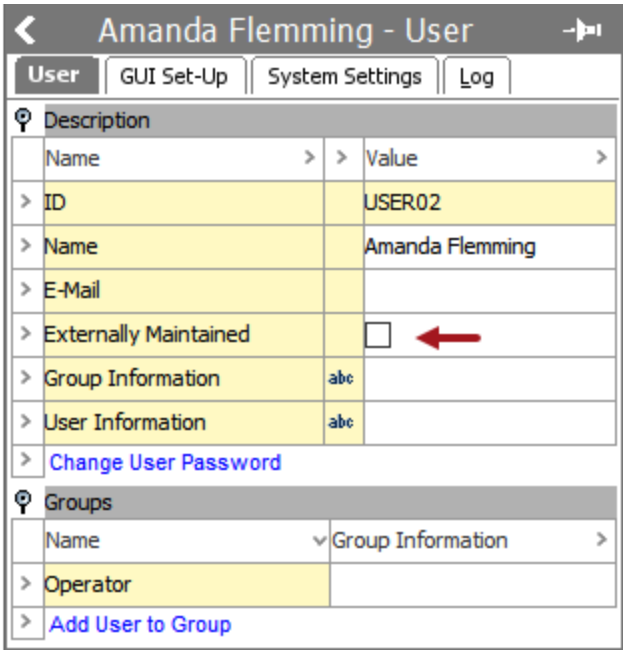
- **Name** - Enter the name to be used for the user.
- **Password** - Enter the password for the user to sign on. Passwords may have up to 24 characters and are case sensitive.
- **Retype Password** - Retype the password just entered.



Complete additional setup for the user and refer to the **Adding a User to a Group** section that follows.

Note: To make additional parameters for users, such as Group Information and User Information shown in the example below, create or identify description attributes. From Object Types & Structures, open the Basic Object Types node and select the User object type. Use the **Add Attribute** link in the Valid Attributes flipper to apply the attributes to user objects.





- **E-Mail** - add the email address used for error reporting from processes started by the user and to publish objects to PDX from the Web UI Search Screen.

- **Force Authentication via STEP** - check to use STEP to authenticate users instead of a configured external authentication, for example, SAML in an on-premises system. Also, when checked, the user is allowed to change their password on the Web UI. Refer to the **Changing a User Password** topic.

  'Force Authentication via STEP' is not available on STEP systems with OAuth2-based authentication enabled (single sign-on). Instead, use the 'Externally Maintained' option below.

- **Externally Maintained** - check to ensure that authentication does not use STEP managed credentials, that a STEP password cannot be set or changed for the user account, and that the STEP password expiration policy does not apply. When checked, users managed via an IDP cannot introduce a conflict to their IDP credentials within STEP.

  'Externally Maintained' is available only on SaaS STEP systems with single sign-on (SSO) enabled. This option is automatically checked when logging in via an IDP, where user authentication is managed outside of STEP.

Bulk Adding New Users

With a STEPXML import, you can create multiple new users at once, including the privilege groups required to enable those users. The STEPXML example below creates a user named 'JohnHarris' who is privileged with all setup and user actions for the Product hierarchy, Classification 1, and Entity hierarchy roots in the user group with ID of 'UserSupport'.

```
<?xml version="1.0" encoding="utf-8"?>
  <STEP-ProductInformation ContextID="Context1" WorkspaceID="Main">
    <UserGroupList>
      <UserGroup ID="UserSupport" ReadOnly="false">
        <Name>UserSupport</Name>
        <PrivilegeRule ActionSetID="All setup actions"/>
        <PrivilegeRule ActionSetID="All user actions" ProductID="Product hierarchy root"/>
        <PrivilegeRule ActionSetID="All user actions" ClassificationID="Classification 1 root"/>
        <PrivilegeRule ActionSetID="All user actions" EntityID="Entity hierarchy root"/>
      </UserGroup>
     </UserGroupList>
    <UserList>
      <User ID="Admin" ForceAuthentication="false" EMail="JohnHarris@acme.com">
```

```
14            <Name>JohnHarris</Name>
15            <UserGroupLink UserGroupID="UserSupport"/>
16          </User>
17        </UserList>
18      </STEP-ProductInformation>
```

Use the example STEPXML as a template for creating new users by repeating the relevant information for each new user being created. Replace the existing values with the relevant values in your system. Omit the UserGroup if not required but confirm the UserGroupID on the UserGroupLink has a value that exists on the target system.

Passwords for bulk created users

Passwords can be included in an import file by replacing line 13 in the previous STEPXML example with the following:

```
<User ID="Admin" ForceAuthentication="false" Password="Password"
EMail="JohnHarris@acme.com">
```

By default, the `Import.Users.PasswordIgnored` property is 'true' and passwords included in the STEPXML import file are ignored. This prevents unauthorized users with access to a STEPXML file of users / passwords to access STEP unintentionally.

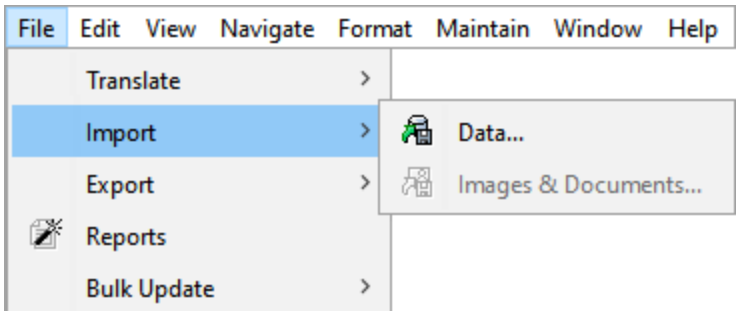
Importing while the property is 'true' with or without a password defined in STEPXML, creates users with system-defined passwords. Attempting to log in as one of these users with the password defined in the file displays the 'Your login credentials are invalid' error message. To resolve this error, the newly created user can set a new password in:

- Web UI via the 'Forgot password' option on the login screen, where the reset option is managed through the email address provided in the import file.
- Workbench on System Setup tab, with the assistance of an administrator.

For testing and non-production systems, to bulk create users with defined passwords via import, update the sharedconfig.properties file on the application server, and set the case-sensitive `Import.Users.PasswordIgnored` property to 'false'. When this property is false, the password specified in the import file is assigned to the new user(s). When the import is complete, revert the property back to the default value of ‘true’.

Importing users

When the STEPXML file includes all required users, import it via the File > Import > **Data...** menu option.



For more information, refer to the **Creating a Data Import** topic in the **Data Exchange** documentation.

Adding a User to a Group

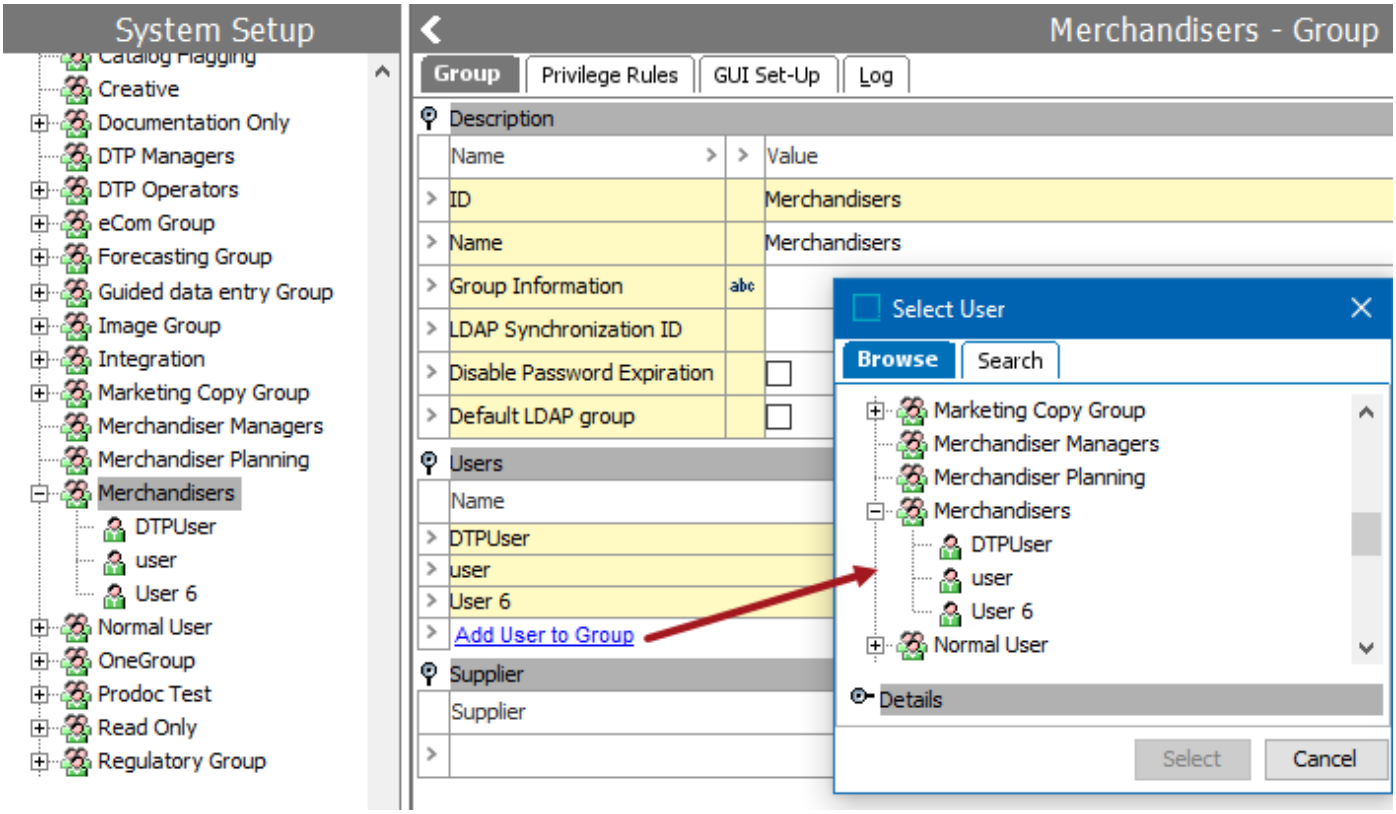
Users are added to groups in System Setup > **Users & Groups**.

Note: Adding a user to multiple groups is not recommended as it makes it difficult to track which privileges a user has.

Adding a user to a group provides the user with the privileges assigned to the group.

1. In System Setup, open **Users & Groups**, and then click the relevant group. The group appears in the group editor.

2. Under the Users flipper, click the **Add User to Group** link. A **Select User** dialog box displays.



3. Select the relevant user, and then click **Select**. A user has now been added to the selected group, and the user appears under **Users**.

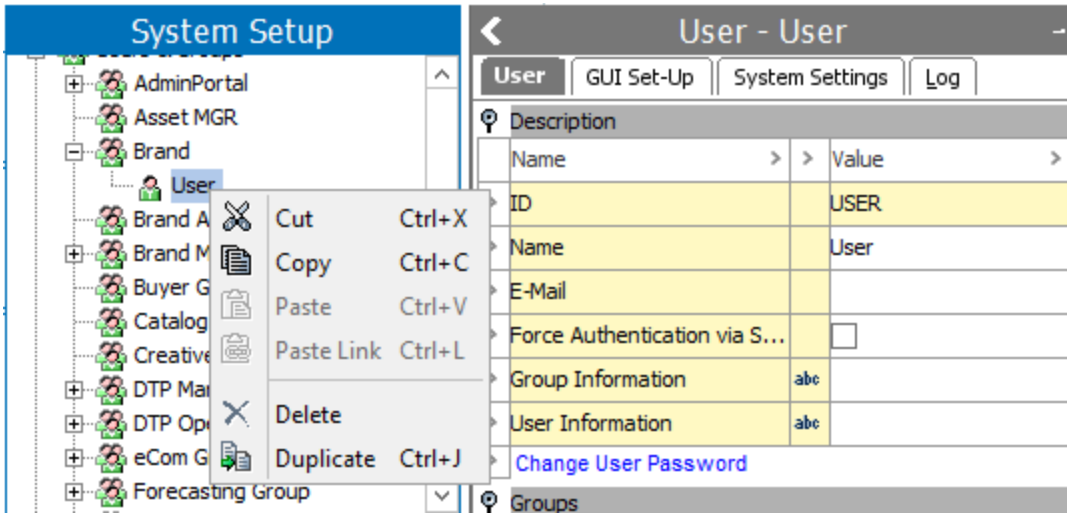
> **Note:** Although a user can be a member of many groups, it is not recommended as it makes it difficult to define what privileges a user actually has.

Duplicating a User

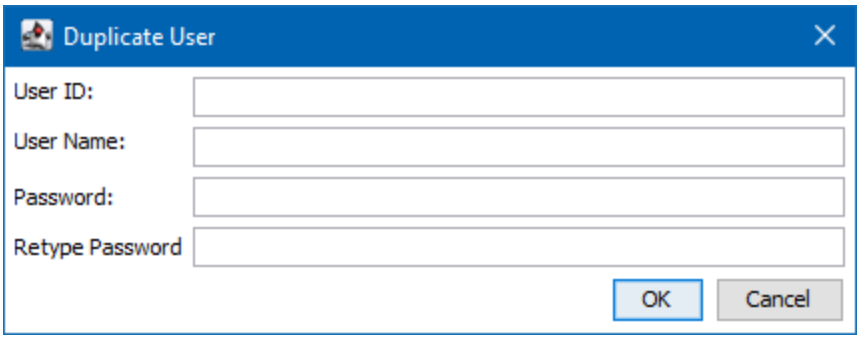
Duplicating a user can be useful if several users need to adhere to the same privileges. For instance, if one hundred users need to be added to the same group, create the first user and then duplicate it for the others.

> **Important:** Duplicating a user is very efficient, but metadata attribute values on the duplicated user are also duplicated. So, for example, if a user email address value is in the user being duplicated, that value is carried over to the new user object and should be changed.

1. To create the first user, follow the process in **Creating a User** section above.
2. Right-click the user you just created and select **Duplicate**.



3. In the Duplicate User dialog, follow the steps outlined in **Creating a User**.

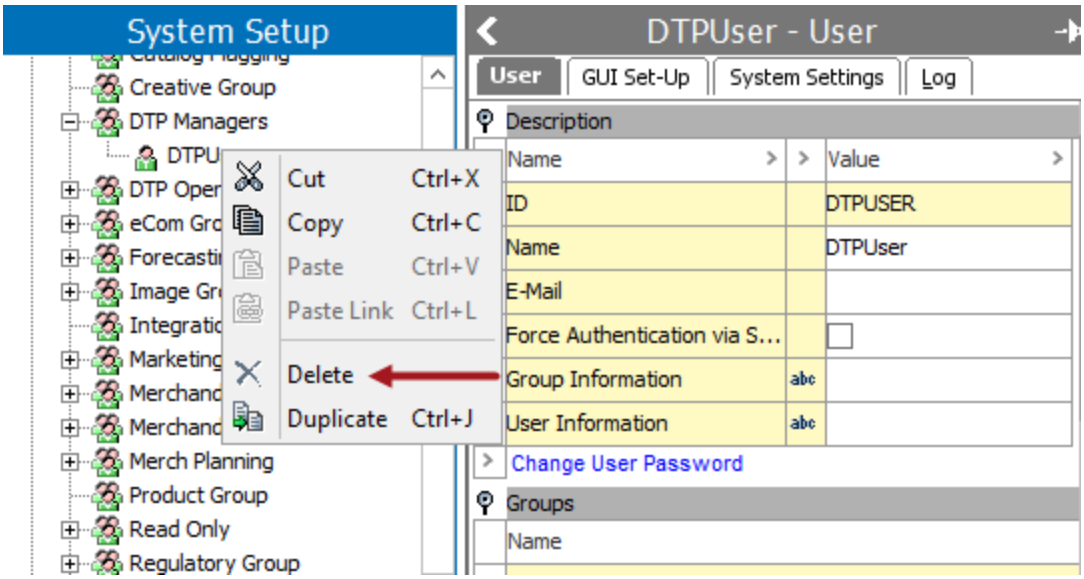


The duplicated user has the same privileges, GUI Set-Up, and System Settings as the user that was duplicated.

Removing a User from a Group

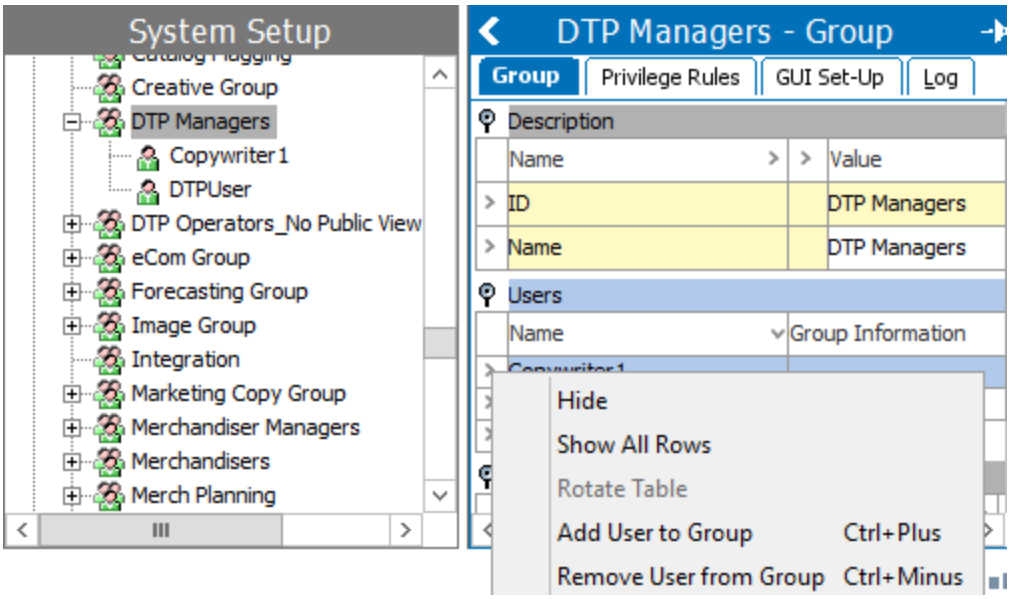
There are two scenarios for removing a user from a group.

- A user is no longer permitted to have any access to the STEP Workbench or the Web UI. Find the user ID in any group, right-click the user, and select **Delete** to delete the user from all groups in the system.



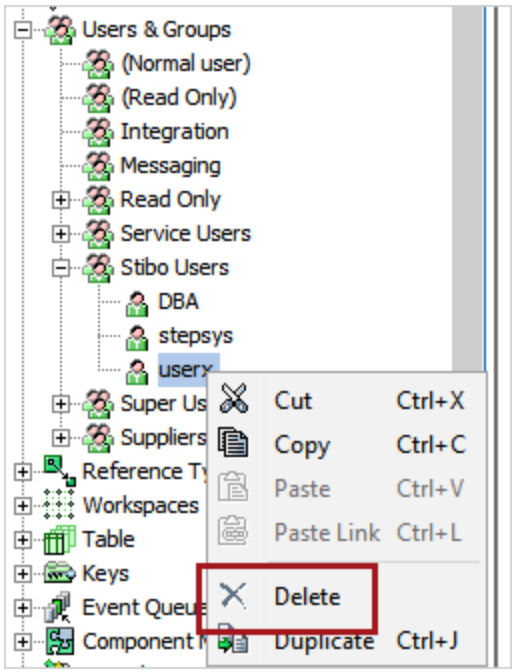
There may be reasons a user cannot be deleted, such as if the user is an assignee within a workflow task, or you are trying to delete your own user ID / name. In this case, you are presented with additional information within the dialog that displays.

- A user needs to be removed from one or more groups while remaining in other group(s). Find the group from which the user should be removed, expand the Users flipper, right-click the arrow next to the User ID, and select **Remove User from Group**. Repeat these steps to remove the user from other groups as needed.

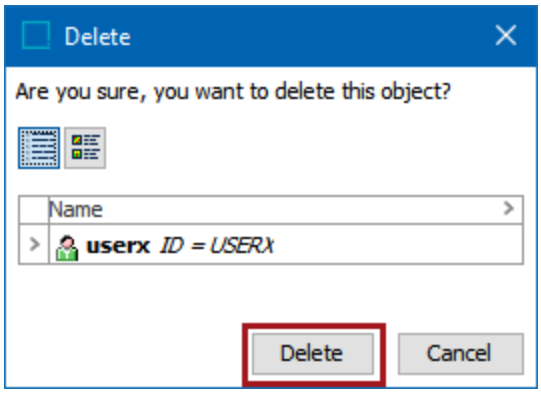


Deleting a User

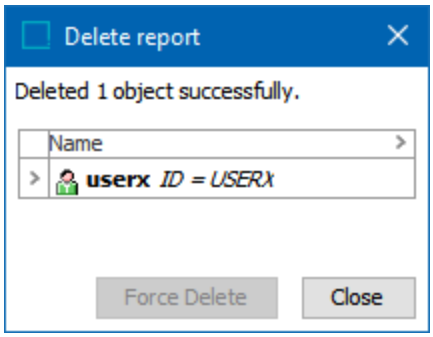
To remove a user from accessing STEP altogether, right-click the desired user and select **Delete**.



A confirmation prompt displays. Select **OK** to confirm deletion.



After a background process completes, the user is deleted.



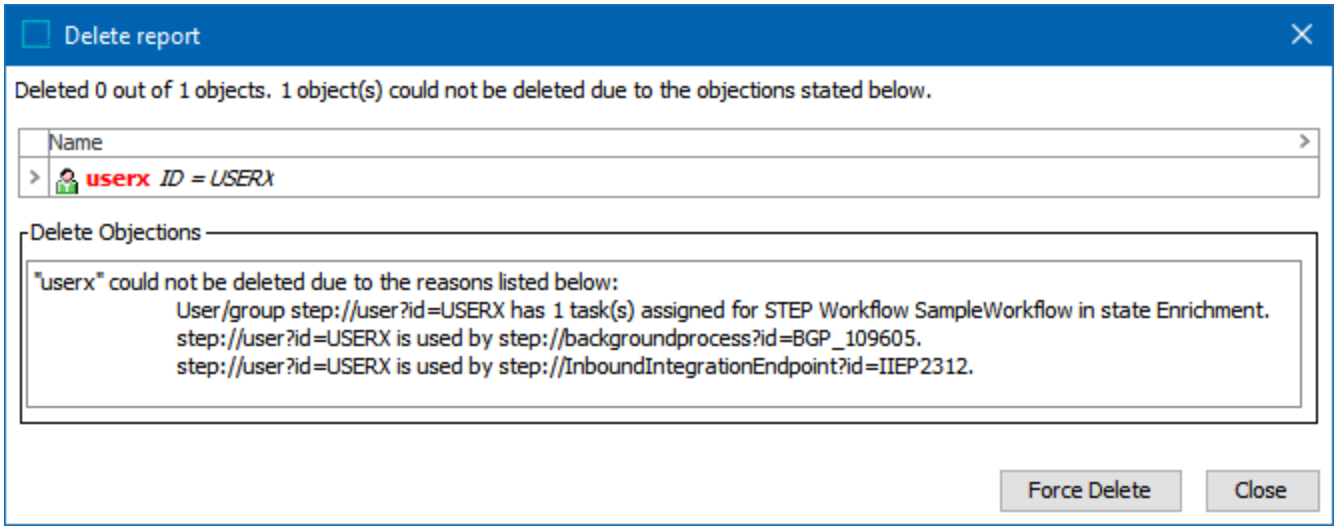
Considerations

A user cannot delete the user they are logged in as.

A user cannot be deleted while they have any outstanding actions. Outstanding actions that stop the deletion process include:

- scheduled background processes that were started by the user, either queued or running
- inbound and outbound integration endpoints that have the user in the Identify Endpoint step User parameter
- workflow states assigned to the user

Attempting to delete the user with responsibilities displays the following error showing where in STEP the user is assigned. Until the user is removed from these actions, they cannot be deleted, even with the 'Force Delete' button.



Changing a User Password

This section outlines the most common scenarios in which user passwords are changed. In the first scenario, the user forgets their password and they need a system administrator to change it. In the second scenario, a user may want to change their own user password.

Additionally, if the user forgets their password the Forgot Password functionality allows password reset via an email generated from Web UI. For more information, refer to the **Accessing a Web UI** topic of the **Web User Interfaces** documentation.

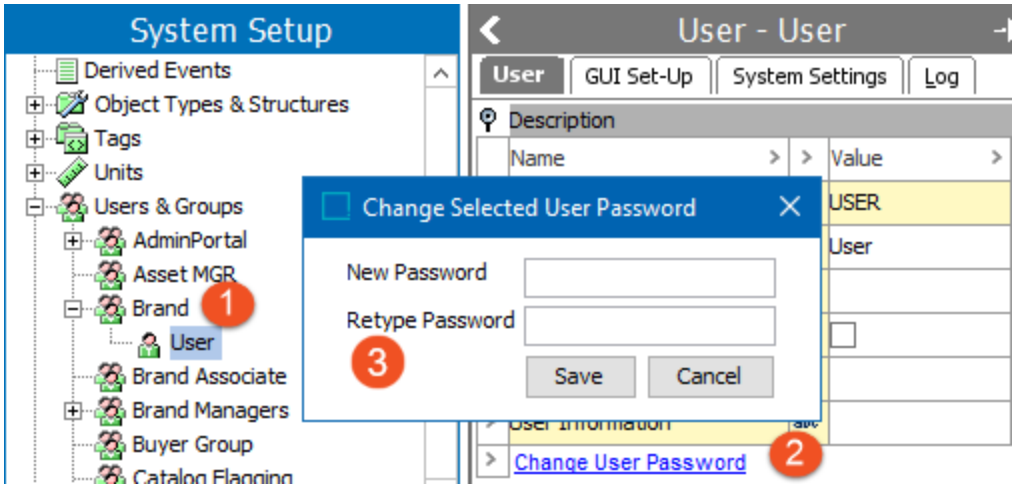
Prerequisites

Users must be privileged to change passwords via the 'Maintain user password' privilege action. For more information, refer to the **Setup Actions and Error Descriptions** topic of the **System Setup** documentation.

Changing a User Password - System Administrator

To change a user password as a system administrator:

1. From System Setup, under Users & Groups, select the user requiring the password change.
2. Select **Change User Password** in the under the Description section of the user information.
3. Enter and retype the new password and click **Save**.



On a standard STEP system, passwords may contain up to 24 characters. Special characters, like asterisks (*) and percentages (%), are not allowed. Passwords are case sensitive. Only an administrative-level user should have the permissions to reset a user's password from the Users & Groups node. Options for users to change their own passwords are outlined below. For security reasons, the password is stored in the system as encrypted so that even an administrator cannot view it.

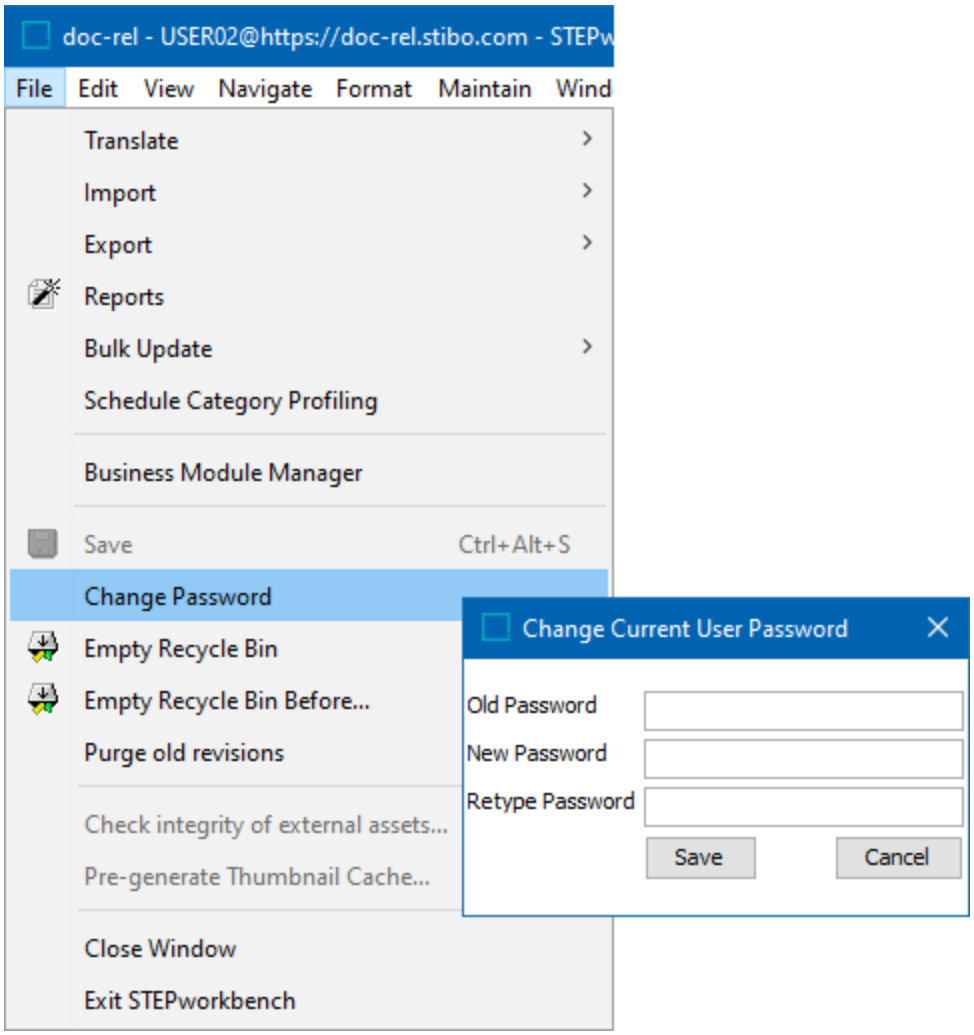
Note: On the Users & Groups root node, you can define a password security policy to be used. Information about setting security policies can be found in the **Security Policy** section of Users and Groups.

Changing a User Password - User

A user may change their own password from the workbench or the Web UI depending upon where the user is working.

From the workbench

From the File menu, select **Change Password** and a **Change Current User Password** dialog box will display. Type in the old password and then the new password twice. Click **Save**, and the new password will take effect at the next system sign-on.



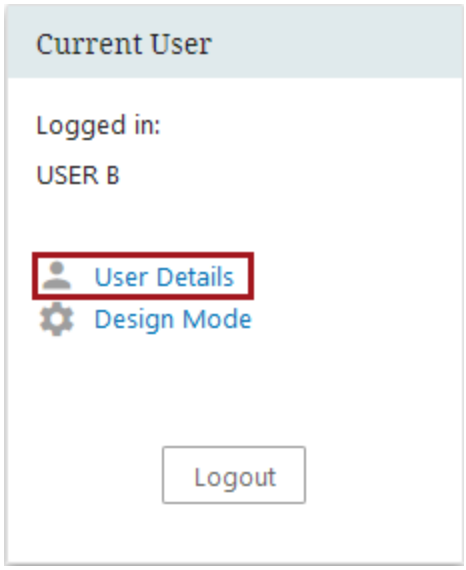
Important: If the user is set as 'Externally Maintained' they are not able to change their password. For more information, refer to the **Working with Users** topic in the **Users and Groups** section of the **System Setup** documentation.

From the Web UI

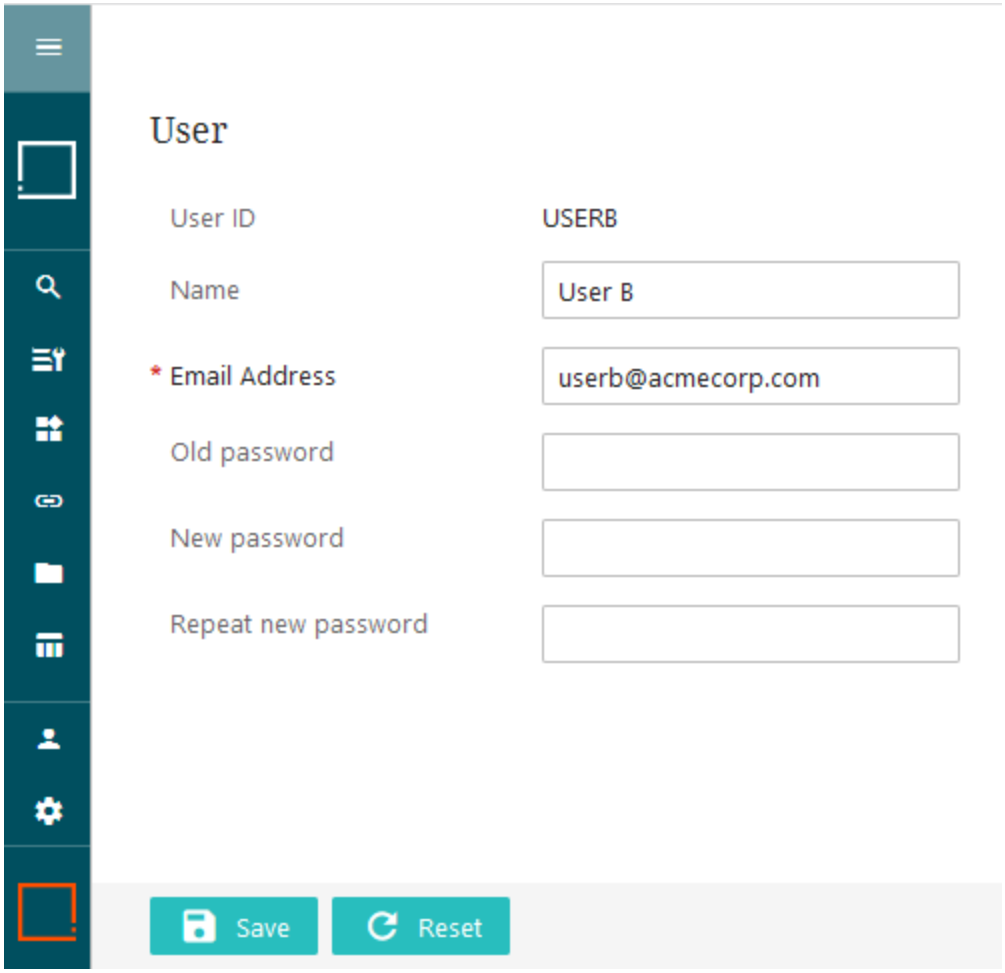
Users can change their own password when logged into the Web UI via the User Details screen, as defined in the **User Details Screen** topic in the **Web User Interfaces** documentation.

To enable users to have the ability to change their passwords on the Web UI, the 'Force Authentication via STEP' setting must be checked for the specific user. This setting is in workbench on the System Setup tab under the user node. If this setting is unchecked, the 'Old password,' 'New password,' and 'Repeat new password' fields do not display, and the user will be unable to change their passwords in the Web UI.

Access to a User Details screen can be configured in different ways. For example, if a User Widget linked to a 'User Details' screen has been configured on the Homepage, then a user can click on the 'User Details' link (as shown in the screenshot below) to access the change password functionality. For more information, refer to the **User Widget** topic in the **Web User Interfaces** documentation.



If correctly configured, users the 'User Details' screen displays.



On the 'User Details' screen, users can take the following steps to change their password:

1. In the 'Old password' field, enter the current password for the user.
2. In the 'New password' field, enter the desired new password for the user.
3. In the 'Repeat new password' field, enter the same password you entered in the 'New Password' field.
4. Click 'Save' at the bottom of the screen. Your password has successfully been saved.

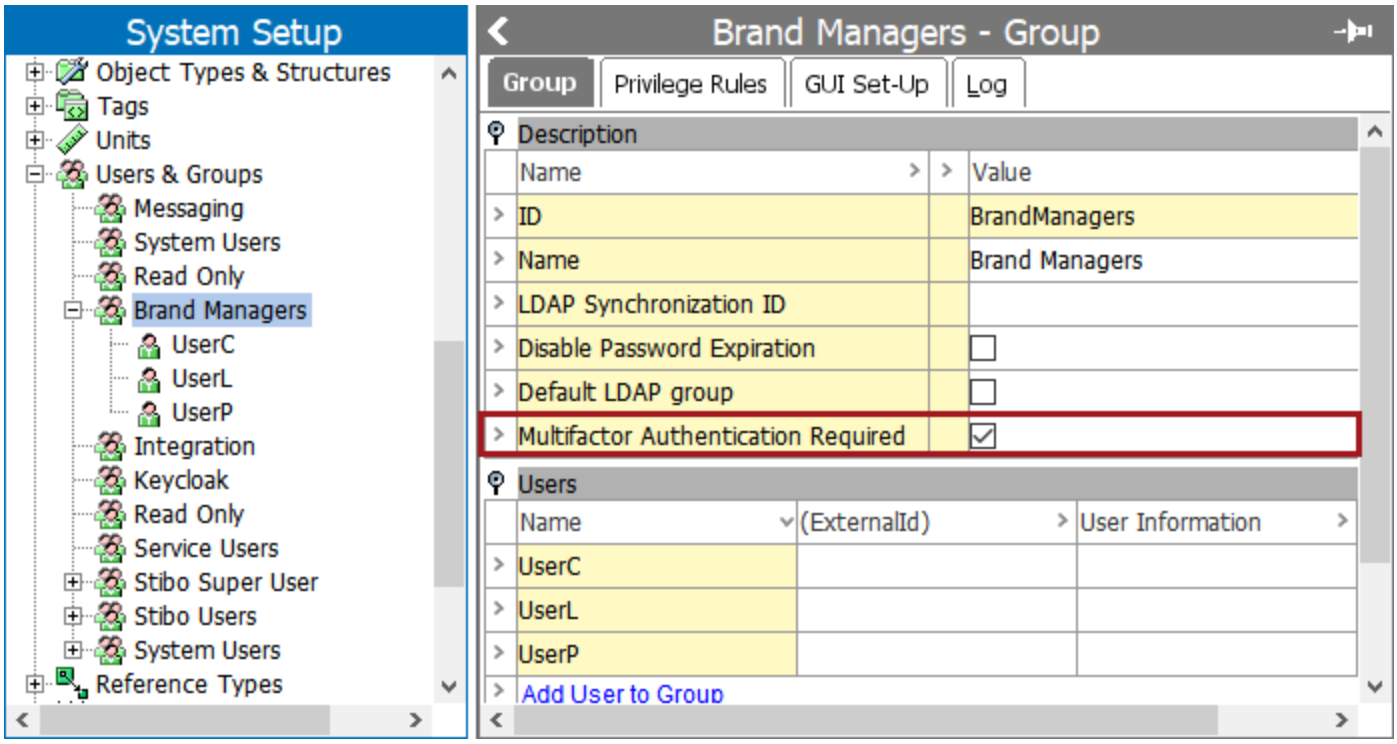
The new password grants you access to Web UIs to which your user group has access, as well as the workbench.

If additional password security has been configured for passwords on your system, specifically 'Password Strength Validation,' any new passwords must conform to those standards. For more information on establishing robust password security protocols, refer to the **Security Policy** topic in the **System Setup** documentation.

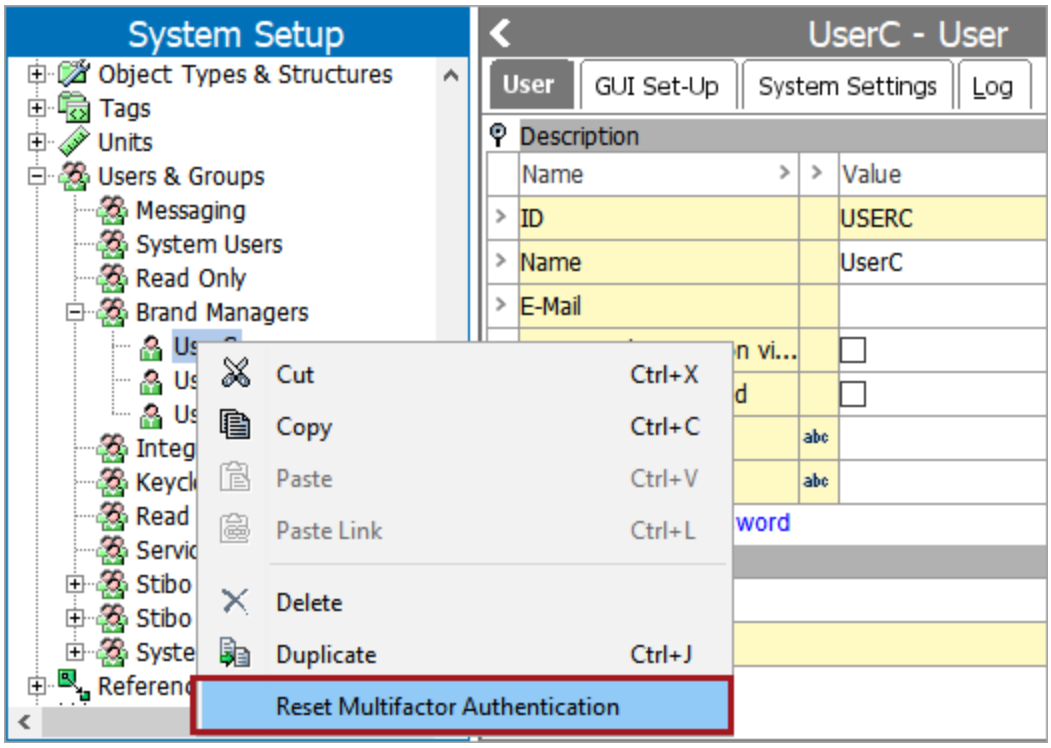
Multifactor Authentication for SaaS

For SaaS customers, a cloud STEP system can be configured to support Multifactor Authentication (MFA) for user accounts managed in STEP.

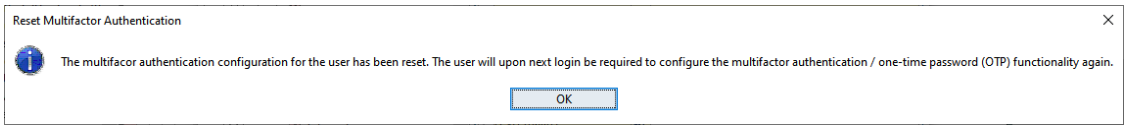
When the functionality is enabled, STEP administrators are able to select the **Multifactor Authentication Required** parameter on the desired user group.



When MFA is enabled for a user group, the users in that group will be prompted to configure MFA using an authenticator application the next time they log into the system. Should a situation arise where the MFA configuration for a user needs to be reset, a STEP administrator can right-click on the desired user and select **Reset Multifactor Authentication**.



A message will appear, notifying the STEP administrator that the password has been reset for that individual user.



User Anonymizer

User Anonymizer is intended to help companies meet their anonymization needs. This add-on component and its functionality are inspired by the 'right to be forgotten' (i.e., one aspect of the European General Data Protection Regulation (GDPR)). However, there may also be other reasons to anonymize a user as part of an established data clean-up routine / record management policy.

The User Anonymization process consists of replacing a deleted user's STEP ID with an anonymous ID. Once the User Anonymizer process has completed, anonymization is implemented as follows in both workbench and Web UI:

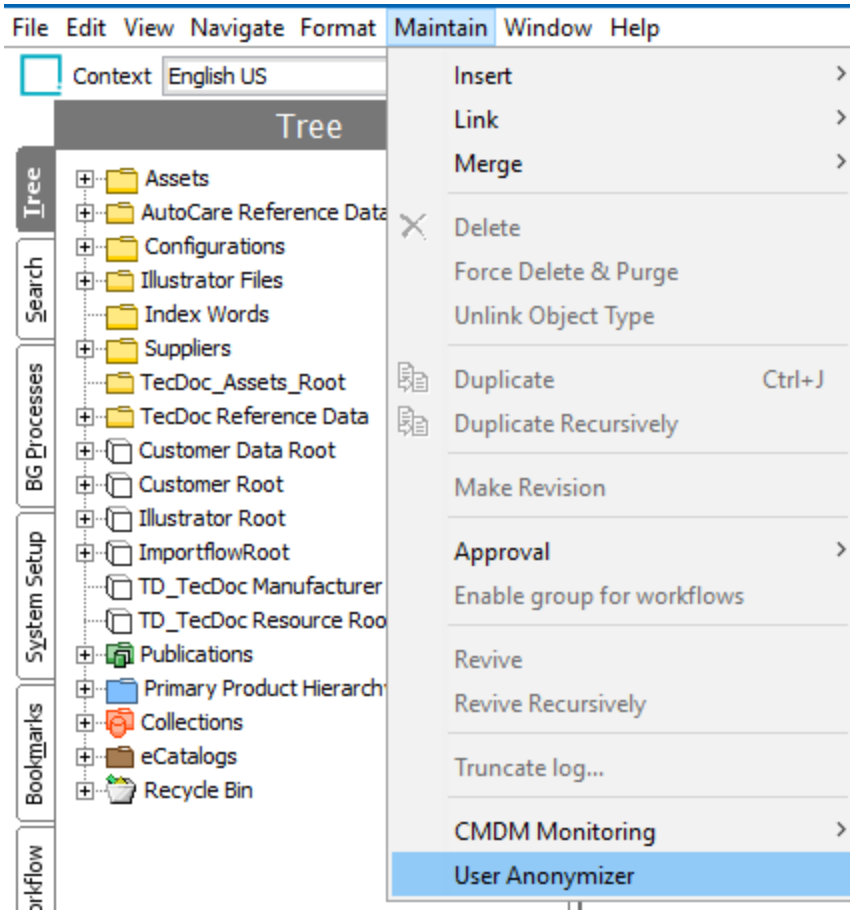
- Revision logs
- Workflow status logs
- Object change logs

Important: Before using this functionality, users should confirm that they are not breaking any retention policies or legal obligations regarding the maintenance of record history. Be aware that anonymizing log files goes against the recommendations of security standards like the OWASP Application Security Verification Standard. In general, Stibo Systems does not recommend using this functionality unless there are very vital business and/or legal reasons for doing so.

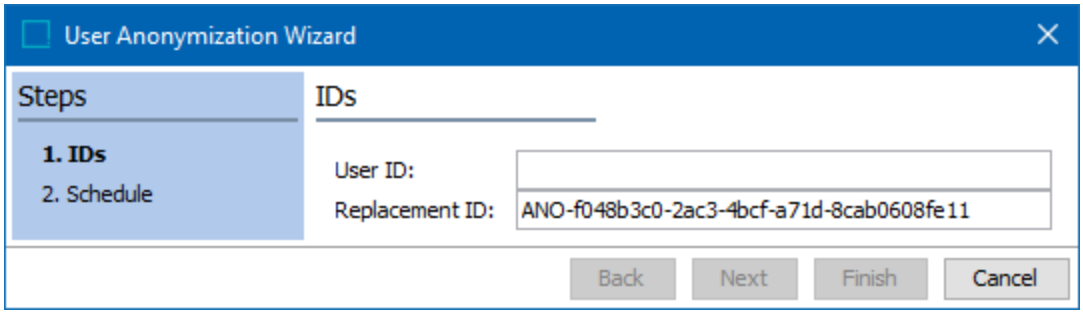
Starting the Anonymization Process

User Anonymizer is done via the workbench by admin users, and anonymizing can only be done to deleted users. This topic does not cover how to delete users. For more information on deleting a user, refer to the **Removing a User from a Group** section of the **Working with Users** topic.

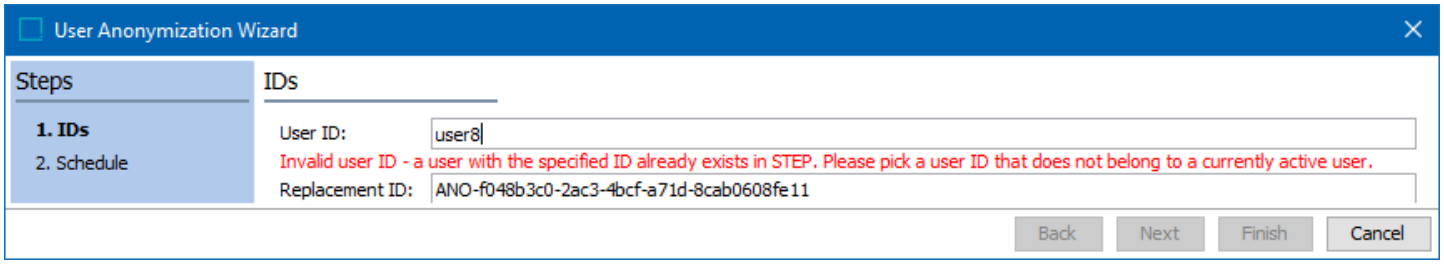
1. In workbench Tree, go to the Maintain menu and select User Anonymizer.



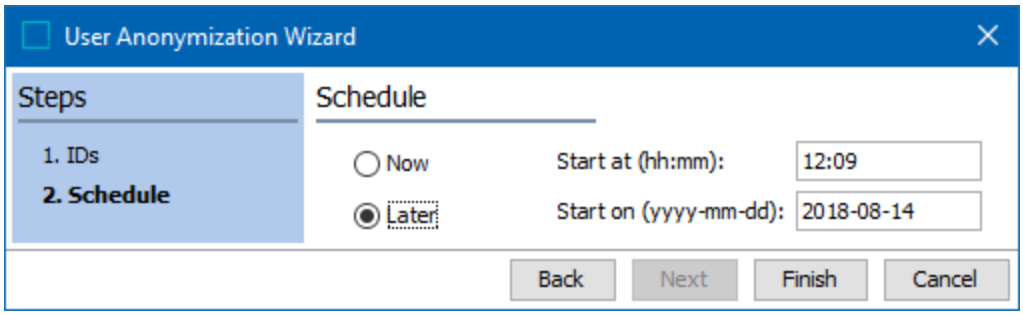
2. Enter the STEP ID of the deleted user to be anonymized. The ID is not case sensitive.



If you enter the ID of an active user, the following message is displayed and cannot move ahead:



3. Click Next.
4. Select 'Later' to enter the date and time to run the process. It may be best for you to do the anonymization after regular business hours. Or, you may leave the default setting of 'Now' selected, and the process will run once you exit the User Anonymization Wizard.

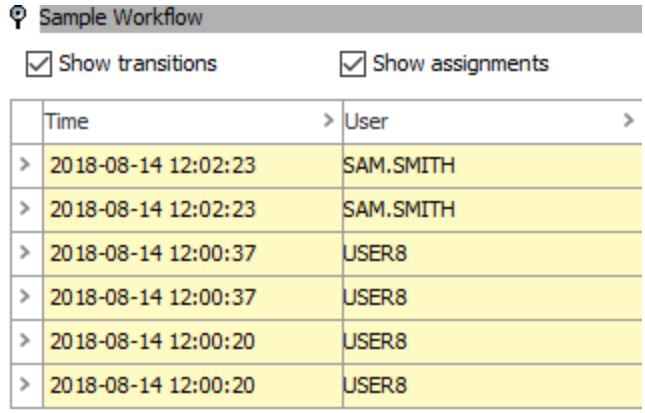


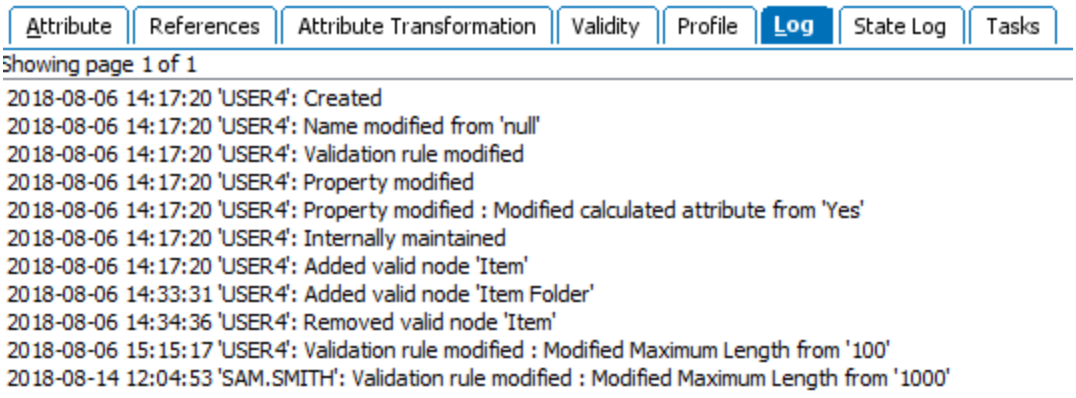
5. Click Finish.

Example: Anonymizing a User

The following example follows user 'Sam Smith' as their ID is anonymized.

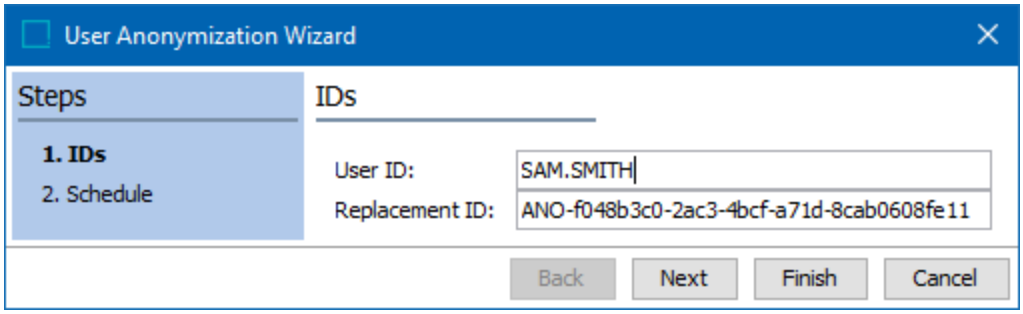
SAM.SMITH is the user identified in a number logs. For example:



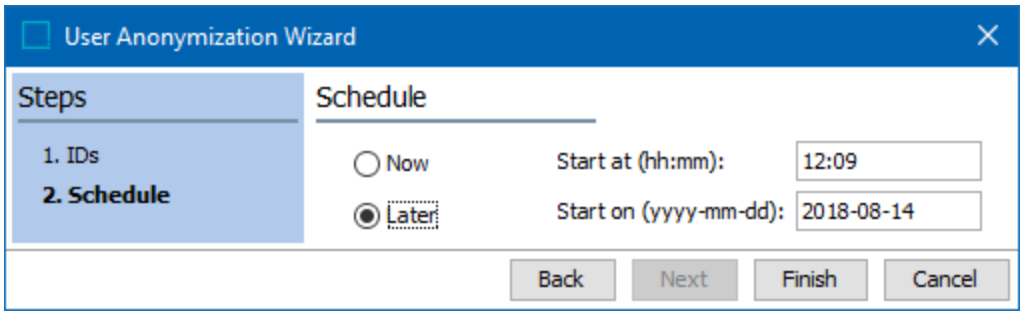


Sam Smith's User ID (SAM.SMITH) is deleted since Sam moved to a new position and no longer accesses a STEP system. It is not vital to the business, nor is there a legal reason, to keep these records.

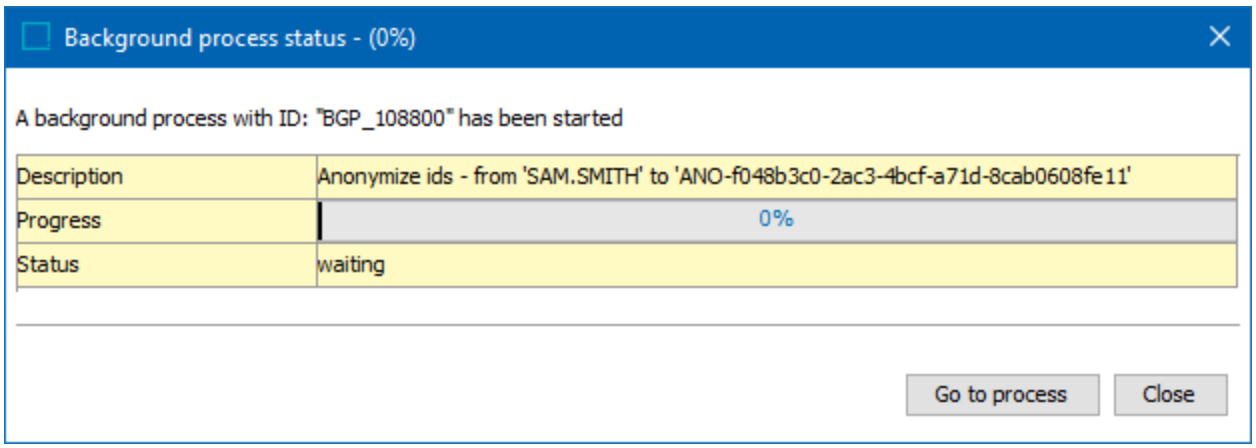
The admin user running the User Anonymizer process enters 'SAM.SMITH' in the ID field and clicks Next.

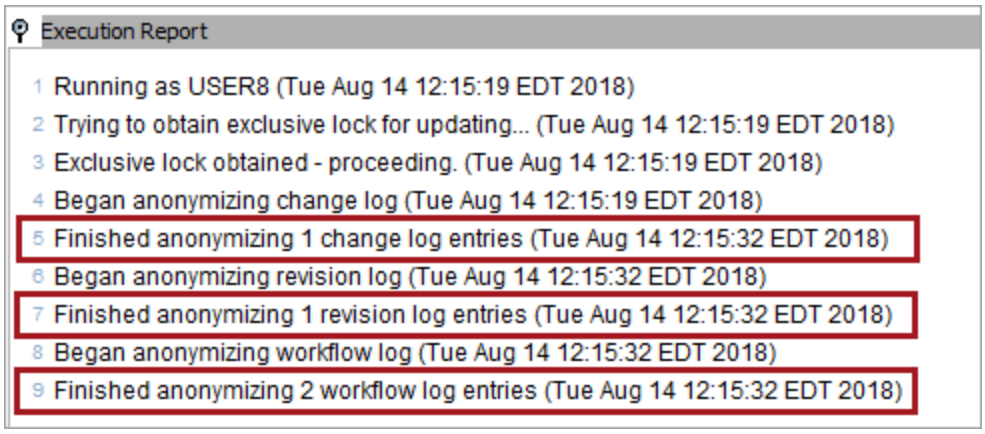


Sam has been at the company for years, Because there are extensive records to anonymize, the process is scheduled for an off time so that there is no business impact as the process runs.



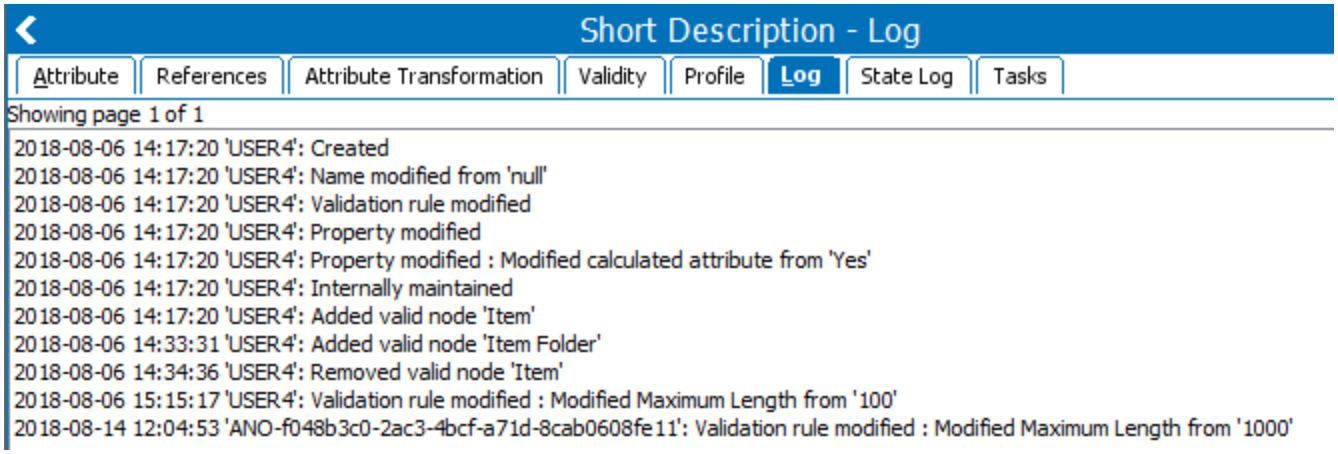
A background process begins, and an Execution Report shows when the anonymization is complete.



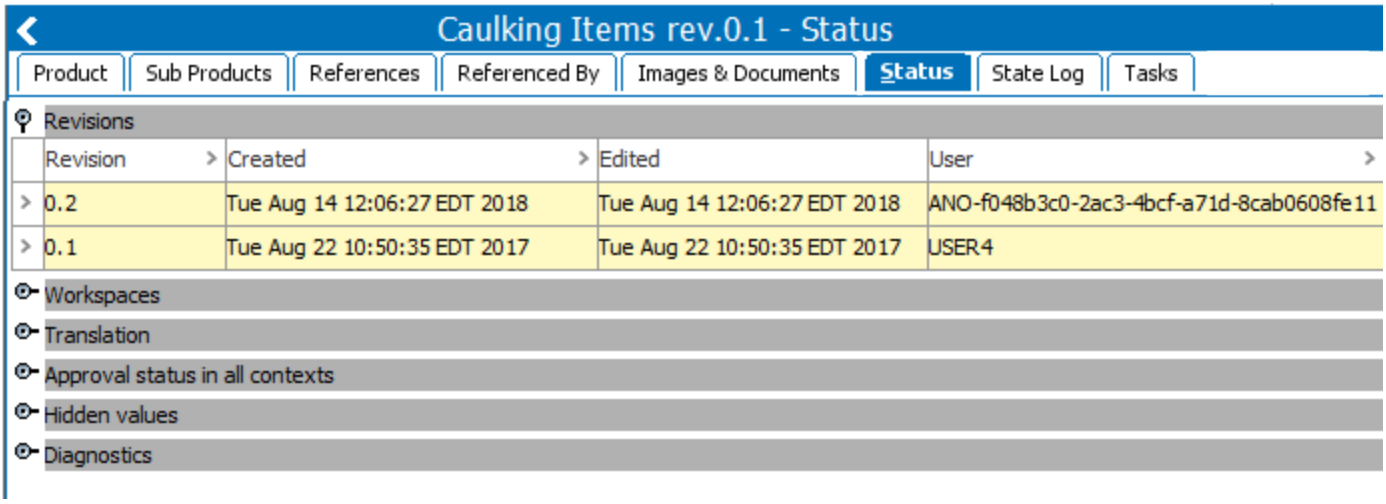


The new anonymized ID shows in place of Sam's ID in the following places:

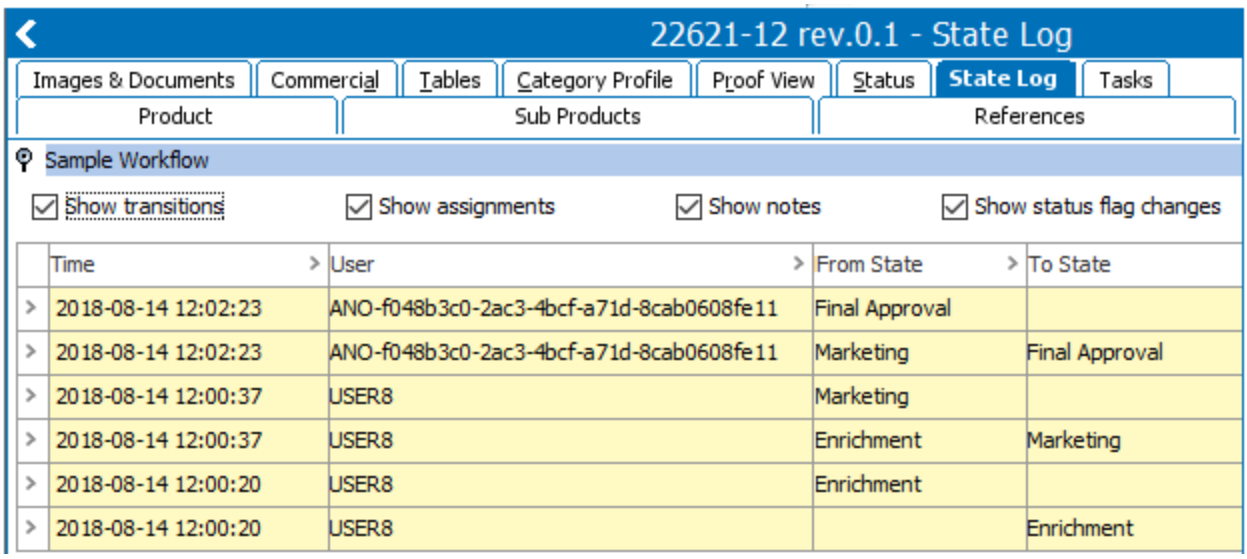
- **[Object] Change Log** (in this example, it is the change log for the 'Short Description' attribute)



- **Revision Log**

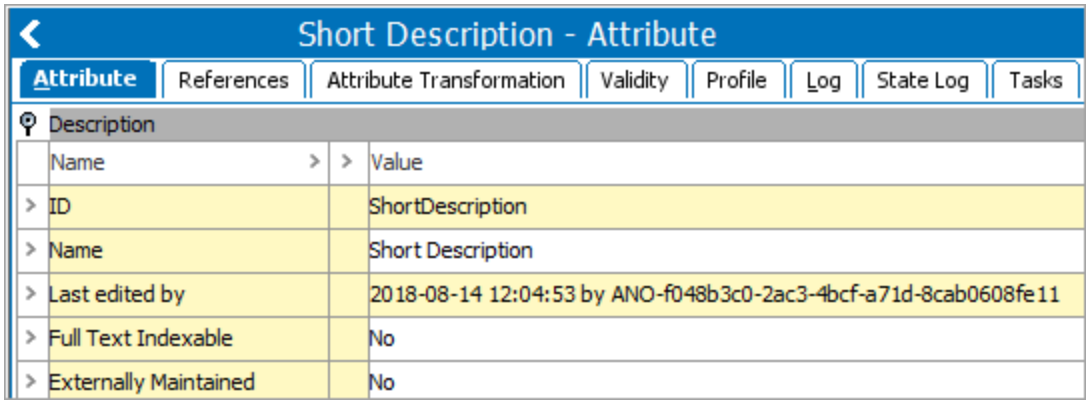


- **Workflow [State] Log**



Time	User	From State	To State
2018-08-14 12:02:23	ANO-f048b3c0-2ac3-4bcf-a71d-8cab0608fe11	Final Approval	
2018-08-14 12:02:23	ANO-f048b3c0-2ac3-4bcf-a71d-8cab0608fe11	Marketing	Final Approval
2018-08-14 12:00:37	USER8	Marketing	
2018-08-14 12:00:37	USER8	Enrichment	Marketing
2018-08-14 12:00:20	USER8	Enrichment	
2018-08-14 12:00:20	USER8		Enrichment

Additionally, the user ID is also anonymized within an object's 'Last edited by' aspect.



Name	Value
ID	ShortDescription
Name	Short Description
Last edited by	2018-08-14 12:04:53 by ANO-f048b3c0-2ac3-4bcf-a71d-8cab0608fe11
Full Text Indexable	No
Externally Maintained	No

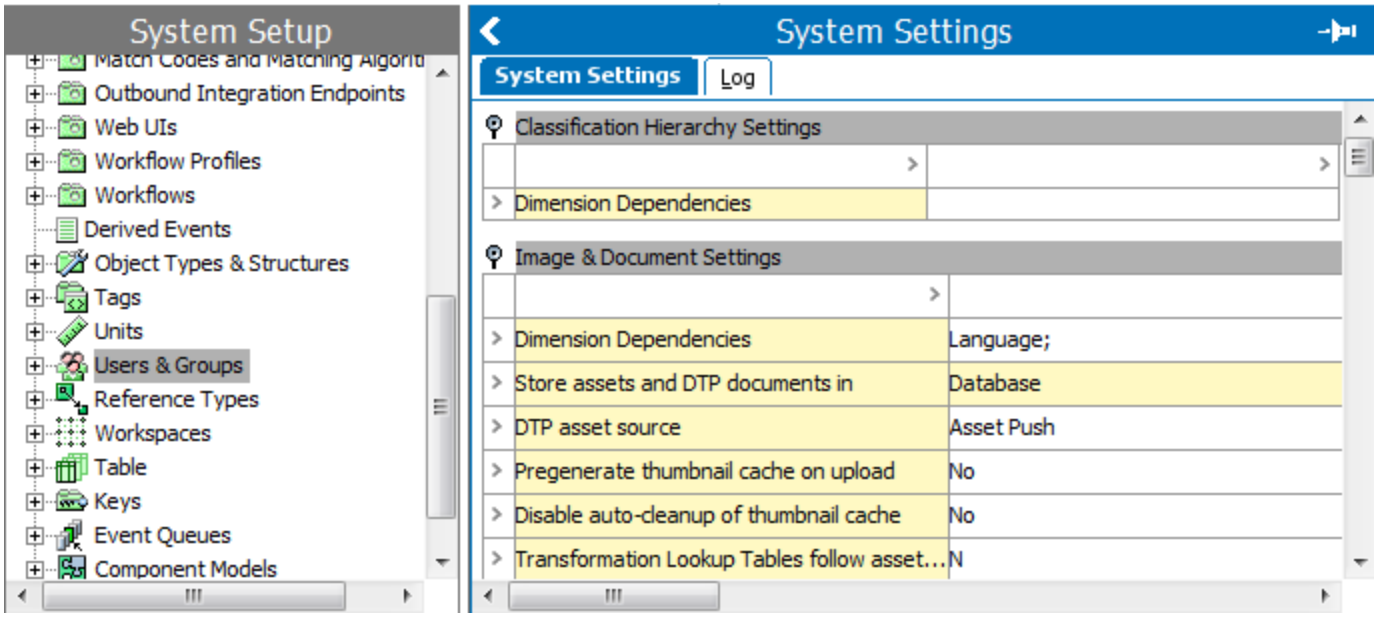
While the examples in this topic are all showing the User Anonymizer end results in workbench, the anonymization is visible in Web UI, where configured and applicable (as a starting point, refer to the **Web User Interfaces** documentation). For example, revision information on the Multi Revision screen:

	Name	ID	Brand	Revision
0.2 (CURRENT)	Caulking Items	8242	Products Galore	0.2 Created by ANO-f048b3c0-2ac3-4bcf-a71d-8cab0608fe11 on Tue Aug 14 12:06:27 EDT 2018
0.1	Caulking Items	8242		0.1 Created by USER4 on Tue Aug 22 10:50:35 EDT 2017

System Settings

Global system settings are maintained in the **System Setup** tab, under the **Users & Groups** root node.

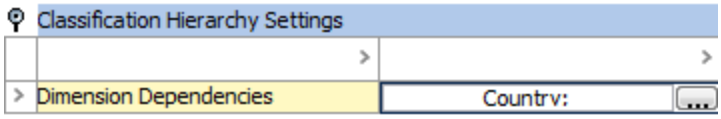
In System Setup, click **Users & Groups**. A **System Settings** editor appears. It lists a number of general and global settings on the system. Each of these settings will be described throughout this section.



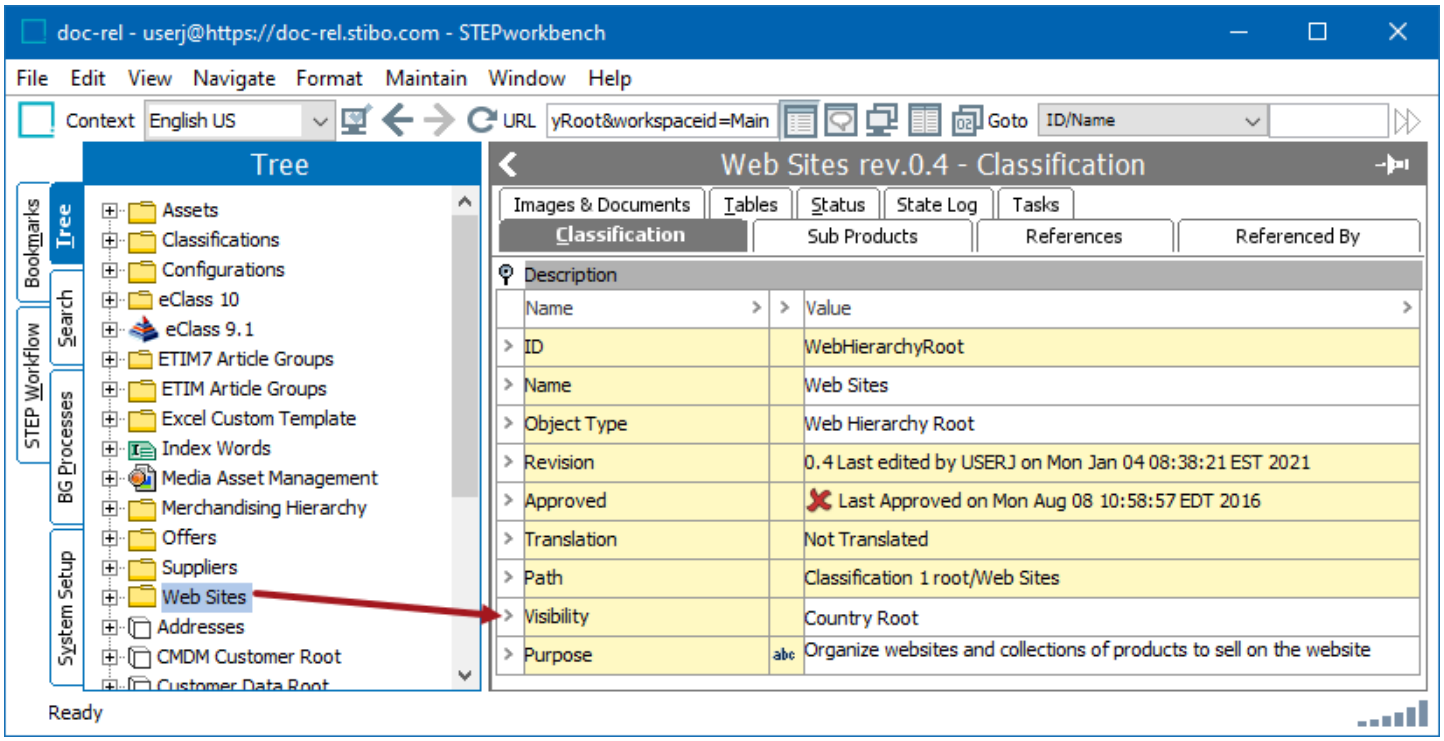
Classification Hierarchy Settings

Dimension Dependencies

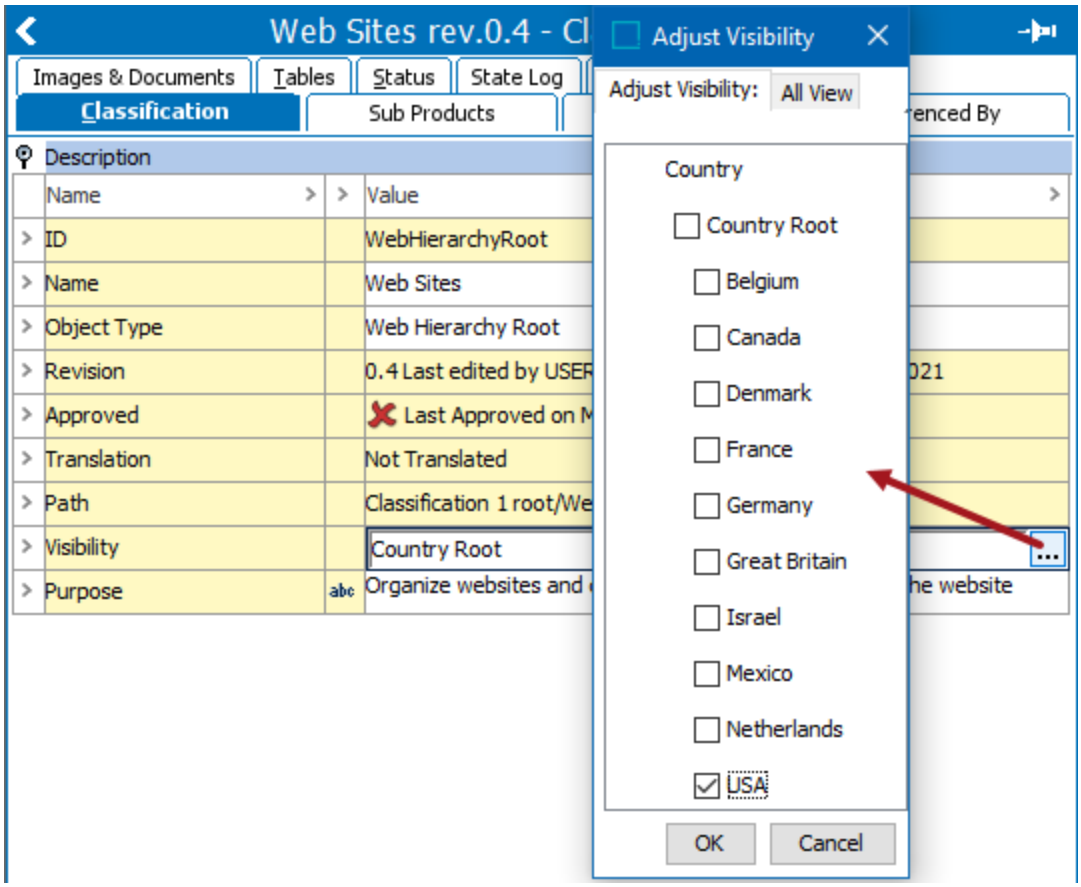
This option allows for **folders** in classification structures to be dimension-dependent. This is different than the dimension dependencies that are set on the object type. Selecting dimension dependencies will determine whether classification structure will or will not be shown in specific languages or countries. In the example below, the dimension dependency has been set for country by clicking on the ellipsis **[...]** button and selecting Country.



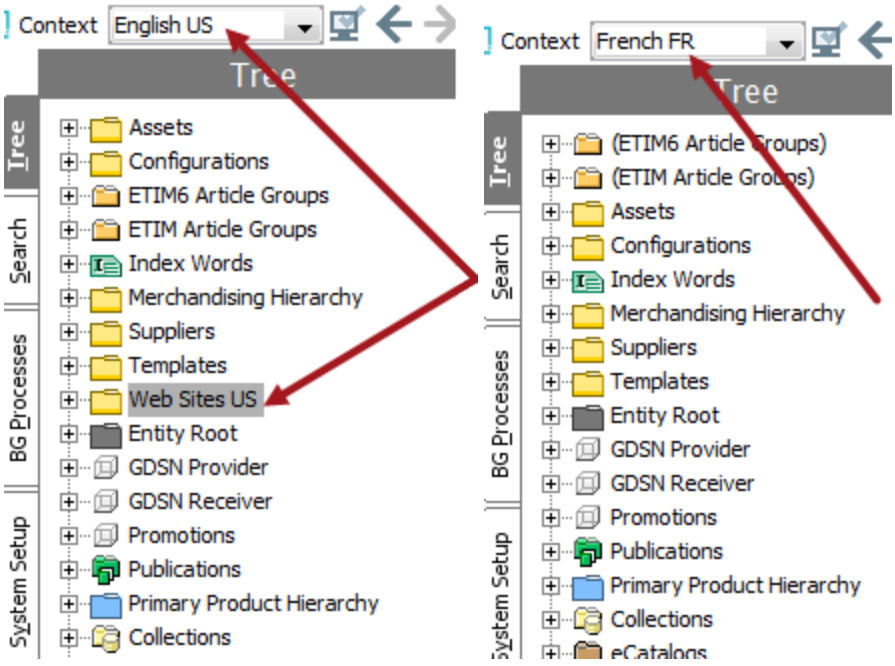
Selecting this dimension dependency added the Visibility metadata attribute to the classification objects in Tree.



Click within the Visibility row, and then click the ellipsis button (...) that is available to the right of the words 'Country Root'. From the 'Adjust Visibility' dialog, select which country or countries your folder structure will show in. In this example, we have a classification structure for Web Sites US.

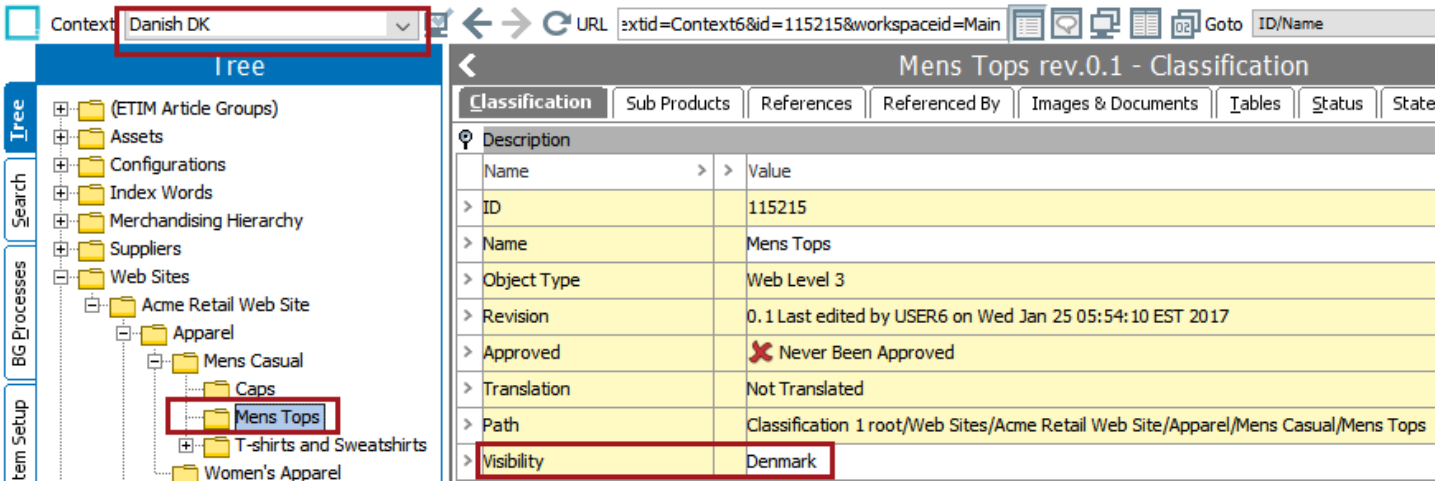


The example below shows an application where classifications have been made country-dependent, and an entire web structure has been created that is visible only in a context where English US is the selected country. The Web Sites Classification folder is not visible in the French FR context.



Note that it is also possible to have selected folders within an existing classification structure that are dimension-dependent (e.g., presence of subfolders is dimension-dependent rather than the hierarchy itself). It depends entirely on which country (in this example) is populated in the currently selected context. Therefore, it is extremely important that when a classification folder is intended to be visible in all countries that the currently selected context specifies 'Country Root' as the country dimension point. Otherwise it will not be visible in all contexts.

When sub-classifications are visible in another context, this can be found on the References tab of the parent. For example, the Mens Tops classification has Visibility = Denmark. In the Danish DK context, this classification is displayed in the hierarchy.



When we switch to the English US context, the Mens Tops classification is not visible in the Tree. However, if we view the References tab of the parent folder (Mens Casual), the Mens Tops classification is listed under the 'Visible Objects in Other Contexts' flipper.

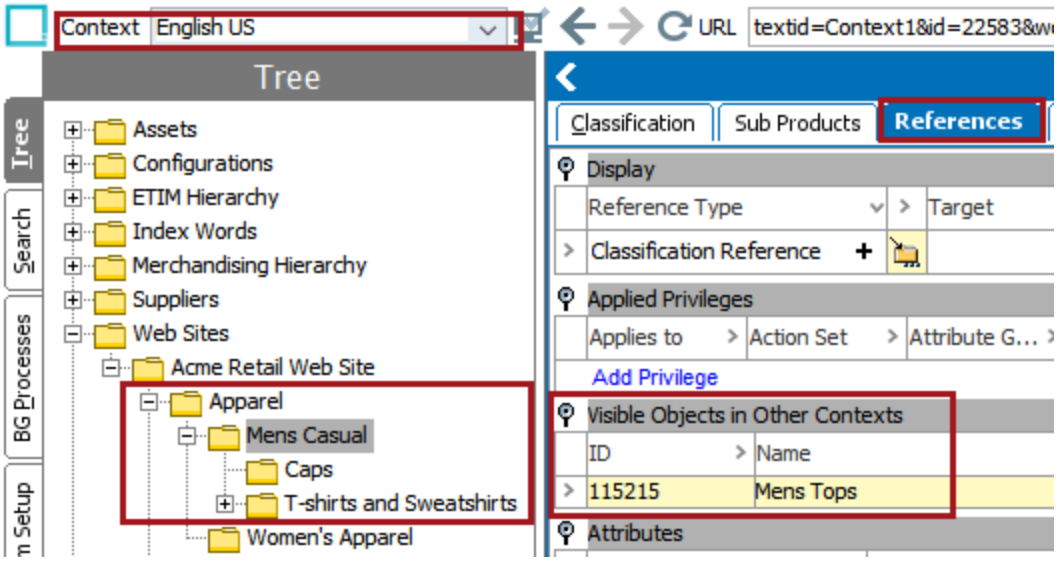
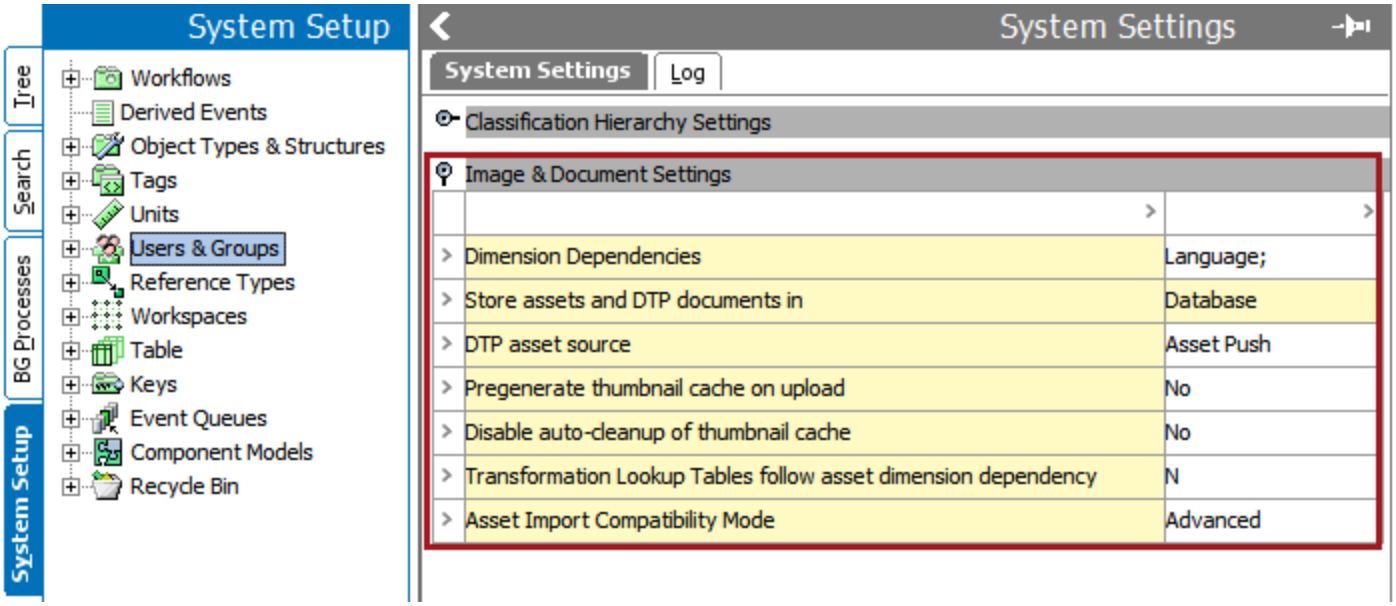


Image and Document Settings

This section is used to describe the various options available in the **System Setup** > **Users & Groups > Image & Document Settings**.



Dimension Dependencies

The Dimension Dependencies option is used if there is a requirement to store images or documents in different contexts. For example, you may have a requirement store an image that has English labels in the image and the same image with French labels, as found in the examples below.

To set up, click in the Dimension Dependencies value row, then click the ellipsis button (...). Select the Language option. Now the image in English can be stored in the English context and the image in French can be stored in the French context.

Note: In the image examples used above, both must have the same image ID when loading into STEP and the appropriate dimension point must be selected for each image.

Store assets and DTP documents in

This option is used to determine where Assets and DTP (Desktop Publishing) documents are stored. There are only two options used: Database and File System. Database is the default and stores the Assets and DTP documents to the Oracle DB. However, if there is a business requirement that necessitates the need to store Assets and DTP documents in a separate File System (such as the number and size of the Assets requiring an inordinate amount of time to back up), the option is available but will require further configurations and setups that are outside of STEP.

Important: This parameter should not be changed without first determining how assets are stored, and carefully considering the benefits of each option. If steps have already been taken to establish a File System solution, this parameter should not be switched back to Database unless the user is absolutely certain that Database is the desired setup.

Before this option can be modified, properties must be added in the sharedconfig.properties file, as defined in the **Initial Setup for an External File Structure** topic of the **Digital Assets** documentation.

DTP asset source

This option works in tandem with the **Store assets and DTP documents in** option and the two values available are Asset Push and External Storage. Asset Push is the default option for storing Assets in the database, and External Storage is used only if it is determined that a hidden File System is required.

Pregenerate thumbnail cache on upload

Under normal circumstances, a thumbnail of an image is generated the first time that image is accessed or the first time a product is selected that contains the image as a primary image. Setting this option to 'Yes' generates the thumbnail when the image is uploaded to the system. A user can perform this action manually using the **Pre-generate Thumbnail Cache...** option on the File menu, as defined in the **File Menu** topic of the **Getting Started** documentation.

Disable auto-cleanup of thumbnail cache

By default, the thumbnail cache in STEP is cleared when it reaches 100MB.

- Set the option to 'Yes' to allow the cache to grow as large as needed to maintain the thumbnail images.
- Set the option to 'No' to improve performance and limit the cache to the default size.

Transformation Lookup Tables follow asset dimension dependency

A transformation that uses a lookup table can be dimension dependent. If set to 'Y', you could have a table that converts the words 'week', 'month', and 'year' to 'wk.', 'mo.', and 'yr.' when in the dimension of the English language, and also converts the words 'semaine', 'mois', and 'année' to the corresponding abbreviations in the

French language dimension.

While allowed, recommended practice is to create separate lookup tables for each language.

Note: This works only if the Dimension Dependency of the 'Lookup Tables' and the Dimension Dependency of 'Images and Documents' are set the same.

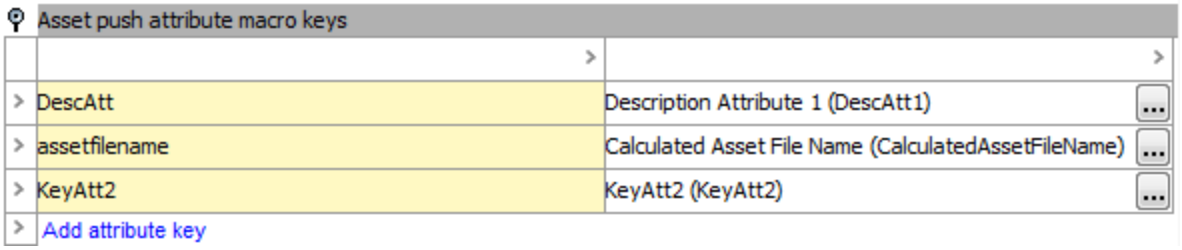
For more information, refer to the **Transformation Lookup Tables** topic in the **Resource Materials** online help.

Asset Import Compatibility Mode

Two options are available for this setting: 'Simple' and 'Advanced'. 'Advanced' is the default setting on new STEP systems, and enables the Asset Importer functionality. Selecting 'Simple' will enable the legacy image import functionality and disable the Asset Importer.

Asset Push Attribute Macro Keys

The **Asset push attribute macro keys** are user defined keys that are designed to extract values from any Description attribute on an asset so they can be used in place of the file name in the asset push path. These are created when a user has opted to use a **Relative Path Template** (RPT) which is a folder structure that is not based using the asset ID. For more information regarding Relative Path Templates including the use of the **Asset push attribute macro keys**, refer to the **Relative Path Template** section of the **Asset Push** documentation.



For an example using an attribute macro key in a calculated attribute, refer to the **Asset Push File Name Scenario** documentation.

Calculated Attribute Settings

The **Calculated Attribute Settings** located in System Setup > Users & Groups > Calculated Attribute Settings allows a user to add a dimension dependency to the formula of a calculated attribute. This is useful when text elements are used within a formula. Dimension Dependency allows value templates to differ across contexts by using a different formula template for the same attribute, based on the selected dimension.

Note: If translation of a value template is required, ensure that the syntax is valid.

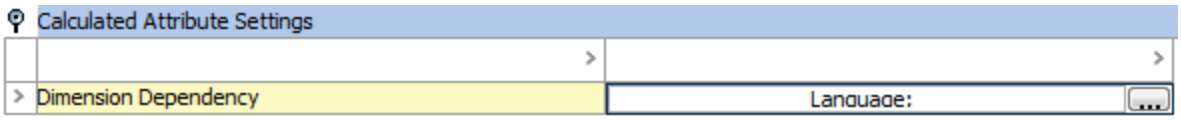
For example, when calculating 'width x depth x height' using the language dimension dependency,

- The following value template for English could return uppercase letters for width, depth, and height as '12W x 16D x 24H':

```
Concatenate(prodval('Width'),'W x ', prodval('Depth'), 'D x ', prodval('Height'), 'H')
```

- The following value template for French could return the preferred lowercase letters for largeur, profondeur, and hauteur as '12l x 16p x 24h':

```
Concatenate(prodval('Width'),'l x ', prodval('Depth'), 'p x ', prodval('Height'), 'h')
```



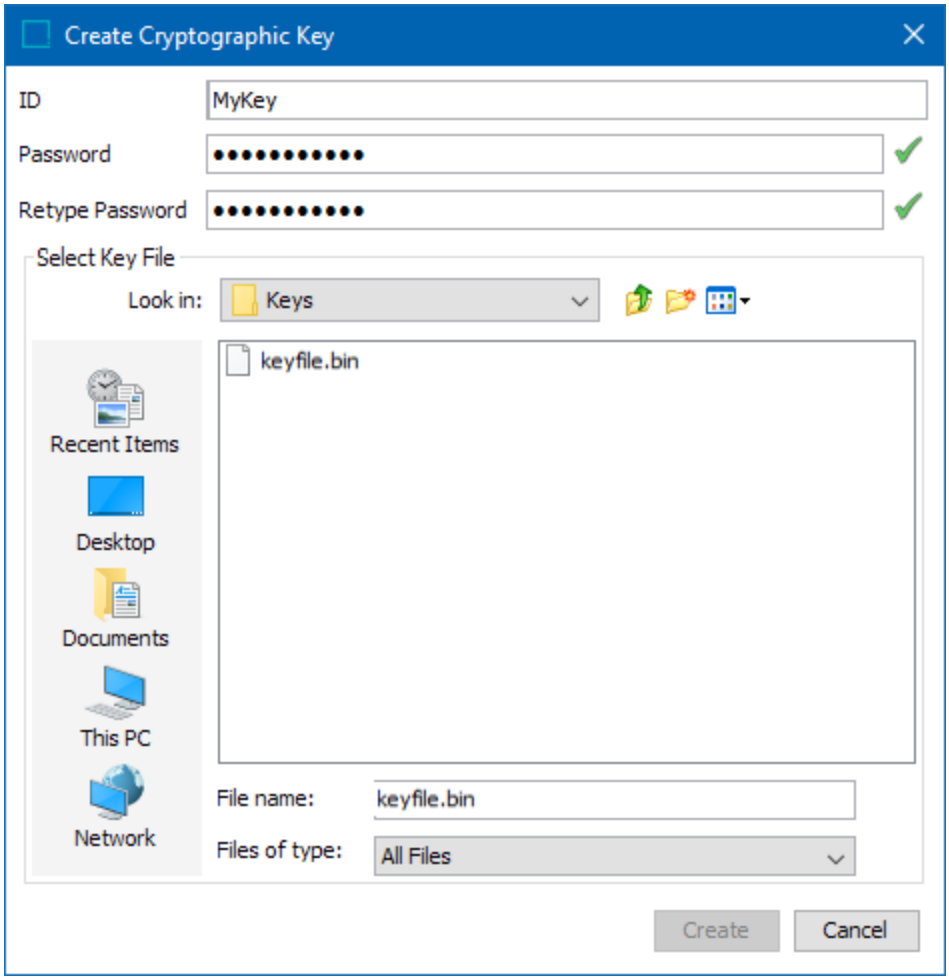
For information about calculated attributes, refer to the **Calculated Attribute** section of the **System Setup** documentation.

Cryptographic Keys

There may be attributes that contain data that is only to be maintained or viewed by a very limited number of users such as medical information that is HIPAA protected. It is possible to encrypt an attribute so that a password has to be entered in order to view or edit values of the attribute. However, a cryptographic key must be created before creating an encrypted attribute. Note that the use of cryptographic keys requires a license.

Creating cryptographic keys

Cryptographic keys are created in the System Setup on the Users & Groups node. When creating a new cryptographic key in STEP a 32 byte file with the actual key will be needed. This key file must be kept in a safe place afterward, (possibly encrypted as well), where it cannot be accessed by intruders. In addition to the key file, an ID and a password have to be supplied.



The ID will be shown to users when prompting for the password, so it would make sense to make the ID human readable. The password is needed each time attributes using this key are encrypted or decrypted. The password can be changed after a cryptographic key has been created. After changing the password, all attributes using the cryptographic key use the new password but the data / values are not modified by changing the password.

Password Requirements

The minimum requirements for passwords are 8 characters containing at least 3 of the 4 groups:

- Lower case characters a-z
- Upper case characters A-Z
- Digits 0-9
- Symbols

Note: The Setup Action **Maintain cryptographic keys** is required in order to create / delete cryptographic keys as well as changing passwords for them.

Validation Templates

The standard validations that are available when creating a new attribute (Text, Number, Integer, etc.) may be augmented by adding new validations based on Regular Expressions. These validations may be created attribute-by-attribute or a template might be created that may then be selected and re-used on many attributes that use the same regular expression pattern (e.g., for US telephone number format and re-used for Work, Home, and Mobile phone number attributes).

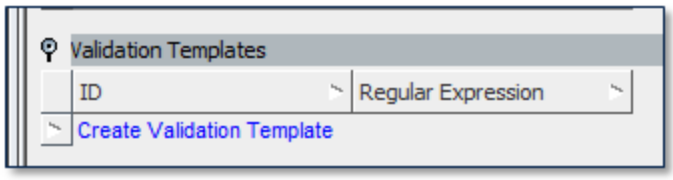
In STEP it is possible to make customized validation base types to be used on Attributes and LOVs. In this field you can create validation templates to be used when creating Attributes or LOVs.

The validation templates require a regular expression. A regular expression is a specific pattern that provides concise and flexible means to 'match', (specify and recognize), strings of text such as particular characters, words, or patterns of characters. For more information on regular expression, refer to the **Regular Expression** topic in **System Setup** documentation.

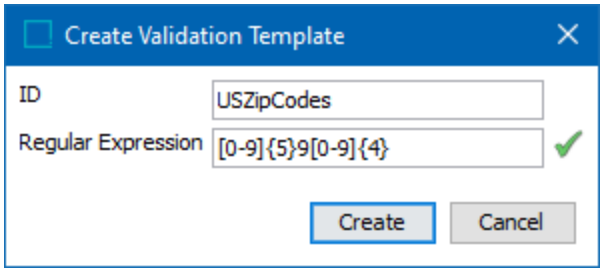
The example below shows how a new Validation Template may be created and how that new template subsequently displays in the drop-down list of validation base types when a new attribute is created (or when changing an existing attribute's validation).

To create a Validation Template:

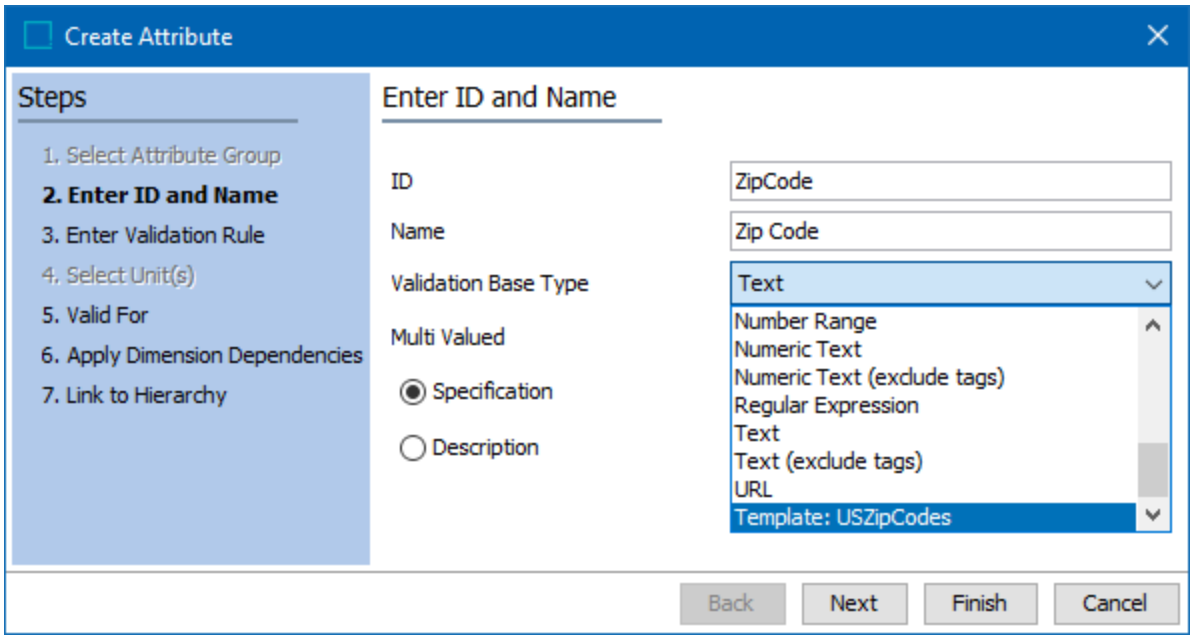
1. Click **Create Validation Template**.



2. In the **Create Validation Template** dialog, type in ID and regular expression and click **Create**.



When a Validation Template has been created, the template can be used when creating new Attributes and LOVs. The template is available among the standard validation base types in the Attribute or LOV editors.



Note: Once you have assigned an attribute to use a Validation Base Type that is a Regular Expression Template, then that template is 'copied' to that particular attribute and the link to the original template is broken. If a user decides to edit the regular expression for that attribute, they must do it at the attribute level. Changing the Regular Expression Template in System settings has no effect.

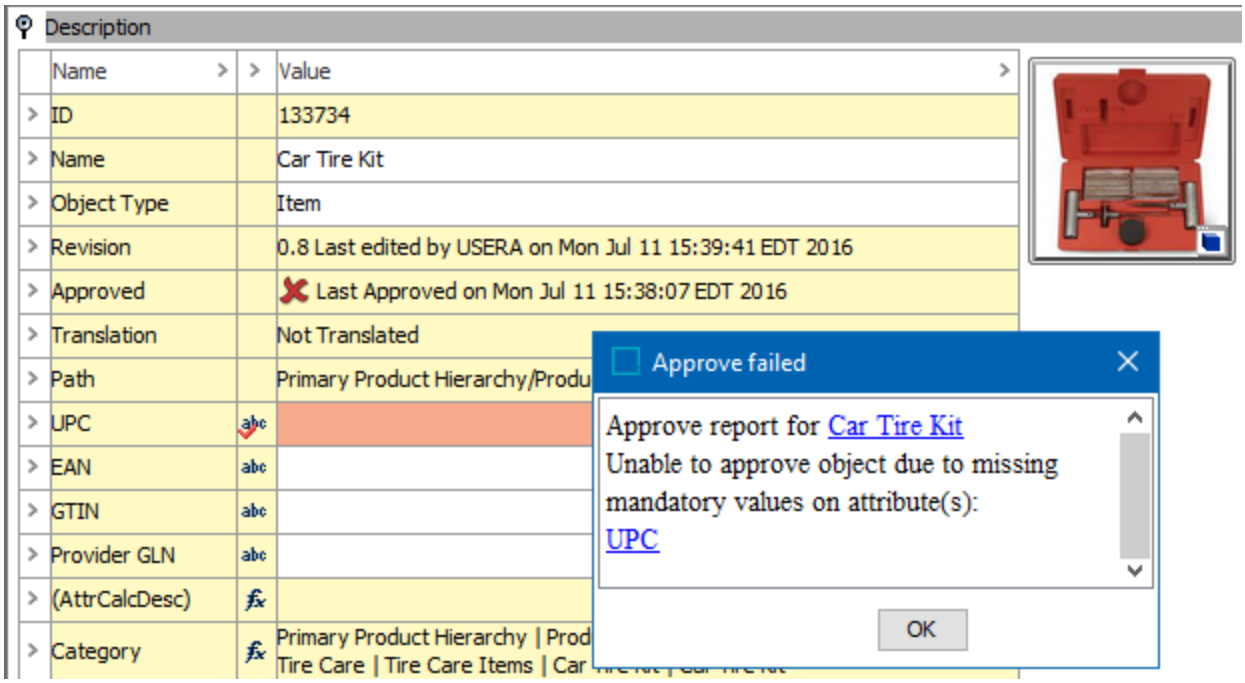
Product Information Manager Default Settings

This section describes the options available in System Setup > **Users & Groups > Product Information Manager Default Settings.**

Product Information Manager Default Settings	
Name	Value
Enforce Mandatory Check for Attributes, References and Links	none
Product Editor, Group attributes by top group	N
Localize numbers with thousand delimiter when localizing exports	Y
Localize dates when localizing exports	Y
Report Save As CSV Character Set	client-locale
Default Attribute to use as Display Sequence Attribute	DisplaySequence
Default Completeness Metric	Test
Conditional Validity Attribute	ConditionAttribute
Block Attribute Groups with more than 1000 attributes	Y
Use full pathname for classes on Product References Tab	N
Pass through unconverted Special Characters and Tags (Y) or discard them on output (N)	N
Product Attribute Help metadata attribute	Attribute Description (Attribute Description) ...
Attribute indicating the Priority of Product Variant Attributes	Product Variant Priority
Show both name and ID in the PIM navigator	Y
Comma separated list of node types for which to show both name and ID	
Attribute Header Column Width	250
Reference Type Column Width	120

Enforce Mandatory Check for Attributes, References and Links

This is the setting that controls whether or not objects can be 'Approved' if they are missing information that has been declared as mandatory. In the image below, the attribute UPC has been set up as mandatory. If the value is set to 'none', the object can still be approved, but the missing attribute value will give a visual indication of the missing data and shows in a background of red / brown. If the value for this setting is set to 'Y', the object cannot be approved.

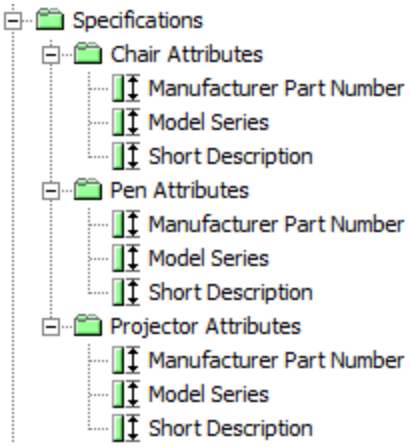


Note: This is a System-wide setting, thus it cannot be turned on and off at different places in the Tree hierarchies.

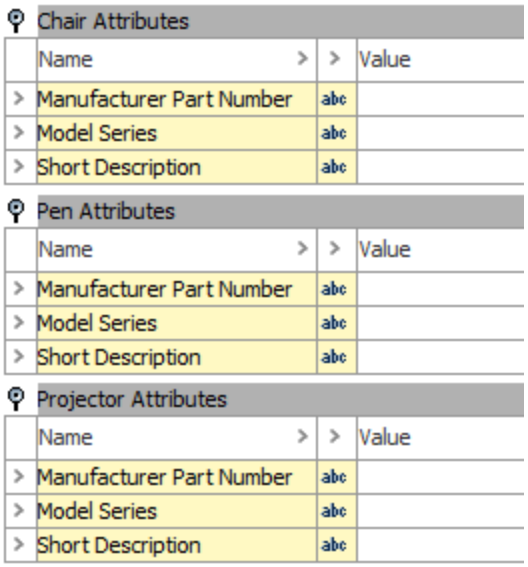
Product Editor, Group attributes by top group

There are cases where a user may create an attribute group that has multiple attribute sub-groups containing the same attributes. This can be the case when setting up User Rights and Privileges where a user can change an attribute value in one sub-group, but does not have the privilege to change the attribute value for the same attribute in the other sub-groups. This setting will control how these attributes are viewed in the workbench.

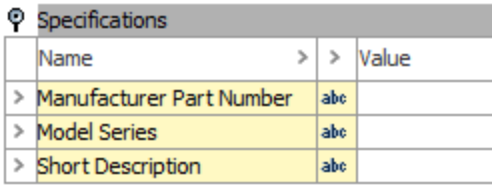
Fore example, you might have an attribute group called 'Specifications' as in the example below. Within that group, you may have several sub-groups containing the same attributes. Again, the use case would be that the user would be responsible for the 'Chair Attributes', but would not be granted privileges to change the same attributes within the 'Pen Attributes' sub-group or the 'Projector Attributes' sub-group.



When the value for this setting is set to 'N', the attribute sub-groups would show up in workbench as in the following image. In the use case example, the user would only have privileges to change "Chair Attributes' but 'Pen Attributes' and 'Projector Attributes' would still appear.



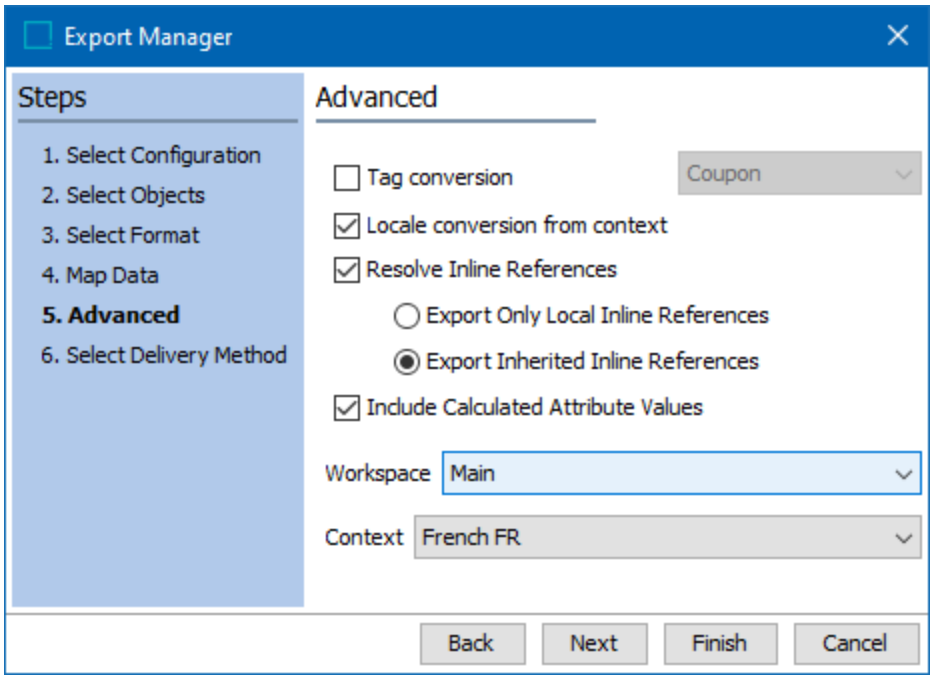
When the value for this setting is set to 'Y', the attributes would roll up into the top group. The user would still have privileges to update 'Chair Attributes' but 'Pen Attributes' and 'Projector Attributes' do not appear.



Localize numbers with thousand delimiter when localizing exports

This setting affects the way numeric values are shown for a selected context. For data exports, this setting causes the system to apply the appropriate thousand delimiter to attributes that have the validation of Number, Integer, Fraction, or Embedded Number. Attributes with the validation of 'Numeric Texts' will not be localized with this setting as they are actually text attributes.

If set to 'Y', when exporting data the currently selected context is always used. If a locale has been assigned to that context, then that locale will be suggested in the Export Manager's Advanced screen as in the image below.



This setting will also affect Flatplanner and the STEP function localizenumber() in calculated attributes.

Important: This setting affects the values presented in the table preview for print applications. It also adversely affects any calculated attribute in the table that accesses attributes with **Numeric**, **ISO Date**, or **ISO Date and Time** validations. Common setup for print applications is to keep this setting at 'N' and use Export Manager to control the localization of exports.

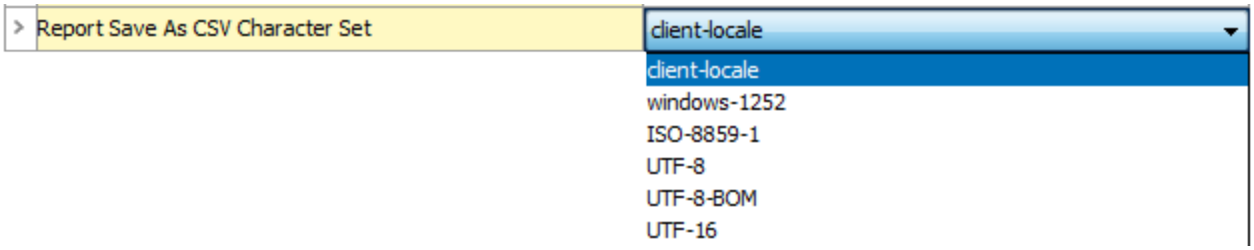
Localize dates when localizing exports

Set the **Localize dates when localizing exports** to Y, if you want number validated values (with base type **Date**, **ISO Date** and **ISO Date and Time**) to be converted into locale values (e.g., YY-MM-DD replaced by DD-MM-YYYY). Values are localized in Flatplanner (considering note below) and optionally in the STEP Export Manager Advanced screen as shown in the 'Localize numbers with thousand delimiter when localizing exports' section above.

Important: This setting affects the values presented in the table preview for print applications. It also adversely affects any calculated attribute in the table that accesses attributes with **Numeric**, **ISO Date**, or **ISO Date and Time** validations. Common setup for print applications is to keep this setting at 'N' and use Export Manager to control the localization of exports.

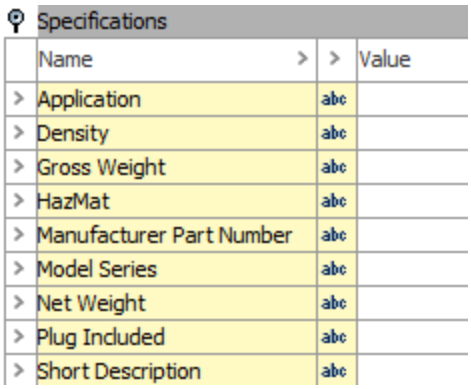
Report Save As CSV Character Set

Reports can be saved in various character formats. In this drop-down you can choose the character format to be used when saving reports as CSV. The available choices are: Client-locale, Windows-1252, ISO-8859-1, UTF-8, UTF-8-BOM, UTF-16.



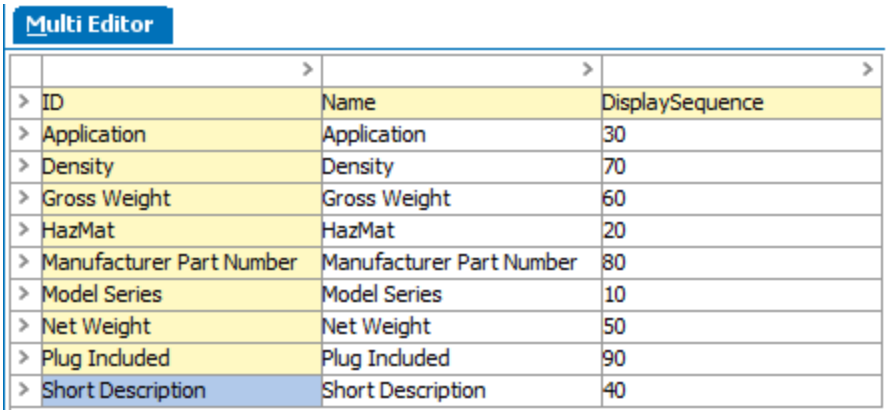
Default Attribute to use as Display Sequence Attribute

By default, attributes in attribute groups are shown in alphabetical order when viewed in the workbench or Web UI as shown in the example below. This setting allows the user to select the metadata attribute to use when displaying the attributes in the Product Editor to sequence the order of the attributes.

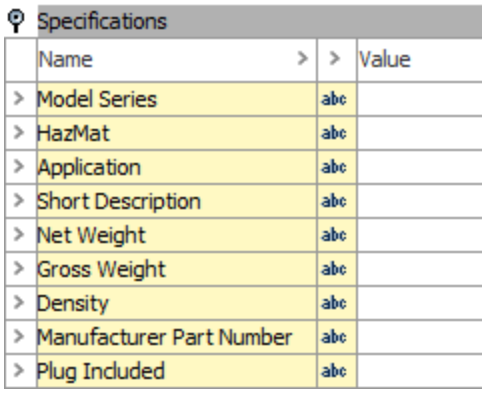


To use this feature, a meta-data attribute must be created to select as the default attribute for sequencing attributes. In this example, a metadata attribute with the ID 'Display Sequence' was created and selected as the default attribute.

This option allows for the user to re-order how any or all of the attributes are shown within that attribute group. This can be done either in a single attribute or in the Multi-Editor as shown in the image below.



As a result, the attributes show in the order in which they were sequenced.



Specifications		
Name		Value
Model Series	abc	
HazMat	abc	
Application	abc	
Short Description	abc	
Net Weight	abc	
Gross Weight	abc	
Density	abc	
Manufacturer Part Number	abc	
Plug Included	abc	

Note: If some attributes have a Display Sequence and others do not, the system displays the ones that have a sequence number first, and then reverts to displaying the remainder in alphabetic order. For more information about Attribute Display Sequence, refer to the **Attribute Display Sequence** section of the **Attributes** documentation.

Default Metric

STEP allows the use of multiple metrics. This setting allows for the selection of a default metric. When a metric is set as the default metric, the completeness meter shown on the product and entity editor tabs in the Workbench display the value from the default metric. For more information about Metrics, refer to the **Metrics** section of the **System Setup** documentation.

Conditional Validity Attribute

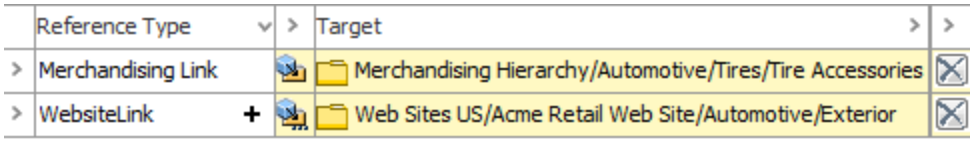
This setting is used to activate a conditional attribute. For more information about conditional attributes, refer to **Conditional Attribute Display** topic of the **Attributes** documentation.

Block Attribute Groups with more than 1000 attributes

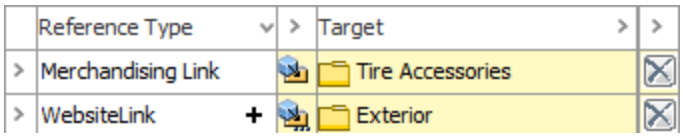
For performance reasons, it may be necessary to prevent the opening of attribute groups with more than a 1,000 entries for that group. The attributes are still accessible using the Search function in workbench or hyper-linking to them from the Edit Panel in single-product mode.

Use full pathname for classes on Product References Tab

This setting affects how the system displays the information concerning a Product-to-Classification link. A setting of 'Y' gives the full path name of the Product-to Classification link as found in the first image below and a setting of 'N' just gives the Classification folder name as found in the second image.



Reference Type	Target
Merchandising Link	Merchandising Hierarchy/Automotive/Tires/Tire Accessories
WebsiteLink	Web Sites US/Acme Retail Web Site/Automotive/Exterior

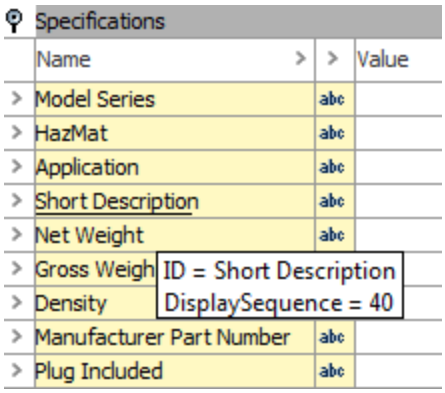


Pass through unconverted Special Characters and Tags (Y) or discard them on output (N)

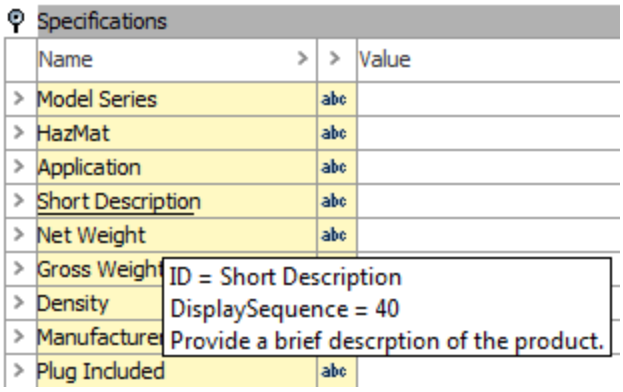
This setting is used to determine whether unconverted Tags and Style Tags should be outputted when there is not an actual conversion for that particular Tag. For example, if this option is set to 'Y', any tag that does not have a conversion in a certain media the actual 'internal' STEP tag will be output as-is. This would normally result in a web application ignoring the tag because it is not HTML, and in InDesign, the incorrect command will cause an error when the information is mounted to a page. If set to 'N', when there is no output conversion for a Tag or Style Tag, the internal STEP tag should be suppressed on output. Refer to the topic on **Tags** in the **System Setup** documentation.

Product Attribute Help metadata attribute

In workbench, it might be useful to display some informational text about an attribute. A use case for this might be to inform the user of the type of information that is expected for the attribute value. This option is used to select the meta-data attribute created to provide this information. Once selected, attributes containing a value for the metadata attribute will display that information when the cursor is hovering over an attribute. The following image depicts what a user would typically have without the help meta-data attribute.



However, once a meta-data attribute is created and selected in this option, the user will have additional information about the attribute. In this example, when the user hovers over the attribute 'Short Description', the user is being asked to provide a brief description of the product.

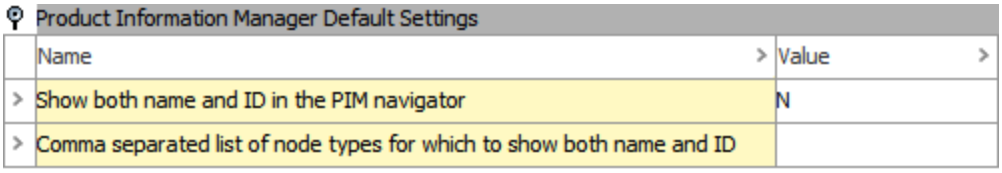


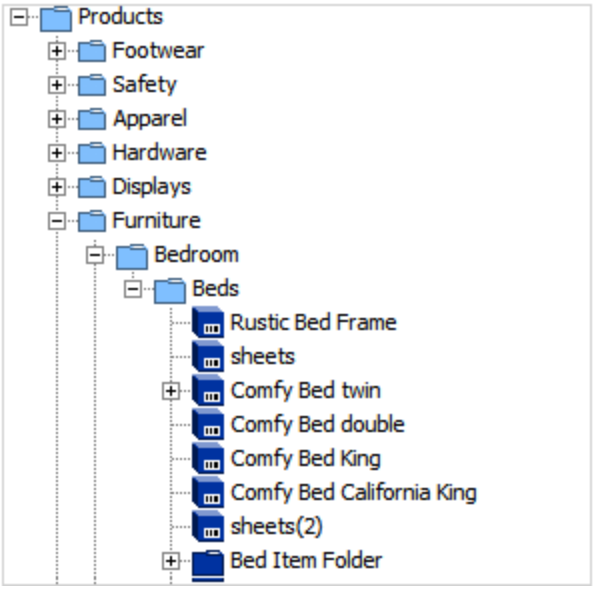
Attribute indicating the Priority of Product Variant Attributes

This setting is used to select the attribute that is to be used as a variant priority attribute. For more information regarding prioritizing product variant attributes, refer to the **Create a Product Variant Priority Attribute** section of **Product Variants**.

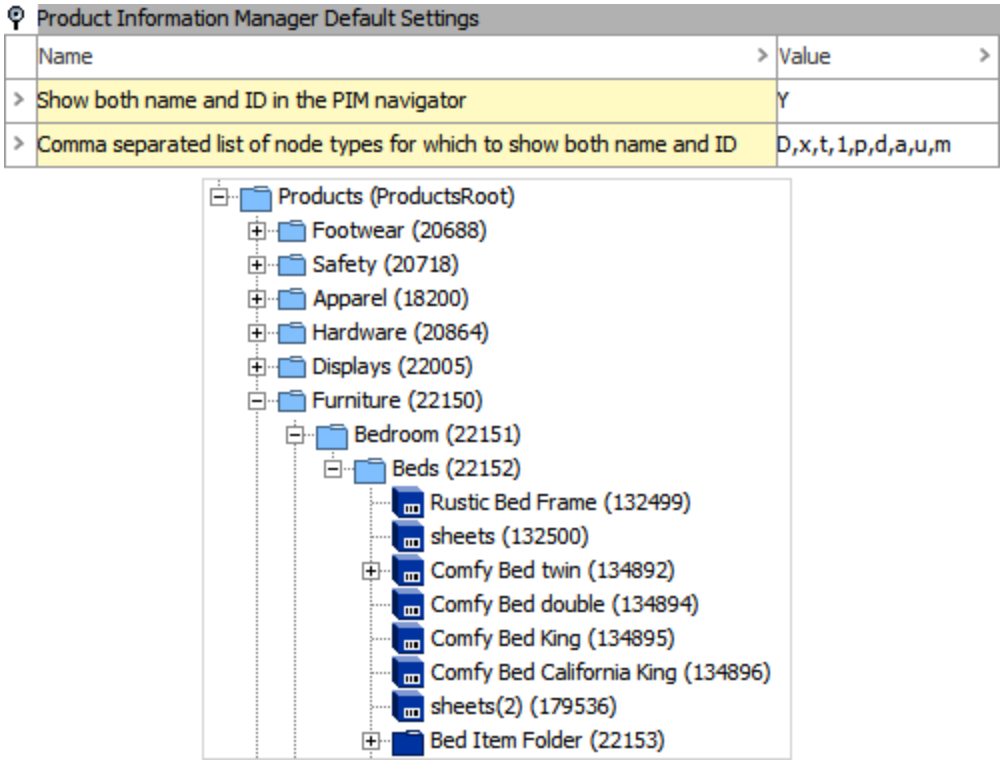
Show both name and ID in the PIM navigator

This setting works in conjunction with the **Comma separated list of node types for which to show both name and ID**, and it determines whether just the name appears in the STEP Workbench navigator panel. The default setting is set to 'N.'





When the setting the value is changed to 'Y,' users will need to change the **Comma separated list of node types for which to show both name and ID** setting.



For information on what the values in the **Comma separated list of node types for which to show both name and ID** setting relate to, refer to the next section.

Note: Once this setting is changed from 'N' to 'Y,' or vice versa, the user must log out of the workbench for the changes to apply. Also, if no values are populated in the **Comma separated list of node types for which to show both name and ID** setting, or there are values but the **Show both name and ID in the PIM navigator** setting is set to 'N', then no IDs will display.

Comma separated list of node types for which to show both name and ID

This setting determines which node types are valid for showing both Name and ID in the Navigator Panel. Node types are not object types in that they are used to identify the various elements within the STEP database. Example: p=Product, a=Attribute, 1=Classifications, m=Assets etc. The following table lists the values and corresponding node types that are valid for this setting.

When selecting multiple node types, a comma must be used to separate the values.

Note: Entering values in this setting will not be effective unless a value of 'Y' is entered in the **Show both name and ID in the PIM navigator** setting.

Key	Node Type
D	Collections
x	Reference Types
t	Object Types
1	Classifications
p	Products
d	LOVs
a	Attributes
u	Units
m	Assets

Note: These node type keys relate to the showing of the associated IDs in the Tree hierarchy not whether or not the associated object types are shown in STEP.

Attribute Header Column Width

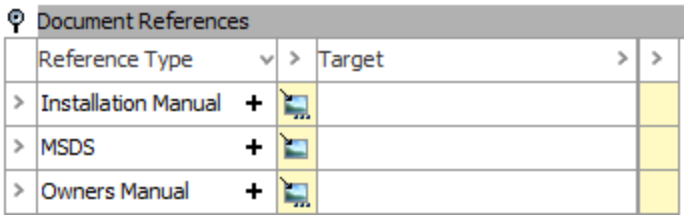
This setting affects the width of the Header Column when viewing products in the multi-products mode regardless of the rotation of the table. In the images below, the Header Column is the left most column in white. The first image has a column width of 250 and the second image has a column of 450.

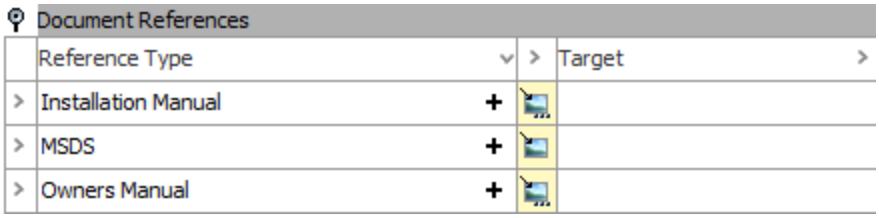
	ID	Name
Name	ID	Name
20004	133737	20004
20005	133738	20005
20006	133739	20006
2007	138845	2007
20-68204	20682	20-68204
555-22346	6806	555-22346

	ID	Name
Name	ID	Name
20004	133737	20004
20005	133738	20005
20006	133739	20006
2007	138845	2007
20-68204	20682	20-68204
555-22346	6806	555-22346

Reference Type Column Width

This setting affects width of the Header Column when viewing references or links. In the images below, the left most column is in white. The first image has a column width of 120 and the second image has a column of 240.

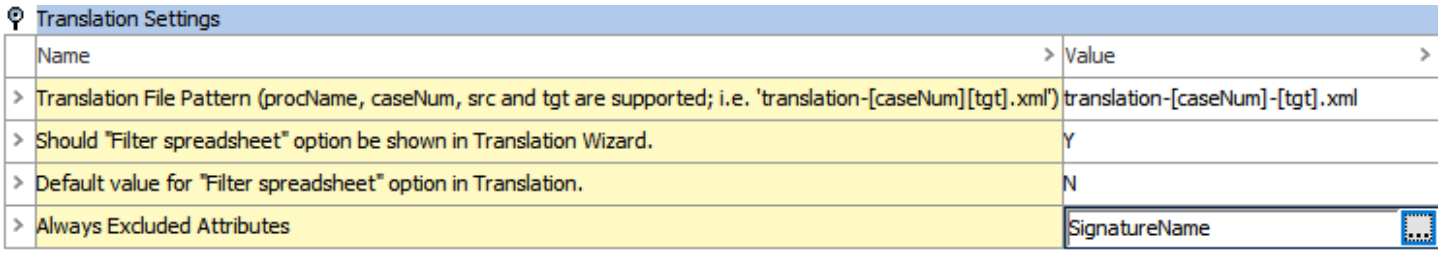




Translation Settings

This section describes the options available under System Settings related to the **Request Translation** functionality (which is explained in more detail in the **Starting a Structured Translation** section of the **Translation** documentation).

These options are available under System Setup > Users & Groups > **Translation Settings**.



Translation File Pattern

The default file name for an XML translation file exported from STEP is 'translation.xml'. The 'Translation File Pattern' setting allows users to change the file name pattern to something a little more meaningful. There are some predefined 'macros' in STEP that enable this tailoring. These macros are: procName, caseNum, src, and tgt. The src and tgt macros pull the source and target language. procName pulls the process name for the action (which is always 'Translation'), and caseNum pulls the number of the corresponding background process.

Therefore an entry such as:

[procName]-[caseNum]-[src]-[tgt].xml

Would create a file with a name such as:

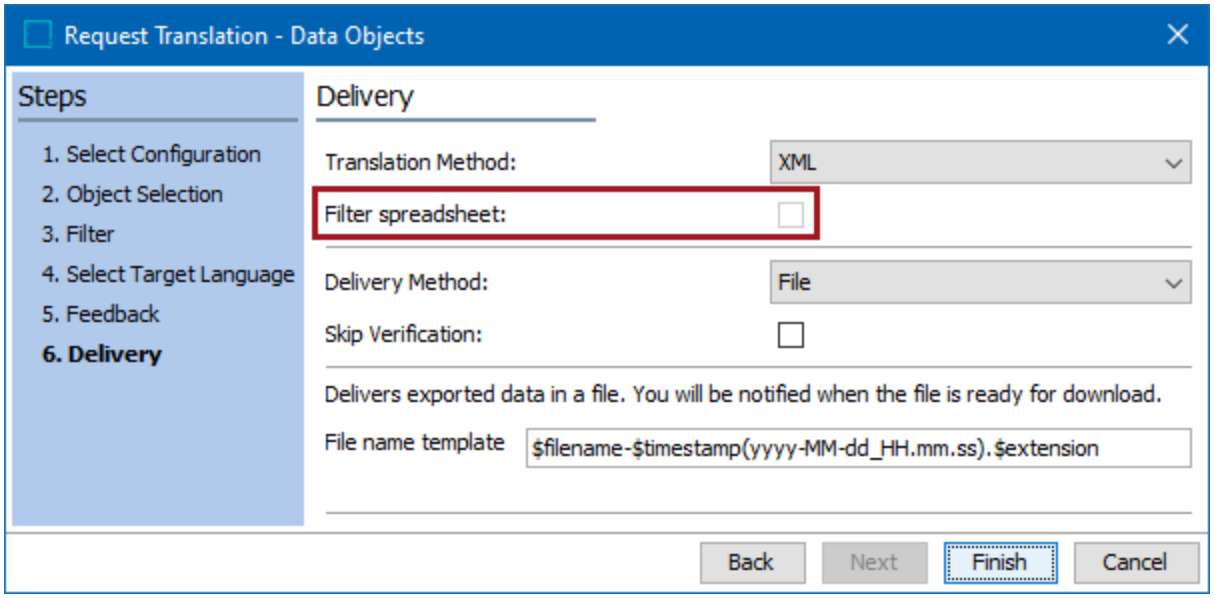
Translation-BGP_24304-US Eng-French Canadian.xml

Note: Users that currently incorporate or are planning to incorporate asynchronous services for translation purposes must include 'translation-' (and not 'procName') at the beginning of the file name pattern, as shown in the image above. For more information regarding asynchronous services for translation, refer to the **Asynchronous Translations** topic in the **Data Integration** documentation.

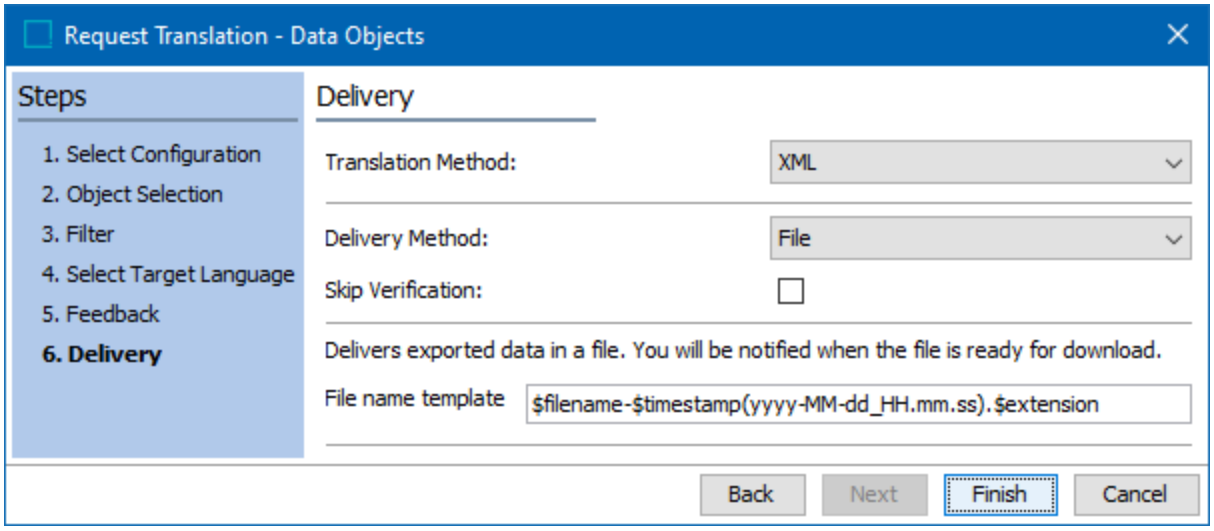
Should "Filter spreadsheet" option be shown in Translation Wizard

The 'Should "Filter spreadsheet" option be shown in Translation Wizard.' setting provides the ability to control whether or not an XLS translation file should contain both text attribute values that need to be translated as well as text attribute values that do not need to be translated. This is accomplished by giving users the ability to filter out all text entries from the XLS translation file that do not require translation by checking a 'Filter spreadsheet:' option.

If set to **Y**, the 'Filter spreadsheet:' option will display on the 'Delivery' screen (step 4) of the 'Request Translation' wizard, which is used when starting a translation workflow. If checked, the exported XLS file will only include text entries that require translations.



If set to **N**, the 'Filter spreadsheet:' option will not be available on this screen.



This option must be set to **Y** before the 'Default value for "Filter spreadsheet" option in Translation.' setting (described next) can be enabled.

Default value for "Filter spreadsheet" option in Translation

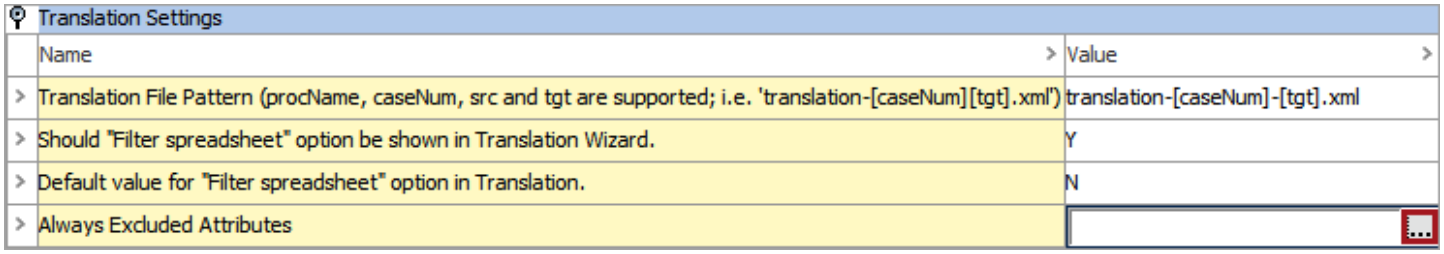
If set to **Y**, the 'Filter spreadsheet:' option will automatically be checked on the Delivery screen (step 4) of the 'Request Translation' wizard. However, this will only work if the 'Should "Filter spreadsheet" option be shown in Translation Wizard' setting is set to **Y**.

Always Excluded Attributes

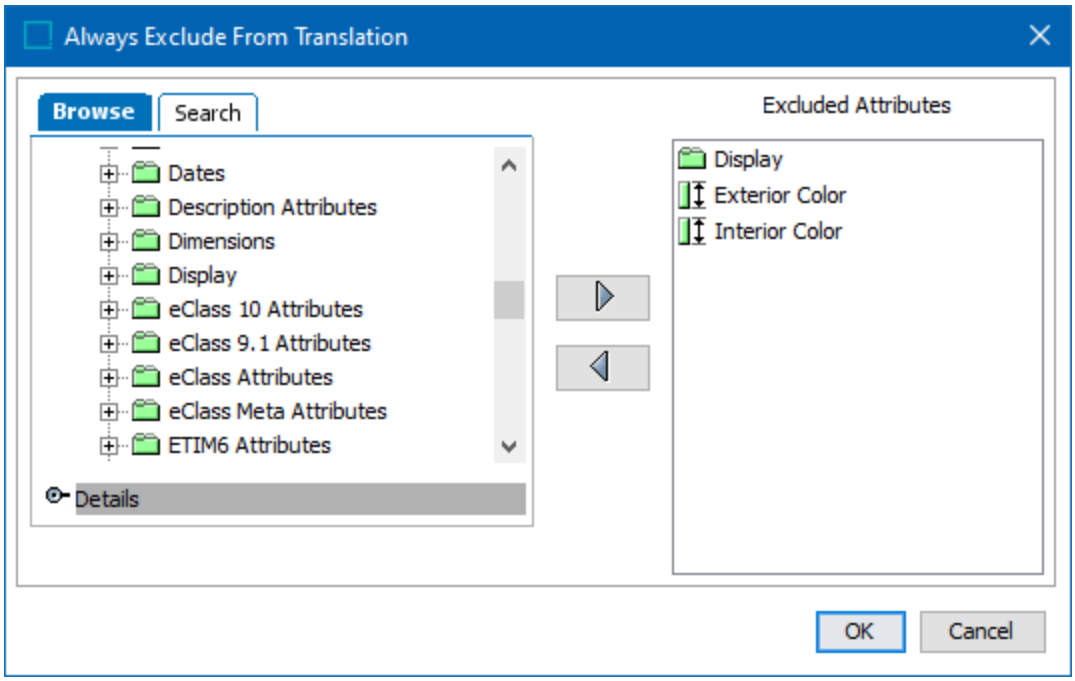
Language-dependent attributes and attribute groups selected in the 'Always Excluded Attributes' parameter will always be excluded from translation requests, i.e., the values set for these attributes and attribute groups will be ignored when creating a translation export, even if present on objects being translated.

To select attributes and attribute groups that should always be excluded for translations:

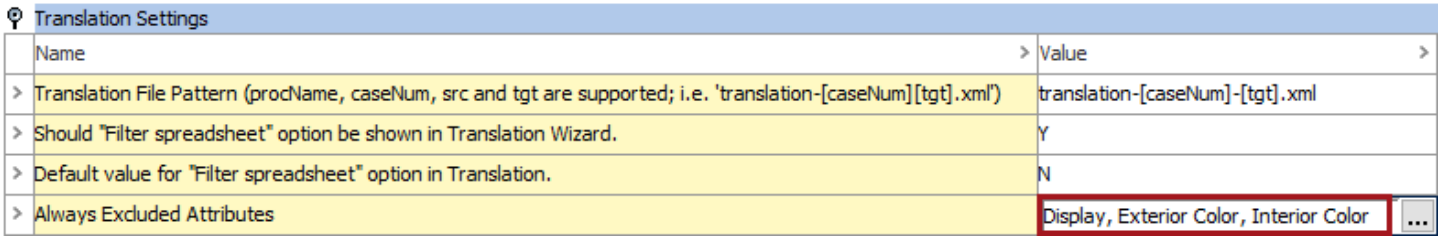
1. Click the ellipsis button (...) located next to the 'Always Excluded Attributes' parameter.



2. In the 'Always Exclude From Translation' dialog, select any language-dependent attribute or attribute group and click the right directional arrow to include in the 'Excluded Attributes' column. In the example shown in the screenshot below, the user has selected the attribute group 'Display' and the attributes 'Exterior' and 'Interior.' To remove any attribute or attribute group from the 'Excluded Attributes' column, select it and click the left directional arrow.



3. Click 'OK' to close the 'Always Exclude From Translation' dialog.



The selected attributes and attribute groups will now always be excluded from translations.

Terms List Settings

Add the products from the selection list import file directly instead of looking up leaf products

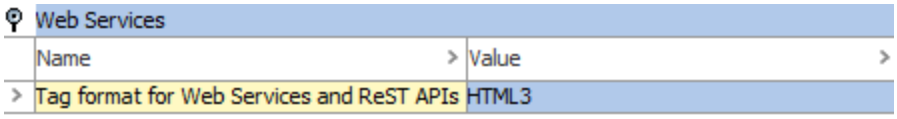
If set to 'Y' then commercial data can be stored against parent nodes. If set to 'N,' commercial data can only be stored against leaf products.

Note: This setting is only valid for eCatalogs and is now deprecated. It has no relationship to commercial terms lists used for print publishing.

Web Services

Tag format for Web Services and REST APIs

This option allows a user to state which output conversion format to use when accessing STEP via the API. The conversion format is not a dropdown list and the value must be entered manually, (e.g., HTML3), as shown in the image below.



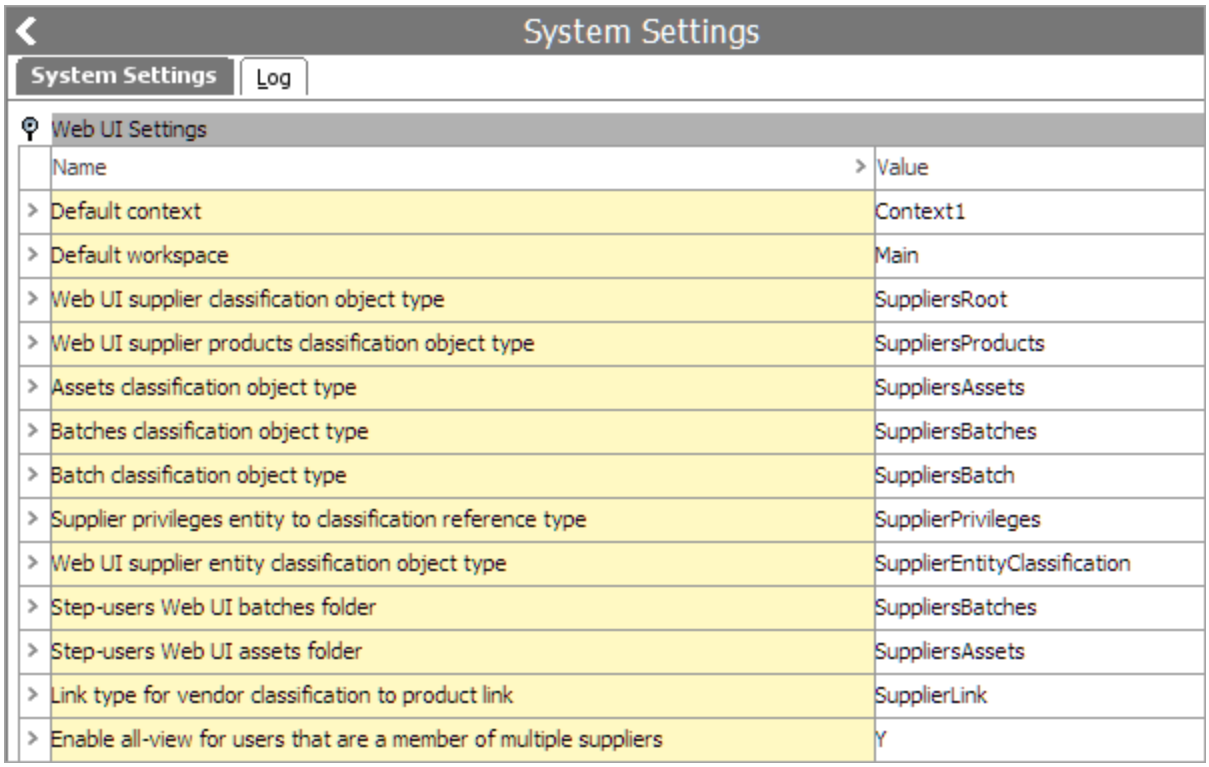
This option is only relevant for STEP systems licensed for the SOAP and REST APIs.

Note: If the purpose of using the API is to be able to edit and resubmit data to STEP, it is recommended that you do not use a conversion format, because the tag will not go through a reverse lookup on re-entry.

Web UI Settings

This section is used to describe the various options available in the **System Setup** > **Users & Groups** > **System Settings > Web UI Settings**.

Some settings may be controlled by licenses that may not be enabled for your system.



Name	Value
Default context	Context1
Default workspace	Main
Web UI supplier classification object type	SuppliersRoot
Web UI supplier products classification object type	SuppliersProducts
Assets classification object type	SuppliersAssets
Batches classification object type	SuppliersBatches
Batch classification object type	SuppliersBatch
Supplier privileges entity to classification reference type	SupplierPrivileges
Web UI supplier entity classification object type	SupplierEntityClassification
Step-users Web UI batches folder	SuppliersBatches
Step-users Web UI assets folder	SuppliersAssets
Link type for vendor classification to product link	SupplierLink
Enable all-view for users that are a member of multiple suppliers	Y

Note: Enter the ID—not the Name—of the Object Type.

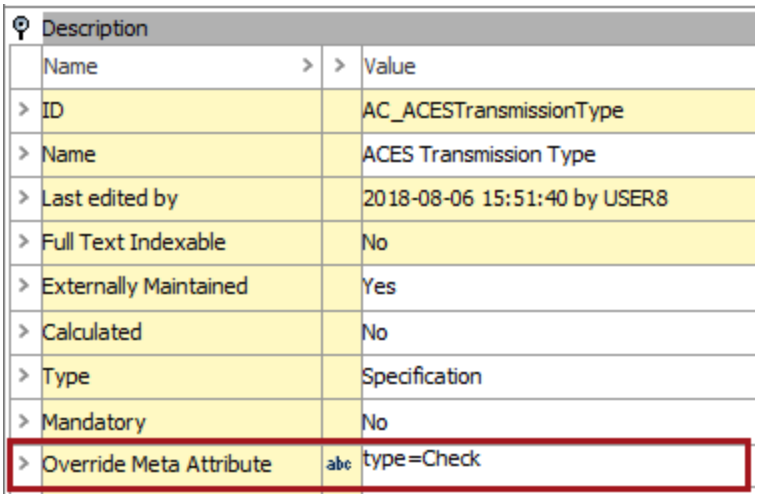
Control Override Meta-Attribute

This setting is a way to define the control type for an attribute in the workbench on the attribute itself. This means that an admin user can define the control type without needing to open the Attribute Management screen in the Web UI or setting the override control type on the attribute itself when configured on a screen / list via the Web UI designer. Ultimately, this gives a user workbench control over everything about an attribute's configuration, even how it displays in the Web UI.

With this setting, the control type can be controlled in workbench and Web UI by following these steps:

- Create a description attribute that is made valid / available for the Attribute object type.
- In STEP Workbench, go to Users & Groups (as shown in the above image).
- Under Web UI Settings > Control, override meta-attribute, populate the parameter with the description attribute created in step 1.

After setup, users can also control the override setting from the description attribute (set up in step 1) for the specific attribute itself. Refer to the example below:



The following is a list of the attribute values that can be used and is dependent on the validation base type.

Override Control Type	Validation Base Type	Control override meta-attribute values for workbench (case sensitive)
Checkbox	LOV	type=Check
Radio	LOV	type=Radio
Radio with clear option	LOV	type=Radiowithclearoption
Rich Text	Text, Text (exclude tags), Numeric Text, Numeric Text (exclude tags)	type=Richtext
Text Area	Text, Text (exclude tags), Numeric Text, Numeric Text (exclude tags)	Type=Textarea
Text Box	Text, Text (exclude tags), Numeric Text, Numeric Text (exclude tags)	type=Textbox
Typeahead	LOV	type=Typeahead

For override control in the Web UI, refer to the information in the **Override Control Type Rule** topic in the **Web User Interfaces** documentation and read more about (and review examples) of the control type overrides available. Users should also be familiar with the **Attribute Value Component** and **Attribute Value Group Component** topics, also.

If override control is set up in Web UI also, when changes are made in workbench, it also changes (where applicable) in Web UI and vice versa. If a user types in an incorrect / invalid control type in workbench, then no changes are made in the Web UI.

Default Context

This setting determines the default context that will be displayed when signing into the Web UI by a user for the first time. It does not control how many contexts are available to the user once they are signed into the Web UI. This means that if the setting is set to an English context and a user wants to view an object in French, then the user can change the context to French. It will stay in the French context every time the user signs into Web UI until it is changed by the user.

Default Workspace

This setting determines the default workspace that will be displayed when a user signs into the Web UI for the first time. However, after a user signs into the Web UI, they can change the default workspace if desired.

When working in the Approved workspace, the 'Approved' workspace indicator is highlighted.

Web UI Supplier Classification Object Type

This option determines the object type that is 'assigned' to a Web UI user via the supplier user group and its associated classification(s). These object types connect the 'root node' for each of the created suppliers. Filling in this information is only required if you are setting up a Web UI that will include a supplier hierarchy. For more information regarding a Supplier Item Web UI setup, refer to the **Supplier Web UI Setup Guide**documentation.

Web UI Supplier Products Classification Object Type

Working in conjunction with the selected 'Web UI supplier classification object type,' this option identifies the root node where the supplier's products reside. For more information regarding a Supplier Item Web UI setup, refer to the **Supplier Web UI Setup Guide**documentation.

Assets Classification Object Type

This option identifies the object type that was created for storing the supplier's assets. For more information regarding a Supplier Item Web UI setup, refer to the **Supplier Web UI Setup Guide**documentation.

Batches Classification Object Type

This option identifies the root node where the batch classification objects reside. For more information regarding a Supplier Item Web UI setup, refer to the **Supplier Web UI Setup Guide**documentation.

Batch Classification Object Type

This option identifies the object type for the batch folders that reside under the batches classification object type. For more information regarding a Supplier Item Web UI setup, refer to the **Supplier Web UI Setup Guide**documentation.

Supplier Privileges Entity to Classification Reference Type

This option links supplier entities to the corresponding classification.

Important: When configuring the entity to classification reference type, you must set 'Externally Maintained' to 'Yes,' and set 'Allow Multiple References' to 'No.'

This setting is available when the Supplier Self-Service Onboarding commercial license is enabled on a system. Contact Stibo Systems to begin the process of enabling a license or licenses for your system. For more information regarding a Supplier Item Web UI setup, refer to the **Supplier Web UI Setup Guide**documentation.

Web UI Supplier Entity Classification Object Type

Working in conjunction with the selected 'Web UI supplier classification object type', this option identifies the root node where the supplier's entities reside.

This setting is available when the Supplier Self-Service Onboarding commercial license is enabled on a system. Contact Stibo Systems to begin the process of enabling a license or licenses for your system. For more information regarding a Supplier Item Web UI setup, refer to the **Supplier Web UI Setup Guide**documentation.

Proof View Stylesheet Attribute

The REST API proof view uses style sheets that are defined in an XML file. This XML must exist as an Asset in the STEP database.

For a standard product proof view, a default set of style sheets is utilized. If for certain products, there is a need to use a different set of style sheets, loaded as an asset to STEP, the metadata attribute specified in this option is used to point to that asset. Thus, different products may display in different styles depending on the style setups in the different XML files. The population of the metadata must have the ID of the asset and it must exist and must be a valid XML file. Otherwise, the 'default' styles are used.

Note: This option refers to the REST API proof view, not the InDesign proof view.

Step-users Web UI Batches Folder

The value entered is the ID of the classification folder into which an operator on the User Web UI may create batch folders and link products into them as a sort of private 'collection' of products.

Step-users Web UI Assets Folder

The value entered is the ID of the classification folder into which an operator in the User Web UI may upload into or download from. It is expected that the Assets folder that is used for the uploads is only a temporary holding area for the assets and that they will subsequently be moved into their 'proper' folder within the assets hierarchy in the STEP system.

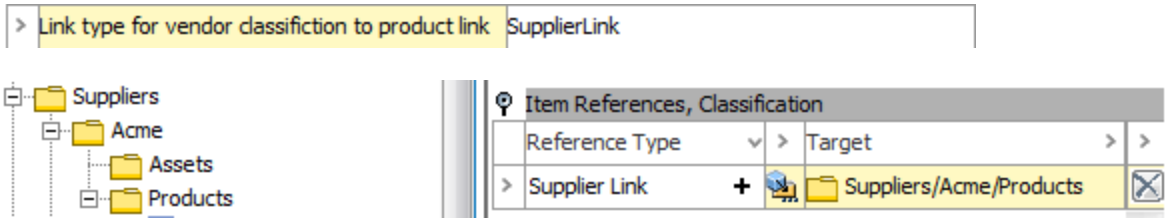
Note: The 'Step-user' referred to in this option is one that has logged in to the User Web UI.

Context Help Metadata Attribute

The **Context Help metadata attribute** functionality allows a user to select the description attribute that contains the help text for use in Web UI. An example of what the help text does is shown in the image below. After the attribute has been created, the ID of the attribute should be entered. For more information about using the Context Help metadata attribute, refer to **Attribute Help Text in Web UI** in the **Web User Interfaces** documentation.

Link Type for Vendor Classification to Product Link

This setting is where the Reference Type that has been defined to use for products associated to a Web UI users' Supplier Products Folder is added. Once configured, products created through the Supplier Item Web UI automatically link to the supplier's classification structure. As shown in the image below, the Reference Type ID is entered and will be made available for use in the Web UI.



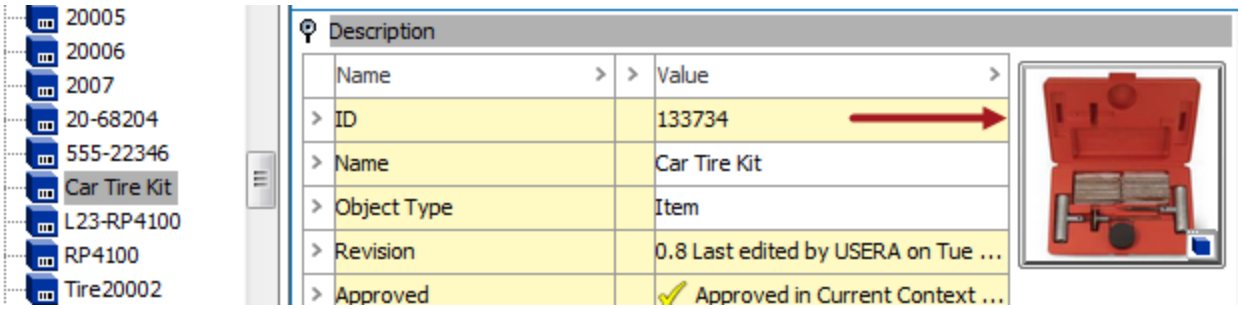
Enable All-view for Users that are a Member of Multiple Suppliers

If set to 'Y,' this setting enables a supplier user that is a member of multiple supplier groups to have views across all the groups when looking at tasks. For more information about the multiple views for suppliers, refer to the **All-View Across Multiple Suppliers** section of **Supplier Web UI Setup Guide** topic.

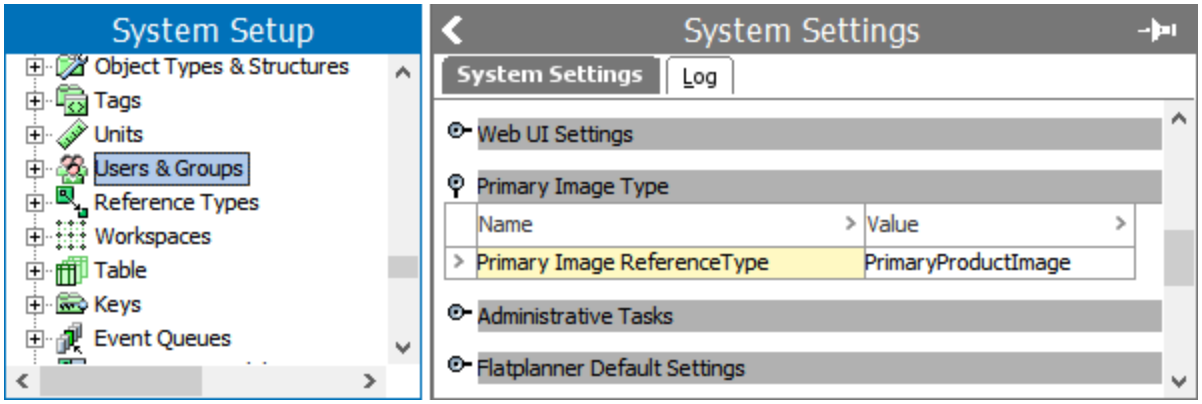
Primary Image Type

In the Primary Image Type flipper, the **Primary Image Reference Type** setting is used to display a thumbnail of the object image in the workbench or in the Web UI.

An example of how a primary image displays in the workbench is shown in the image below.



On the System Setup tab, click the Users & Groups node to display the System Settings tab and the Primary Image Type setting.



By default, the **Primary Image Reference Type** value is the ID of the Reference Type, 'PrimaryProductImage.' The ID of the reference type can be changed if a different reference type is used to associate an image thumbnail to an object.

Flatplanner Default Settings

This section describes the available options under System Setup > Users & Groups > **Flatplanner Default Settings**.

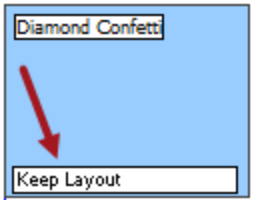
Flatplanner Default Settings

Name	Value
Enable keep layouts for publications	Y
Show frame information on flatplans with layout pickup	Y
Reapply Flatplan rules when adding product to non-empty frame	N

Enable keep layouts for publications

When a Flatplanner page is mounted in InDesign (using either the 'Create Document from Plan,' 'Mount planned page,' or 'Mount on current page' function), the page is created using layouts from the product templates that were assigned to objects on the page (typically product objects), either by assignment to individual Flatplanner frames or by the specification of default product templates on the objects themselves.

After pages are mounted and saved back to STEP, if 'Enable keep layouts for publications' is set to **Y**, Flatplanner will save ('keep') the layout of the mounted page and override the layouts from the original product templates. A 'kept' layout is signified on Flatplanner page frames by the text 'Keep Layout,' which appears on the frame where the name of the product template normally displays. (**Note:** View > **Show Product Templates** must be selected from the plan before the 'Keep Layout' label will appear.)



If a page or frame that is designated as 'Keep Layout' is remounted in InDesign, the page will mount with the 'kept' layout instead of the layout of the original product templates. This feature is handy because it is common for users to make manual changes to mounted pages before saving them back into STEP. The ability to 'keep' manually changed page layouts enables the reuse of these layouts, either when the page is remounted in InDesign or 'picked up' for a different publication.

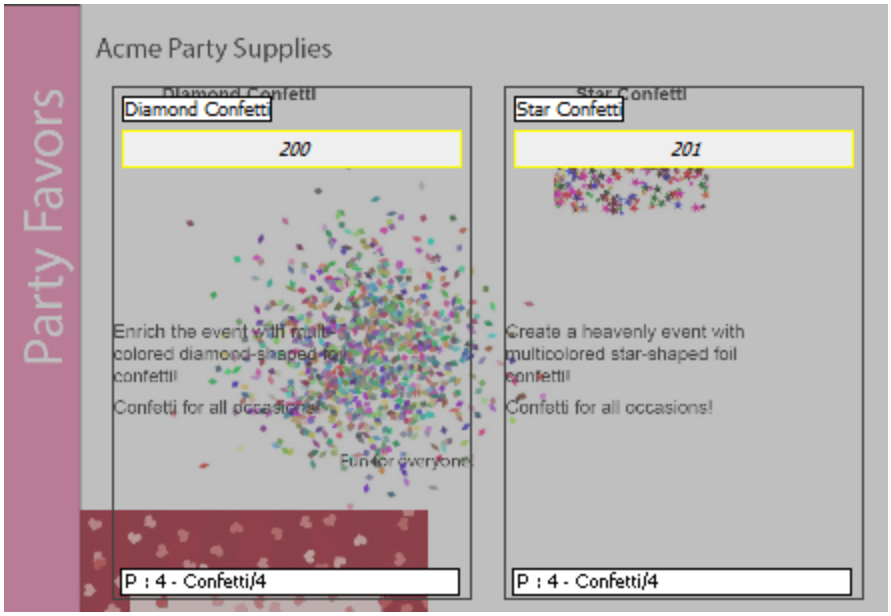
If 'Enable keep layouts for publications' is set to **N**, users are free to save manually adjusted pages back to STEP, but the next time a page is mounted from the corresponding Flatplan, it will mount with the layout from the original product template(s).

(Note that a 'kept' layout will be removed from the Flatplan if the corresponding mounted [actual] pages are deleted from STEP.)

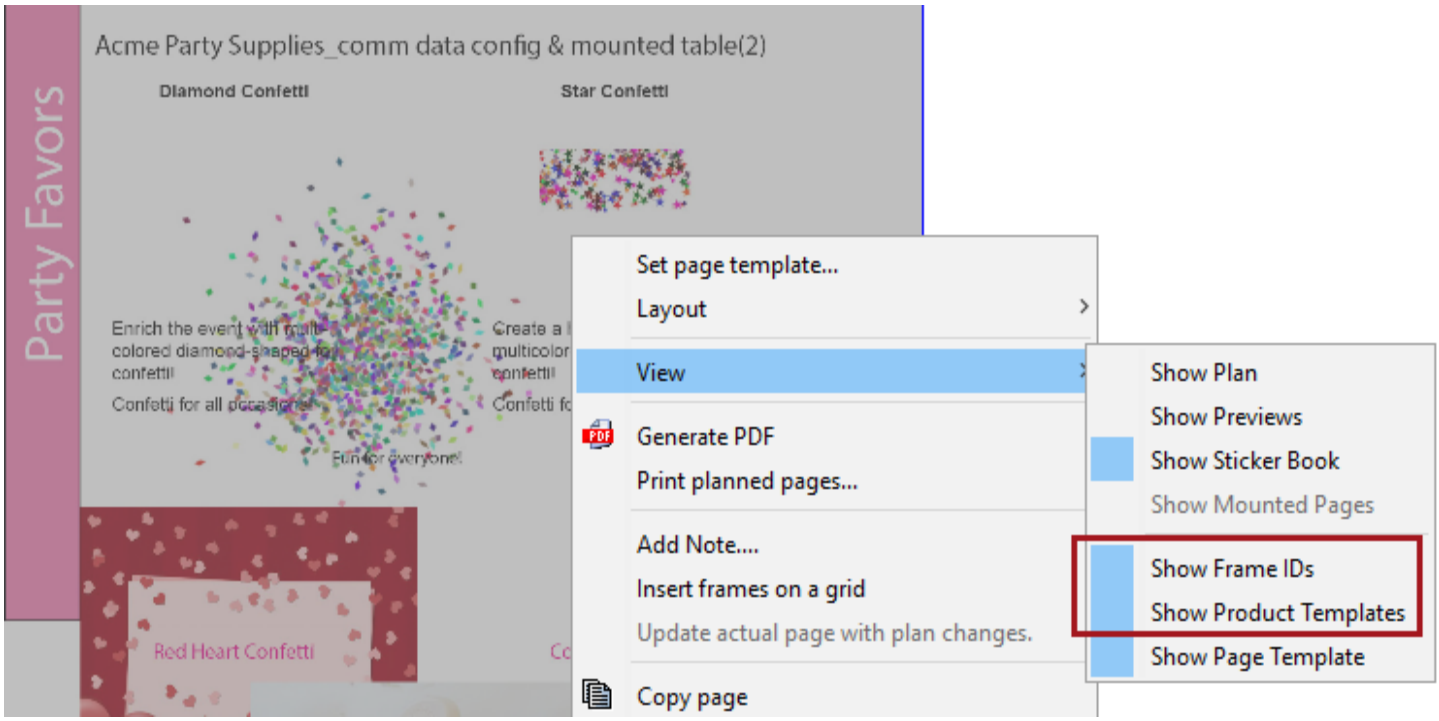
For more information, refer to **Reusing Saved Layouts** in the **Print Flatplanner** documentation.

Show frame information on flatplans with layout pickup

When 'Show frame information on flatplans with layout pickup' is set to **Y**, a Flatplan with a page pickup will display the same information as any other Flatplan page—product object, layout indicator (which, in the case of picked-up pages, is the letter 'P' followed by the page number and name of the picked-up page), and frame ID. In addition, the Sticker Book view is accessible, as with any other Flatplan page.



When set to **N**, a Flatplan with page pickup only shows the preview of the picked-up page. No additional frame information is available, even if 'Show Frame IDs' and 'Show Product Templates' are selected under the 'View' menu. The Sticker Book view is also disabled.



Reapply Flatplan rules when adding product to non-empty frame

Setting this option to **Y** allows for object layout pagination rules to be reapplied to non-empty planned page frames, i.e., frames that contain either a product, classification, or asset, or entity. If the product template applied to the frame has been changed to something other than the template specified in the pagination rule, it can be reverted to the template specified in the pagination rule by using the 'Reapply layout rules' feature in Flatplanner. If this option is set to **N**, then 'Reapply layout rules' will not work.

For more information on how to use the 'Reapply layout rules' feature, refer to the **Applying Product Templates to Page Frames** topic in the **Print Flatplanner** documentation.

For more information on Flatplanner pagination rules, refer to the **Flatplanner Pagination Rules** section of the **Print Flatplanner** documentation.

DTP Settings

This section describes the various options available under System Setup > Users & Groups > **DTP Settings**.

DTP Settings

Name	Value
Use Publication Name prefix when naming DTP documents	N
Enable calculation of border rectangle space usage for actual pages	N
Calculated DTP Table width includes left and right rules	N
Attribute Display Sequence	Print Display Sequence (PrintDisplaySequence) ...
Attribute Name Style Meta-attribute	...
Attribute Value Style Meta-attribute	...
Asset Order Meta-attribute	Image Display Sequence (ImageDisplaySequence) ...
Table Cell Skip Empty Cell	N
JPEG DPI	72
DTP Page - preview image	High-resolution
Inherit Default Product Template through product hierarchy for Product Overrides.	Y
Proof View Start Page Number	1

Use Publication Name prefix when naming DTP documents

When a user creates an InDesign page (DTP document) in InDesign from a Flatplanner planned page spread (by right-clicking on the planned page in the STEP Publication view panel and choosing 'Create document from plan'), the default file name of the mounted document is the page number (for example, 1.indd). By setting 'Use Publication Name prefix when naming DTP documents' to 'Y', the publication name will be added as a prefix to that document file name. For example, if the publication name in STEP is 'Bath Catalog Fall Collection,' the mounted document will be called ''Bath Catalog Fall Collection_1.indd'

Note: If there are spaces or any invalid or 'questionable' characters in the publication name (for example, ™), they will be removed.

Enable calculation of border rectangle space usage for actual pages

When viewing actual pages in STEP, the space usage for mounted product and classification objects can be viewed on the **Page data** tab. The system setting 'Enable calculation of border rectangle space usage for actual pages' tells the system whether to calculate the space that is taken up by each individual mounted element (product, classification, or image object) on the page, or if the white space surrounding these elements should also be calculated.

For more information, refer to the **Space Usage in STEP** topic in the **Publisher (Adobe InDesign Integration)** documentation.

Calculated DTP Table width includes left and right rules

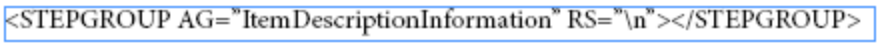
This option tells STEP to make an adjustment to correct an anomaly in InDesign tables when vertical rules are placed on the left and right side of a table. InDesign does not normally include the width of a left or right vertical rule in the overall width of a table. Instead, it effectively over-sets the table's width. Setting 'Calculated DTP Table width includes left and right rules' to 'Y' will readjust the left and right vertical rules so they are within the overall table width.

To further explain, when 'Fit calculated Table Width to Frame Width' is checked in the STEP Preferences menu in InDesign, Print Publisher will fit the mounted table to the width of the frame on the product template that contains the table tag. If 'Calculated DTP Table width includes left and right rules' is set to 'N,' the table will be slightly wider than the frame because the rule lines are not 'fit' inside the boundaries of the frame. When set to 'N', the table width will exactly match the frame width, as the side rules will be fit inside the frame.

Attribute Display Sequence

The 'Attribute Display Sequence' setting under DTP Settings is different than the 'Default Attribute to use as Display Sequence Attribute' setting under Product Information Manager Default settings. Whereas 'Default Attribute to use as Display Sequence' is used to sort the order of attributes as they display in the STEP Workbench (for example, on the 'Product' tab of a product object), the 'Attribute Display Sequence' setting controls the order of mounted attribute values from an attribute group on mounted InDesign pages.

On product templates, a tag to mount values from an entire attribute group can be placed into a frame (as opposed to the more common practice of placing single attributes at a time into frames), as pictured below.



When an object is mounted onto an InDesign page using a product template containing this type of tag, the values from all attributes within this group are mounted. The 'Attribute Display Sequence' attribute will determine what order the attributes mount on the page. By default, these values would display in the order in which they reside under the attribute group (which is typically in alphabetical order).

For more information, refer to the **Mounting Multi-Valued Attributes and Attribute Groups** section of the **Publisher (Adobe InDesign Integration)** documentation.

Attribute Name Style Meta-attribute and Attribute Value Style Meta-attribute

The description attributes used for the 'Attribute Name Style Meta-attribute' and 'Attribute Value Style Meta-attribute' settings are used to call out paragraph styles in InDesign that are applied to the name and values of attributes, respectively, when mounted as part of an attribute group.

For more information, refer to the **Mounting Multi-Valued Attributes and Attribute Groups** section of the **Publisher (Adobe InDesign Integration)** documentation.

Asset Order Meta-attribute

This feature enables a sequence order to be set on assets (usually images) when products are mounted to InDesign pages. This sequence is set by the use of a metadata attribute that is valid on the link between products and image reference types. If there are multiple references from a product to various images using the same reference type (for example, 'Product Images'), and the product template calls out the Product Images, then all these images mount to the page. However, without this feature, the order that they mount would be in the same order as they are displayed in the workbench—by their alphabetically sorted name. By creating a metadata attribute and placing it on the link between the product and asset (reference type = Product Images in this case), then the user may establish a numeric order to the images. If this system setting specifies this metadata attribute, then the images will mount to the InDesign page in the order specified by this 'sequence' attribute.

For more information, refer to the **Sequencing Images in InDesign** section of the **Publisher (Adobe InDesign Integration)** documentation.

Table Cell Skip Empty Cell

Setting 'Table Cell Skip Empty Cell' to 'Y' solves an issue for customers using the 'Repeated Rule' transformation in tables in such a way that it conflicts with the way in which the system treats rules in tables. The issue concerns how the system decides to choose a rule width if one cell does not have a horizontal rule on the bottom, in effect, and the adjacent cell below it has a horizontal rule, in effect, on the top. In almost all circumstances, this setting should be set to 'N.'

JPEG DPI

DTP Settings

Name	Value
JPEG DPI	72

This setting affects the regular product proof view (as accessed from the Proof View tab in the workbench and through the Proof View component in the Web UI) and the Flatplanner when a plan preview is requested. It also affects the resolution of the thumbnail image that STEP creates when you upload a document to a publication. Any change to this value is not put into effect until the InDesign sidecar (InDesign server) is restarted.

For performance purposes, care should be taken not to enter a value that is too high, e.g., 300 dpi. A proof view of 150 dpi maximum should be sufficient for most purposes.

When mounted documents are uploaded to the publication structure in STEP, a new document thumbnail is created and saved within the document based on the new resolution specified. All existing thumbnails on 'old' documents will still show the 'preview' in the former resolution. Note that in the regular product proof view, the zoom factors will no longer match. For example, 100% will really show as larger than true 100% on-screen if a resolution higher than 72 dpi has been entered.

For more information on Proof Views, refer to the **Print Proof View** section of the **Publisher (Adobe InDesign Integration)** documentation.

DTP Page - preview image

DTP Settings	
Name	Value
DTP Page - preview image	Low-resolution

Images that are mounted onto InDesign pages are represented on the page by low-resolution images. These low-resolution images are linked to the original high-resolution images, and InDesign will know where the original images are stored as long as the image links are not broken.

The 'DTP Page - preview image' setting is used to control whether the low-resolution or high-resolution images will be embedded in Flatplanner page previews, which are fetched from the STEP Workbench and generated by the InDesign Server (IDS). This setting is intended to improve the time taken to render page previews. If the setting is changed, the IDS must be restarted before the new setting takes effect.

The 'DTP Page - preview image' options and their behavior are as follows:

- **None:** No preview of DTP page. Not recommended.
- **Low-resolution**: Tells the InDesign server to build the page preview with the low-resolution images embedded in the InDesign document.
- **High-resolution:** Tells the InDesign server to build the page preview from the actual high-res images. This is the recommended setting.

If a Flatplanner page does not have an abnormally high number of images, e.g., less than 80, then there is not a noticeable difference in the time that it takes to render the preview, making the setting of high-resolution appropriate.

Note: The 'DTP Page - preview image' setting and the immediately preceding setting of 'JPEG DPI' are unrelated.

Inherit Default Product Template through product hierarchy for Product Overrides.

This setting is to maintain backward compatibility with prior versions of STEP.

In releases prior to 6.0, any product that was placed into a product override would inherit the default product template placed on that override. The default in 6.0 and up is not to inherit from the override but from the originating (or 'natural') parent.

This is the only type of inheritance that is done from a product node 'downwards' to the product overrides below it.

Proof View Start Page Number

This setting allows for Proof Views and the PDFs created from Proof Views to begin on either page 1 (a right-hand page) or page 2 (a left-hand page). A starting page of '2' is the default.

A selection of '1' is useful, for example, when producing documents for PDF output, such as datasheets, that may not be produced in a 2-page spread format and should start page numbering at 1.

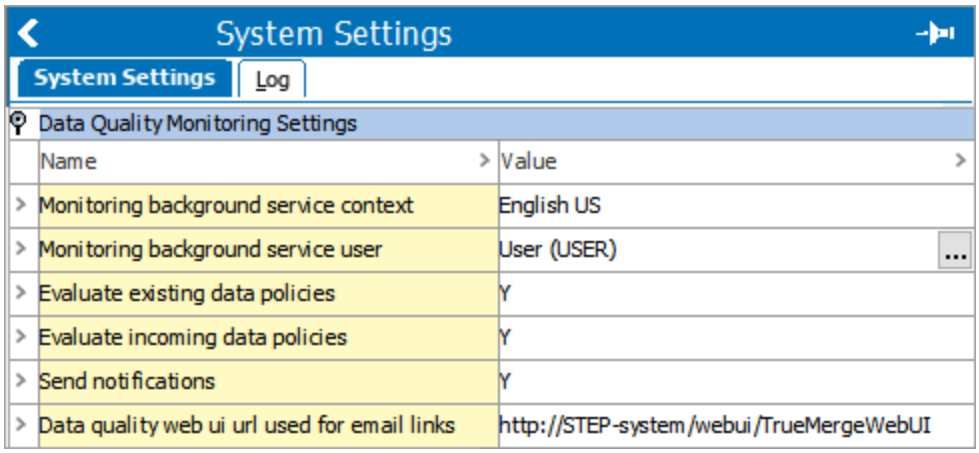
For more information on Proof Views, refer to the **Print Proof View** section of the **Publisher (Adobe InDesign Integration)** documentation.

Data Quality Monitoring Settings

This section is used to describe the various options available in the **System Setup** > **Users & Groups** > **System Settings** > **Data Quality Monitoring Settings**.

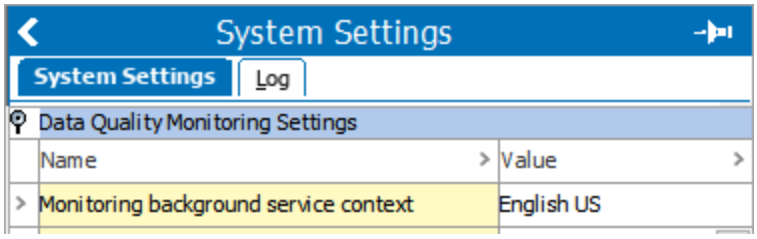
Important: This section only displays if the cmdm-monitoring component has been activated. Contact Stibo Systems with assistance, if needed.

The information within this section outlines the settings needed to properly monitor data policies.



Selecting a Data Policies Default Context

Data monitoring is performed in a single context. In this example, English US was selected.



With English US selected, all other context in the system will go unmonitored. For more information, refer to the **Web UI Configurations for Policies** topic in this documentation.

Monitoring background service user

This option sets the ID of the user that executes the 'MonitoringBackgroundServiceUserEntry' global setting. If left empty, the system will set this value to 'stepsys.' In this example, it is set to USER.

Note: Any attribute values need to be readable by this user for data monitoring. It is recommended that the user should have elevated permissions, specifically a system user with privileges to read anything in the system.

Evaluate existing data policies

If this is set to 'N,' then no evaluation will be done on existing data. This setting is for the policies running on data already in the system.

Evaluate incoming data policies

If this is set to 'N,' then no policy evaluation will be done on stream imported nodes like the Match and Merge importer.

Send notifications

If set to 'N,' then no notifications will be sent on policy breaches.

Data Quality Web UI URL used for email links

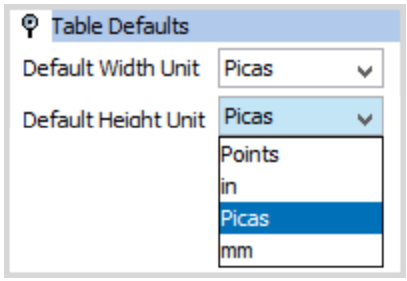
This value is where the policy list is located in the associated Web UI. To find this URL, navigate to the policy screen to be displayed, and copy everything before the first hash. In the following example, the text in bold is used as the Web UI URL.

```
http://STEP-system/webui/TrueMergeWebUI
#contextID=Context1&workspaceID=Main&selection=260789&nodeType=collection&displayMod
e=-1680893663.0
```

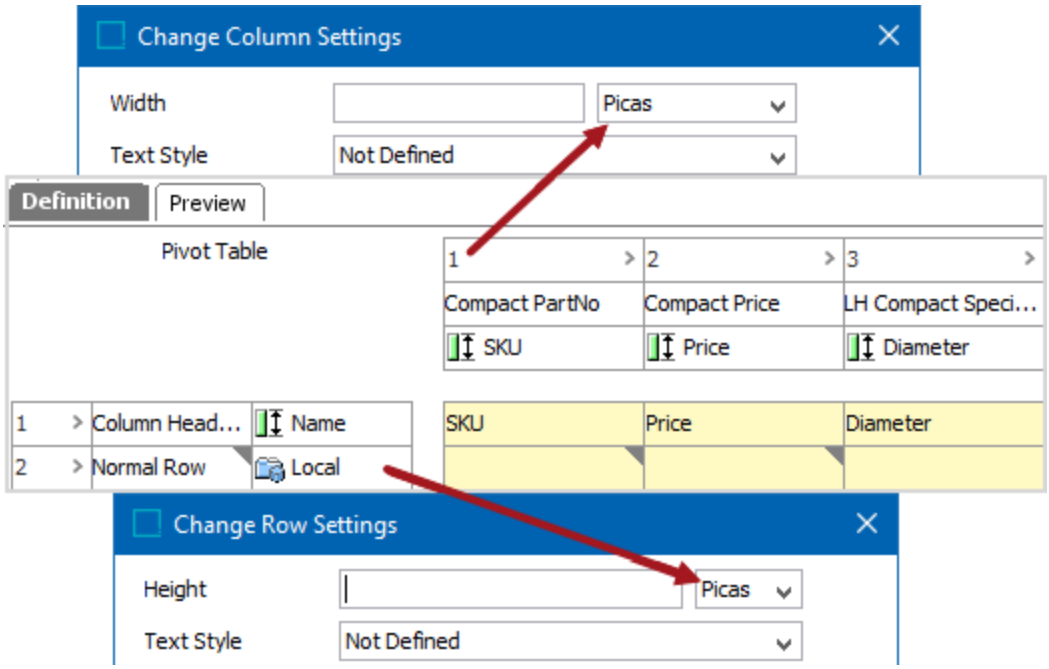
This allows email to include links to the list or to a specific policy. Without this option set, there will not be a 'View Policy List' button in notification emails.

Table Defaults

The settings under Table Defaults establish the default unit that will be applied to the height or width of columns, rows, and entire tables in the workbench table editor for STEP tables. For example, the default unit can be set to Picas from the dropdown menu as shown below.



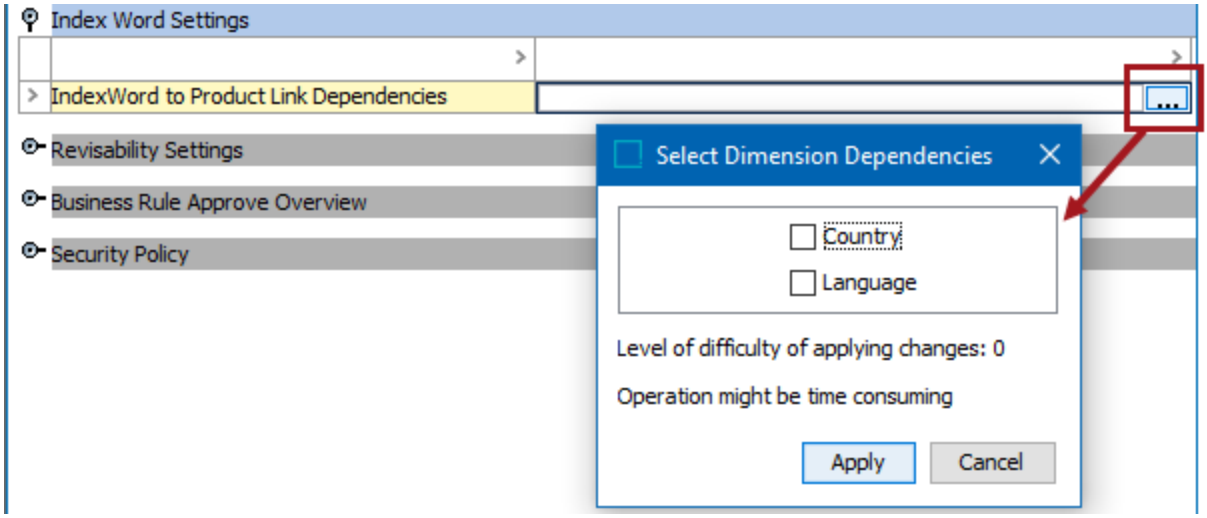
Once the default units have been set, the units will be the default units in the table editor as shown in the image below. If no default unit is selected, the default units will be blank and must be manually selected every time.



For more information on STEP Tables, refer to the **Tables** documentation.

Index Word Settings

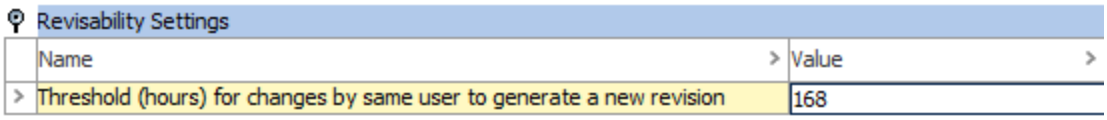
By default, the links between products and index words are not dimension independent. By selecting a dimension under 'IndexWord to Product Link Dependencies,' you can make these links dimension dependent. Making the links between products and index words dimension dependent can be useful for a situation where not all products are sold in all countries.



For more information on index words, refer to the **Creating Document Indexes** section of the **Publisher (Adobe InDesign Integration)** documentation.

Revisability Settings

Threshold (hours) for changes by same user to generate a new revision



STEP automatically preserves all versions of a revisable object. Each time a change is made by a different user, a numbered revision is created and logged. This setting sets the threshold for the number of hours to occur before a new revision by the same user is reflected in STEP. The default setting is 168 hours or one week. 24 hours is the minimum number of hours that can be entered.

For more information about revisions, refer to the **Revisions** topic.

Business Rule Approve Overview

Business Rule Approve Overview

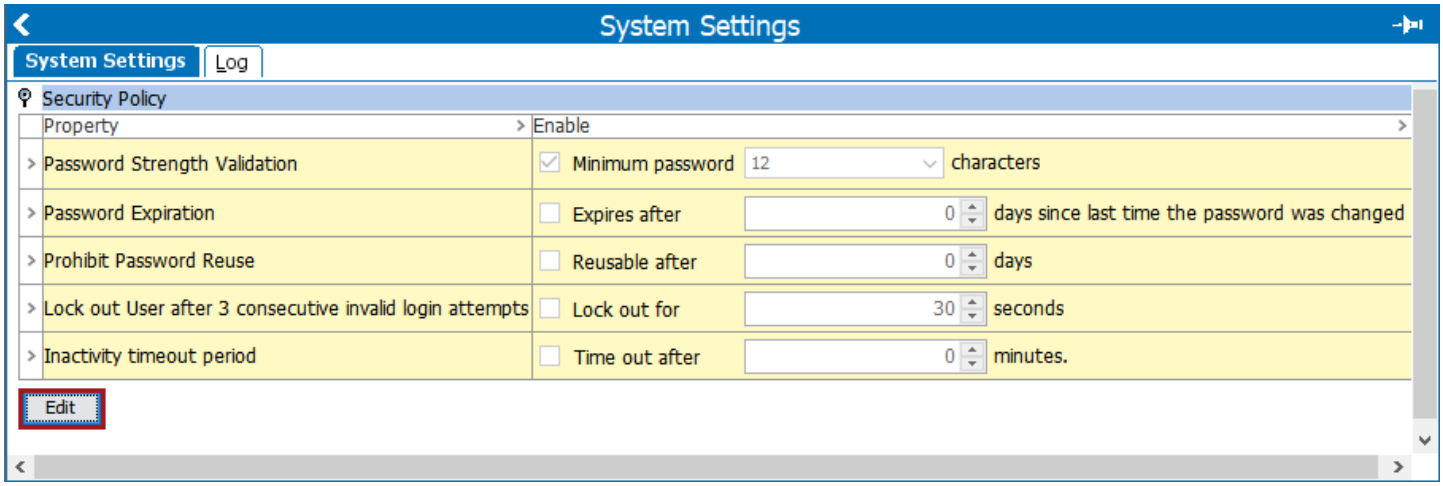
	Business Rule	Description	Role	Condition
>	GDSNRegisterCondition		Validate after Approve	

Some STEP implementations have a large number of business rules in place, some of which are executed as part of an approval process (determined by the On Approve setting on the rule itself). The Business Rule Approve Overview section of the System Settings editor serves to consolidate all rules executed with approvals so that they can be easily identified. The name listed under the business rule column is a hyperlink to the business rule so that a user can quickly access and edit the business rule.

For more information about approval-based business rules, refer to the **Business Rules on Approval** section of the **Business Rules** documentation.

Security Policy

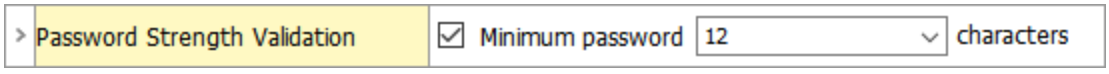
Admin users can configure security settings related to passwords to ensure that STEP users adhere to the required password security level. To access the password settings, on the **System Setup** tab, select the **Users & Groups** node. Scroll down to find the **Security Policy** flipper, which includes the following settings, shown below:



Important: Changes made to these parameters will be applied to **all** user groups located under the **Users & Groups** node. These settings cannot be customized for single users or user groups.

To change the Security Policy parameters, click the **Edit** button below the parameters to display the Security Policy edit dialog.

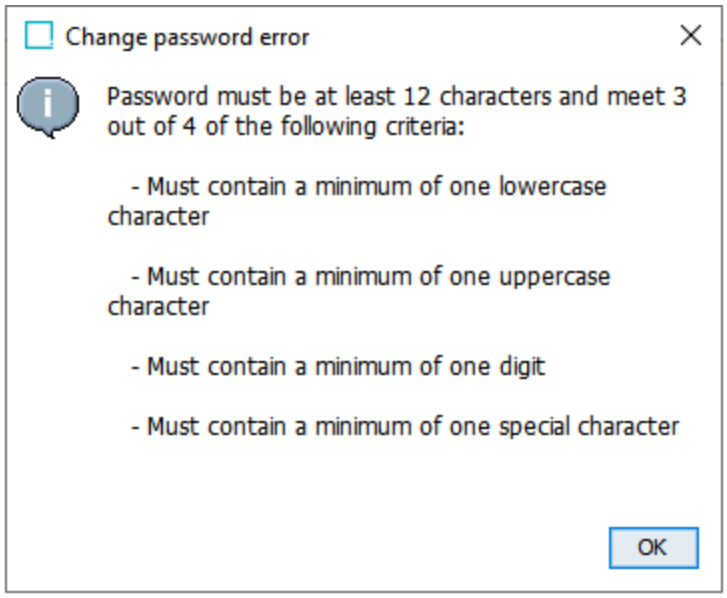
- **Password Strength Validation** – When checked, new passwords must conform to at least three of the four requirements intended to ensure a strong password.

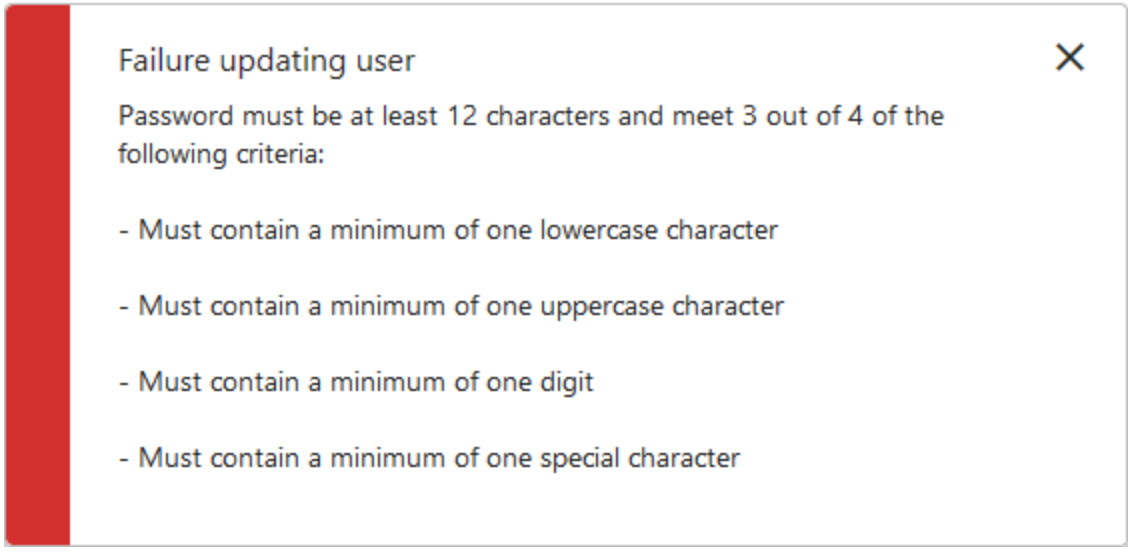


  - Must contain a minimum of one lower case character
  - Must contain a minimum of one upper case character
  - Must contain a minimum of one digit
  - Must contain a minimum of one special character

  Additionally, the password must meet the minimum password character requirement, which ranges from the default of eight (8) characters to the maximum of 20.

The following error displays in workbench and in Web UI if not all password requirements are met.

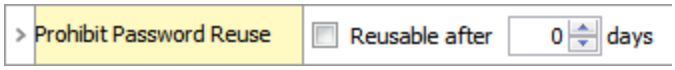




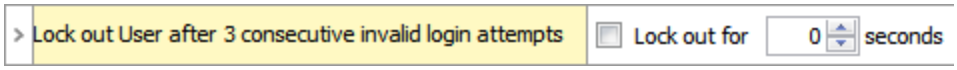
- **Password Expiration** – When checked, all new passwords will expire after the set number of days have passed. Once a password has expired, upon the next log in attempt, login will fail and an 'Invalid username or password' message will display. Verify that you have entered the correct username and password for authentication. If you have, then the message likely indicates that your password has expired and needs reset. If you continue to have issues, contact your system administrator.

Note: Passwords can be set to not expire for a user group via the Group tab for a specific user group. Refer to **Working with User Groups** documentation for more information.

- **Prohibit Password Reuse** – When box checked, the system prohibits a user from reusing old passwords. Old passwords are unavailable for reuse based on the set number of days.

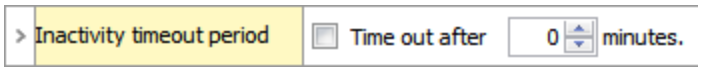


- **Lock out User after 3 consecutive invalid login attempts** – When checked, three (3) failed attempts to log in by entering a wrong or mistyped password will prohibit any new log in attempts for the set number of seconds.

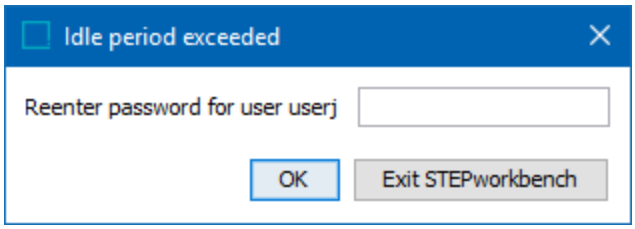


Note: Administrators who reset passwords for users locked out of the system also reset the time-out period for those users.

- **Inactivity timeout period** – When checked, the system can be configured to automatically sign out any logged in user from workbench and Web UI once the set number of inactive minutes is reached. This setting is most appropriate for STEP systems with a large number of active users.



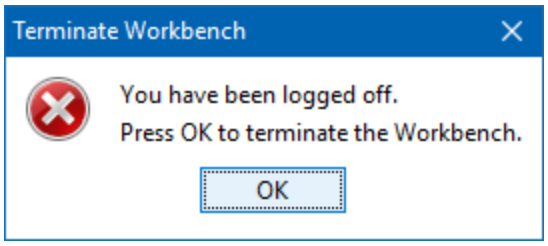
Once the inactivity timeout period is reached, the following dialog is displayed for the logged out user, and the password must be entered to resume work in workbench.



Web UI users will get a popup dialog when there are two (2) minutes left before the inactivity timeout period is reached. You can choose to extend your session to avoid automatic logout.

As an additional, but unrelated security measure, workbench token renewal time is required every four hours by default. While increasing that time also increases token-related security risks proportionally, modifications can be made via the sharedconfig.properties file. Include the case-sensitive property text 'Step.Token.ExpiryTimeInHours=[hours]' to set a time between five and 72 hours. For example, Step.Token.ExpiryTimeInHours=5.

When the expiry time is reached for workbench users, the Terminate Workbench dialog shown below is displayed and the user is logged out.



When the expiry time is reached for Web UI users, they are logged out and returned to the Web UI login screen.

GUI Localization

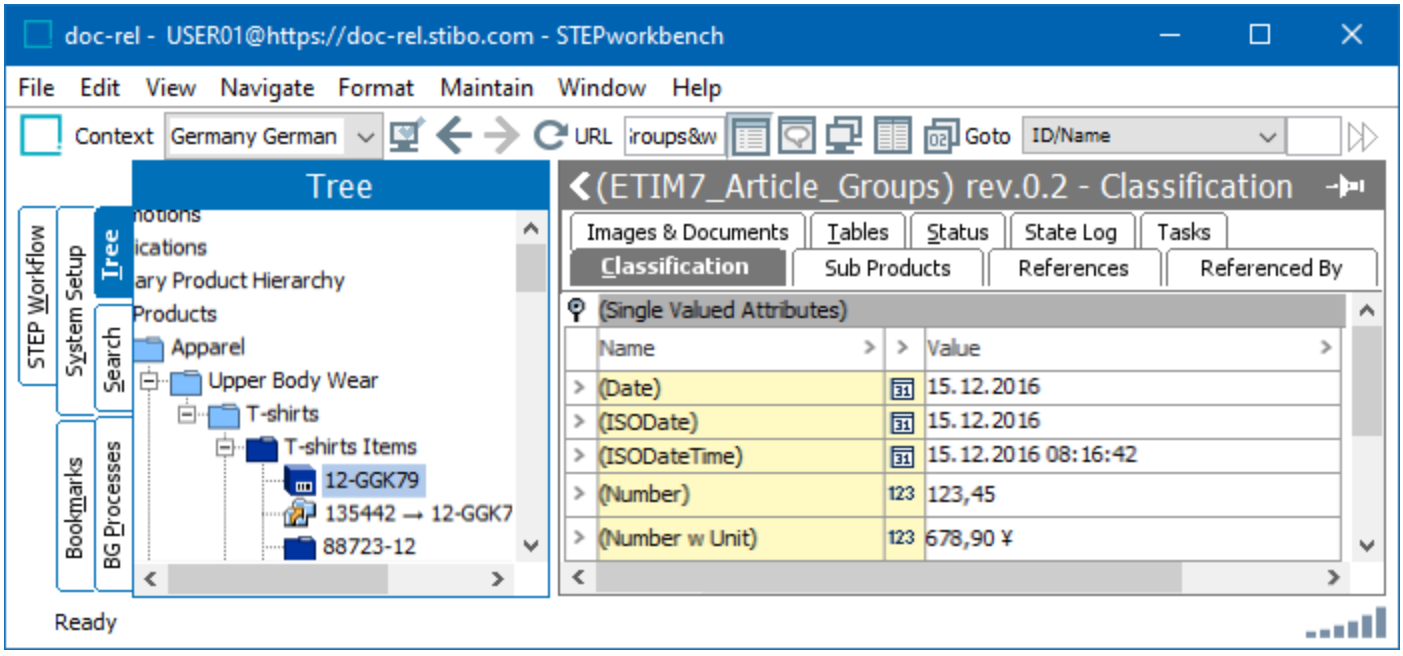
GUI Localization is maintained in System Setup > **Users & Groups** > **Users** on the **System Settings** tab.

In the Workbench when viewing and maintaining **Numbers** and **Dates**, they will as default be maintained and viewed using the English - US locale. A number like 1234.56 will appear with a dot to indicate the decimal. When editing and saving numbers and dates in the database, only an English-US locale is allowed to be used.

In the User editor in the System Settings tab, you have an option to select a specific locale to be used for a User. This locale will change the behavior in the Workbench to match a selected locale for the specific user. This option is useful for users working in other countries and where they want to view and maintain values in the Workbench with a different locale than the English - US.

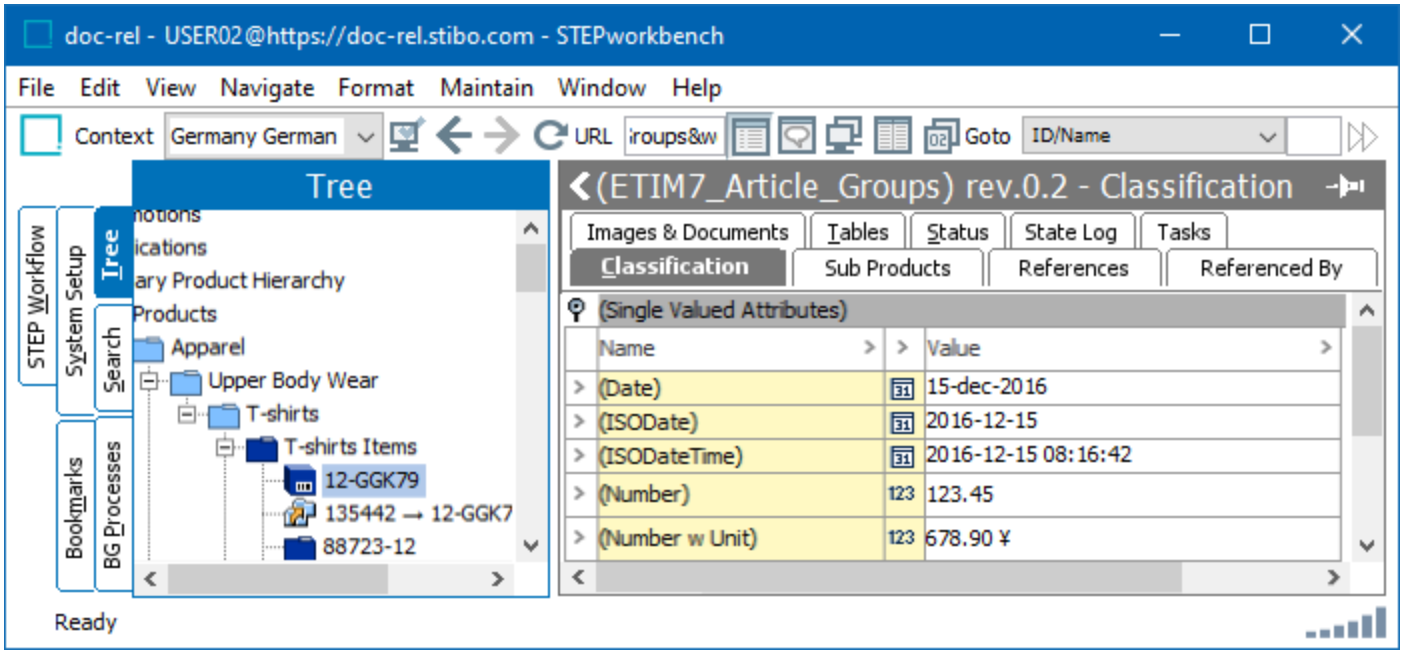
Important: A locale applied a User will only change the view of numbers and dates according to the locale in the Workbench and it will change dialogs to allow saving numbers and dates based on the locale. A number can e.g., be saved with a comma as a decimal separator using a German - de locale. Behind the scenes it is always the English - US locale that is used to save numbers and dates into the database.

For example, User 01 is using German - de/de locale:



In this example User01 is logged on the Workbench. The User is setup to use a German - de/de locale for numbers. A comma will appear in single and multi valued attributes / LOVs. User 01 will only be allowed to use a comma as a decimal separator for numbers. When User 01 saves a number into the database, the English - US locale will still be used to save the number. So if User01 enters a number: 2343,76 into a value field, the value will be saved in the database as 2346.76.

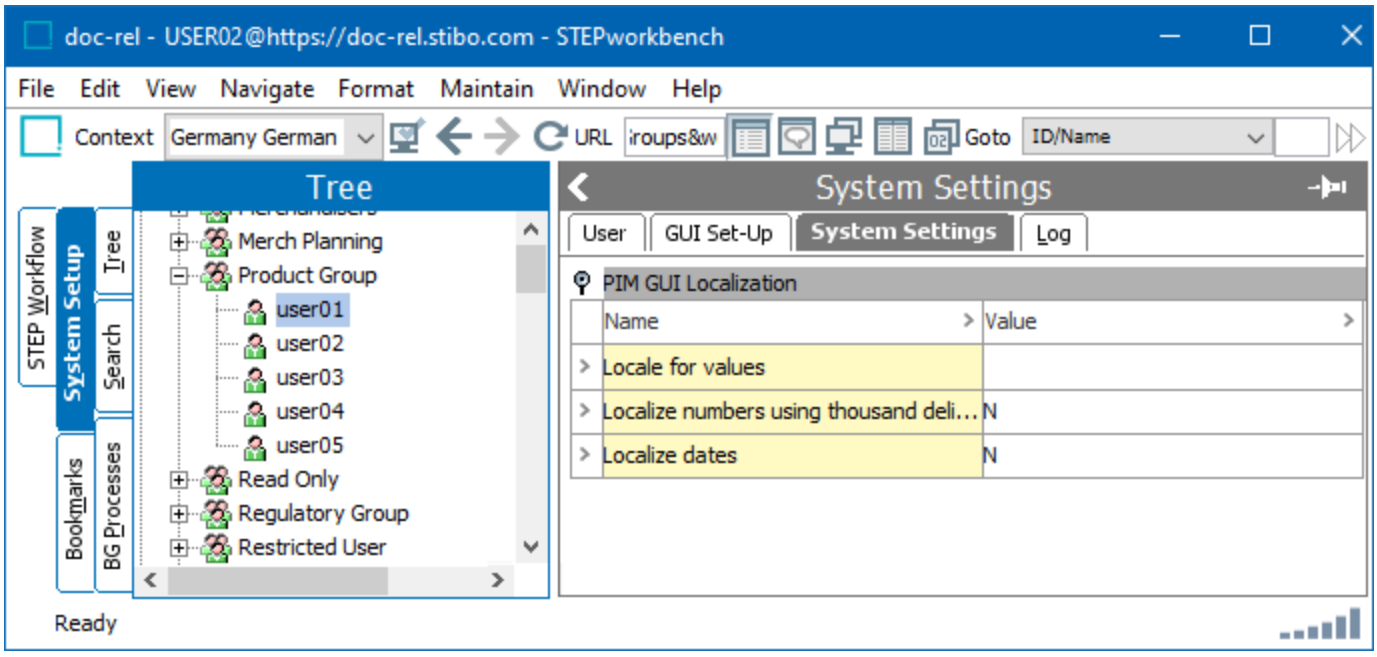
For example, User 02 is using English - us locale:



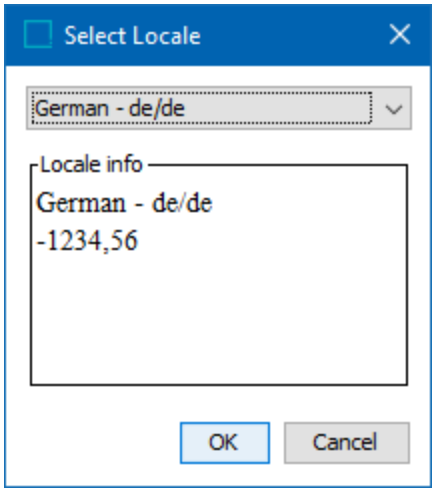
In this example User02 is logged on the Workbench. The User is setup to use a English-us locale for numbers. A dot will appear in single and multi valued attributes and LOVs. User 02 will only be allowed to use a dot as a decimal separator for numbers.

Setting up a GUI Localization for a User

GUI Localization is maintained in System Setup: **Users & Groups** > **Users** in the **System Settings** tab.



1. In **Locale for values**, click field to open a locale selector dialog. In this example a German - de/de locale is selected for User 01.



2. Click **OK** to apply the German locale for User 01.

> **Note:** Users without any locale applied will as default use the English - US locale to enter values or viewing values in the Workbench editors.

3. In **Localize numbers using thousand delimiter**, select Y to localize numbers using a thousand delimiter. In this example a German - de/de locale is selected for User 01, which will enable a dot to be shown as a thousand delimiter for Number and Integer validated values. For User 01, values like 1000 or 1000.10 will be shown as 1.000 and 1.000,10.

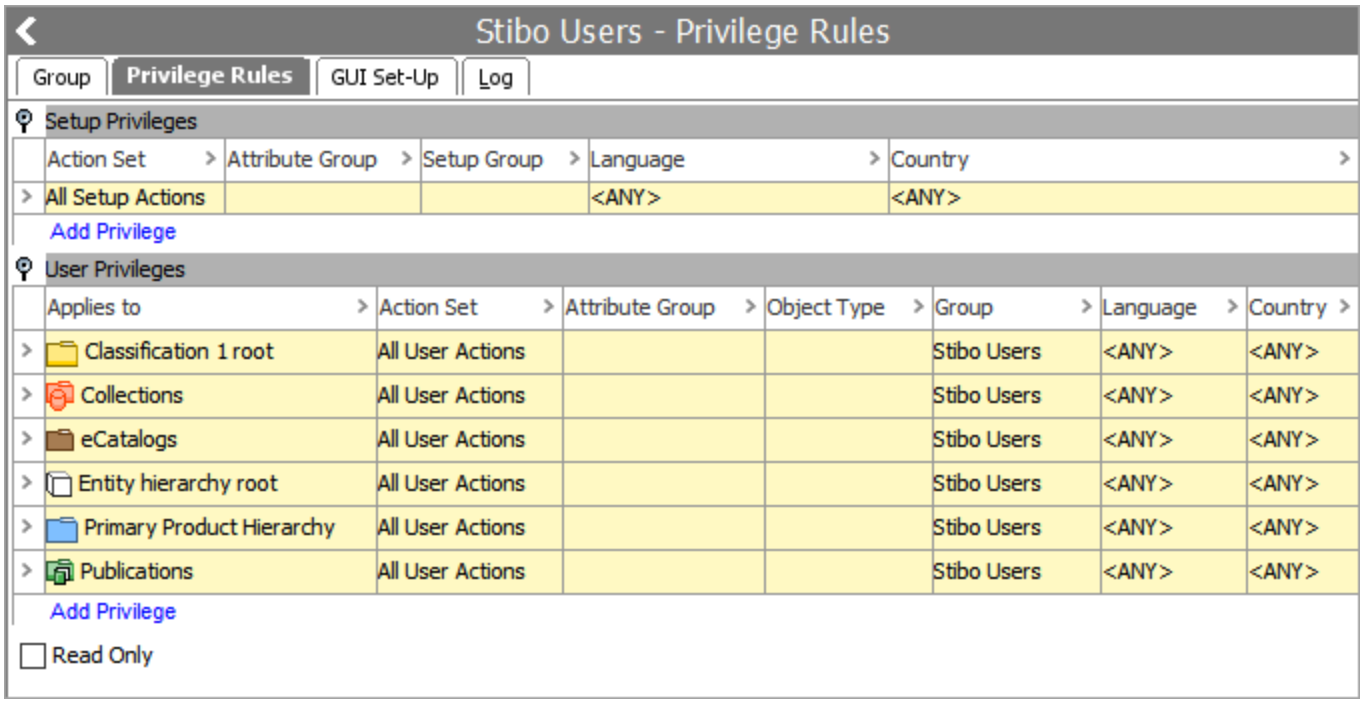
> **Note:** The thousand delimiter is only a display setting for values shown in the Workbench. Saving numbers and integers will not be saved in the database with a dot as a thousand delimiter.

4. In **Localize dates**, click Y to localize dates in the Workbench. In this example a German -de/de locale is selected for User 01. For User 01, isodates will be shown as 13.05.2009 and 'ISO Date and Time' will be shown as 13.05.2009 19:10:48.

Privilege Rules

Privilege rules are maintained in System Setup within the **Users & Groups** node on individual **Groups**.

Privilege rules are rules that specify a set of permitted actions that members of a specific group can perform on a specified set of data. There is no limit to the number of privilege rules that can be applied to the same group.



Each privilege rule is defined by specifying:

- A group (of users)
- An action set
- A structure node (products, classifications, collections, publications, entities, or eCatalogs)
- A workflow state
- An attribute group (or one attribute).
- An object type
- Limitations to certain dimensions

Each group must be assigned privilege rules, defining which actions the members of that group are allowed to perform, and which data the members of the group is allowed to work with. Defining the privilege rules forms one part of the privilege control system settings. The second part, defining action sets, is performed in System Setup under Action Sets. For more information, refer to **Action Sets** topic. A privilege rule grants all of the users in a

group the permission to perform any of the actions in the selected action set. This permission can be restricted to specific sets of data. To prevent a group of users from making changes, refer to the **Read-Only Access** section below.

Important: Except for supplier privileges, privilege inheritance is not recommended since it does not allow for re-engineering when business conditions change.

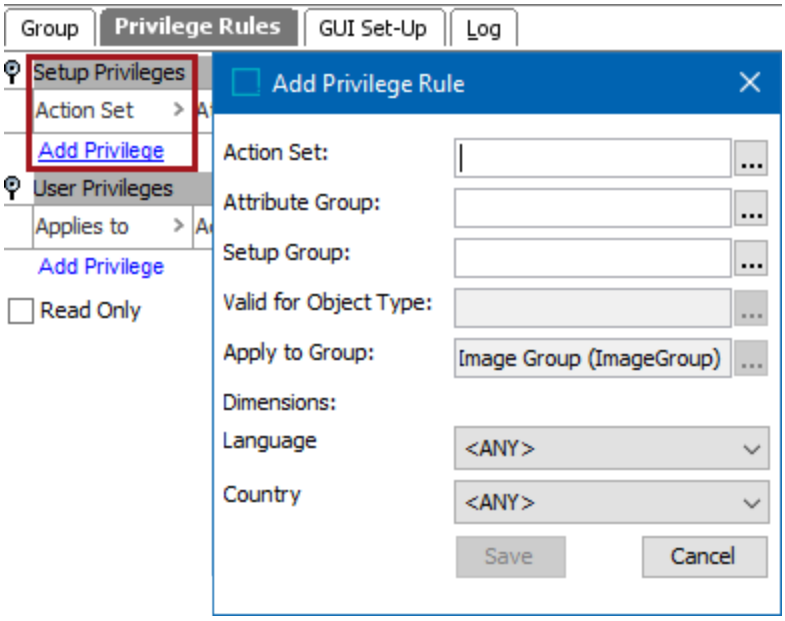
Recommendations for Privilege Rules

- Create users specifically for inbound and outbound integrations, and then apply privileges to these users. Doing this enables control of users viewing the integrations and allows for limiting of what can be exported. This is also helpful for audit trails.
- Privilege Rules applied a User Group will be inherited to sub User Groups. This means it is possible to apply general Privilege Rules on a top level and only specify local Privilege Rules on sub User Groups. It is recommended to apply all general Privilege Rules as high as possible in the User Groups hierarchy to simplify management of the Privilege Rules.
- Configuring privilege rules in STEPXML can save time. To do so, configure a few privilege rules in workbench, then export only the user definitions to STEPXML to use as a template.
- Do not use Web UI configurations to limit actions as this is not sufficient for a security audit. Instead, use action sets and privilege rules to limit actions.

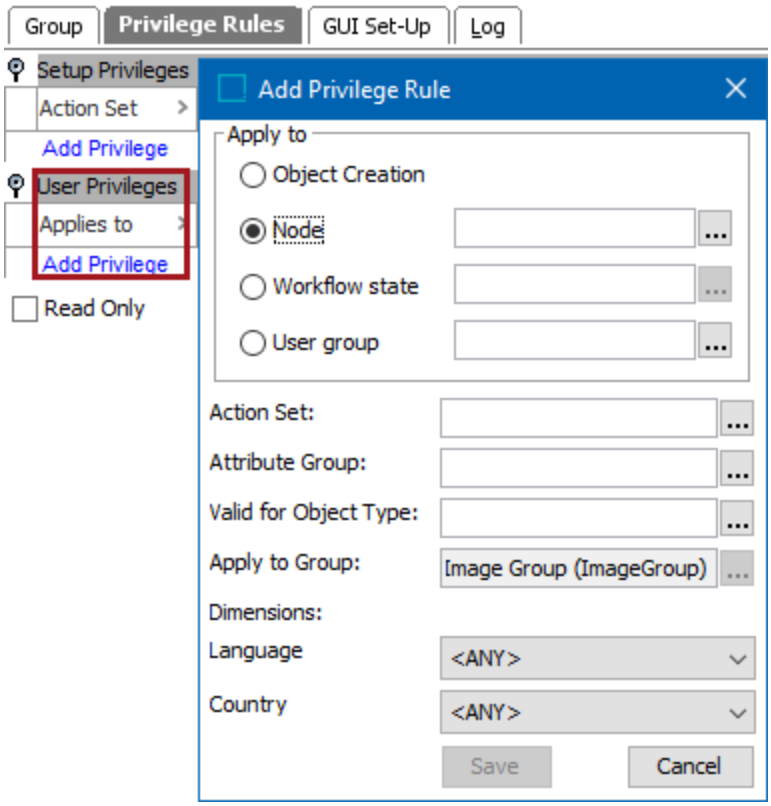
Privilege Rule Types

There are two types of Privilege rules:

Setup Privileges: These are usually actions that are usually performed by a System administrator.



User Privileges: For actions that should be performed by the users of a specific group.



Restricting Actions

Actions can be restricted to:

- Objects that are linked to a specific node (or a node below) in the classification, product, publication, entity, or eCatalog hierarchy, in a specific node collection, or in a STEP Workflow in a specific state.
- Attributes within a specified attribute group (e.g., changing an attribute value). If an attribute group(s) is not specified, the action is permitted for all attributes.
- Workflows, integration endpoints, and business rules within a specified setup group.
- Specified dimension points. If no dimension point is specified for a dimension, the action is permitted for all dimension points within that dimension.
- Specified object type. If no object type is specified, the action is permitted for all object types.

Unlimited Number of Privilege Rules

Any number of rules may be set up for the same group, granting permissions for specific actions sets on a number of hierarchy nodes and dimension points.

Note: A user may be a member of multiple groups. The user will accumulate the privilege rules from all these groups, so a restriction from one group is ignored if the corresponding action is permitted via another group membership.

Editing Linked Objects

If a privilege rule permits the editing of a specific attribute value for products linked to a specific classification node, this attribute value can also be edited through other classification nodes that these products may be linked to.

Access to Classifications and Products

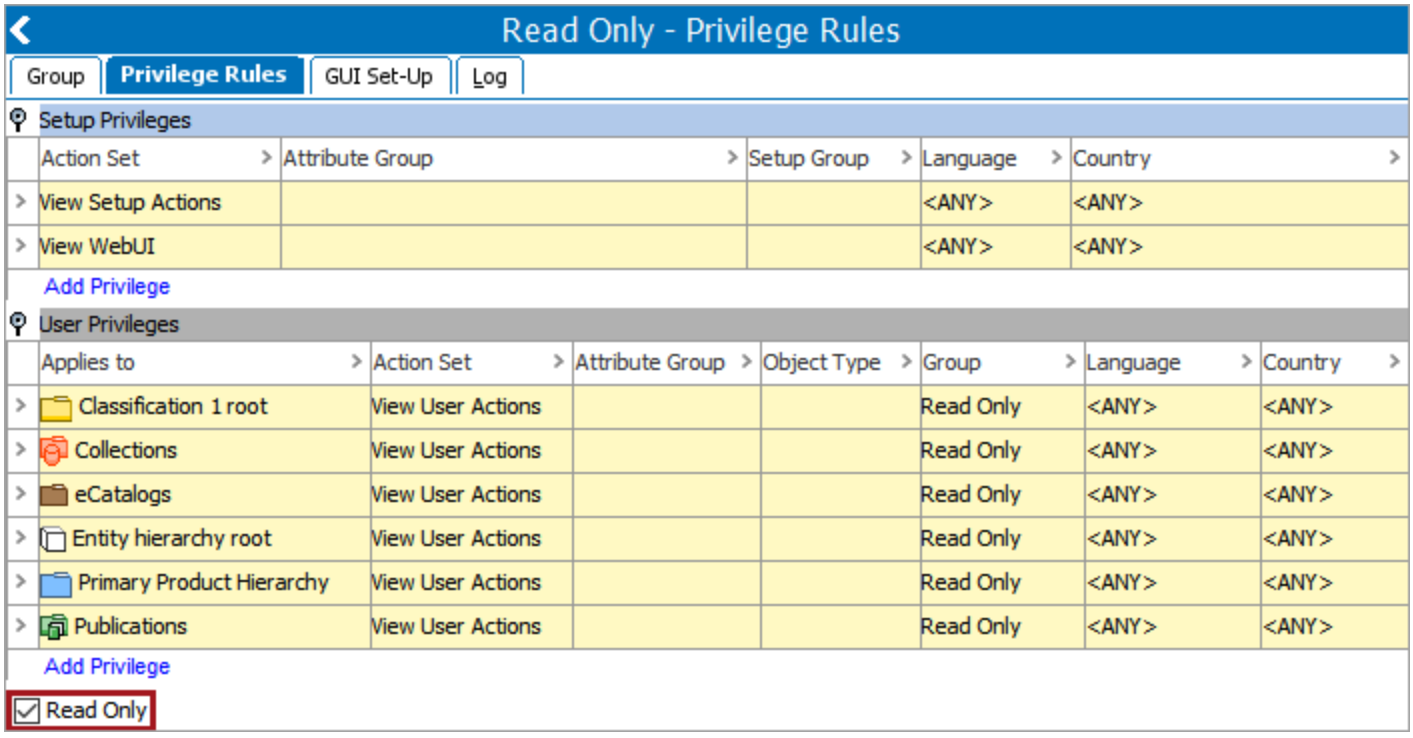
If a group has permission to work with a specific classification node, attribute values can be edited for all products linked to (or below) that node. However, access to the classification node does not grant the privilege to link new products in the product hierarchy. To do that, the group must have permission to work with the specific product node as well.

Read-Only Access

To prevent a group of users from making changes, create a group with the following privilege rules settings:

- Only 'View actions' rights are added
- The 'Read Only' checkbox is checked

For example:



This example group provides the users with only view access; the group members are not able to make any changes while logged into the system.

Adding User Privileges for a Group

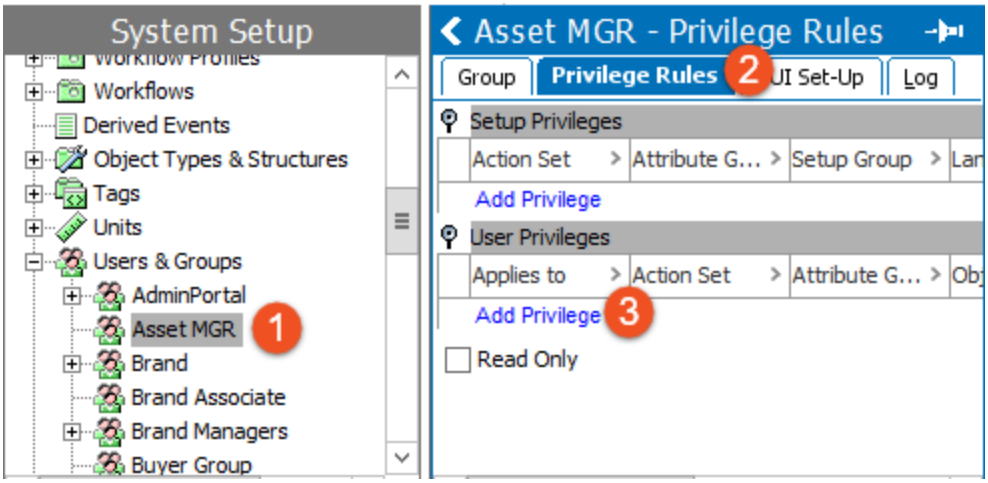
User Privileges are maintained in System Setup within the Users & Groups node, under the Privilege Rules tab.

A privilege rule specifies a set of permitted actions that members of a specific group can perform on a specified set of data. There is no limit to the number of privilege rules that can by applied to the same group so you can be as granular as needed regarding specific actions for specific objects, attributes and so on.

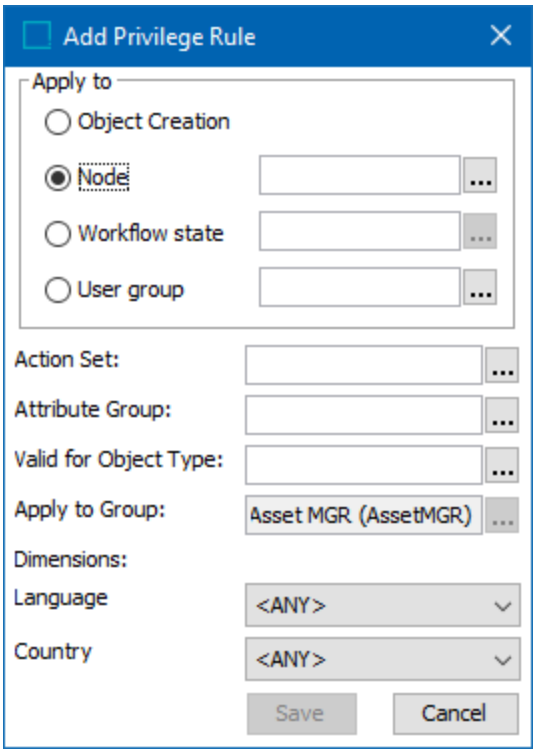
Important: Privilege rules applied at the group level affect all users and sub-groups within that level.

To add a privilege to a group:

1. From the System Setup menu, open the Users & Groups node and select the relevant user group.
2. Click the **Privilege Rules** tab.
3. In the User Privileges flipper, click the **Add Privileges** link.

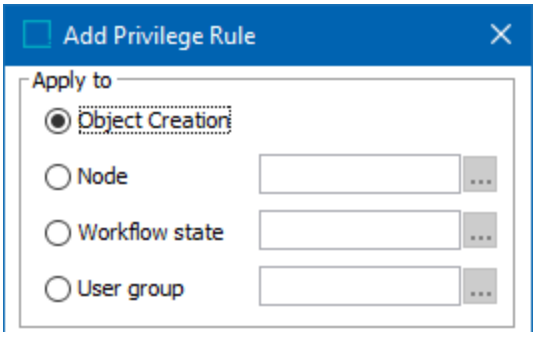


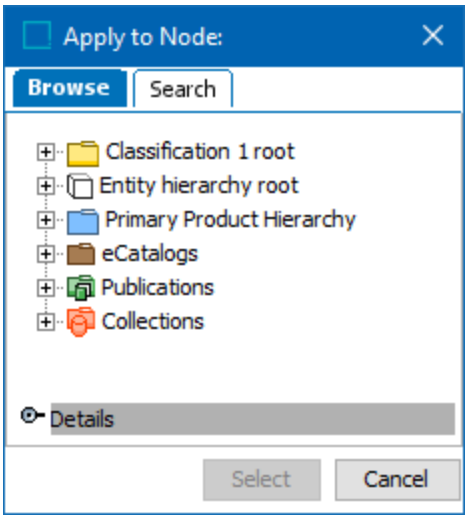
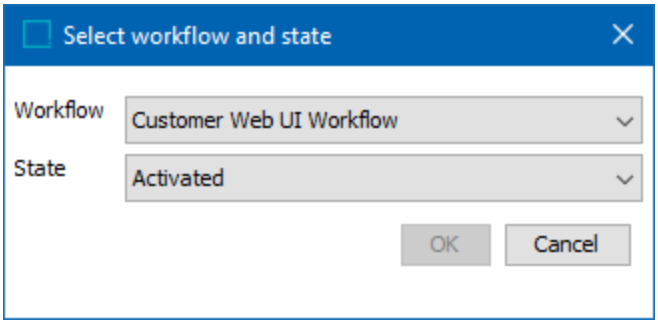
4. The **Add Privilege Rule** dialog box displays as shown in the image below.

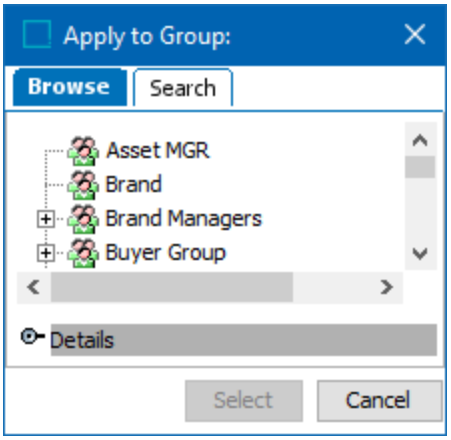
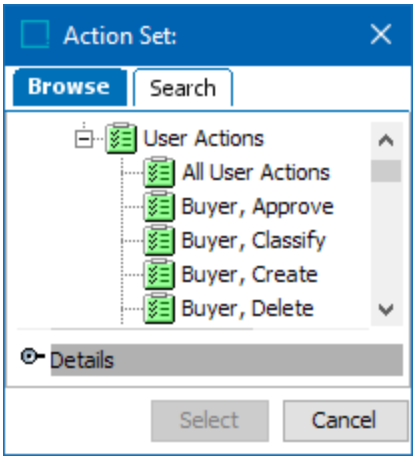


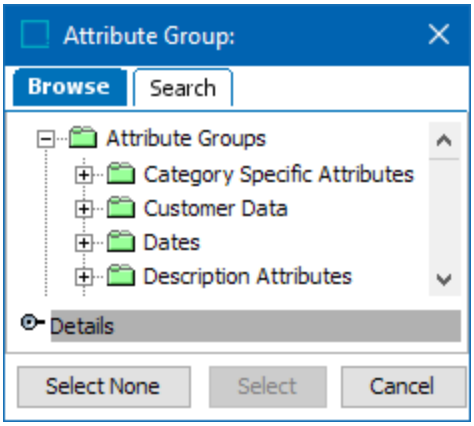
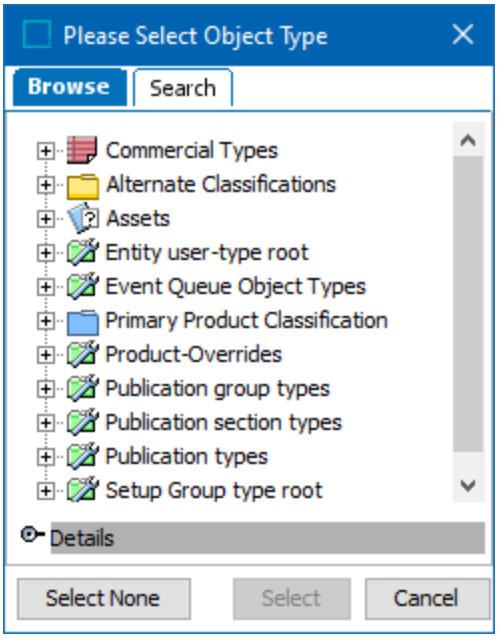
5. Set the relevant parameters as defined in the following table, and then click **Save**.

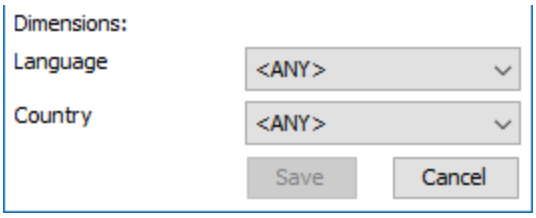
Add Privilege Rule Options

Parameter	Description
Apply to Object Creation	Administrators select this option to give permission for users to create new objects in STEP via the Object Creation parameter which is available when configuring user privileges. More information about this parameter can be found in **Object Creation Privileges**. 
Apply to Node	Select the allowed classification or product node for the group, which includes also specific sub-nodes.

Parameter	Description
	If a specific object type and node is selected, the users in the group can only access objects within that selection. For example, a specific classification or product node, or products of a certain object type. However, if a product not included in the selection is linked to a classification node to which the user has access, the user can access the product, but not edit it. 
Apply to Workflow State	When you create a user privilege rule for a STEP Workflow state, the group will have that privilege for nodes in that particular state in the STEP Workflow. More information about this parameter can be found in **Configuring Workflow Privileges**. 
Apply to User Group	Select a group that needs the privilege being created. Web UI user impersonation enables a privileged user to act as another user, but using their own password so that the impersonated user's password is not revealed. This is done through selecting a user group. More information about this parameter can be found in **Web UI User Impersonation**.

Parameter	Description
	
Action Set	Select the permitted action set(s) for the group. Action sets should be very specific to the privileges that you want the user group to have. For more information about action sets, refer to **Action Sets** in **System Setup** documentation. 
Attribute Group	Optional. Select the permitted attribute group. Select if the group should only be allowed to work with attributes in a specific attribute group. If there are attributes within a group that should not be valid for a user to access, a separate group should be maintained containing the attributes the users should have access to. Consider creating attribute groups to be used only for privileges and link allowable attributes into the user privilege groups (approve, view and modify). Separate privilege rules can handle the category specific attribute group or sub-groups if they exist.

Parameter	Description
	
Valid for Object type	Optional. Select the permitted object type. For more information about object types, refer to **Object Types and Structures** topic. 
Apply to Group	Select the user group that the privilege rules should be applied to. This is not necessary if you are already on the group that you are applying privilege rules for.
Dimensions	Optional. Select the permitted language or country dimension. If a privilege rule to modify an attribute value is restricted to a dimension: • Users only have the ability to modify the dimension dependent attribute values.

Parameter	Description
	• Users cannot modify values that have no dimension dependency. **Note:** The default of **Any** allows the group to work with all dimension points. For more information about dimension points, refer to the **Dimensions and Dimension Points** topic. 

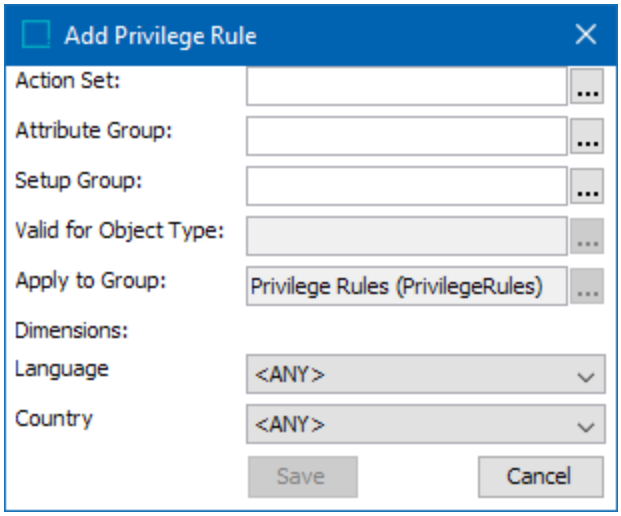
Adding Setup Privileges for a Group

Group Privileges are maintained in System Setup: **Users & Groups**: **Privilege Rules** tab.

Setup privileges cover the Actions that are performed by members of a specific group in System Setup.

1. From the System Setup menu, click the flipper to open the Users and Groups node and select the relevant User Group.
2. Click the **Privilege Rules** tab.
3. In the User Privileges field, click **Add Privileges**.

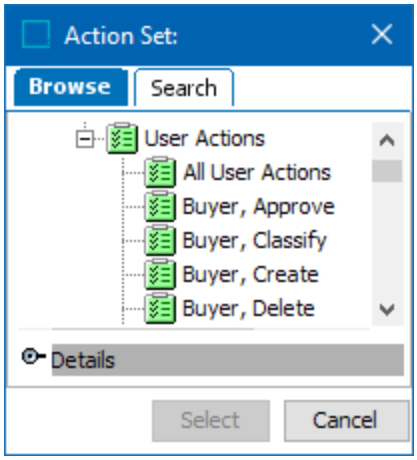
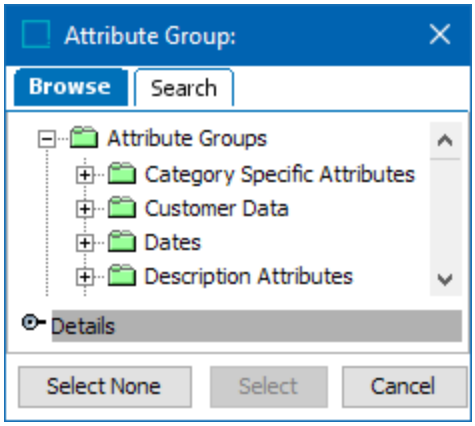
   An **Add Privilege Rule** dialog box appears.

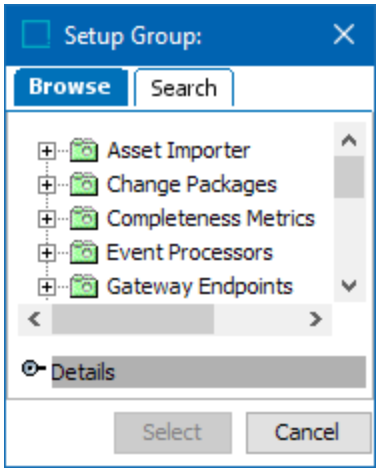


4. Make the relevant changes, and then click **Save**.

Add Setup Privilege Rule Options

Setting	Description
Action Set	Select the permitted Action Sets for the Group. For more information about Action Sets, refer to **About Action Sets** in **System Setup** documentation.

Setting	Description
	
Attribute Group	Optional.: Select the permitted Attribute Group. 
Setup Group	Optional: Select the permitted Setup Group.

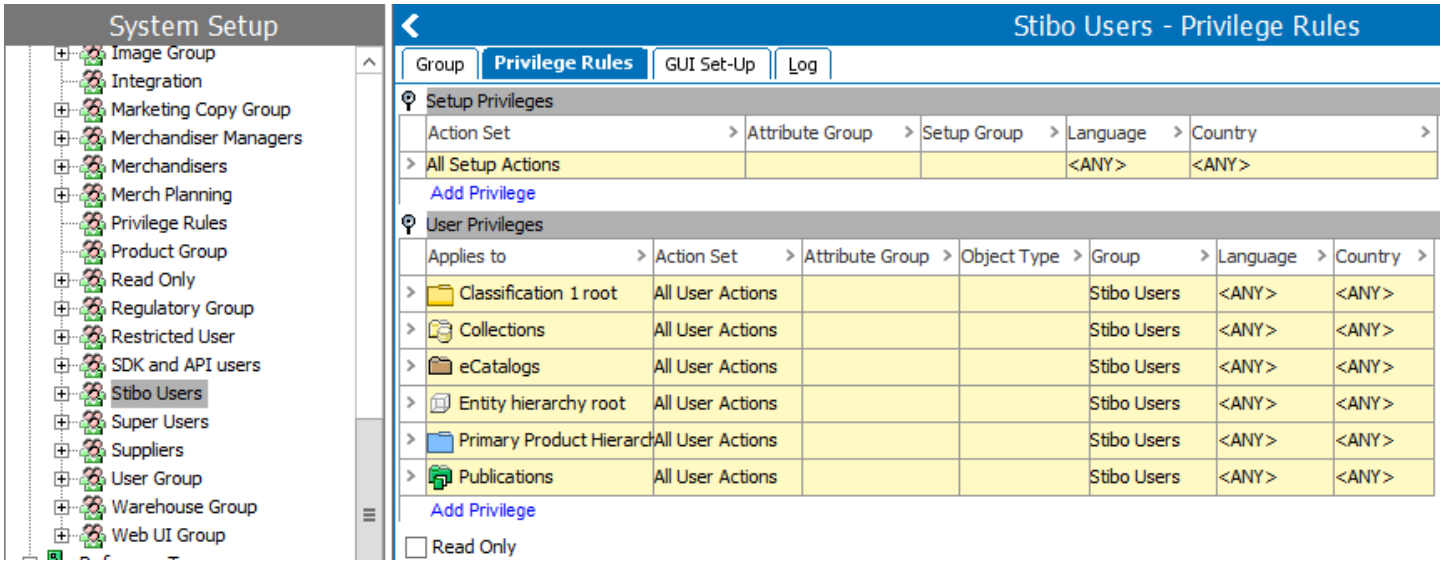
Setting	Description
	
Valid for Object type	Selecting an Object Type is not a part of a Setup privilege.
Language Country	Optional. Select the allowed Dimension to be accessed.

Note: The **Attribute Group** field and **Action set** field are standard. The rest of the fields will reflect the currently set up Dimensions, e.g., **Language**, **Price** and **Division**. Setting dimension points is a time consuming process. Typically a Super User should have permission to work with all dimension points. Also note that **<ANY>** will allow the group to work with all dimension points. For more information about dimension points, refer to the **Dimensions and Dimension Points** topic in the **System Setup** documentation.

Once saved, the Setup Privilege rule is added to the User Group.

Editing Privilege Rules

Privileges are maintained in System Setup: **Privilege Rule** tab in the **User Group** Editor.



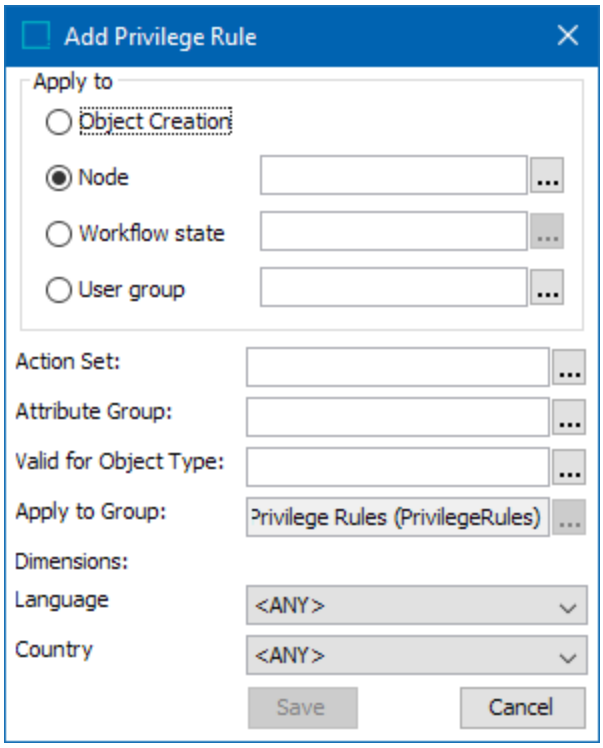
For more information about Privileges Rules and the Privileges Rule Types, refer to **Privilege Rules** in the **Users and Groups** section of **System Setup** documentation.

1. In System Setup, open **Users & Groups**, and then click the relevant Group.

   The Group appears in the **Group** Editor.

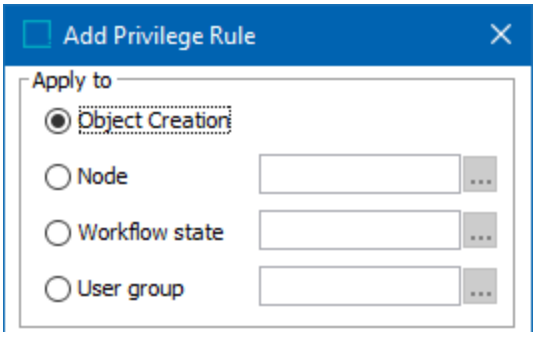
2. Click the **Privilege Rules** tab.
3. Click the relevant Privilege to be changed, right-click, and then click **Edit Privilege Rule**.

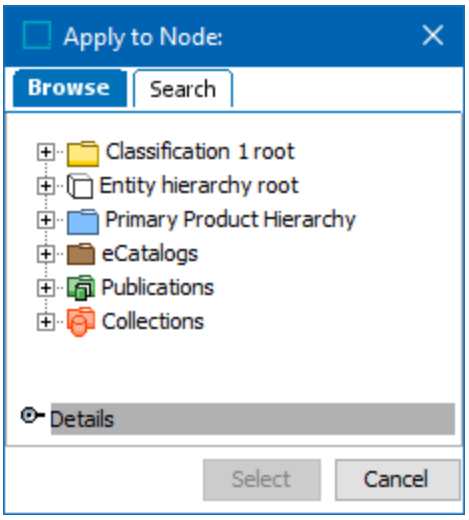
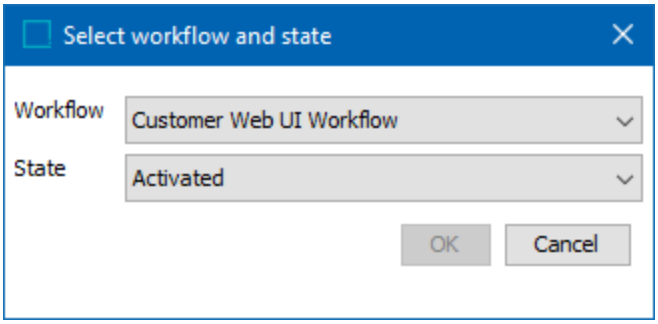
   An **Edit Privilege Rule** dialog box appears.

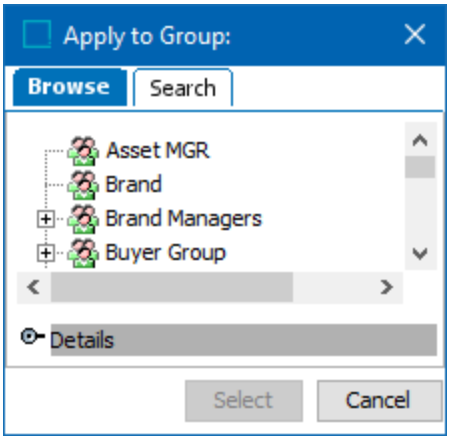
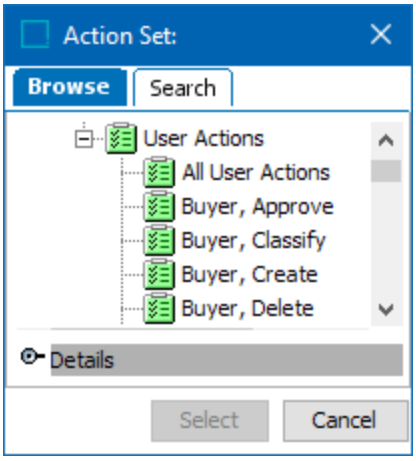


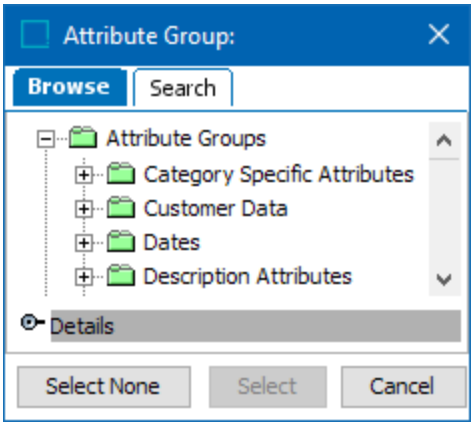
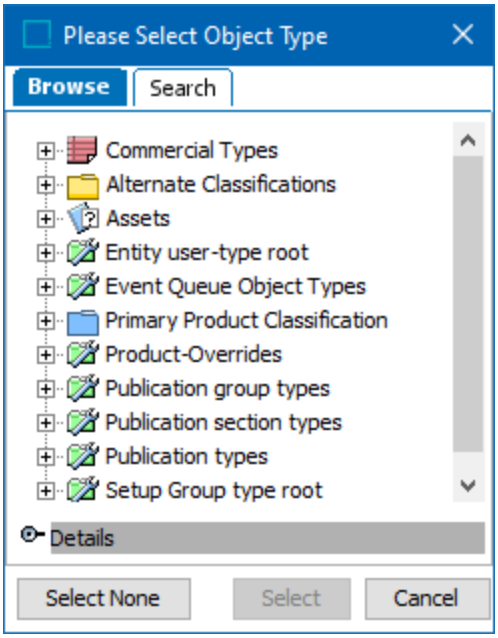
4. Make the relevant changes, and then click **Save**.

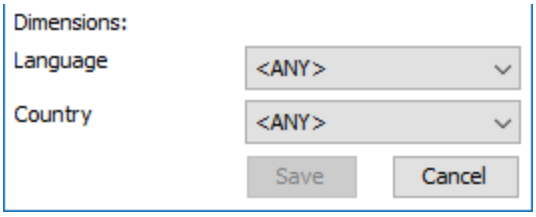
Edit Privilege Rule Options

Setting	Description
Object Creation	When configuring user privileges, the Object Creation option allows an administrator to give specified access to a user who also has privileges to create new objects in STEP. More information about this option can be found in **Object Creation Privileges**. 
Apply to Node	Select the allowed classification or product node for the group. This would include specific sub-nodes as well.

Setting	Description
	If a specific Object type and node is selected, the Users in the Group can only access Objects within that selection. e.g., a specific Classification or Product node, or Products of a certain Object type. However, if a Product not included in the selection is linked to a Classification node to which the User has access, the User can access the Product, but not edit it. 
Workflow state	When you create a user privilege rule for a STEP Workflow state, the group will have that privilege for nodes in that particular state in the STEP Workflow. More information about this parameter can be found in **Configuring Workflow Privileges**. 
User Group	Web UI user impersonation enables a privileged user to act as another user, but using their own password so that the impersonated user's password is not revealed. This is done through selecting a User Group. More information about this parameter can be found in **Web UI User Impersonation**.

Setting	Description
	
Action Set	Select the permitted Action Sets for the Group. Remember to create Action Sets that are very specific to the privileges that you want the User Group to have. For more information about Action Sets, refer to **About Action Sets** in **System Setup** documentation. 
Attribute Group	Optional. Select the permitted Attribute Group. Select if the Group should only be allowed to work with attributes in a specific Attribute Group. Note that if are attributes within a group that should not be valid for a User to have access to, a separate group should be maintained containing the attributes the Users should have access to. Consider creating attribute groups that will be used only for privileges and link allowable attributes into the user privilege groups, (approve, view and modify). Separate privilege rules can handle the Category Specific attribute group or sub-groups if they exist.

Setting	Description
	
Valid for Object type	Optional. Select the permitted Object type.  For more information about Object Types, refer to **Object Types and Structures** in **System Setup** documentation.
Apply to Group	Select the User Group that the Privilege Rules should be applied to. This is usually not necessary if you are already on the group that you are applying Privilege Rules for.
Dimensions	Optional. Select the permitted Language or Country dimension. If a restriction to a dimension is required, you should know:

Setting	Description
	• If a Privilege Rule to modify an attribute value is restricted to a dimension, user will only have the ability to modify the dimension dependent attribute values. • They are not able to modify values that have no dimension dependency. **Note:** The default of **Any** will allow the Group to work with all dimension points. For more information about Dimension Points, refer to the **Contexts** topic in the **System Setup** documentation. 

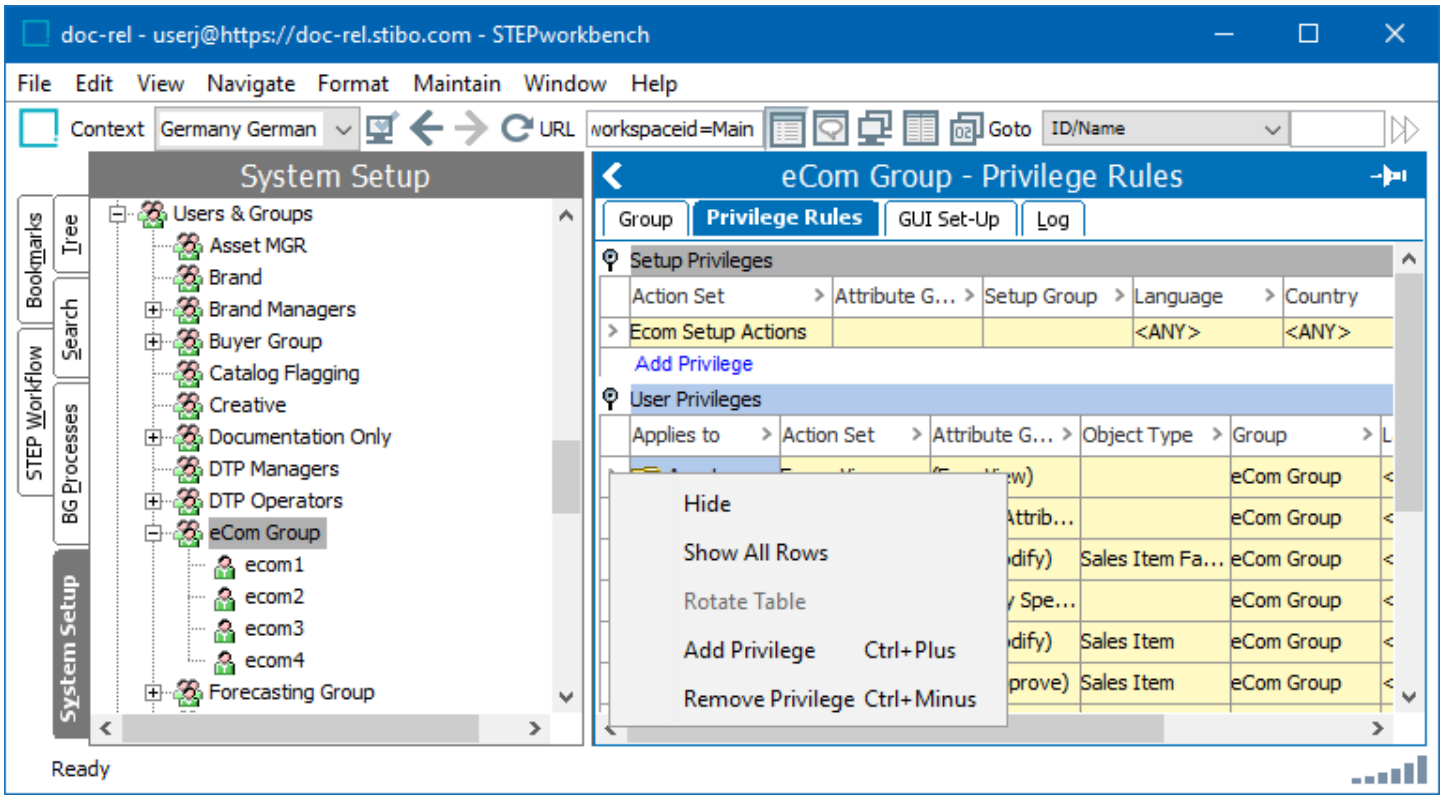
Removing a Privilege Rule from a Group

1. In System Setup, open **Users & Groups**, and then click the relevant Group.

   The Group appears in the **Group** Editor.

2. Click the **Privilege Rules** tab.
3. Click the row header of the Privilege rule to be removed, and then click **Remove Privilege**.

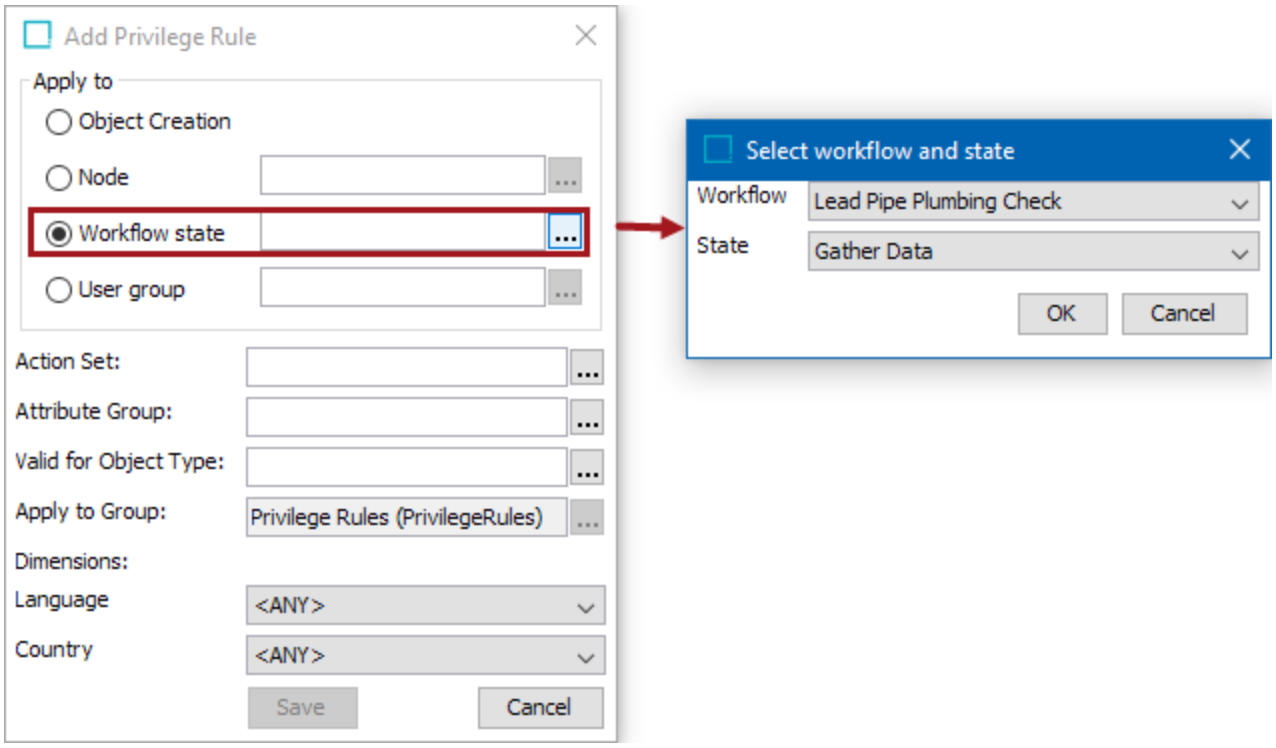
   The Privilege rule will now be removed from the list and will no longer apply to the members of the selected Group.



Configuring Workflow Privileges

User privileges can be applied to a STEP Workflow state. When you create a user privilege rule for a node, the group will have that privilege for that particular node and all nodes below it in the hierarchy. When you create a user privilege rule for a STEP Workflow state, the group will have that privilege for nodes in that particular state in the STEP Workflow. A possible use of this is to set up a group of data entry users, that are only allowed to view a part of the product hierarchy. Once the products enters the data entry state, the users can be set up to be able to modify values in a certain attribute group and submit the products once done. Once submitted, they are not be able to search for a product and make any additional changes if the product is not in the data entry state.

If you click the 'Workflow state' radio button in the dialog below, and click the ellipsis button (...), you will get the below STEP Workflow state selector:

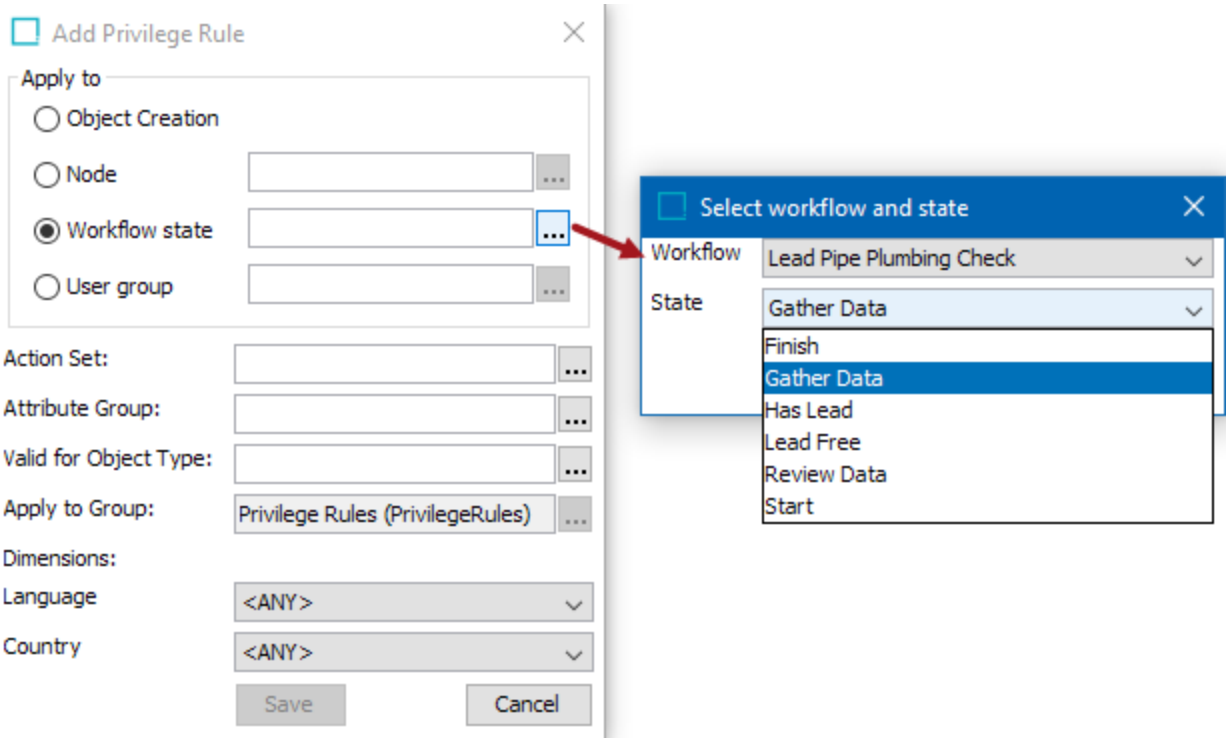


When applying Workflow state-specific privileges, it is important to keep the following in mind:

- A user's User Group privilege overrides workflow state-specific rules that restricts the privilege. For example, if the User Group can edit attribute values, a workflow state-specific rule that restricts editing has no impact on users in the group.
- If state-specific restrictions are not needed, entries are not required either.
- If state-specific restrictions are needed, a privilege rule must be duplicated for each state.

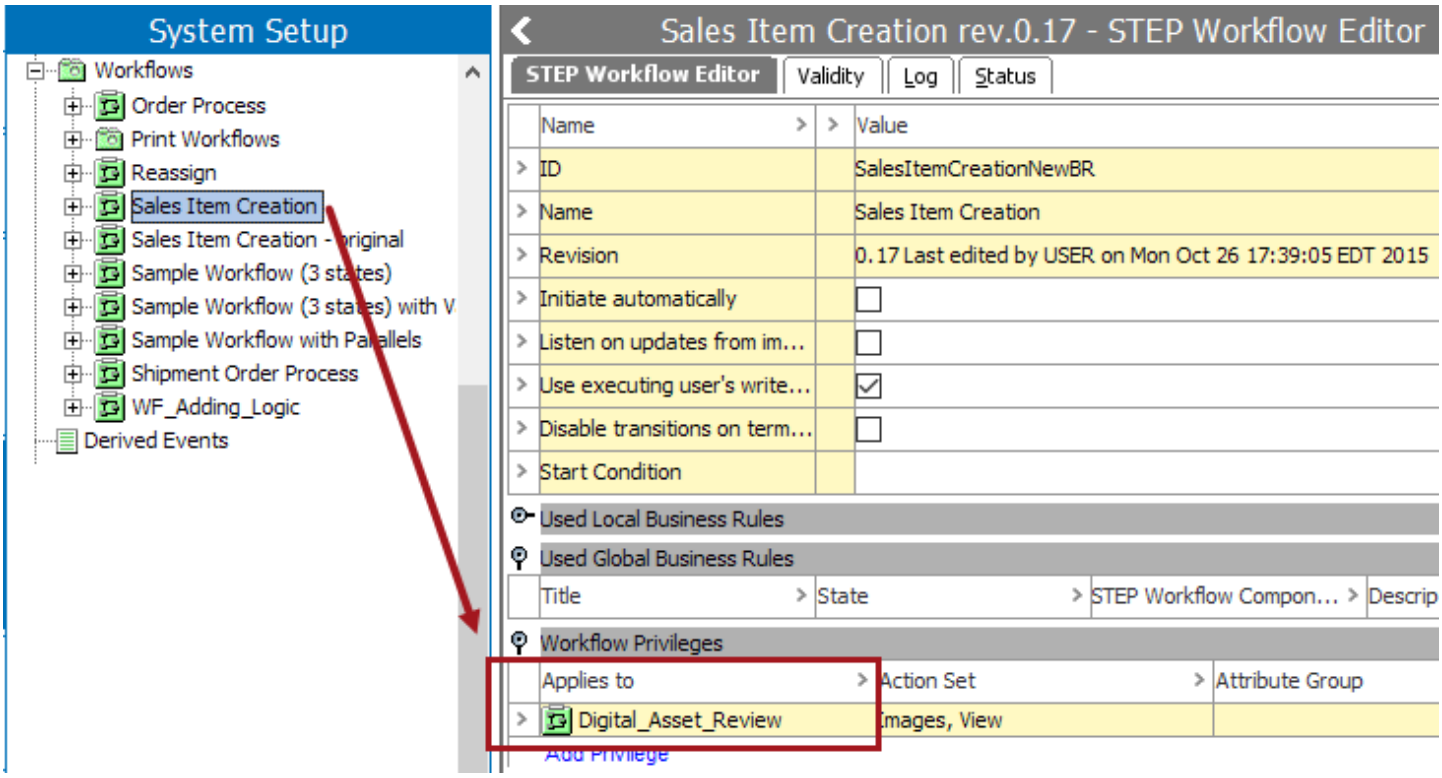
Workflow State Selector

The dialog consist of two combo boxes. The top combo box allows you to select the STEP Workflow. Once the STEP Workflow has been selected the button combo box will be populated with all the states within the selected STEP Workflow. The states are arranged such that cluster and parallel states will have their child states shown below them indented. If you hover the arrow on a state, the hover text will give information about the type of the state; initial, cluster, parallel, or final.

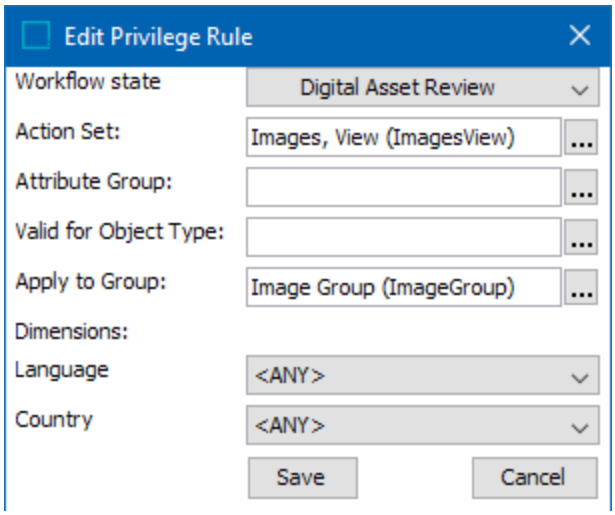


Editing Privilege Rules with Focus on STEP Workflows

The above describes how to edit privilege rules with focus on a User Group. However, it is also possible to edit privileges with focus on either a product or classification hierarchy. Thus you can also find the privilege table on the 'Referenced By' tab when having selected a product - or on the 'References' tab when having select a classification in the Workbench. Additionally, you can set up privileges while focused on STEP Workflows by using the 'Workflow Privileges' table on the STEP Workflow Editor. This shows all the privileges rules referring the selected Workflow. The first column in the table is slightly different from the privilege rules table when shown for a group, where it shows the name of the STEP Workflow followed by the name of the state the rule applies to. On the STEP Workflow Editor the 'Applies to' column only displays the state - as the STEP Workflow is given from the selection.



Likewise, when editing a privilege rule or adding a new privilege rule via the STEP Workflow Editor, the dialog is slightly different. Instead of radio buttons to select either a node or a Workflow and State, a combo-box allows you to select a state of the given Workflow.



It is possible to review which states have privilege rules in the Workflow Editor. The states will be marked with an encircled 'P.'

Limitations on Workflow Privileges

Not all actions can be granted as Workflow / State privileges. It is valid for a Workflow / State specific privilege rule to add an action set containing some of the actions that does not apply to Workflow / State specific rules. These actions will be ignored. A list of the valid actions for Workflow / State specific rules are:

- Approve Classification Product Links
- Approve Create
- Approve Data Containers
- Approve Modify
- Approve References
- Approve Values
- Classify asset
- Classify product
- Create asset reference
- Create classification reference
- Create collection
- Create data container
- Create entity
- Create entity reference
- Create product
- Create product reference
- Declassify asset
- Declassify product
- Delete asset
- Delete asset reference
- Delete classification reference
- Delete data container
- Delete entity
- Delete entity reference
- Delete product

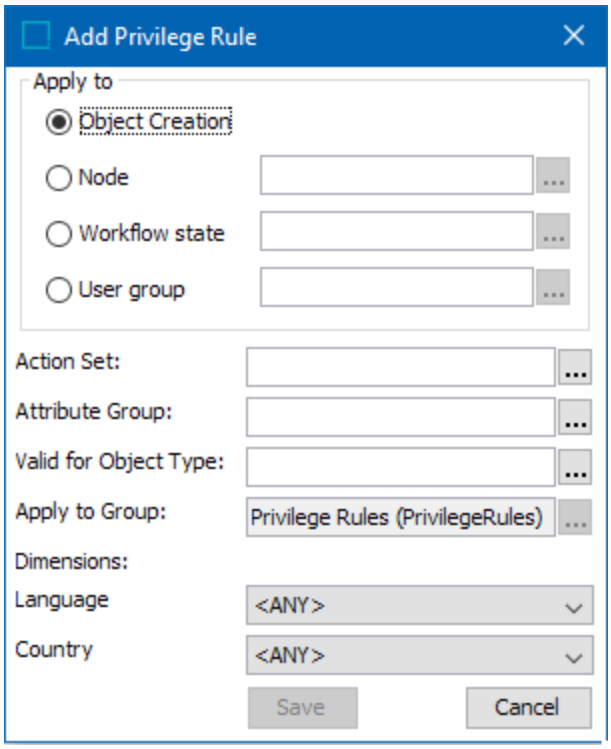
- Delete product reference
- Download asset
- Link (product) attribute into classification
- Modify metadata for asset
- Modify metadata for asset reference
- Modify metadata for attribute to classification link (also translate)
- Modify metadata for classification
- Modify metadata for classification reference (link value) (also translate)
- Modify metadata for data container (property value) (also translate)
- Modify metadata for entity
- Modify metadata for entity reference
- Modify metadata for product
- Modify metadata for product classification (link value) (also translate)
- Modify metadata for product reference
- Modify name/description of asset
- Modify name/description of classification (also translate)
- Modify name/description of entity
- Modify name/description of product
- Modify product attribute value
- Move classification from
- Move classification to
- Move entity from
- Move entity to
- Move product from
- Move product to
- View asset
- View asset reference
- View attribute to classification link
- View classification reference

- View Collection
- View Collection Group
- View data container
- View entity
- View entity reference
- View metadata for attribute to classification link (link attribute value)
- View metadata for asset (property value)
- View metadata for asset reference
- View metadata for classification
- View metadata for classification reference (link attribute value)
- View metadata for data container (property value)
- View metadata for entity
- View metadata for entity reference
- View metadata for product
- View metadata for product classification
- View metadata for product reference
- View product attribute value
- View product
- View product reference
- Unlink (product) attribute from classification
- Upload to asset

Object Creation Privileges

In addition to configuring user privileges, the Object Creation option allows an administrator to further specify the access of a user who also has privileges to create new objects in STEP. The Object Creation parameter is intended for use on Initiate Item, Mass Creation, and Simple Importer in Web UI, as well as when using Smartsheets and/or the STEP Importer.

Note: The Object Creation option provides additional control for what a user can do when creating an object. Separate user action(s) that allow a user to create object(s) are also required, as defined in the **User Actions and Error Descriptions** topic.



For example, when creating a product, a user may be able to populate certain attribute values, but once the object is created, they no longer have access to these data fields, and thus cannot change them. This allows for more granular control over data so that users can be given access to data during the creation process only, but not to the same data after the object has been created. Following creation of the object, any global or workflow specific permissions will take over.

For more on how to set up privileges and how they work, refer to the topic on Users and Groups in the System Setup documentation.

For more on how to setup global and business rules, refer to the Local and Global Business Rules topic in the Business Rules documentation.

For more on workflow specific permissions, refer to the Configuring Workflow privileges topic in the System Setup documentation.

It is worth noting that these object creation privileges do not apply to any new setup type nodes. Also, if an administrator selects to apply the object creation permissions to an unsupported object type, such as eCatalogs, publication sections, pages, attributes, etc., there will not be any kind of warning message.

Note: The Object Creation privilege is not recommended for use when using Web Services and creation in workbench outside of an importer. This is because users do not populate values for new objects in these cases until after creation of the object.

Considerations When Creating New Object

When setting up permissions for Object Creation in STEP, administrators need to keep in mind certain aspects when their users create new objects through the different means: Mass Creation in Web UI, as well as Smartsheets and/or the STEP Importer (e.g., Import Manager or inbound integration endpoints).

General aspects to Consider

If there is data that needs to be provided only once (upon creation only) and never updated again, a specific privilege rule must be created. If the data cannot be provided upon creation, make it available only in subsequent 'states' and exclude it in the creation state. If creation-specific restrictions are not needed, then entries are not required either.

Mass Creation Screen in Web UI

If a field for entering an attribute value is shown on the Mass Creation screen that the user does not have privileges to populate, this will result in a 'privileges' error that will not be detected until after the 'Create' button is clicked. Administrators should take care that the Mass Creation screen is configured appropriately so that only fields that the end user has permission to edit are visible.

For more on mass creation, refer to Onboarding Multiple Objects Using Web UI Screens in the Web User Interfaces documentation.

Smartsheets

Like the Mass Creation screen, care should be given when creating the Smartsheet template. If fields for attributes, references, etc. are editable that should not be to the end users, this will give a privilege error when attempting to validate the Smartsheet or importing into STEP. Additionally, the author of any business rules that will be executed during a validation or import process will need to consider the 'Object Creation' and other create-privileges rules.

For more on Smartsheets, refer to the **Excel Smartsheet Format** documentation.

Importer

This is not recommended for use with imports where the importer is creating references to objects that are being created as part of the same import, as this may result in errors. Furthermore, administrators should ensure that only the attributes that the privilege is applied to are available in the user interface, else the user will receive a privilege error. The author of any business rules that will be executed during an import process will need to consider the Object Creation and other create-privileges rules.

For more about importing, refer to the Data Exchange documentation.

Privileges and Security

Unlike workflow state-specific privileges, the Object Creation privilege is not associated with any state in any workflow, so it works similar to global privileges, however only while the object is in the process of being created. After the object is created, any global or workflows specific privileges will take place.

The list of actions that can be associated with an Object Creation privilege are limited to the following list:

Object (node) Type	Action
Asset	• Classify asset (link asset to classification) • Create asset reference • Modify name / description of asset (also translate) • Modify metadata for asset reference (link attribute value, and also translate) • Modify metadata for asset (property value, and also translate)
Classification	• Create classification reference • Modify name / description of classification (also translate) • Modify metadata for classification reference (link value, and also translate) • Modify metadata for classification (property value, and also translate)
Entity	• Create entity reference • Modify name / description for entity (also translate) • Modify metadata for entity reference (link value, and also translate) • Modify metadata for entity (property value, and also translate)
Product	• Classify product (link product to classification) • Create entity reference • Modify name / description of product (also translate) • Modify product attribute value (also translate)

Object (node) Type	Action
	• Modify metadata for product classification (link value, and also translate) • Modify metadata for product reference (link attribute value, and also translate)

Granting Access to the SDK and API Documentation

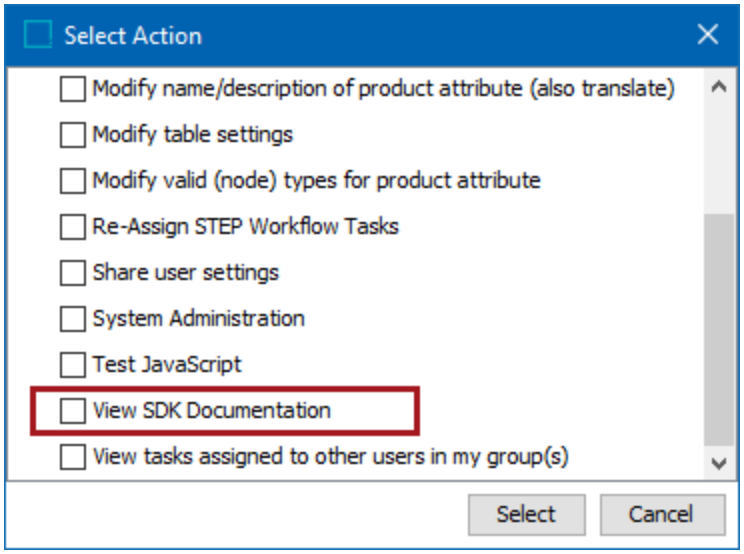
To provide additional security within the STEP system, users must log in with user name and password to access the SDK and API documentation from [server]/sdk or by clicking the **Technical Documentation** button on the **Start Page**.

Note: Only users who are members of a user group that has been granted the **View SDK Documentation** setup action privilege are able to log in.

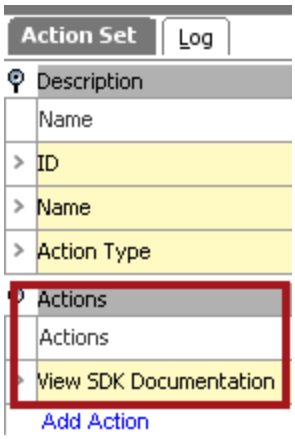
Assigning the privilege is a two-step process: First, you create an action set that includes the **View SDK Documentation** setup action privilege, and then you assign the action set to the relevant groups.

Grant Access to the SDK and API documentation

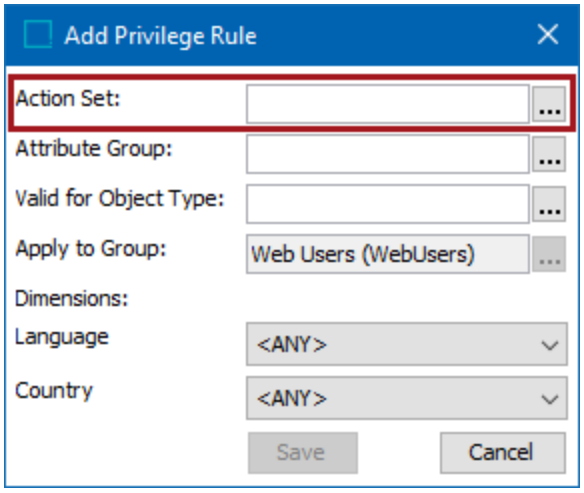
1. In **System Setup**, expand **Action Sets**, right-click **Setup Actions**, and then click **New Action Set**.
2. Enter an **ID** and a **Name** for the action set, and then click **OK**.
3. On the **Action Set** tab, click **Add Action**.
4. In the **Select Action** dialog, scroll down and select **View SDK Documentation**, and then click **Select**.



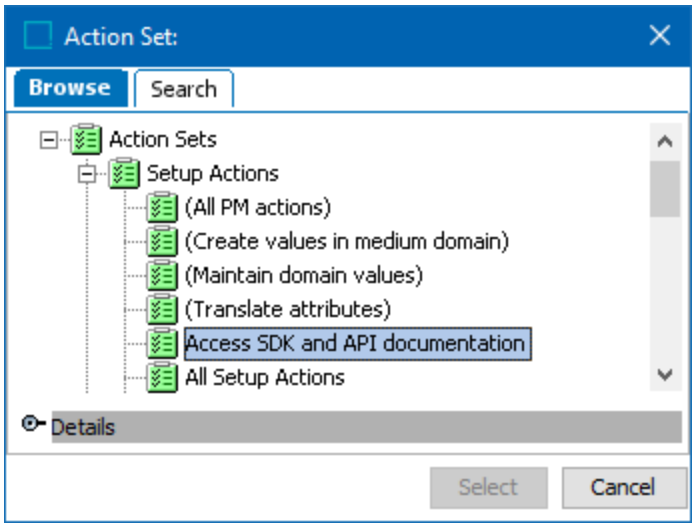
The action is now listed in the **Actions** area on the **Action Set** tab, and you can add the action set to the relevant user group.



5. Expand **Users & Groups**, and then select the relevant user group.
6. Click the **Privilege Rules** tab, and then click **Add Privilege**.
7. In the **Add Privilege Rule** dialog, next to the **Action Set** field, click the ellipsis button (...).



8. In the **Action Set** dialog, expand **Action Sets**, and then expand **Setup Actions**.
9. Select the action set that grants access to the SDK and API documentation, click **Select**, and then in the **Add Privilege Rule** dialog click **Save**.



The privilege is granted to the selected user group.

GUI Setup

GUI Set-Up is maintained in System Setup: **Users & Groups** > **Groups** or **Users**

Note: Defining the Privilege Rules forms one part of the Privilege Control system settings. You can give users access to some STEP functionality but limit others. This will result in a STEP PIM GUI Interface, where some of the commands are made unavailable (appear as dimmed). The second part is defining the GUI Set-Up. You can consider defining the GUI Set-Up as cleaning up the user interface, based on the Privileges rules that are set up for a specific User Group.

GUI Set-Up applied to a top User Group will not be inherited to any sub User Groups, it will only be inherited to the users directly below the User Group.

GUI Set-Up settings apply **only** in the workbench. (Except in the case of Accessible Workspaces and Accessible Contexts – these will apply to both workbench and Web UI.)

GUI Set-Up makes it possible to:

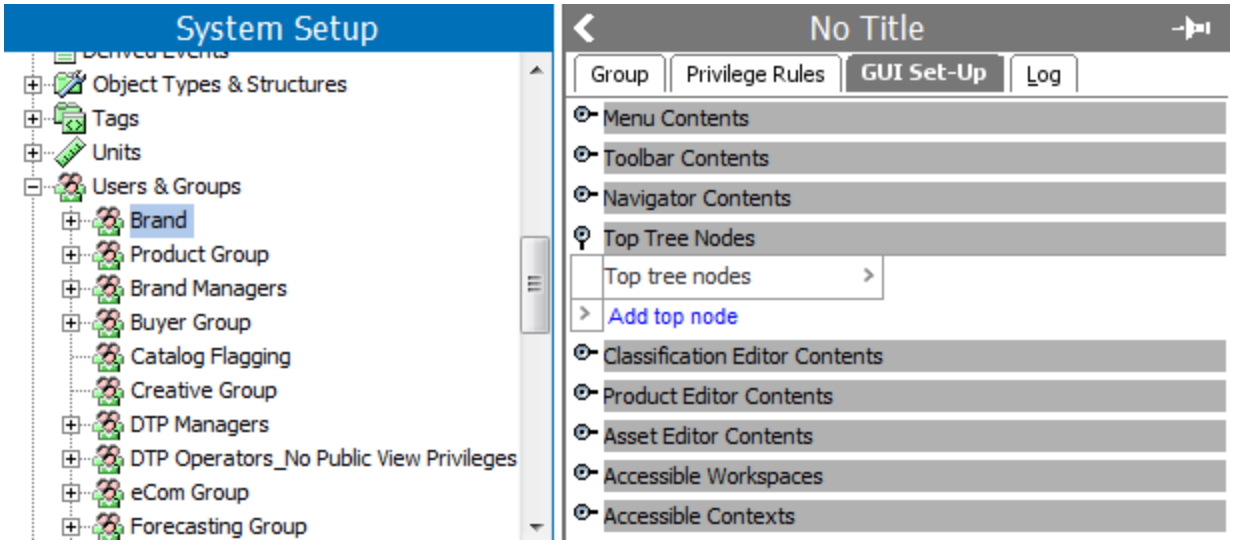
- Customize contents in toolbars and menus. You can add and remove buttons and menus on toolbars, hide or display toolbars.
- Make specific Contexts and Workspaces accessible. For more information, refer to the GUI Setup Recommended Practices for restricting Context(s) and Workspace(s).
- Set Navigator Contents
- Contents in Classification, Product, and Asset Editors
- Set top level Tree nodes

A few use cases for a GUI setup might be the for the following:

- If you have many users in different parts of the world that should all perform the same actions but should have access to specific context(s). Proper configuration would enable the users to have only the context(s) they need.
- It can be configured in conjunction with Action Sets for workbench to prevent non-administration users from having access to delete anything, by disabling the menu option for Maintain>Delete, Force Delete, and Purge.
- I can be used to set the top tree nodes for a specific user group, especially in a multi-domain MDM system, where users responsible for maintaining products do not need to view the 'Customers' node for CMDM.
- If the implementation does not use Tables, Proof View, or Data Containers, the entire tab can be hidden.

Important: As the GUI Set-Up only has an impact on what is displayed in the User Interface, the GUI Set-Up must follow the privilege rules in order to create consistency between what is displayed in the GUI and the

esults you get when navigating around in the STEP Workbench. Disabling GUI Set-Ups settings does not prevent actions as a user could still upload an Excel or XML file and modify content. Additionally, it is not sufficient for a security audit.



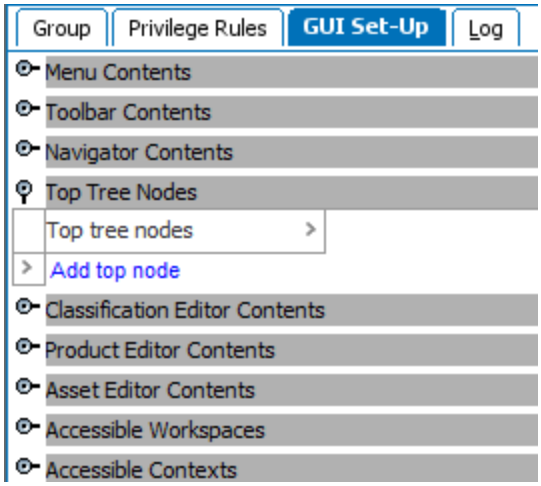
GUI Setup on Groups

The GUI settings at the user group level applied to all the users that get created under it.

GUI Set-Up is maintained in System Setup: **Users & Groups** > **Groups**

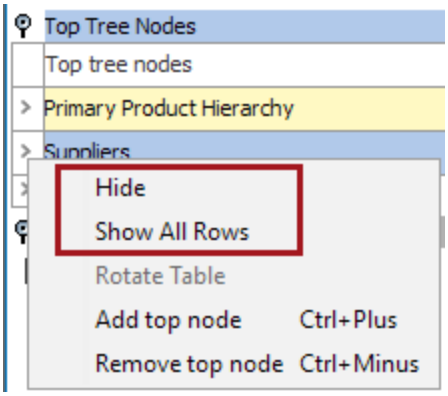
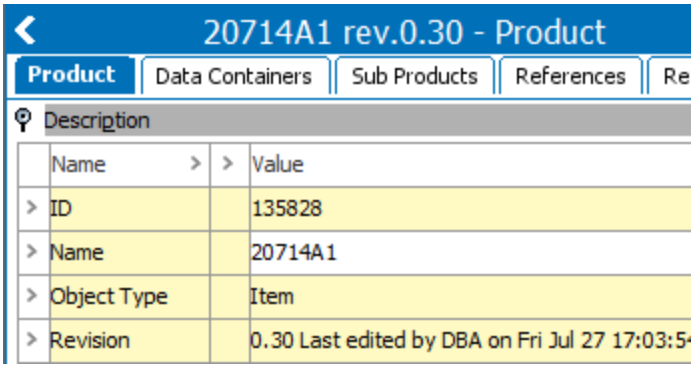
GUI Set-Up on User Groups makes it possible to customize menu contents, navigator contents, accessible workspaces and contexts and Classification, Product and Asset editor contents for Users in the Group.

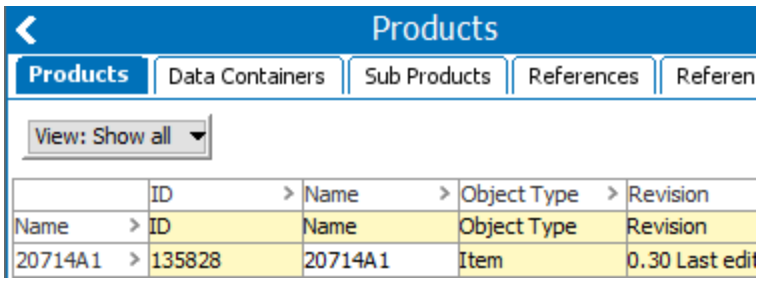
1. In System Setup, open **Users & Groups**, and then click the relevant Group.
   A **Group** Editor appears.
2. Click the **GUI Set-Up** tab.
   An editor appears listing settings that can be applied on a Group.



GUI Set-Up tab flipper	Description
Menu Contents	Open this flipper to customize menu contents. Choose one of the following settings: • **'On'** means that the menu item will be shown • **'Off'** means that the menu item will not be shown • **'Advanced'** means that the menu item will be shown in a sub menu item named 'Advanced'. Advanced is typically selected for menu items that are rarely used. For easy accessibility, 'Enable All' and 'Disable All' buttons are available.

GUI Set-Up tab flipper	Description
Toolbar Contents	Open this flipper to customize the icons or menus to be shown in the tool panel. Choose one of the following settings: • **'On'** means that the menu / icon will be shown in the toolbar • **'Off'** means that the menu / icon will not be shown in the toolbar For easy accessibility, 'Enable All' and 'Disable All' buttons are available.
Navigator Contents	Open this flipper to specify the tabs to be shown in the Navigator section of the STEP Workbench: • Tree Navigator • Search Navigator • Tasks Navigator • Process Navigator • System Setup Navigator • Bookmarks Navigator • Current Task Navigator • Product Introduction Navigator • STEP Workflow Navigator Choose one of the following settings: • **'On'** means that the Navigator will be shown and can be accessed. • **'Off'** means that the Navigator is hidden and cannot be accessed. For easy accessibility, 'Enable All' and 'Disable All' buttons are available.
Top Tree Nodes	Open this flipper to customize the tree nodes to be shown in the Tree Navigator. You can select any top node for Classification, Products, Collections, etc. Once a top node is selected, if you want to prevent other users from making changes to it, you can 'Hide' the selection. To make it visible again, select 'Show All Rows.'

GUI Set-Up tab flipper	Description
	
Classification Editor Contents	Open this flipper to customize the fields and tabs to be shown in the Classification Editor.
Product Editor Contents	Open this flipper to customize the fields and tabs to be shown in the Product Editor. After changing the following **Product** options, you must close STEP and log in again to verify the updates. • **Use normal product editor** displays the standard editor for the selected object.  • **Use view** displays data using the selected multi-object view for a single object.

GUI Set-Up tab flipper	Description
	
Asset Editor Contents	Open this flipper to customize the fields and tabs to be shown in the Asset Editor.
Accessible Workspaces	Open this flipper to limit the number of Workspaces that can be viewed and accessed.
Accessible Contexts	Open this flipper to limit the number of Contexts that can be viewed and accessed.

Note: STEP Privileges are different from GUI Set-Up. GUI Set-Up applies only on workbench and not on Web UIs nor web services. If the user has privileges to access a product hierarchy which is restricted by the GUI Set-up, the user can still access the same via Web UIs or web services.

GUI Setup for Users

GUI Set-Up for Users is maintained in System Setup: **Users & Groups**.

GUI Set-Up for a User makes it possible to customize top tree nodes for the user and provides an administrator with a way to make relevant workspaces and contexts accessible.

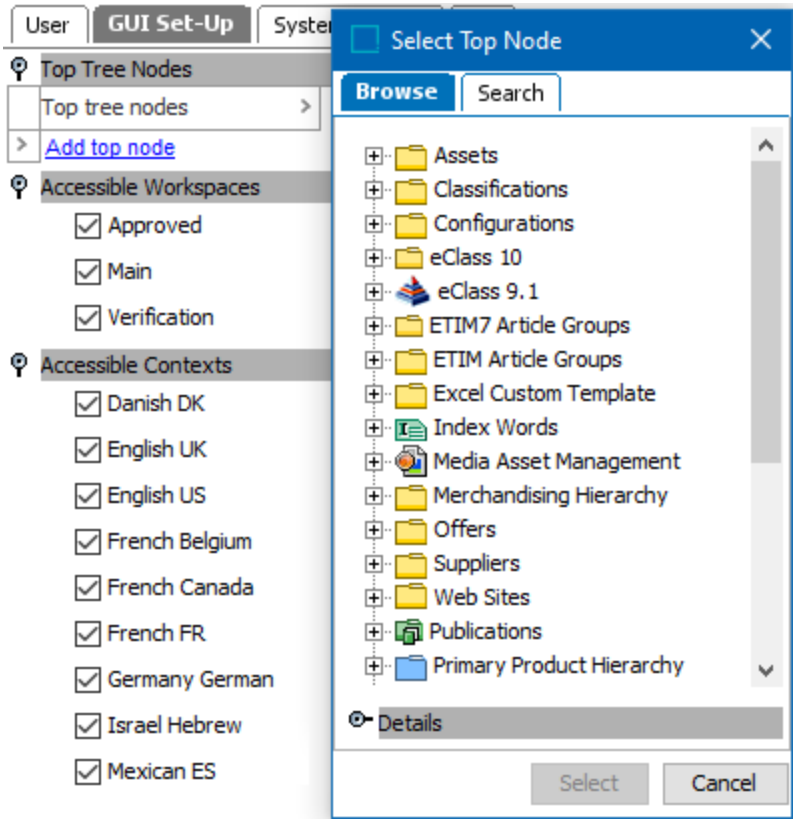
Important: It is recommended to set up user groups specifically for privileges, as many users share the same privileges. Additionally, create separate user groups specifically for GUI setup and link users to these GUI user groups which are not used for other purposes.

1. In System Setup, open **Users & Groups**, open the relevant Group, and then click a User.

   A **User** Editor appears.

2. Click the **GUI Set-Up** tab.

   An editor appears listing settings that can be applied on a User. The **Add top node** was selected in this image example.



Option	Description
Top Tree Nodes	The field 'Top Tree Nodes' allows you to customize the tree nodes to be shown in the 'Tree Navigator'. You are not required to select the Root Node in the hierarchy, for example: Primary Product Hierarchy, but you can select the specific nodes that the user needs to access to perform their tasks. **Important:** Remember that GUI Set-up should align with the User's privileges.
Accessible Workspaces	In this field it is possible to limit the number of Workspaces that can be accessed.
Accessible Contexts	This allows an administrator to select only those Contexts that are necessary for the User to work in.

GUI Setup Recommended Practices to Restrict Context and Workspace

While STEP is highly configurable for creating and maintaining contexts and workspaces, certain GUI Setup restrictions are standards apply. This topic outlines considerations recommended for restricting contexts and workspaces.

There are cases where certain users should only have access to the 'Approved' workspace and should not access the 'Main' workspace in the workbench and Web UI. In some cases, a user should only access a restricted set of contexts; for example, the user should only access the root language (English) and the target language for translation (French).

Instead of creating multiple Web UIs based on which context and workspace users should have access to, the recommendation is to create one Web UI with all contexts and workspaces that are available and control which context(s) and workspace(s) are visible to a user through workbench GUI Set-Up.

Additionally, admin users can also determine whether users, based on their privilege level, will have access to the Workspace and Context settings found in the 'System Settings' options in the Web UI's Global Navigation Panel.

These restrictions will also be reflected in components throughout the Web UI where users have a context or workspace selection option, such as the Multi Context, Multi Language, and Multi Workspace Screens.

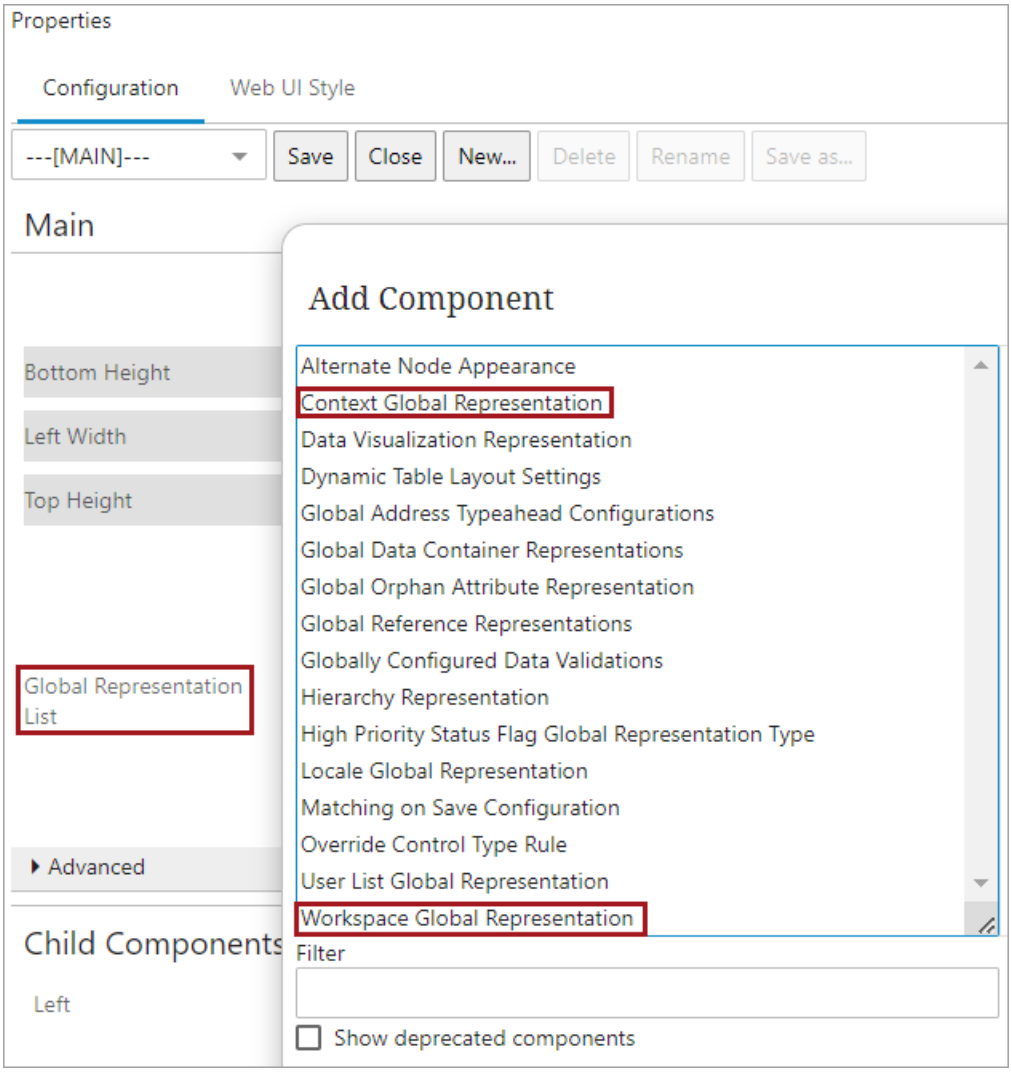
Prerequisites

Users must have super user admin system setup privileges and must be familiar with workbench System Setup.

Recommendations

- In Web UI, do not add the Context Global Representation or the Workspace Global Representation to the Global Representation List. When these components are not configured, all contexts and all workspaces are available for the Web UI, which means that users with different context and workspace access can use the

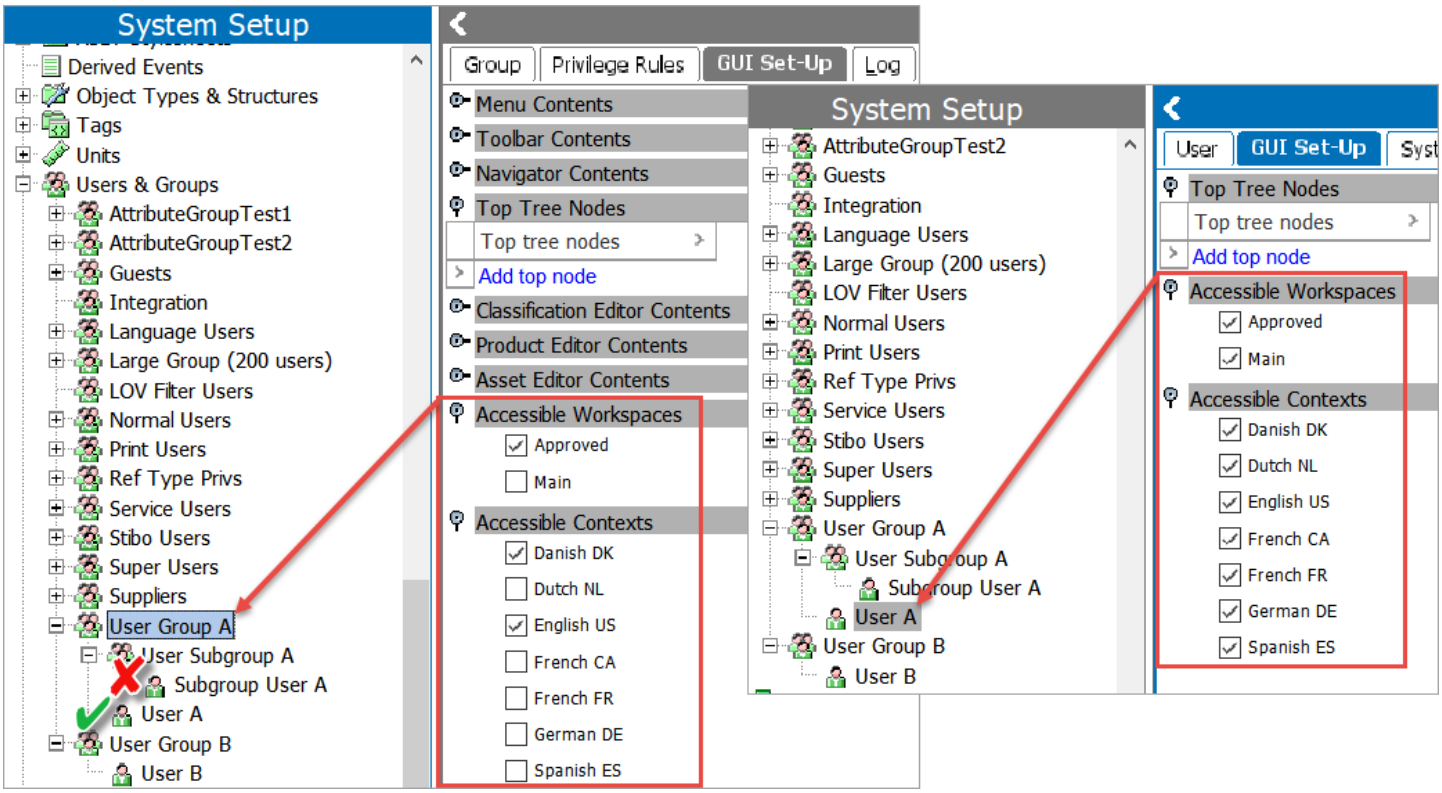
same Web UI.



- When creating a User Group, be mindful if the users within that group should have any restrictions to the context or workspace that they can access.
- The context and workspace selection that is made on the User Group GUI Set-Up applies to all of the users directly below that User Group even though at the User level all contexts and workspaces are selected. It is recommended that the context and workspaces be controlled at the User Group level.

  While not recommended, further restrictions for context or workspace can be added at the User level. User level restrictions can be complicated and requires careful testing. For example, at the User Group level, the Approved workspace and the Danish DK and English US contexts are selected. But if there are users who belong to that User Group who should only access the English US context, then the GUI Set-Up can be changed at the User level by selecting only English US below Accessible Contexts flipper for those users.

Important: The selections made at the User Group level do not inherit down to sub User Groups and users within the sub User Groups.



- To control which workspace(s) a user should have access to, in workbench go to the User Group GUI Set-Up tab and below the 'Accessible Workspaces' flipper, select the workspace(s) that the users in that group should have access to.
- To control which context(s) a user should have access to, in workbench go to the User Group GUI Set-Up tab and below the Accessible Contexts flipper, select the context(s) that the users in that group should have access to.

Use Cases

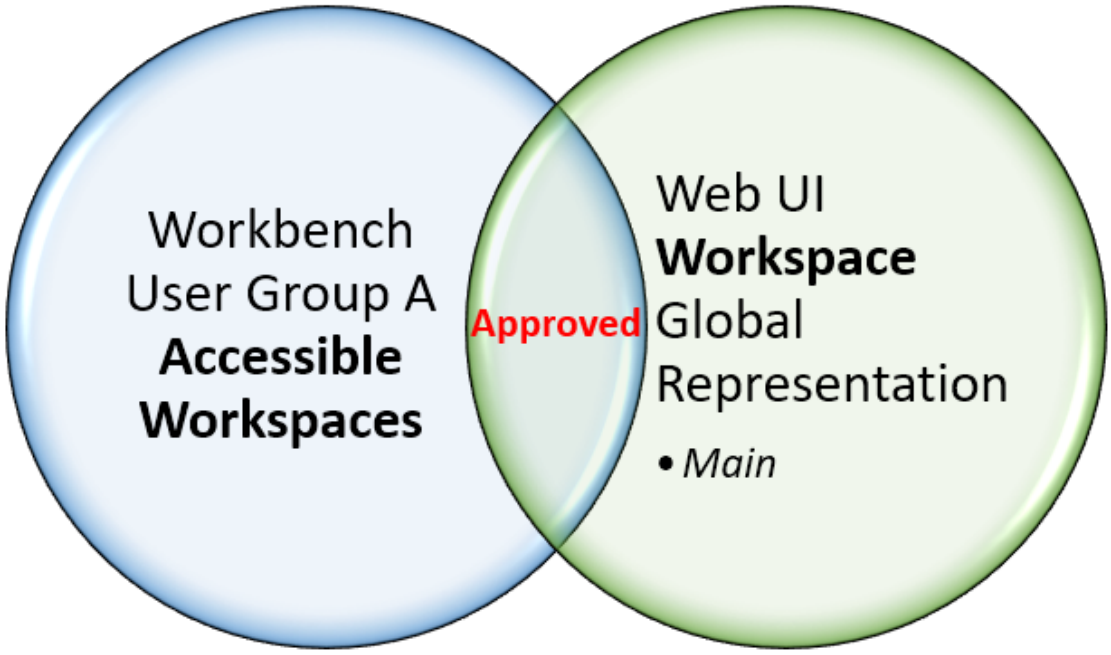
The contexts and workspaces that are available for a user to view and select in Web UI is determined by the intersection of the commonality between the selections in workbench Accessible Contexts and Accessible Workspaces, and Web UI Context / Workspace Global Representation components.

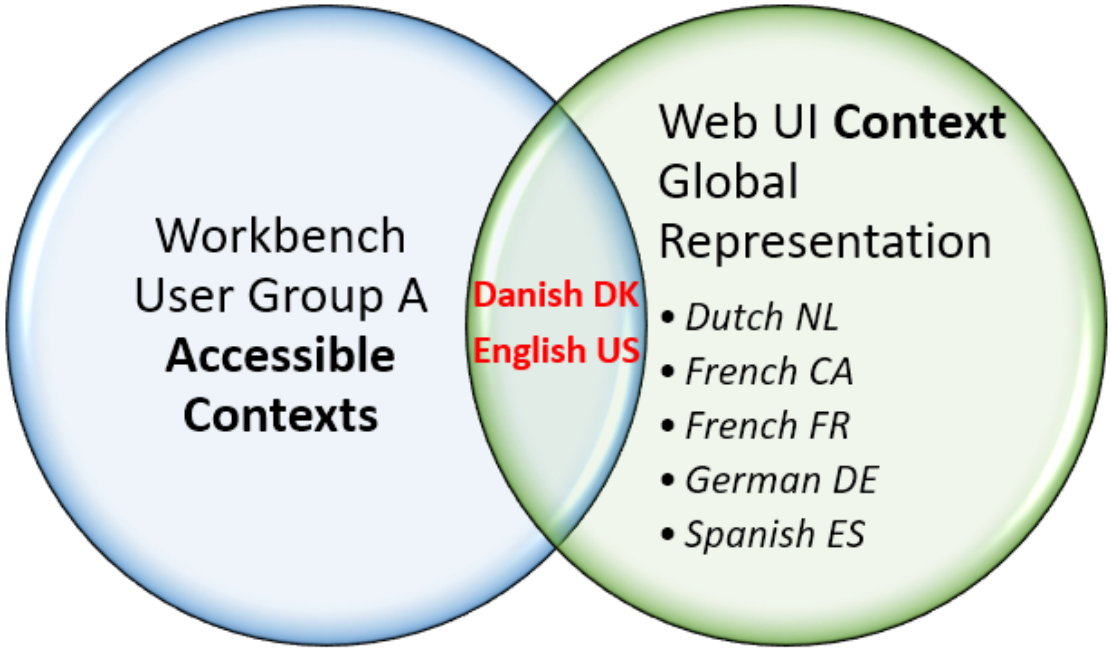
Case 1

A user belongs to one User Group (User Group A) and should only access the Approved workspace, and the Danish DK and English US contexts when they open Systems Settings in Web UI. At the User Group level, only

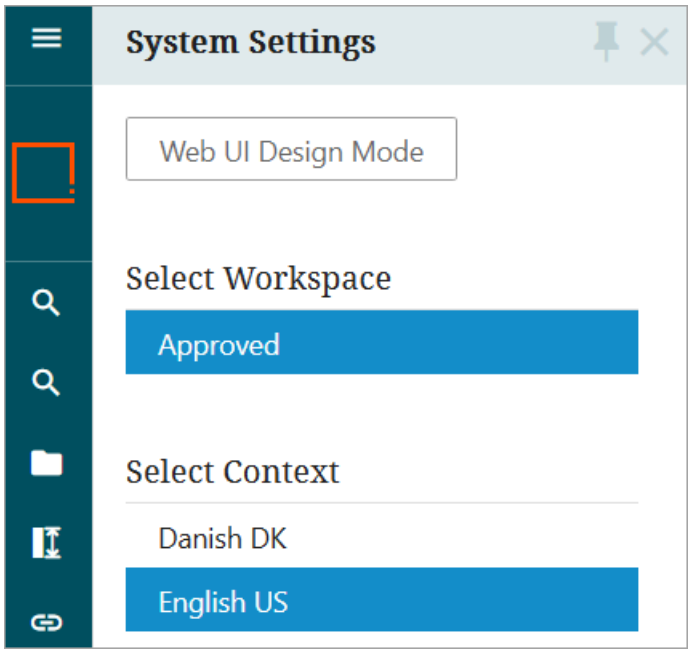
the Approved workspace below Accessible Workspaces flipper is selected, and only the Danish DK and English US contexts below Accessible Contexts flipper are selected. But at the User level all contexts and workspaces are selected.

The result is determined by the intersection of the User Group GUI Set-Up selections and all of the workspaces and contexts that are available in Web UI, as shown in the graphics below.





When the user opens Systems Settings in Web UI, they have only Approved below 'Select Workspace', and only Danish DK and English US below 'Select Context'.



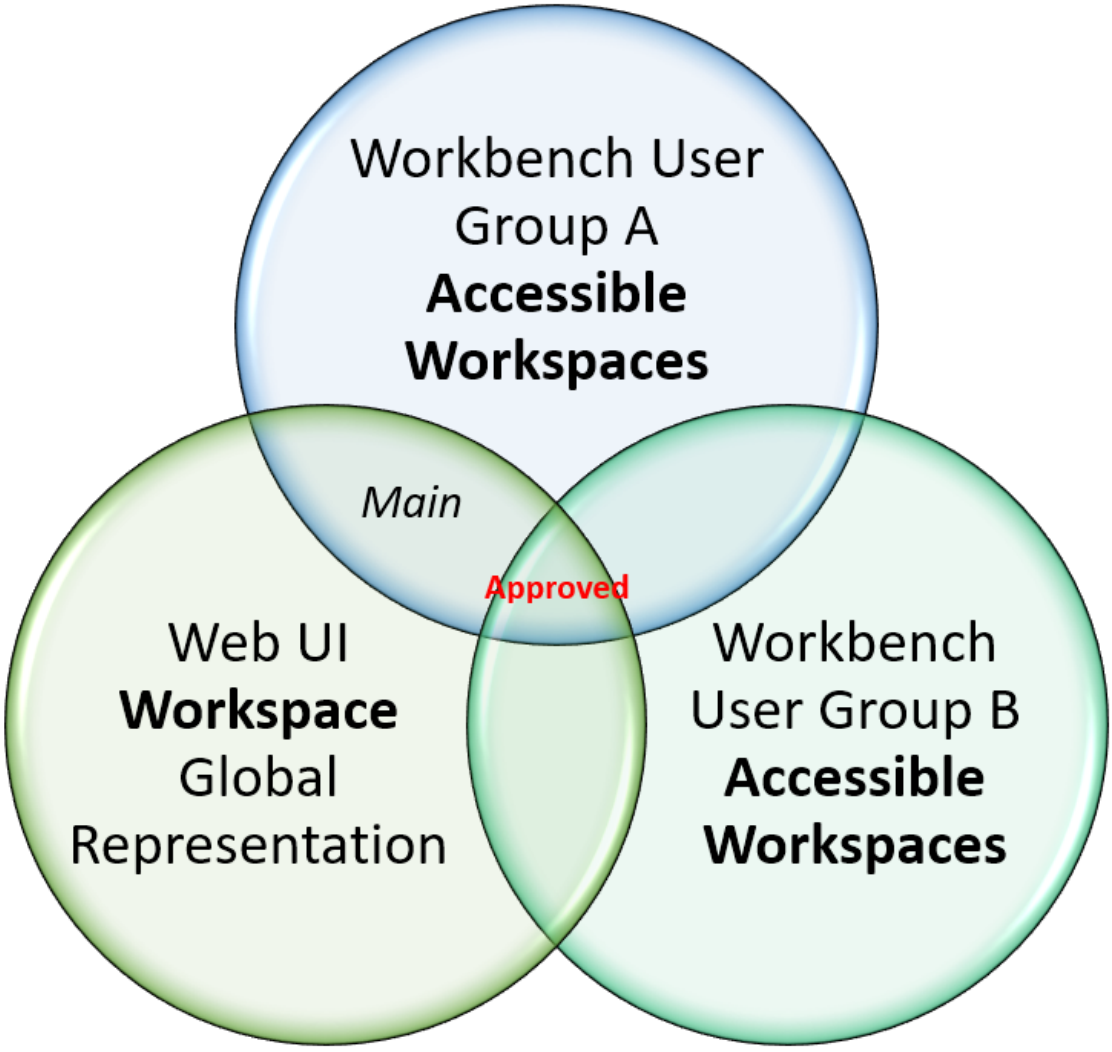
Note: In this example, if there are other users who should access Main workspace and only French and English US contexts, create a different User Group for those users.

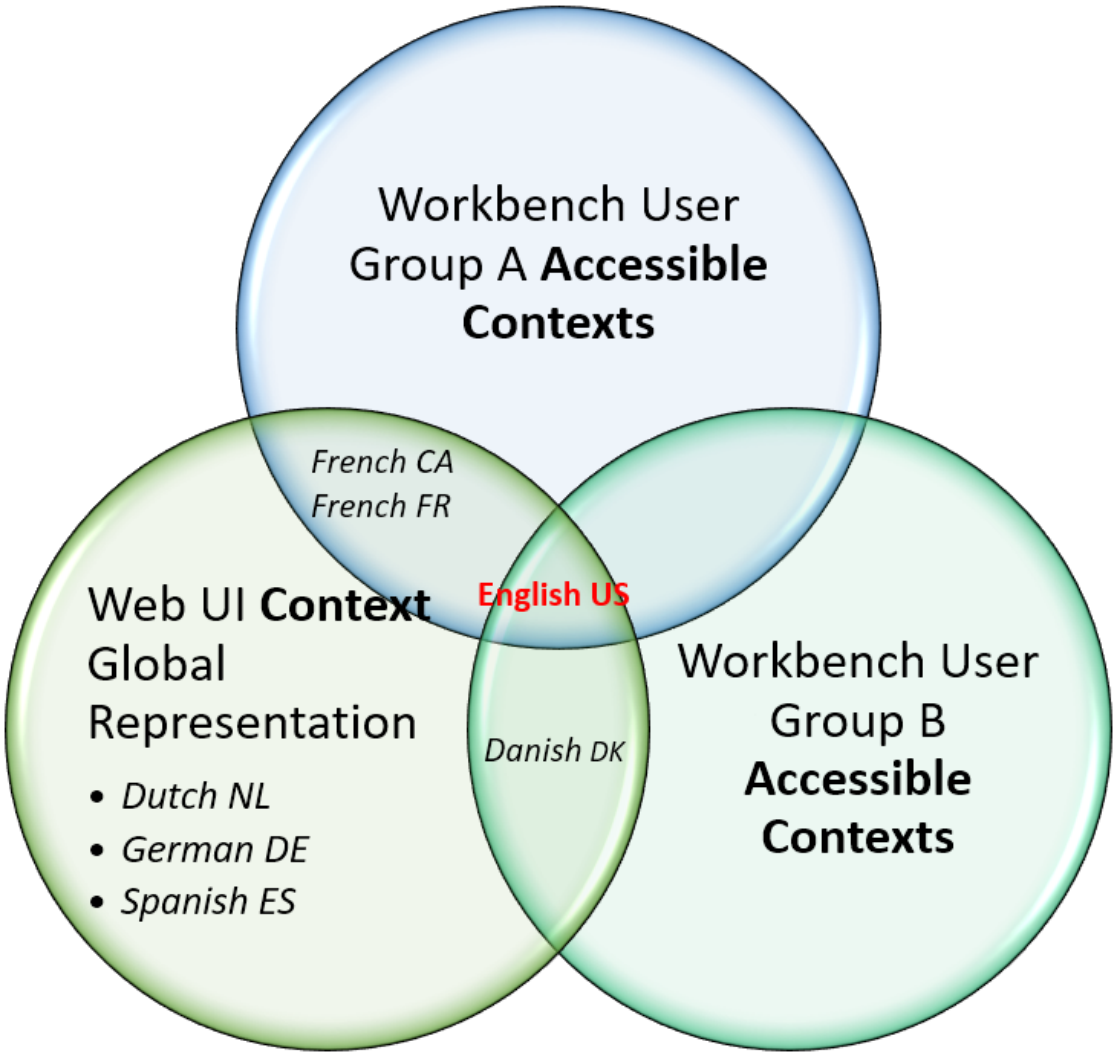
Case 2

A user belongs to two User Groups (User Group A and User Group B). The result in Web UI is determined by the intersection of the User Groups' GUI Set-Up selections and all of the workspaces and contexts that are available in Web UI. For example:

- The Web UI has all workspaces (Main and Approved) and all contexts (Danish DK, Dutch NL, English US, French CA, French FR, German DE, and Spanish ES) available.
- User Group A can access Main and Approved workspaces; and can access English US, French CA, and French FR contexts.
- User Group B can access on Approved workspace; and can access English US and Danish DK contexts.

When the user opens System Settings in Web UI, only the Approved workspace and the English US context are available. This is because those are the only options that intersect between User Group A, User Group B, and Web UI workspaces and contexts, as shown in the graphics below.

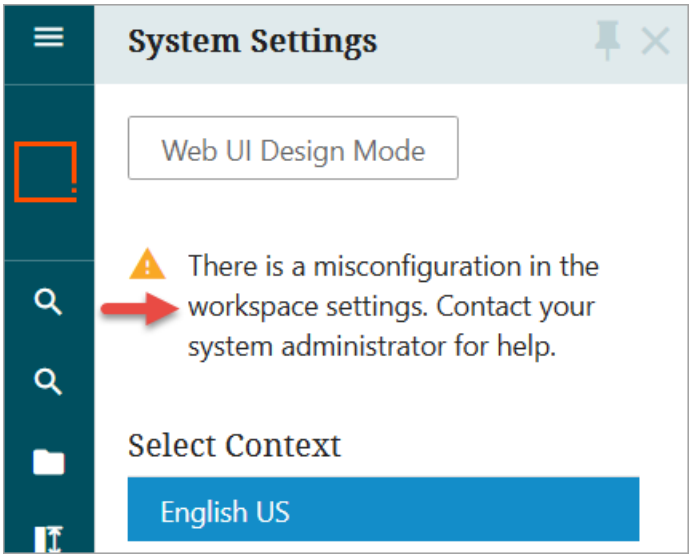

Workbench User Group A **Accessible Workspaces**
Main
Approved
Web UI **Workspace** Global Representation
Workbench User Group B **Accessible Workspaces**



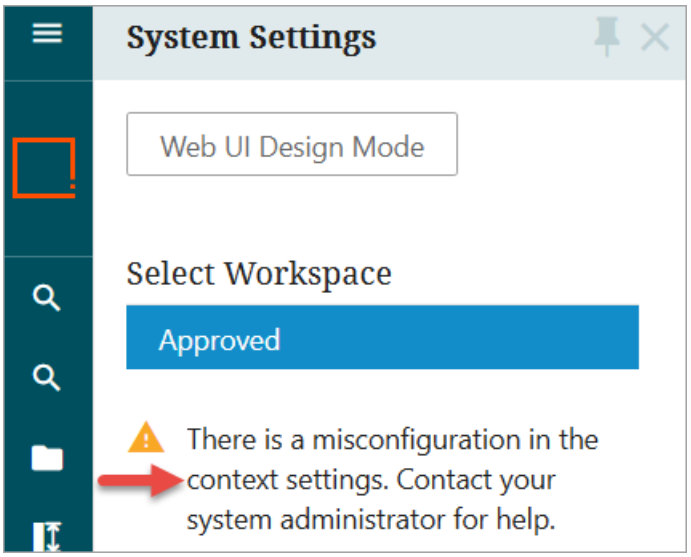
Warning Messages

- When there is not an intersection for workspace between multiple User Groups that the user belongs to, or no intersection between User Groups and Workspace Global Representation component (although it is not recommended to use this component), then the following message is displayed for the user in Web UI

System Settings.

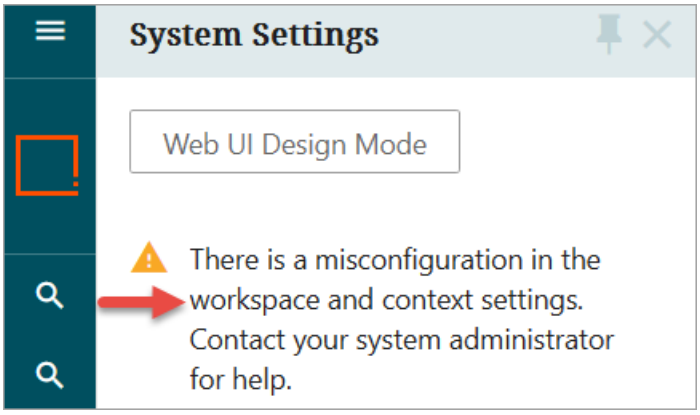


- When there is not an intersection for context between multiple User Groups that the user belongs to, or no intersection between User Groups and Context Global Representation component (although it is not recommended to use this component), the following message is displayed for the user in Web UI System Settings.



- When there are no intersections for workspace and context between multiple User Groups that the user belongs to, or no intersections between User Groups and Workspace / Context Global Representation components (although it is not recommended to use these components), the following message is displayed

for the user in Web UI System Settings.



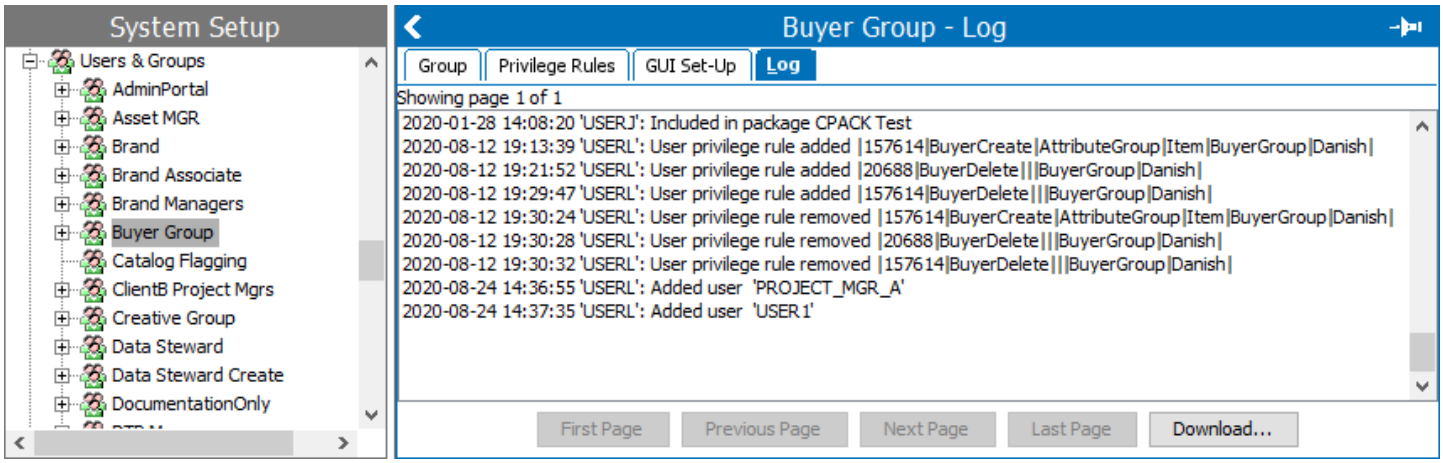
Log for Users and Groups

The Log tab on Users and Groups records any changes that occur to a particular user group or a specific user. This information is essential for audit purposes, as well as aiding data stewards and/or system architects in setting up and maintaining privileges. The information recorded uses IDs for all data recorded. The recorded information for each data point is the following:

- Date the changed occurred
- Time of change
- Who made the change
- What was updated or changed

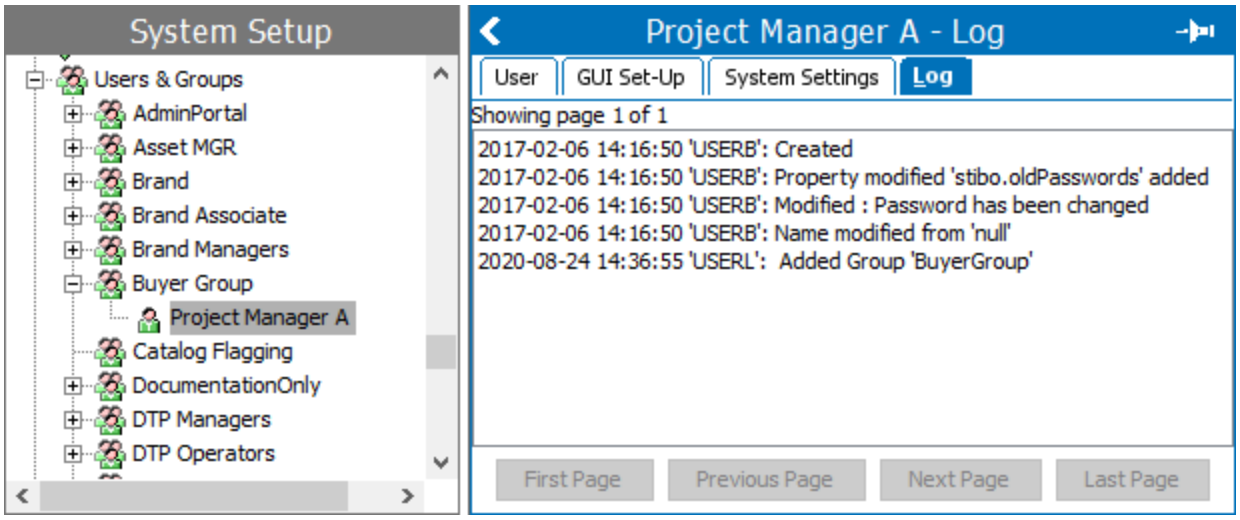
Some examples of information points that the user group Log tab holds are:

- Adding the group to a Change package
- Adding or removing privilege rules
- Adding or removing users to the group.



Some examples of information points that the individual user Log tab holds are:

- When the user was created
- Any property modifications
- Password changes
- User groups the user is added to or removed from


System Setup
Users & Groups
AdminPortal
Asset MGR
Brand
Brand Associate
Brand Managers
Buyer Group
Project Manager A
Catalog Flagging
DocumentationOnly
DTP Managers
DTP Operators
Project Manager A - Log
User
GUI Set-Up
System Settings
Log
Showing page 1 of 1
2017-02-06 14:16:50 'USERB': Created
2017-02-06 14:16:50 'USERB': Property modified 'stibo.oldPasswords' added
2017-02-06 14:16:50 'USERB': Modified : Password has been changed
2017-02-06 14:16:50 'USERB': Name modified from 'null'
2020-08-24 14:36:55 'USERL': Added Group 'BuyerGroup'
First Page
Previous Page
Next Page
Last Page

Web UI User Impersonation Setup and Reporting

In support situations it is often relevant to be able to review exactly what the user experiencing the issue is observing, including data and error messages. Web UI user impersonation enables a privileged user to act as another user, but using their own password so that the impersonated user's password is not revealed. When impersonating someone, all privileges, views, and access are exactly matched to the user being impersonated.

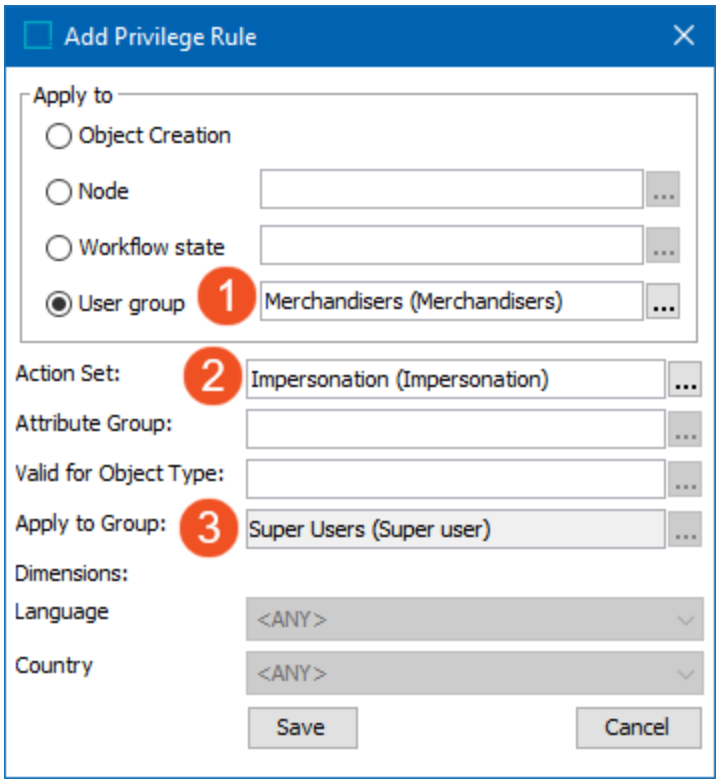
Specific privileges have been created to support impersonation:

- Setup action **Maintain Impersonation** indicates that the user may maintain the impersonation privileges of others. Users with maintain impersonation privileges can assign the Impersonate User privilege to other groups, including specifying the target group that can be impersonated.
- User action **Impersonate User** enables any user with this privilege assigned to be able to impersonate the selected user group identified in the privilege setup.

Once those actions are set up in an action set, they can be applied to designated user groups. Refer to the **Action Sets** section of the **System Setup** documentation for setting up and maintaining action sets.

In System Setup, go to Users & Groups and click on the group that can impersonate. On the Privilege Rules tab in the editor, click 'Add Privilege" under User Privileges and fill in the dialog as follows. Refer to the **Privilege Rules** topic in the **System Setup** documentation for additional information.

1. Target (group being impersonated)
2. Action set with Impersonate User privilege
3. Source (group that can impersonate)



Note: Impersonation can only be used in Web UI.

Any user with the Impersonate User privilege can impersonate any user in the target user group for which the privilege is configured. Impersonate functionality is added to the Web UI via the following components:

- Select User To Impersonate is an option within the Global Navigation Panel > User Settings
- Impersonate User Widget can be inserted in the Homepage

The impersonation components are only visible if the user is a member of a user group with impersonation rights for another group. For demonstration of the first two methods, refer to the **User Impersonation** topic in the **Using Web UI** section of the **Web User Interfaces** documentation.

The impersonator impersonates another user by selecting the user in one of the user impersonation components. The Web UI will then start on the homepage, and the impersonator can now act as the impersonated. The impersonator can continue switching between impersonated users and return to act as the impersonator user as needed.

Impersonation edits are indicated as performed by the authenticated user (impersonator) instead of the previous way of doing it, which was to log transactions by the impersonated user. While Web UI impersonation is intended to be used for troubleshooting purposes, changes to existing data may be made in accordance with the impersonated user's privileges. Therefore, the new way of logging user actions presents an accurate audit history, allowing for differentiation of user activity in log files and in other areas in Web UI (and workbench) that track revision history and user actions. For the sake of data governance it is logged in the system log, the impersonator user log, and the impersonated user log when an impersonator starts or stops impersonation.

Note: For impersonation in older (unsupported) versions of STEP (pre-10.1), the logs, revision histories, etc., will continue to reflect the previous way of tracking impersonation users, which is that all actions made by the impersonator are logged as actions taken by the user being impersonated. Hence, consistency between old and new should not be expected.

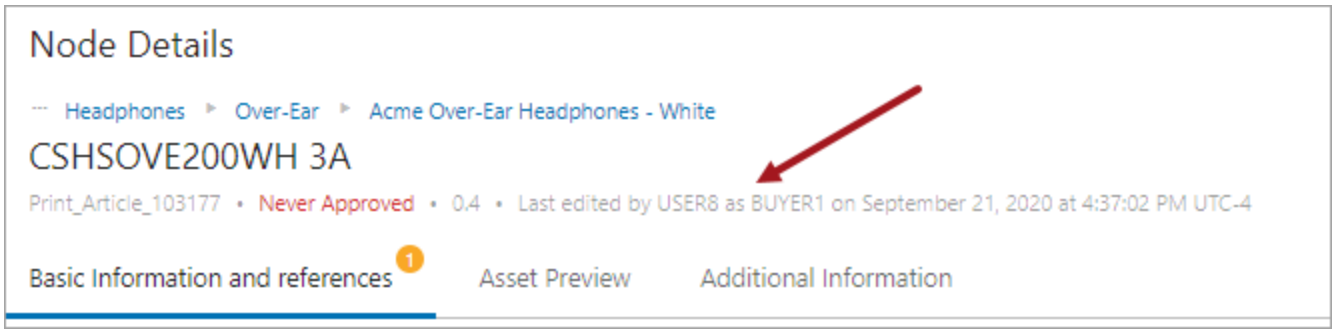
If you want to revert to the old way of tracking impersonation, the `Impersonation.RunAsImpersonatedUser=true` must be added to the sharedconfig.properties file. The impersonation functionality will switch to the impersonated user instead of a system-generated impersonation user. **Warning: All actions taken during impersonation will be performed and logged as the actual impersonated user, which will impact auditability when identifying data changes.**

Whenever a user starts impersonating another user, a user with the name <'Impersonator User ID> as <Target User ID>' and the ID, which will begin with the 'STIBO.I' prefix, will be created. The audit trail will then indicate that it is this new user revising objects or making other changes. These special user types are hidden from all browse, search, and assignment interfaces and will not count against the licensed number of users. The Admin Portal's user activity report fills this void in visibility and is shown in the first image below (as well as some other examples).

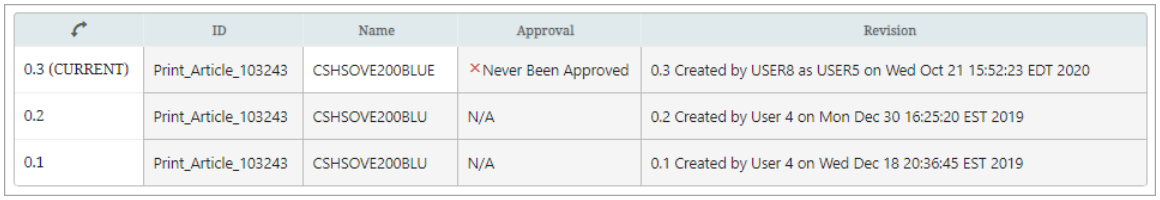
Admin Portal > User Activity Report:

A	B	C	D
User ID	User Name	Interface	Latest Activity
USER7	User 7	bgp	2020-09-21T11:05:33-04:00[America/New_York]
USERJ	User J	workbench	2020-09-21T11:05:33-04:00[America/New_York]
STIBO.I.74BE24A09843B2A48ACFAF82ED17E5CF	USER8 as BUYER1	web ui	2020-09-21T11:05:39-04:00[America/New_York]
USER8	User 8	workbench	2020-09-21T11:05:10-04:00[America/New_York]
STIBO.I.444E7C50B8AE6CEFE84A9261F1BBAB85	USER8 as SUPPLIER1	web ui	2020-09-21T10:38:41-04:00[America/New_York]

Node Details > Summary Cards:

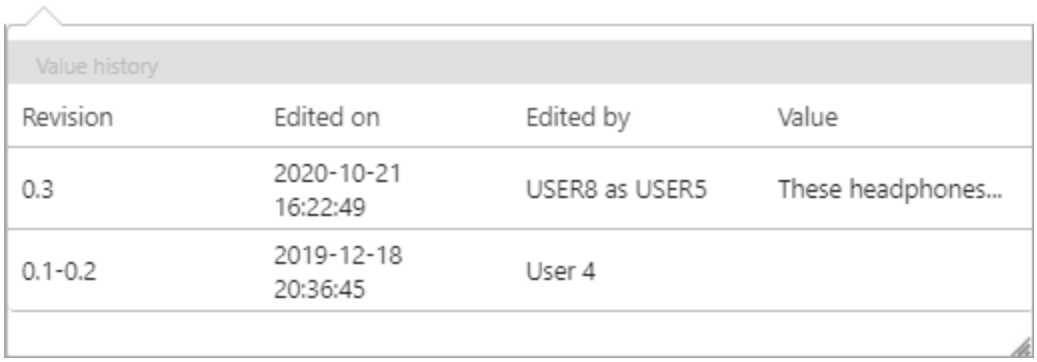


Multi Revision Screen:



	ID	Name	Approval	Revision
0.3 (CURRENT)	Print_Article_103243	CSHSOVE200BLUE	✕Never Been Approved	0.3 Created by USER8 as USER5 on Wed Oct 21 15:52:23 EDT 2020
0.2	Print_Article_103243	CSHSOVE200BLU	N/A	0.2 Created by User 4 on Mon Dec 30 16:25:20 EST 2019
0.1	Print_Article_103243	CSHSOVE200BLU	N/A	0.1 Created by User 4 on Wed Dec 18 20:36:45 EST 2019

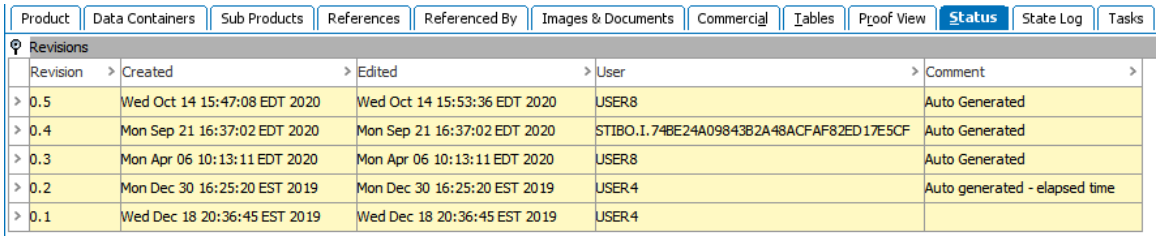
Revision History:



Value history

Revision	Edited on	Edited by	Value
0.3	2020-10-21 16:22:49	USER8 as USER5	These headphones...
0.1-0.2	2019-12-18 20:36:45	User 4	

Important: Workbench audit history shows user IDs, so only the STIBO.I user is displayed when looking at revision history in the workbench. The STIBO.I prefix indicates that the change was made under impersonation, and prompt you or other users to view the Admin Portal User Activity Report to uncover exactly who made the change.



Product | Data Containers | Sub Products | References | Referenced By | Images & Documents | Commercial | Tables | Proof View | Status | State Log | Tasks

Revisions

Revision	Created	Edited	User	Comment
0.5	Wed Oct 14 15:47:08 EDT 2020	Wed Oct 14 15:53:36 EDT 2020	USER8	Auto Generated
0.4	Mon Sep 21 16:37:02 EDT 2020	Mon Sep 21 16:37:02 EDT 2020	STIBO.I.74BE24A09843B2A48ACFAF82ED17E5CF	Auto Generated
0.3	Mon Apr 06 10:13:11 EDT 2020	Mon Apr 06 10:13:11 EDT 2020	USER8	Auto Generated
0.2	Mon Dec 30 16:25:20 EST 2019	Mon Dec 30 16:25:20 EST 2019	USER4	Auto generated - elapsed time
0.1	Wed Dec 18 20:36:45 EST 2019	Wed Dec 18 20:36:45 EST 2019	USER4	

For more information on setting up components to access impersonation in Web UI, refer to the following topics:

- **Homepage Widgets** (refer to the **Impersonate User Widget** section)
- **Global Navigation Panel** (refer to the **Main Properties** section)

For information on accessing and using impersonation, refer to the following:

- **User Impersonation** (refer to the **Using Web UI** documentation)

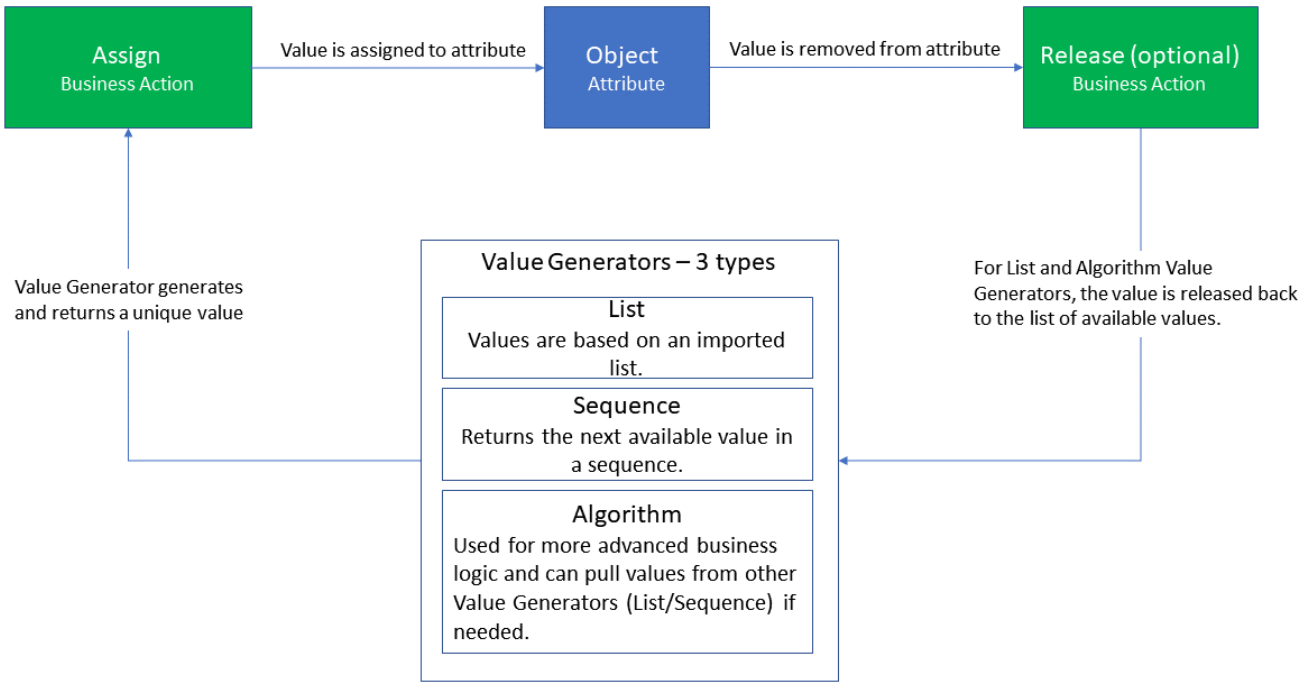
Value Generators

Value Generators allow users to create and hold unique values (often in the form of numbers) for an object's attributes so that these values can be used as identifiers. The ability to generate these unique identifiers is especially helpful in ensuring ease of integration and data synchronization when communicating with external systems.

Important: While a powerful tool, the use of value generators can result in significant performance impacts in some scenarios. This is dependent on a number of factors and can be difficult to predict. Therefore, use of value generators should be thoroughly tested within your solution and as part of your overall business processes before relying on them as part of critical onboarding and/or import activities.

The Value Generator Configuration Type allows users with the appropriate privileges to create several different value generators:

- **Algorithm Value Generator**
- **List Value Generator**
- **Sequence Generator**

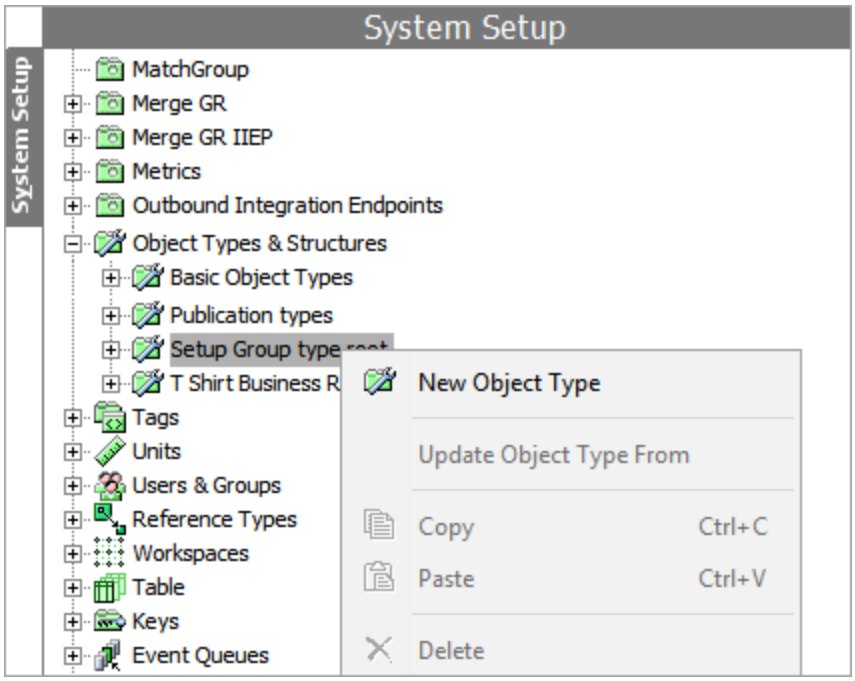


Note: To access Value Generators, the 'value-generator' add-on component must be added to your system. Additionally, users must have the 'Maintain Value Generator' user privilege in order to configure and maintain Value Generators. For on-premises systems, instructions for installing components can be found in the 'SPOT Program' topic in the System Administration documentation found in 'Downloadable Documentation'. For Stibo Systems SaaS environments, contact Stibo Systems Support.

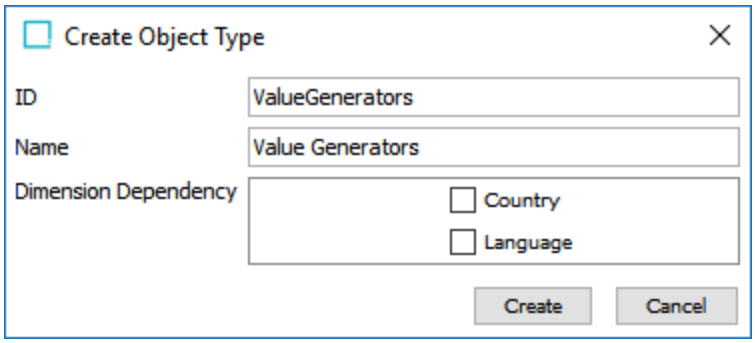
Creating a Value Generator Configuration Type

A Value Generator Configuration Type must be created before a specific value generator can be configured.

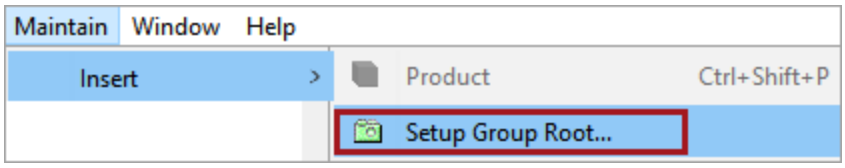
1. In the System Setup, right-click 'Setup Group Type Root' and select 'New Object Type.'



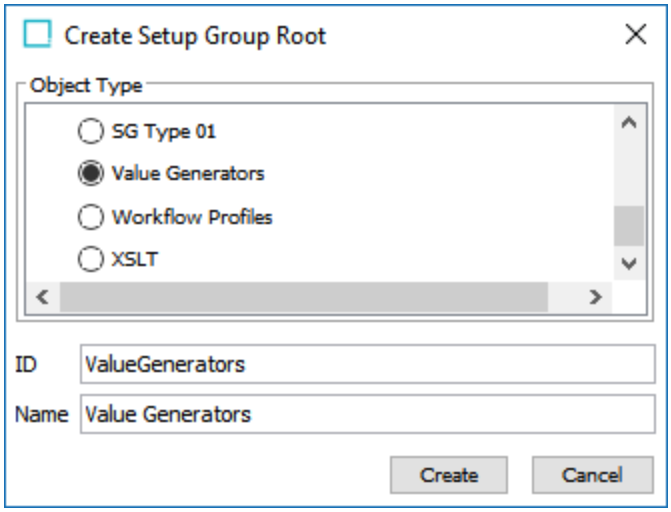
2. In the Create Object Type dialog box, enter a value for the ID and Name text field. In the example below, the user has created an object type with the ID 'ValueGenerators' and the Name 'Value Generators.'



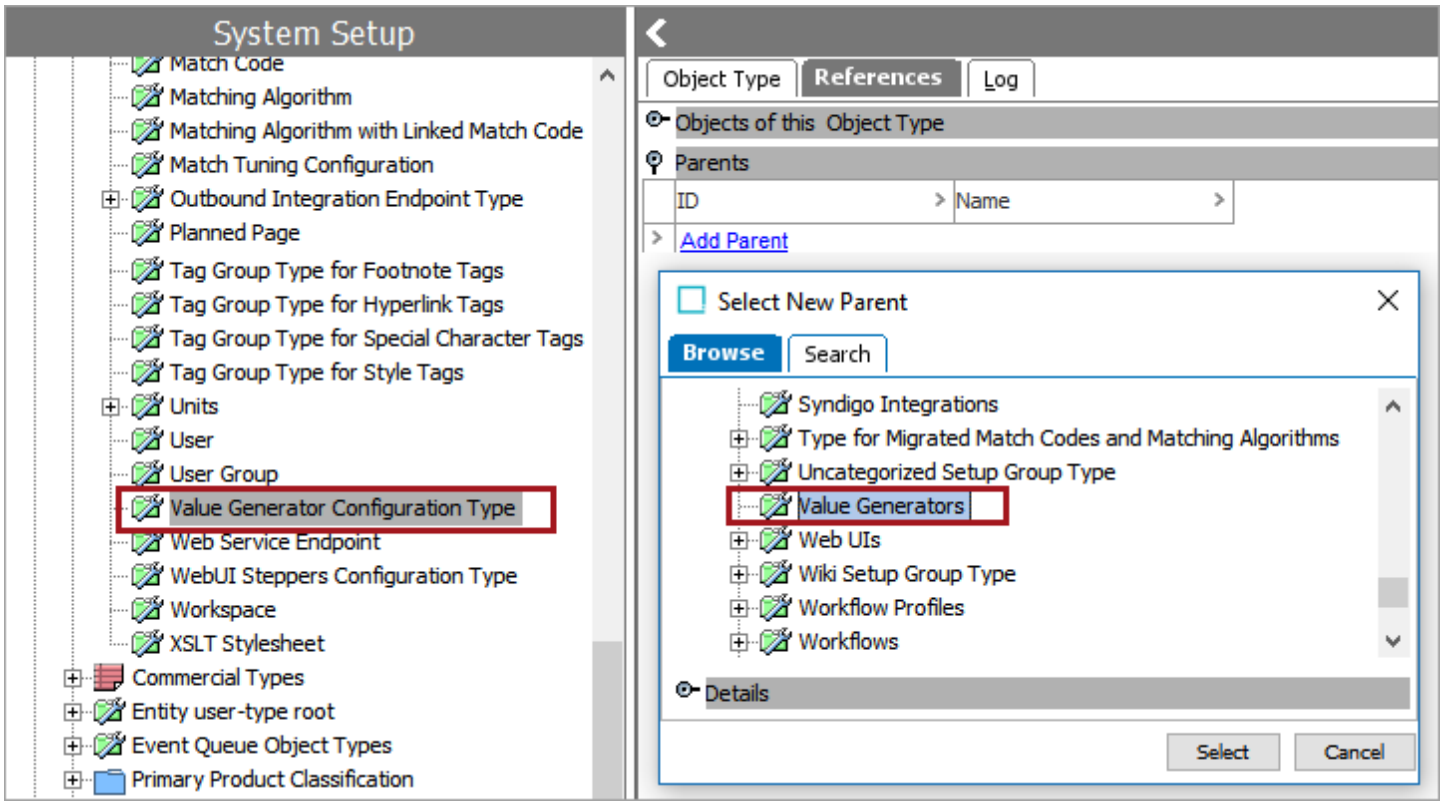
3. Click 'Create' to save the settings and close the dialog.
4. In the toolbar menu, click 'Maintain,' select 'Insert,' and click 'Setup Group Root....'



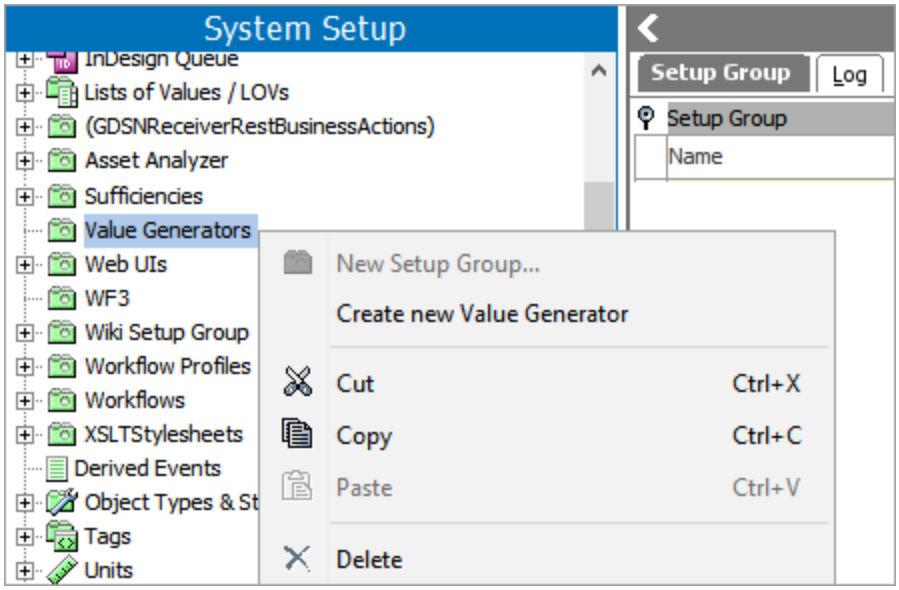
5. In the Create Setup Group Root dialog, select the object type created in the previous step (in this example, 'Value Generators') and enter a value for the ID and Name text field. In this example, the user created a setup group root with the ID 'ValueGenerators' and the Name 'Value Generators.'



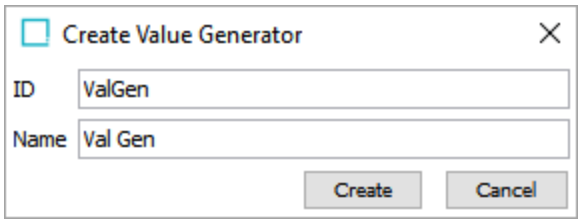
6. Click 'Create' to close the dialog.
7. Select 'Value Generator Configuration Type' from the Basic Objects menu in System Setup. In the References tab, select 'Add Parent,' and in the Select New Parent dialog, select the Setup Group (in this example, 'Value Generators') created in the previous step.



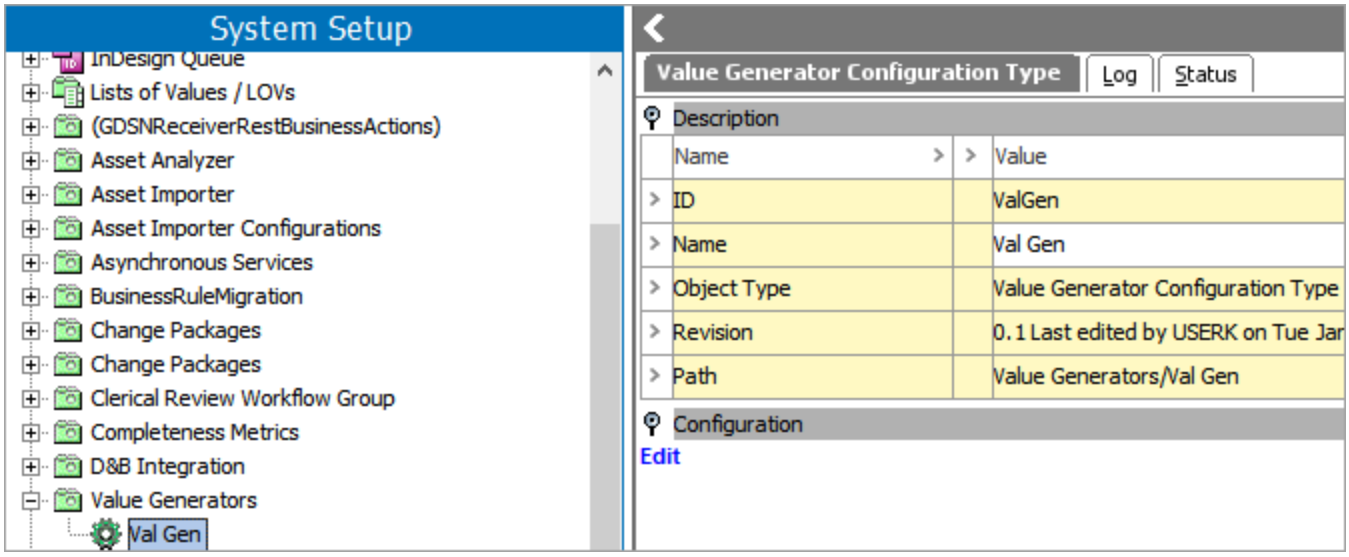
8. Click 'Select' to close the Select New Parent dialog.
9. Right - click the 'Value Generators' Setup Group and select 'Create new Value Generator.'



10. In the Create Value Generator dialog box, enter a value for the ID and Name text field. In this example, the user has created a value generator with the ID 'ValGen' and the Name 'Val Gen.'



11. Click 'Create.' The dialog closes and the Value Generator Configuration Type has been created.



Now that a Value Generator Configuration Type has been created, a specific value generator can be configured. For information regarding the configuration of Algorithm Value Generators, refer to the **Algorithm Value Generator** topic. For information regarding the configuration of List Value Generators, refer to the **List Value Generator** topic. For information regarding the configuration of Sequence Generators, refer to the **Sequence Generator** topic.

Algorithm Value Generator

The Algorithm Value Generator allows users to generate a value based on business logic (e.g., concatenating two or more attribute values to create a new value, adding a category name to a product line to create a new value, etc.). Additionally, the Algorithm Value Generator can generate values produced by List Value Generators and/or Sequence Value Generators.

Important: While a powerful tool, the use of value generators can result in significant performance impacts in some scenarios. This is dependent on a number of factors and can be difficult to predict. Therefore, use of value generators should be thoroughly tested within your solution and as part of your overall business processes before relying on them as part of critical onboarding and/or import activities.

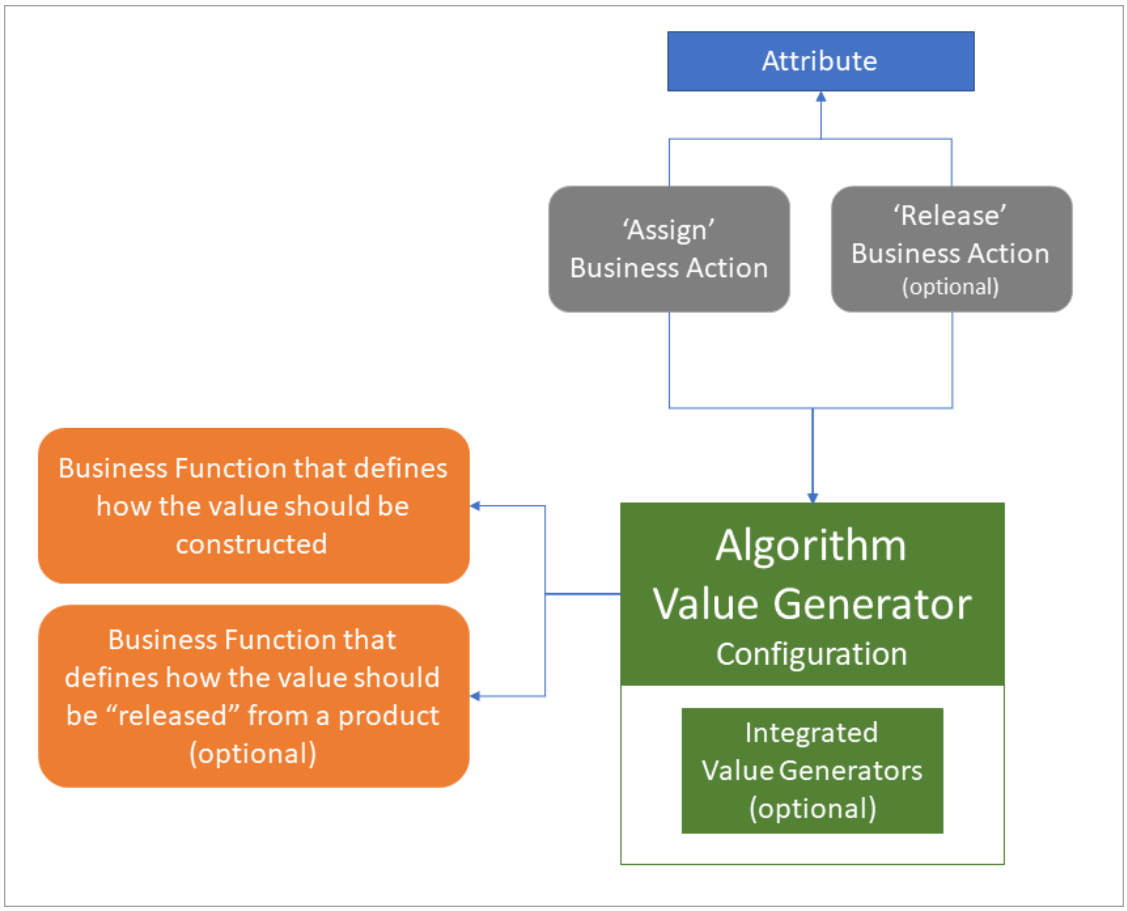
Prerequisites

Before an Algorithm Value Generator can be configured, a Value Generator Configuration Type must be created. For instructions on how to create a Value Generator Configuration Type, refer to the **Value Generators** topic.

Business functions and business actions must also be configured to generate and release values using the Algorithm Value Generator.

While this topic includes specific requirements necessary for business functions and business actions to be used in tandem with Algorithm Value Generators, users need a working knowledge of business functions (e.g., creating and inputting binds, return types, input parameters, etc.), and a working knowledge of configuring and implementing business actions. Additionally, users should have an understanding of JavaScript and how it works in conjunction with business functions. For more information, refer to the **Business Rules** documentation.

The diagram below visually displays how the Algorithm Value Generator works in relation with business actions and business functions to generate / release values.



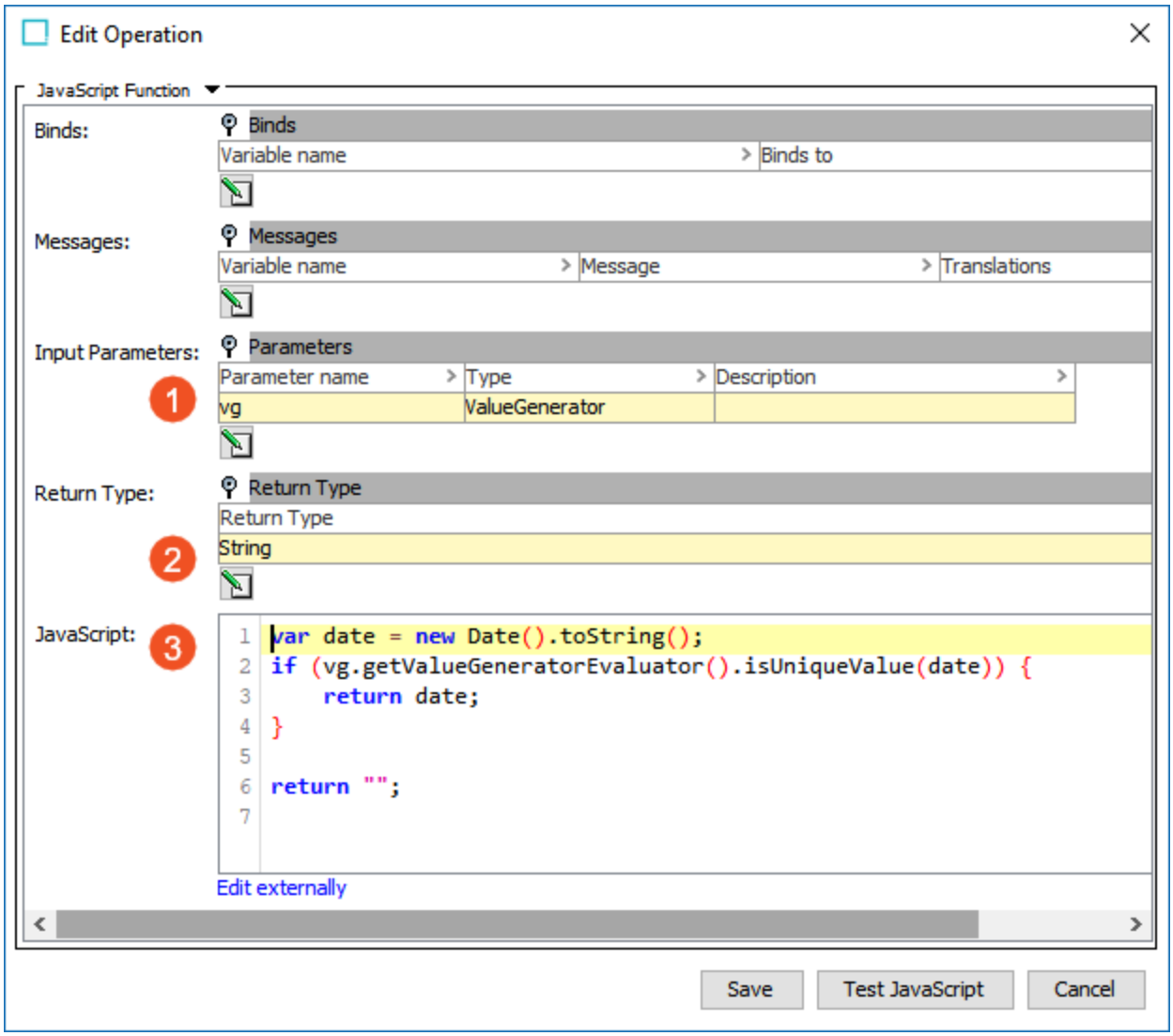
Configuring Business Functions to Generate a Value

There are several ways in which a business function can be configured to be used in tandem with an Algorithm Value Generator, depending on business needs. This topic includes examples of business functions that have been configured to generate values using the Algorithm Value Generator. One example shows a business function that does not use integrated value generators to generate a value. Another example show a business function that uses integrated value generators (specifically, a List Value Generator and a Sequence Value Generator).

Note: Although these examples demonstrate how business functions can be configured to work with an Algorithm Value Generator to generate a value, only the business function that uses integrated value generators is used in conjunction with the Algorithm Value Generator and business action examples addressed later in this topic.

Example business function for an Algorithm Value Generator that does not include integrated value generators

In this example, the business function has been configured in a way that does not use integrated value generators. This business function produces a value (in this case: a date) and checks for uniqueness of that value. If the date is not unique, it returns an empty string.

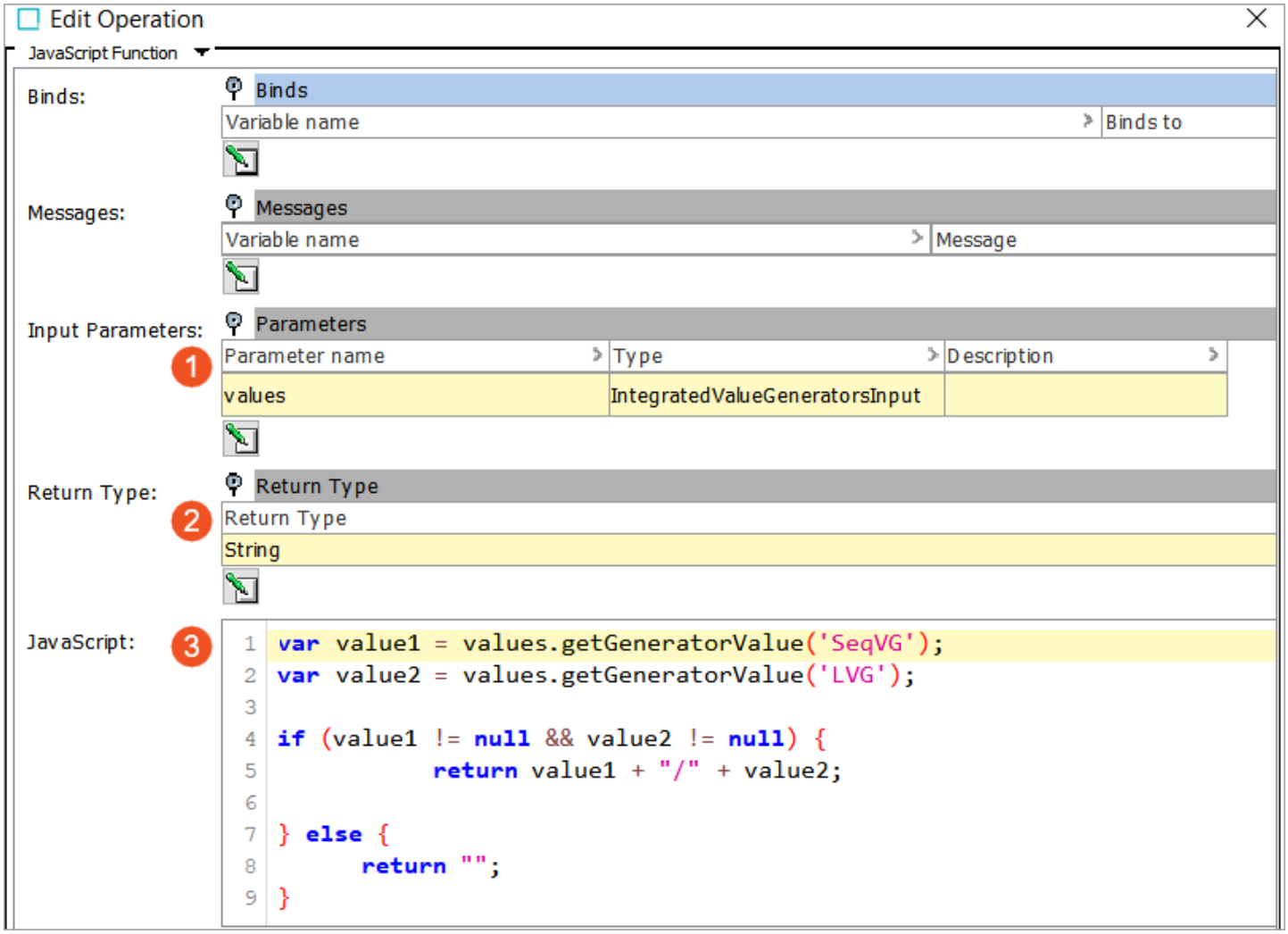


1. **Input Parameters**: Create a parameter name (in this example, 'vg'). Select Value Generator > 'ValueGenerator' as the type.
2. **Return Type**: Select 'String' as the return type.
3. **JavaScript**: A new date is returned as a value for the attribute if the value is unique. Otherwise, an empty string is returned as the value.

Note: Clicking the **Test JavaScript** button on the JavaScript Function for Value Generator can return a 'rollback performed' error. Instead, configure a business action (as defined in the sections below) to use the value generator and verify the result.

Example business function for an Algorithm Value Generator using integrated value generators

In this example, the business function has been configured to incorporate a List Value Generator and Sequence Value Generator to generate a value.



1. **Input Parameters**: Create a parameter name (in this example, 'values'). Select Value Generator > 'IntegratedValueGeneratorsInput' as the type.
2. **Return Type**: Select 'String' as the return type.
3. **JavaScript**: If the value of a Sequence Value Generator (in this example, 'SeqVG') and the value of a List Value Generator (in this example, 'LVG') are not equal to null, return a value that combines the values from 'SeqVG' and 'LVG.' These values are separated by '/.' If either of these value generators are equal to null (that is, there are no available values), then an empty string is returned as the value.

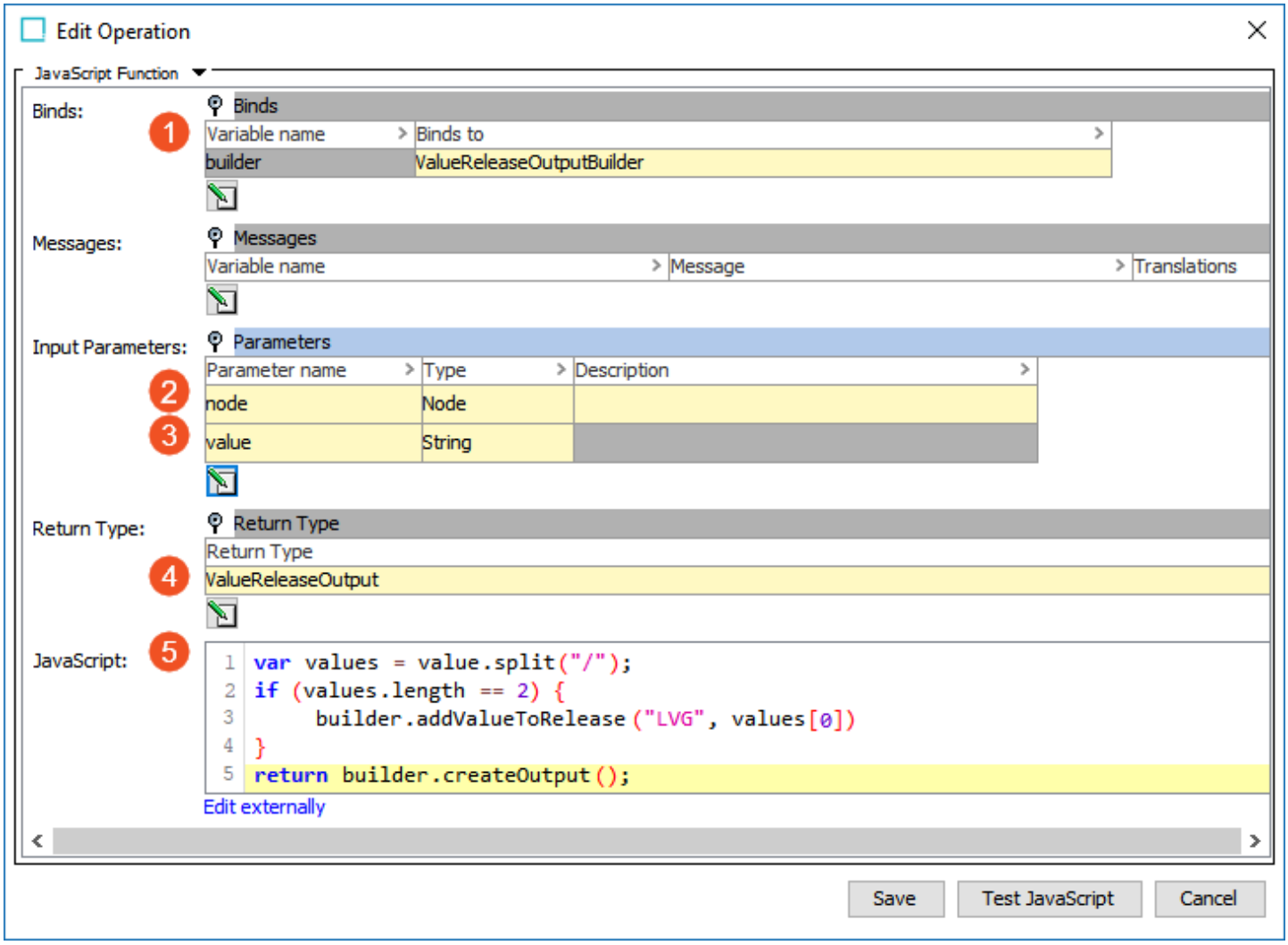
Note: Clicking the **Test JavaScript** button on the JavaScript Function for Value Generator can return a 'rollback performed' error. Instead, configure a business action (as defined in the sections below) to use the value generator and verify the result.

For information regarding List Value Generators, refer to the **List Value Generator** topic. For information regarding Sequence Value Generators, refer to the **Sequence Value Generator** topic.

Configuring a Business Function to Release a Value

Although similar to business functions that are configured to generate values, there are a number of specific differences when editing a business function whose purpose is to be used in tandem with an Algorithm Value Generator to release a value. These setting are described in the example below.

Important: Values that have been released can be used at a later time. However, released values for the Sequence Value Generator cannot be used at a later time as doing so would disrupt the sequence of numbers.

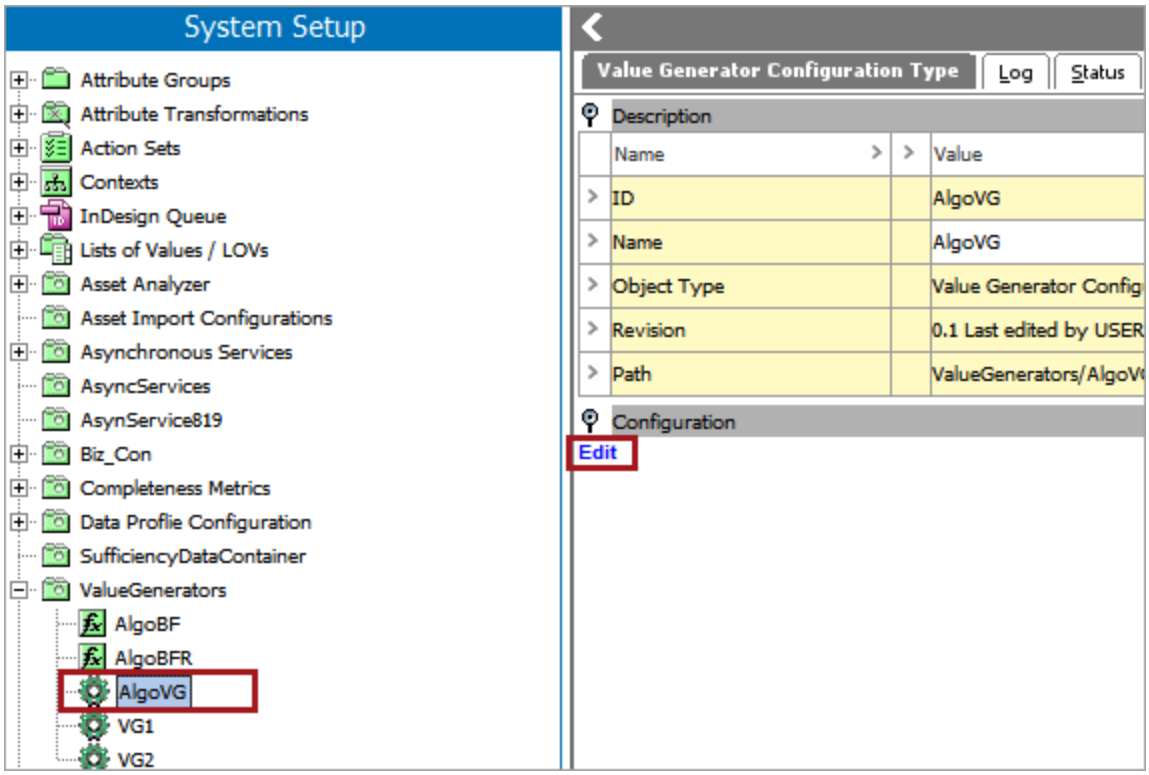


1. **Binds**: Create a variable name (in this example, 'builder'). Select Value Generator > 'ValueReleaseOutputBuilder' as the binds to.
2. **Input Parameters**: Create a parameter name (in this example, 'node'). Select 'Node' as the type.
3. **Input Parameters**: Create a parameter name (in this example, 'value'). Select 'String' as the type.
4. **Return Type**: Select Value Generator > 'ValueReleaseOutput' as the return type.
5. **JavaScript**: If the value is equal to a combination of two values and comprised of a value made up of two values separated by a forward slash, the value is released.

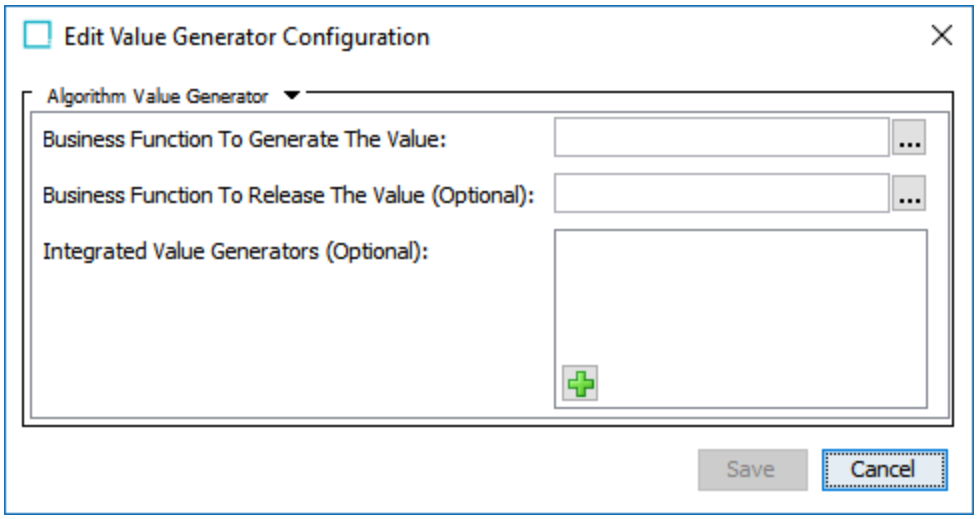
Configuring an Algorithm Generator

Once a business function is configured, an Algorithm Value Generator can be configured. Users should configure the business function prior to configuring the Algorithm Value Generator, as part of configuring the Algorithm Value Generator is selecting the business function to be used to generate / release a value.

1. With the desired Value Generator Configuration Type selected (in this case, AlgoVG), click the 'Edit' link, which is located under the Configuration flipper.

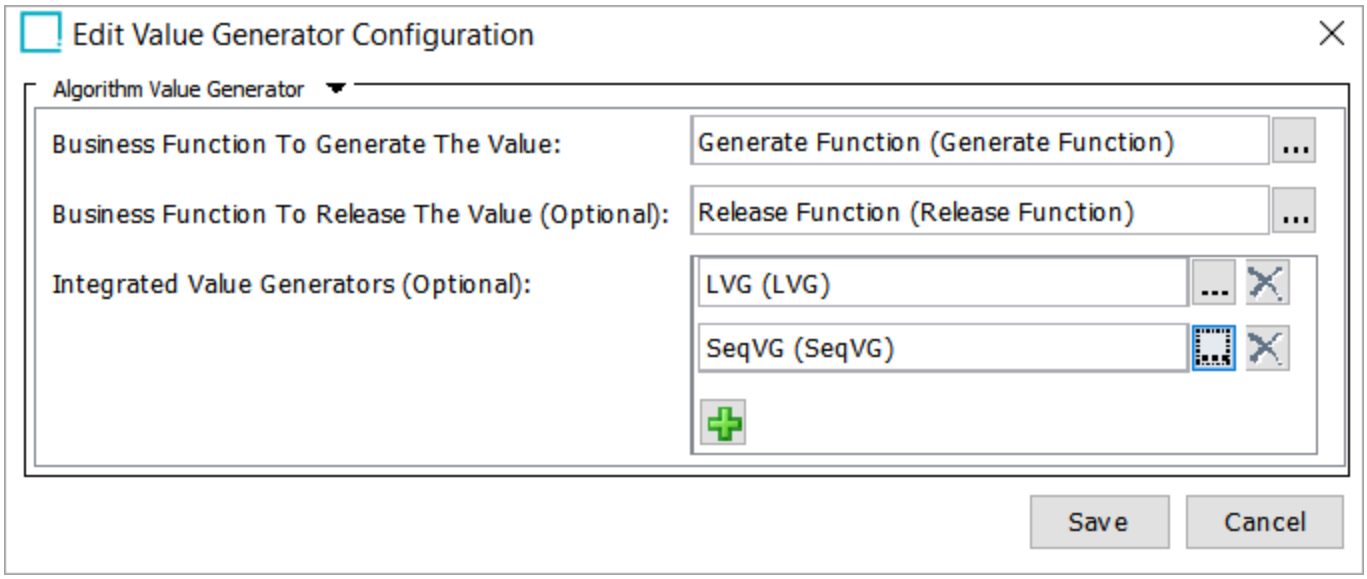


2. Select 'Algorithm Value Generator' from the dropdown menu. The parameters for configuring the Algorithm Value Generator are now visible and ready for editing.



3. Click the ellipsis button (...) next to the ' Business Function to Generate the Value' text field and select the business function to generate a value. In this example, the user has selected the second business function (the business function that includes two integrated value generators and is titled 'Generate Function') that was created earlier in this topic.
4. Click the ellipsis button (...) next to the Business Function to Release the Value (Optional) text field, and select the business function to release a value. In this example, the user has selected the business function (titled 'Release Function') that was created earlier in this topic.
5. In the 'Integrated Value Generators (Optional) text field, select the value generators you want to use within the Algorithm Value Generator by first clicking the green cross and then clicking the ellipsis button (...).

   In this example, the user has selected the List Value Generator ('LVG') and Sequence Value Generator ('SeqVG'), both of which are incorporated as part of the JavaScript within the first business function created earlier in this topic.



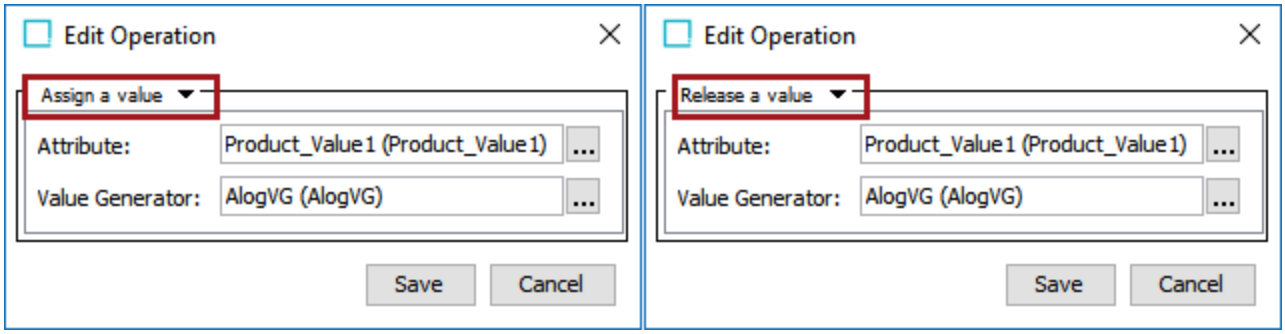
6. Click 'Save' to save your settings and close the dialog.

Configuring a Business Action to Generate / Release Values

Business actions must be configured to assign / release values using the Algorithm Value Generator.

While this section includes details to configure business actions used in conjunction with the Algorithm Value Generator, it does not include the steps necessary to create the business actions. For more information regarding the initial setup of business actions (which are considered to be part of business rules), refer to the **Business Rules** documentation.

1. Within the business action Edit Operation dialog, select 'Value Generator' > 'Assign a value' or 'Release a value' from the dropdown menu, depending on which action to perform.
2. Select an attribute and value generator. In this example the user has selected the attribute 'Product_Value1' and the value generator 'AlgoVG,' which was configured earlier in this topic.



'Assign a value' option

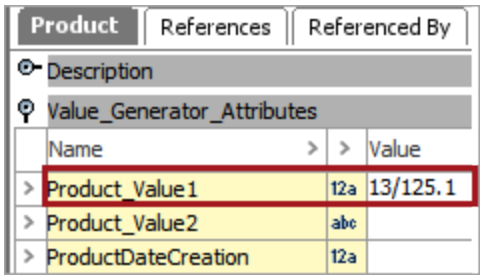
- The value is assigned to the selected attribute.
- The value is obtained from the selected value generator.

'Release a value' option

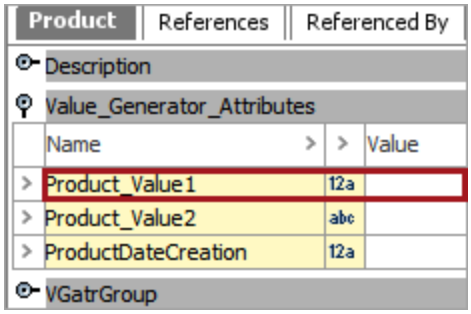
- The value id removed from the selected attribute.

Important: Values that have been released can be used at a later time. However, released values for the Sequence Value Generator cannot be used at a later time as doing so would disrupt the sequence of numbers.

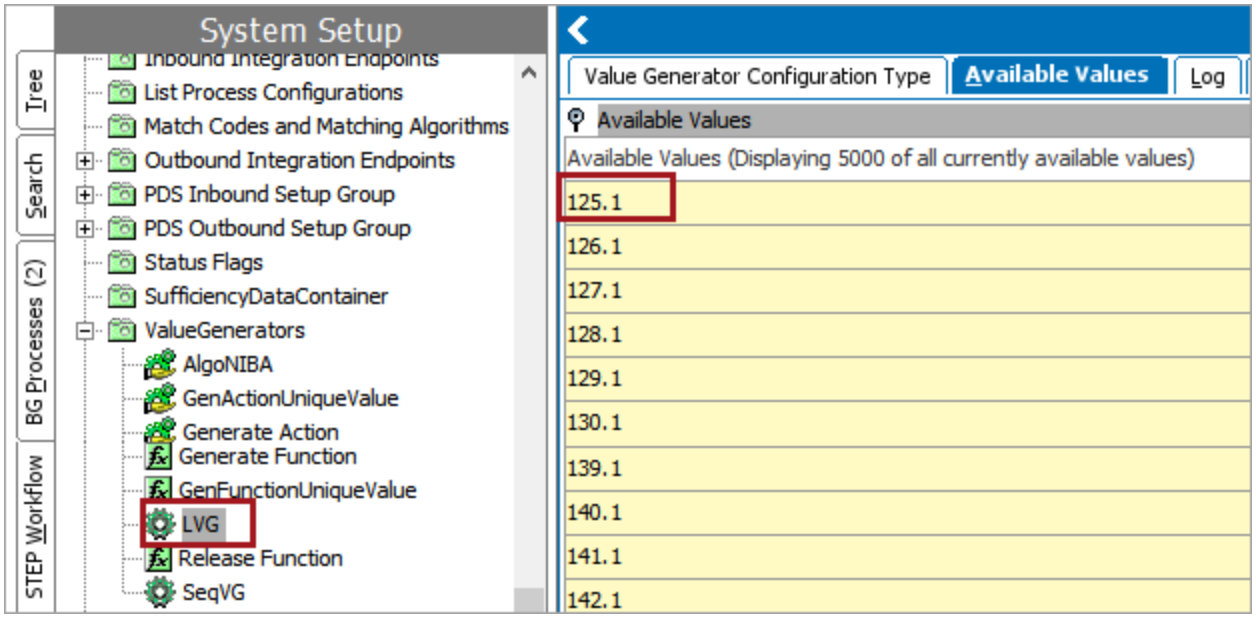
Once the business action configured to assign a value is run, the value for the attribute 'Product_Value1' is populated by a value as determined by the business function (in this case, a value taken from a Sequence Value Generator and List Value Generator, separated by a forward slash).



Once the business action configured to release a value is run, the value for the attribute 'Product_Value1' is removed from the attribute.



The value from the List Value Generator 'LVG' (125.1) has been placed back into the Available Values list and can be reused.



List Value Generator

The List Value Generator allows users to import values from a specified list (e.g., a list of numbers) and assigns those values to an attribute of an object. Additionally, if a user decides that they do not want to retain a value that has been assigned to an attribute, the value can be returned to the list for later use.

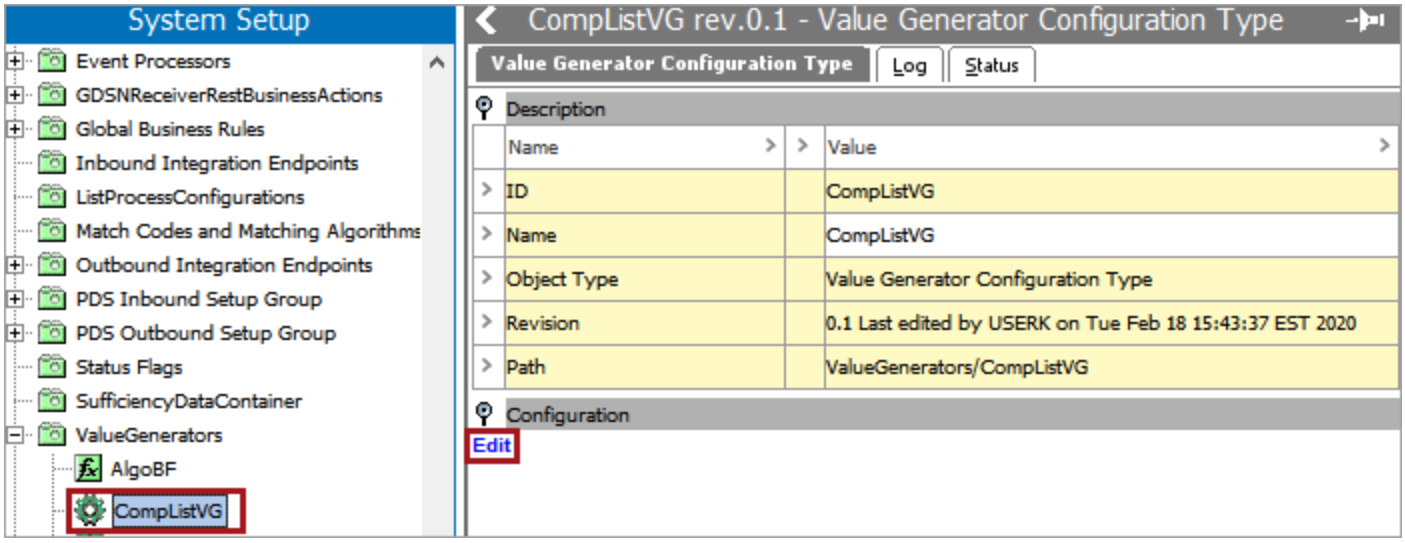
Important: While a powerful tool, the use of value generators can result in significant performance impacts in some scenarios. This is dependent on a number of factors and can be difficult to predict. Therefore, use of value generators should be thoroughly tested within your solution and as part of your overall business processes before relying on them as part of critical onboarding and/or import activities.

Configuring a List Value Generator

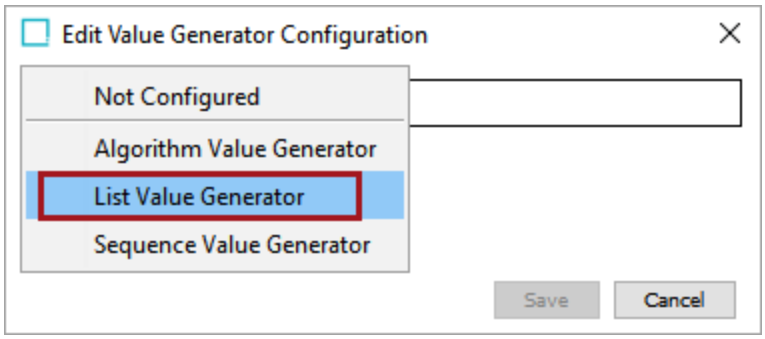
The following steps are required prior to using the List Value Generator to generate values for selected attributes.

Note: Before a List Value Generator can be configured, a Value Generator object type must be created. For instructions on how to create a Value Generator object type, refer to the **Value Generators** topic.

1. With the desired Value Generator Configuration Type selected, click the 'Edit' link under the Configuration flipper in the Value Generator Configuration Type editor.



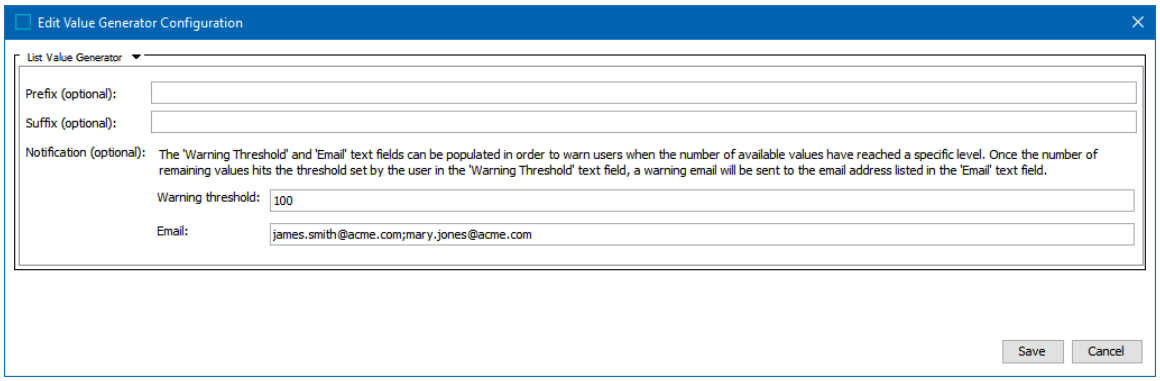
2. From the dropdown menu, select 'List Value Generator.'



Within the Edit Value Generator Configuration dialog:

- **Prefix (Optional)**: Characters to precede values generated from a selected list.
- **Suffix (Optional)**: Characters to follow values generated from a selected list.
- **Notification (Optional)**: As the descriptive text indicates, once the Warning Threshold number is met (the number of values left within the list selected by the value generator), an email is sent to the recipients included in the Email parameter. Use a semicolon (;) (but no spaces) to separate multiple email addresses.

Important: The Warning Threshold and Email parameters are dependent on each other. If one is populated, the other must also be populated.

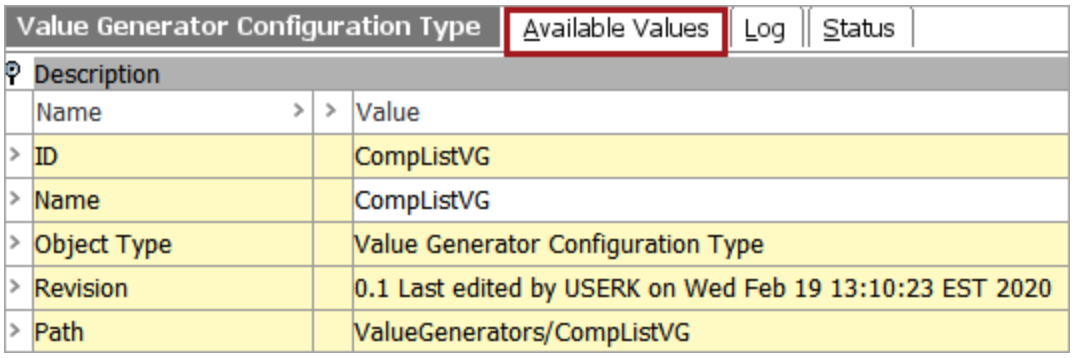


3. Once the desired parameters are populated, click 'Save' and close the Edit Value Generator Configuration dialog.

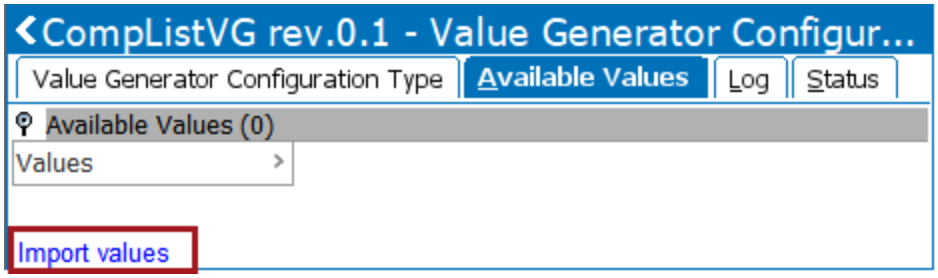
Importing Values into the List Value Generator

Once the List Value Generator is configured, values must be imported for use.

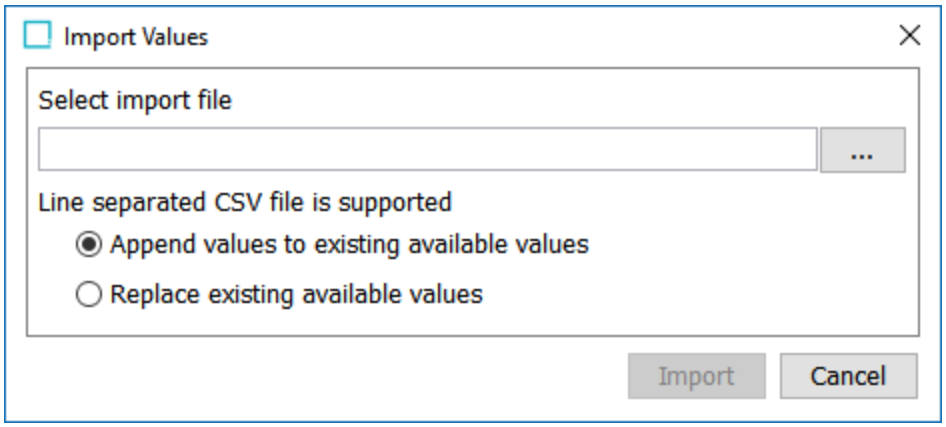
1. With the List Value Generator configured, click on the 'Available Values' tab.



2. With the Available Values tab open, select the 'Import values' link.



3. In the Import Values dialog, click the ellipsis button (...) located next to the 'Select import file' text field.

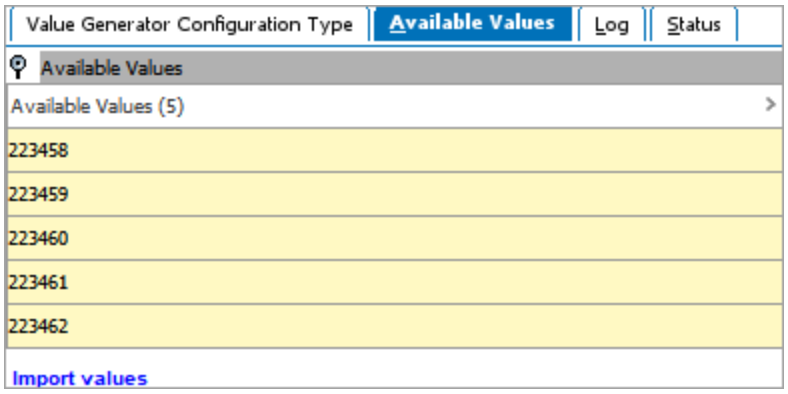


Important: Only line-separated CSV files are supported, and values that are imported can be added to ('Append values...') or replace already-existing values (if applicable). Importing duplicate values is not permitted. If a user tries to import duplicate values, a message stating which values were omitted during import will appear. A duplicate value is considered any value that already exists in the Available Values list or has already been assigned to an attribute from the List Value Generator.

4. Click the 'Import' button to import the values and close the dialog.

The available values are now ready to be used with the List Value Generator. By default, the available values are sorted by when they were imported and the order of values within the CSV file itself (e.g., the most recent imported values will be at the bottom of the list and a value within a higher row will be above a value in a lower row).

In this example, the first available value is '223458.' This value will be found later in this topic when the business actions used in conjunction with the List Value Generator are run.



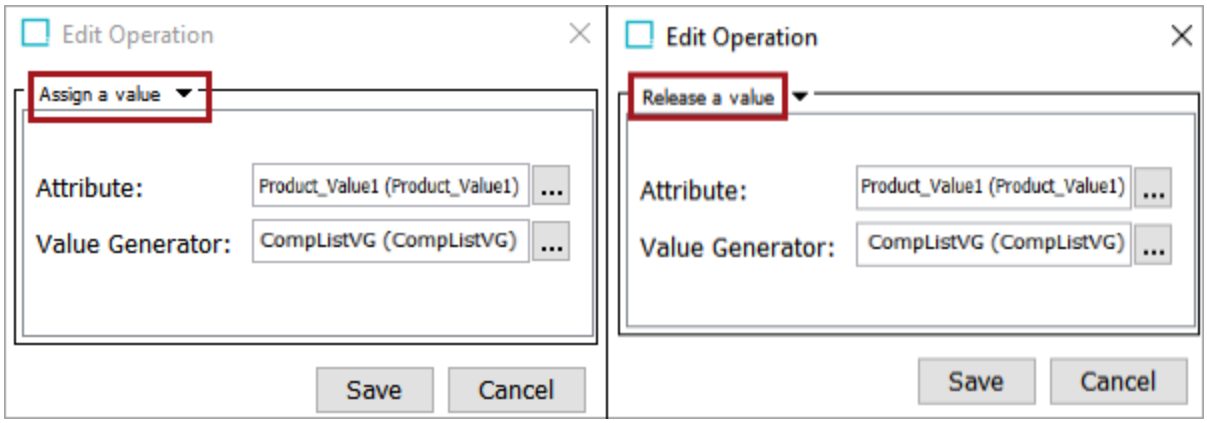
Note: The 'Available Values' table can display up to 5,000 values. If more than 5,000 values exist in a list, the message 'Displaying 5000 of a currently available values' is displayed next to 'Available Values' label. Otherwise, the specific number of available values (in this example, '5') is displayed in parenthesis next to 'Available Values' label. Additionally, filtering only applies to the values that are visible within the table. For more information regarding filtering options, refer to the **Sorting and Filtering Views** topic in the **Views** section of the **Publisher (Adobe InDesign Integration)** documentation.

Configuring Business Actions for a List Value Generator

Once a list of available values have been added to a List Value Generator, business actions must be configured to assign / release values.

While this section covers the details regarding the configuration of business actions used in conjunction with the List Value Generator, it does not cover the steps necessary to create business actions themselves. For more information regarding the initial setup of business actions (which are a type of business rule), refer to the **Business Rules** topic in the **Using Business Rules in STEP** documentation.

1. Within the business action Edit Operation dialog, select 'Value Generator' > 'Assign a value' or 'Release a value,' depending on which action to perform.
2. Select an attribute and value generator. In this example the user has selected the attribute Product_Value1 and the value generator CompListVG, which was configured earlier in this topic.



With the 'Assign a value' option selected:

- The value will be assigned to the selected attribute.
- The value will be obtained from the top of the selected value generator's value list.

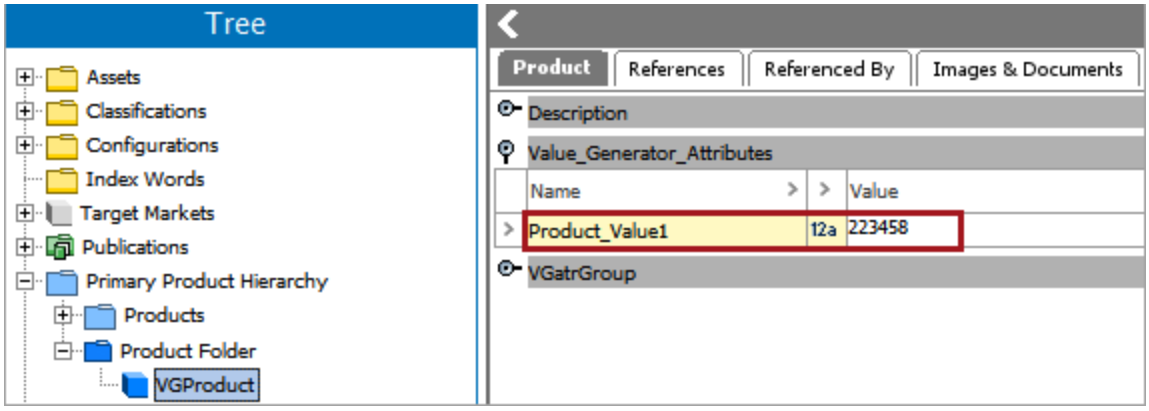
With the 'Release a value' option selected:

- The value will be removed from the selected attribute.
- The value will be put back at the top of the selected value generator's value list.

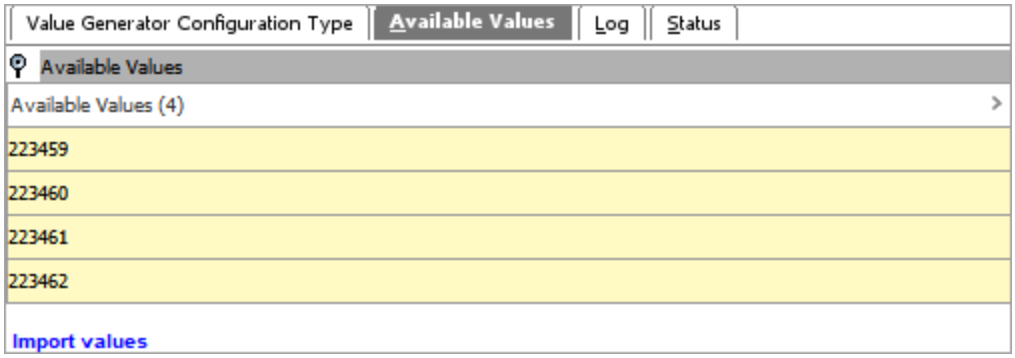
Important: When selecting an attribute that the value will be applied to, be aware of the attribute's validation base type, especially if the prefix or suffix text field was populated when the List Value Generator was configured. An error may occur if, for example, a prefix of 'GTIN' (or some other combination of letters) is included as a prefix or suffix for the list value generator, and then an attribute is selected, which does not allow for anything besides numbers. For more information on validation base types, refer to the **Validation Base Type** topic in the **Validation Rules** documentation.

3. Click 'Save' to save your settings and close the dialog.

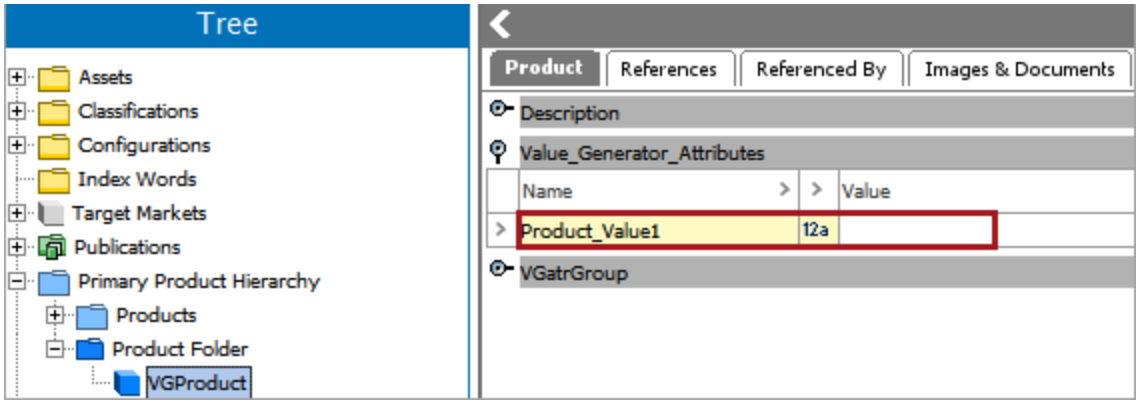
   When the business action with the 'Assign a value' setting selected is run, it will obtain the next value from the list in the List Value Generator and assign it to the attribute 'Product_Value1.'



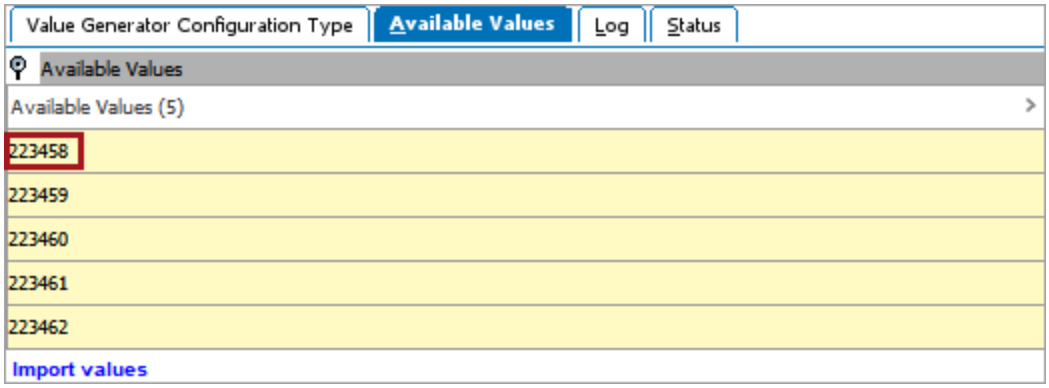
The Available Values list now only contains four available values.



When the business action with the 'Release a value' setting selected is run, it will remove the value from the attribute.



The value is placed back into the Available Values list in the List Value Generator and is ready to be assigned to an attribute when the 'Assign a value' business action is run.



Sequence Value Generator

The Sequence Value Generator allows users to assign unique values to attributes, based on a user-determined sequence of numbers.

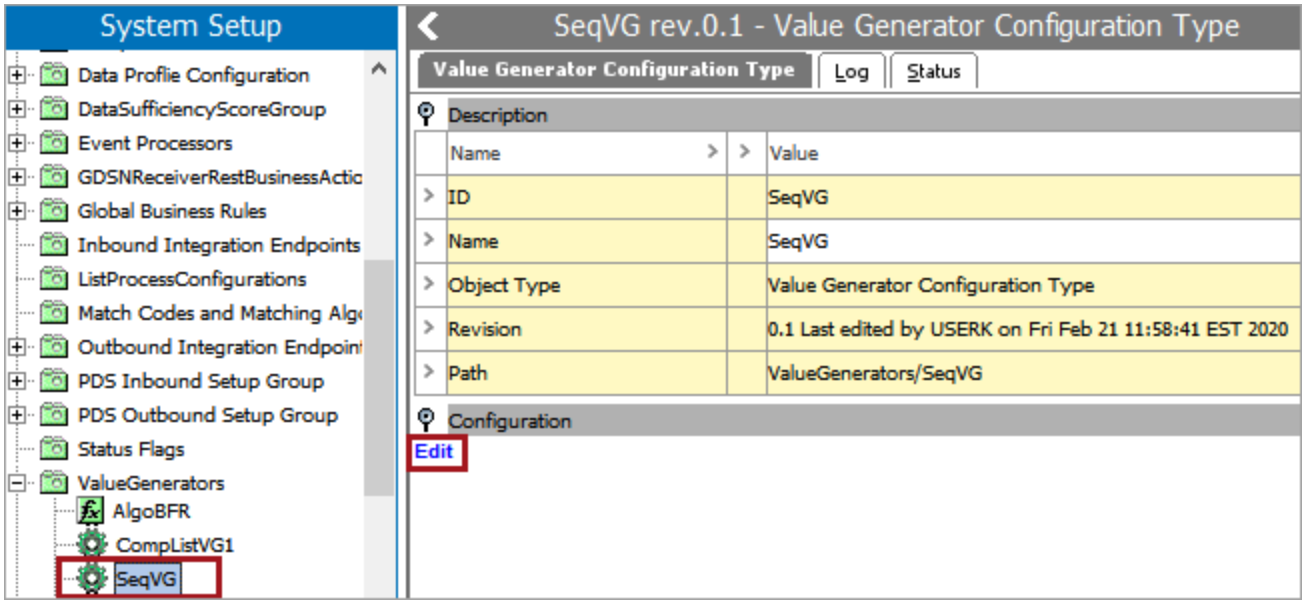
Important: While a powerful tool, the use of value generators can result in significant performance impacts in some scenarios. This is dependent on a number of factors and can be difficult to predict. Therefore, use of value generators should be thoroughly tested within your solution and as part of your overall business processes before relying on them as part of critical onboarding and/or import activities.

Configuring a Sequence Value Generator

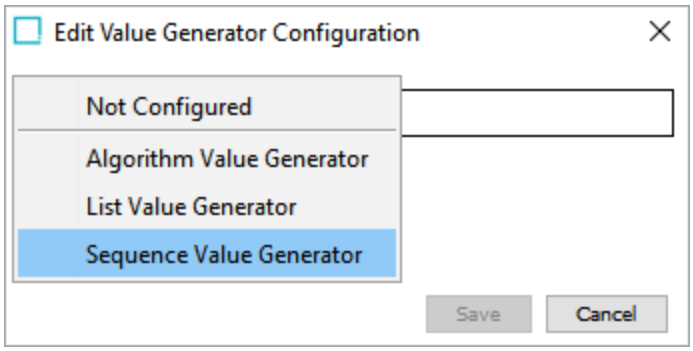
The following steps are required prior to using the Sequence Value Generator to generate values for selected attributes.

Note: Before a Sequence Generator can be configured, a Value Generator object type must be created. For instructions on how to create a Value Generator object type, refer to the **Value Generators** topic.

1. With the desired Value Generator Configuration Type selected, click the 'Edit' link, which is located under the Configuration flipper of the Value Generator Configuration Type editor.



2. From the dropdown menu, select 'Sequence Value Generator.'

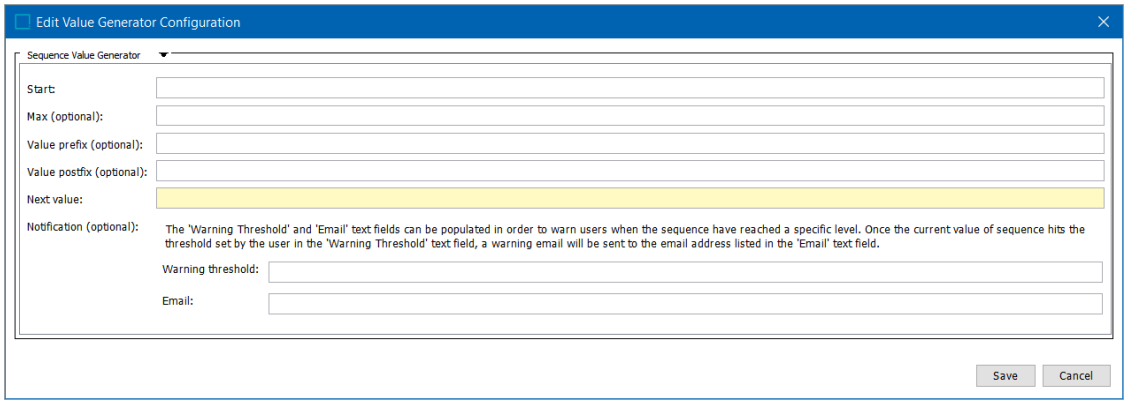


Within the Edit Value Generator Configuration dialog, there are several editable parameters:

- **Start**: The starting number for the number within the range.
- **Max (optional)**: The maximum number within the range.
- **Value prefix (optional)**: This value will precede the number sequence, allowing for more specified unique values if desired.
- **Value postfix (optional)**: This value will follow the number sequence, allowing for more specified unique values if desired.
- **Notification (optional)**: As the descriptive text indicates, once the Warning Threshold number is met (i.e., the sequence has reached a specific level), an email will be sent to the email recipients included in the Email text field. A semicolon (;) is used to separate email addresses.

Important: The Warning Threshold and Email parameters are dependent on each other, e.g., if one is populated, the other must be populated as well.

The parameter Next Value is a read-only text field. It displays the next available number in the sequence.



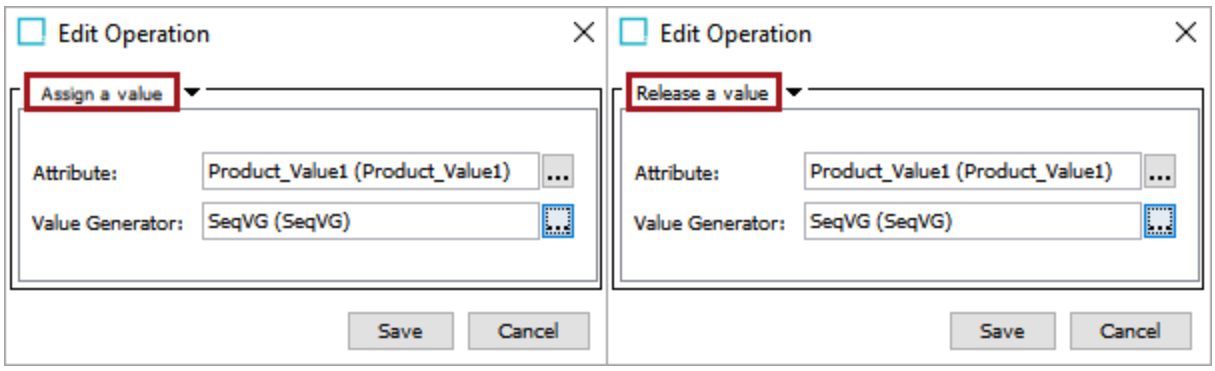
3. Once the desired parameters are populated, click 'Save' and close the Edit Value Generator Configuration dialog.

Configuring Business Actions for a Sequence Value Generator

Now that a Sequence Value Generator has been configured, business actions must be configured to assign / release values.

While this section will cover the specifics regarding the configuration of business actions used in conjunction with the Sequence Value Generator, it will not cover the steps necessary to create business actions themselves. For more information regarding the initial setup of business actions (which are considered to be part of business rules), refer to the **Business Rules** topic in the **Using Business Rules in STEP** documentation.

1. Within the business action Edit Operation dialog, select 'Value Generator' > 'Assign a value' or 'Release a value,' depending on the action to perform.
2. Select an attribute and value generator. In this example the user has selected the attribute Product_Value1 and the value generator SeqVG, which was configured earlier in this topic.



With the 'Assign a value' option selected:

- The value will be assigned to the selected attribute.
- The value will be obtained from the selected value generator.

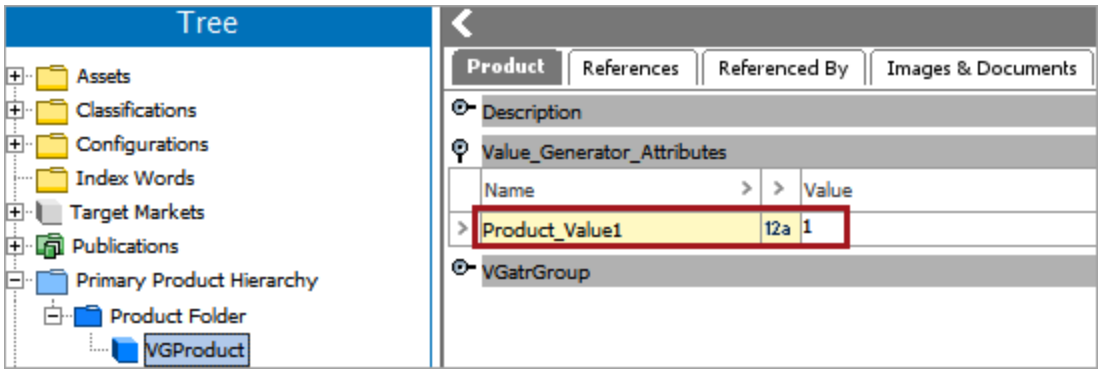
With the 'Release a value' option selected:

- The value will be removed from the selected attribute.

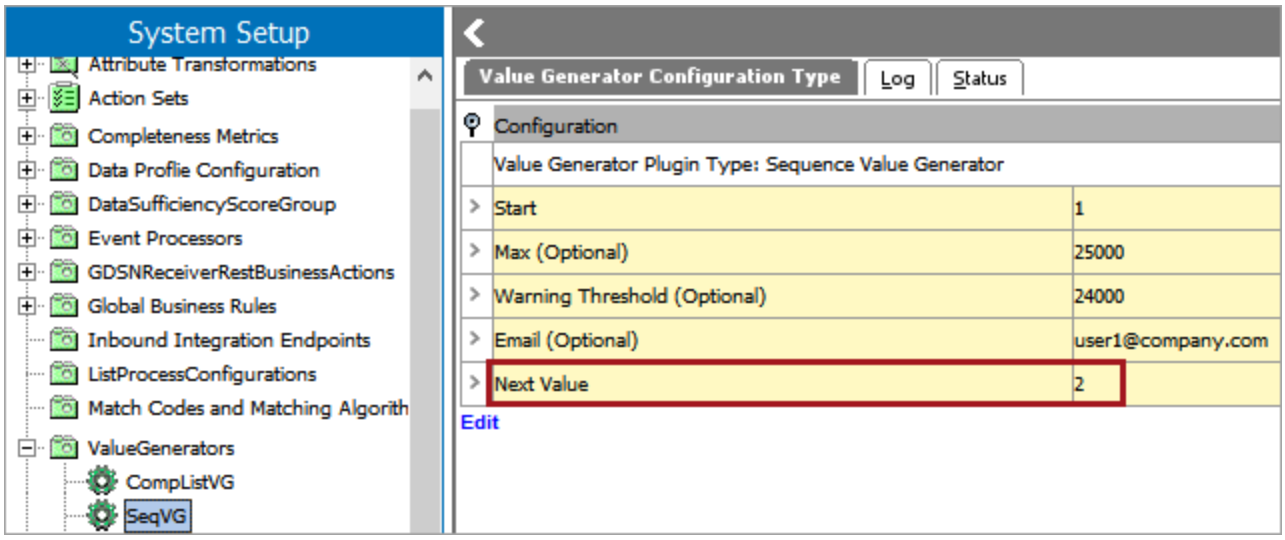
> **Note:** Unlike the Algorithm Generator and List Value Generator, the value will not be returned to the list of available values when the 'Release a value' option is selected, as doing so would disrupt the number sequence.

3. Click 'Save' and close the dialog.

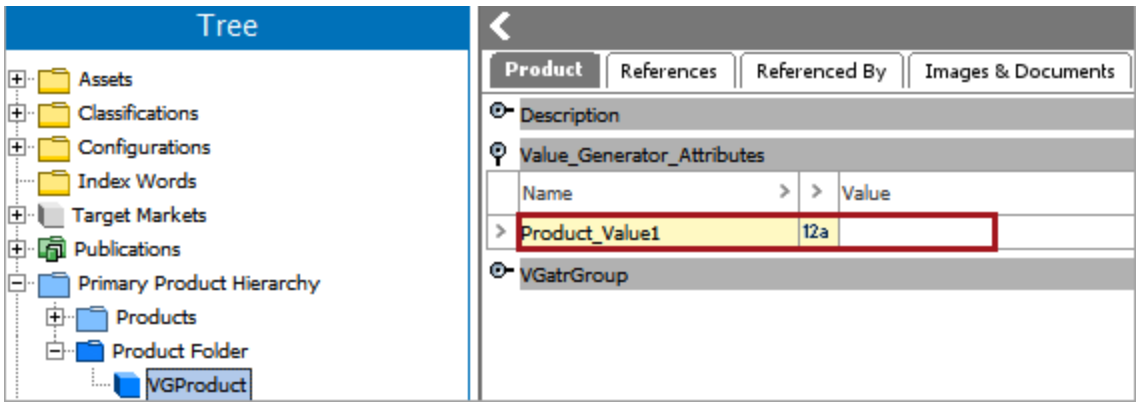
   When the business action with the 'Assign a value' setting selected is run, it will obtain the next available value from the Sequence Value Generator (in this case, '1') and assign it to the attribute 'Product_Value1.'



With the number obtained from the Sequence Value Generator, the next available value (2) is displayed, as illustrated in the image below.



When the business action with the 'Release a value' setting selected is run, it will remove the value from the attribute.



Wiki Metadata (Data Catalog Connector)

Note: Data Catalog Connector: This functionality has been deprecated and is no longer supported and/or available for new installations. This documentation is retained as a reference only for customers already using the functionality and for whom it remains available in the current state. The functionality will be removed in the future so customers using this should make plans to transition away from their implementation of it.

Configuration Governance involves capturing data that explains how your system works and how to use it. This could include metadata that documents, for example, the purpose of an attribute or integration endpoint, the owner of an LOV, or the process to request a change to a workflow. For STEP, the wiki (also known as Data Catalog Connector) provides a way to capture configuration governance metadata on many system setup objects, and displays it via a 'Go to Wiki' link.

The Wiki Metadata functionality requires installation of the XWiki advanced open source enterprise wiki platform and database, which reside outside of STEP. However, the XWiki content pages can be launched from both workbench and Web UI, and the content can also be searched. For information about XWiki, review the content found on the web at: https://www.xwiki.org/xwiki/bin/view/Documentation/

Executing the Wiki Metadata STEP installation recipe includes creation of a pre-configured, event-based OIEP to handle creation of and updates to wiki pages. After a successful installation of both STEP and XWiki, links to the wiki are included in the workbench and in Web UI.

Additionally, an MDM system provides support for Information Governance functionality such as policy evaluation, creation, and collaboration, as well as policy change management and impact analysis. For more information, refer to the **Data Governance** documentation.

Setup Requirements

Setting up and using the wiki involves the following steps:

1. Install, configure, and test the Wiki Metadata as defined in **Initial Setup for Wiki Metadata**.
2. Generate new wiki pages as defined in **Creating Wiki Metadata Pages**.

Additional Information

The following information is useful once the wiki is set up:

1. Display a wiki page for a selected system setup object as defined in:
   - **Viewing Wiki Metadata Pages from Workbench**
   - **Viewing Wiki Metadata Pages from Web UI**
2. Modify the data on the wiki page as defined in **Editing Wiki Metadata Pages**.

Initial Setup for Wiki Metadata

Note: Data Catalog Connector: This functionality has been deprecated and is no longer supported and/or available for new installations. This documentation is retained as a reference only for customers already using the functionality and for whom it remains available in the current state. The functionality will be removed in the future so customers using this should make plans to transition away from their implementation of it.

Complete the following one-time steps to set up and use Wiki Metadata.

1. Install the XWiki platform and database on a system, noting the hardware and software requirements and following the instructions on the web at:
   http://www.xwiki.org/xwiki/bin/view/Documentation/AdminGuide/Installation/

   Note: Although HSQL database is allowed for XWiki installation, it is not recommended for a STEP production environment.

2. Go to the directory where you installed XWiki and execute the start file appropriate for your system (Windows or Unix).

3. Contact Stibo Systems to activate the 'wikimetadata' component.

4. On the STEP application server, edit the sharedconfig.properties file, and add the following case-sensitive properties:

   - **Wiki.OIEPID=WikiMetadataEndpoint** - This property identifies the ID (WikiMetadataEndpoint) of the OIEP created upon restarting the server after applying the STEP Wiki Metadata installation license.
   - **WikiEndpointImportStartPlugin.ContextID=[context ID]** - Replace [context ID] with the ID of the context that should be set on the OIEP. If this property is not added, the default context is global with an ID of 'GL'. The OIEP creation requires that a context exists with either an ID of 'GL' or the context ID defined by this property. Multiple contexts can be added if needed, using a comma-delimited list of IDs.
   - **WikiEndpointImportStartPlugin.User=[user ID]** - Replace [user ID] with the ID of the user that should be set on the OIEP. If this property is not added, the default user is database administrator with an ID of 'DBA'. The OIEP creation requires that a user exists with either an ID of 'DBA' or the user ID defined by this property.

5. Stop and restart the application server to create a new setup group named 'Wiki Setup Group' in System Setup, as well as a new event-based OIEP named 'WikiMetadataEndpoint'. If either the setup group or OIEP already exists, even in the recycle bin, they cannot be created.

   Important: An OIEP with an ID that matches the ID given by the Wiki.OIEPID property is required to display the wiki links in Web UI.

6. In System Setup, manually configure the **OIEP Delivery Method** as required to work with your system. For details on configuration, refer to the **Wiki Delivery Method** topic in the **Data Exchange** documentation.
7. In System Setup, manually configure the WikiMetadataEndpoint event-based OIEP parameters:
   - On the Configuration tab, Configuration section, update the **Schedule** to run as required. By default, the OIEP is created to be invoked every minute. For details, refer to the **Schedule** section of the **OIEP - Configuration Section** topic in the **Data Exchange** documentation.
   - On the Configuration tab, Configuration section, update the **Workspace** parameter if needed. The default workspace is Approved.
   - On the Configuration tab, Event Queue Configuration section, update the **Queue Status** parameter to **Read Events**. By default, the OIEP is created to discard events, and no wiki pages are created with this setting. For details, refer to the **Event-Based OIEP Status and Queue Status** topic in the **Data Exchange** documentation.
   - On the OIEP's Event Triggering Definitions tab, verify that the triggers are adequate to generate the required wiki pages. For more information, refer to the **Creating Wiki Metadata Pages** topic.
8. In System Setup, right-click the OIEP and click the **Enable Integration Endpoint** option to run the OIEP based on the schedule. For details, refer to the **Running an Outbound Integration Endpoint** topic in the **Data Exchange** documentation.

Setup is now complete. Continue by verifying that setup was successful by following the **Testing Wiki Metadata** steps below.

Testing Wiki Metadata

1. In the System Setup attribute node, create a new attribute. This action should trigger the creation of a new wiki page.
2. Right-click the WikiMetadataEndpoint OIEP and click the **View First Event Batch** option. The Current Event Batch dialog displays the attribute you created and a number of events triggered by the creation process.
   - If the attribute is not displayed with events, revisit the OIEP manual configuration steps.
3. On the Current Event Batch dialog click the **Close** button.
4. Right-click the WikiMetadataEndpoint OIEP and click the **Invoke Endpoint** option. A background process is started.
5. On the WikiMetadataEndpoint OIEP Background Processes tab, verify the process succeeds.
   - If the background process fails, revisit the configuration of the Delivery Method on the OIEP.
6. Right-click the new attribute and click the **Go to Wiki** option.
   - If the wiki page displays with the expected data, continue to the **Creating Wiki Metadata Pages** topic.
   - If the wiki page does not display as expected, revisit the setup steps and update as required.

Creating Wiki Metadata Pages

Note: Data Catalog Connector: This functionality has been deprecated and is no longer supported and/or available for new installations. This documentation is retained as a reference only for customers already using the functionality and for whom it remains available in the current state. The functionality will be removed in the future so customers using this should make plans to transition away from their implementation of it.

After the OIEP setup is complete, events are generated based on the settings of the OIEP's Event Triggering Definitions tab. For more information on how events are handled by an OIEP, refer to the **OIEP - Event-Based - Event Triggering Definitions Tab** topic in the **Data Exchange** documentation.

Events queued by the OIEP are processed by the queue to create and update wiki pages.

Events can be triggered for:

- Attribute groups
- Attributes
- Business rules (action, condition, function, and library)
- Integration endpoints (inbound, outbound, and gateway)
- LOVs
- Reference types
- User Groups
- Workflows

Some system setup object types include a 'Go to Wiki' link, but do not trigger an event. For details on objects or changes that do not trigger events, refer to the **Events Not Triggered** topic in the **System Setup** documentation.

In the wiki, two pages are created for each system setup object triggered: [object ID]-STEP and [object ID]-CUSTOM. The STEP page includes metadata sent from the STEP system. The CUSTOM page includes a template for user defined content.

When the OIEP includes multiple contexts, multiple versions of the data will be included in the wiki STEP page. Data from the available contexts are displayed with the qualifier ID from the context.

Bulk Wiki Page Creation

The Republish command allows you to populate the wiki as a whole. For more details, refer to the **Event-Based OIEP Event Actions** topic in the **Data Exchange** documentation.

Note: The time required to complete the republishing process is based on the number of objects being republished, the environment, and the server performance.

1. Select the Workspace that should be used for republishing events.
2. On System Setup, open the WikiMetadataEndpoint OIEP Configuration tab.
3. On the Event Queue Configuration flipper, click the **Republish** button.
4. Use the **Select Setup Nodes to Republish** checkboxes to select the objects that should be republished. For example, check the 'Republish all Attributes' checkbox and the 'Republish all setup nodes' checkbox.
5. Add text to identify the **Process Description**. This is a required parameter.
6. Click the **Start Republish** button to start the republishing background process.

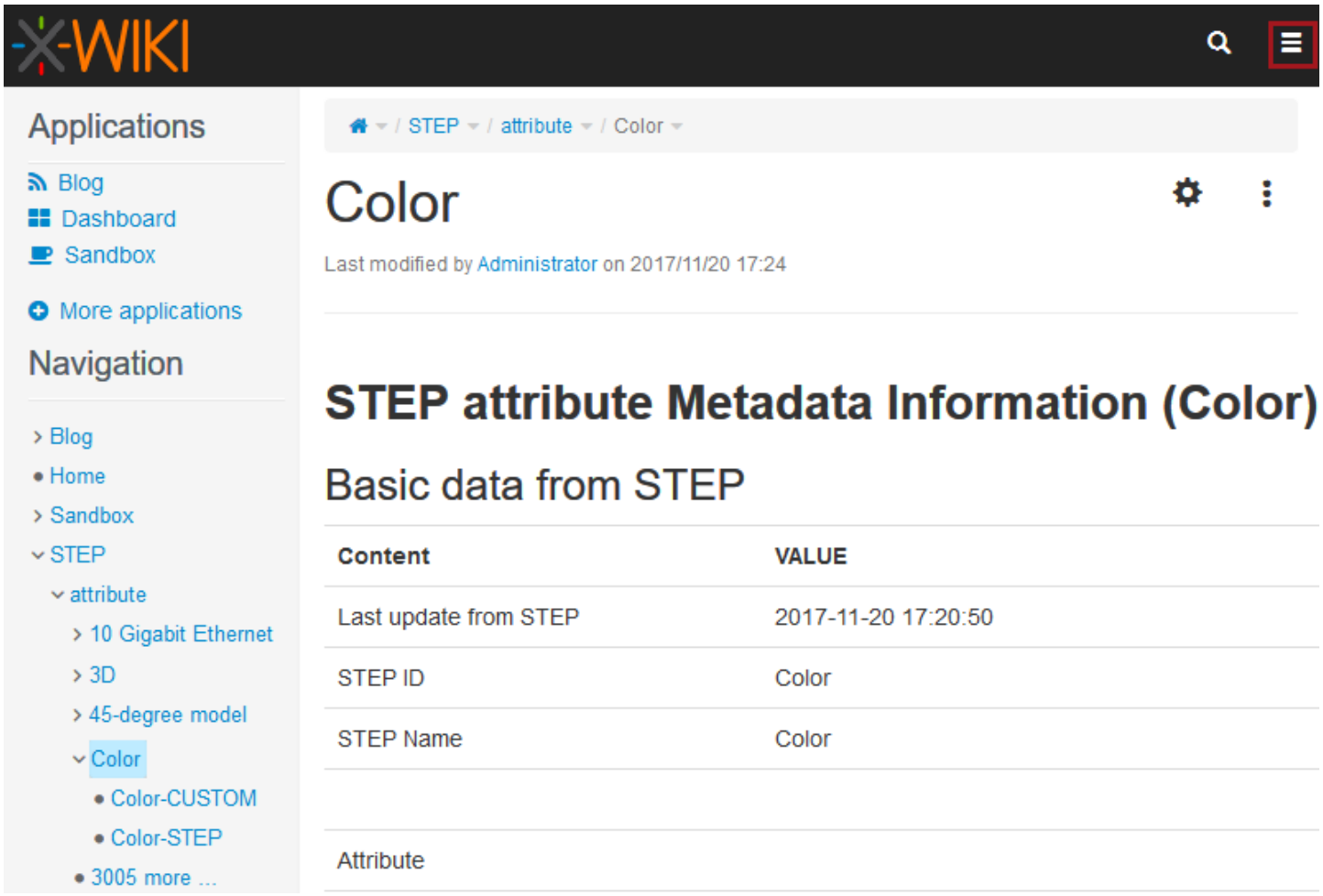
Editing Wiki Metadata Pages

Note: Data Catalog Connector: This functionality has been deprecated and is no longer supported and/or available for new installations. This documentation is retained as a reference only for customers already using the functionality and for whom it remains available in the current state. The functionality will be removed in the future so customers using this should make plans to transition away from their implementation of it.

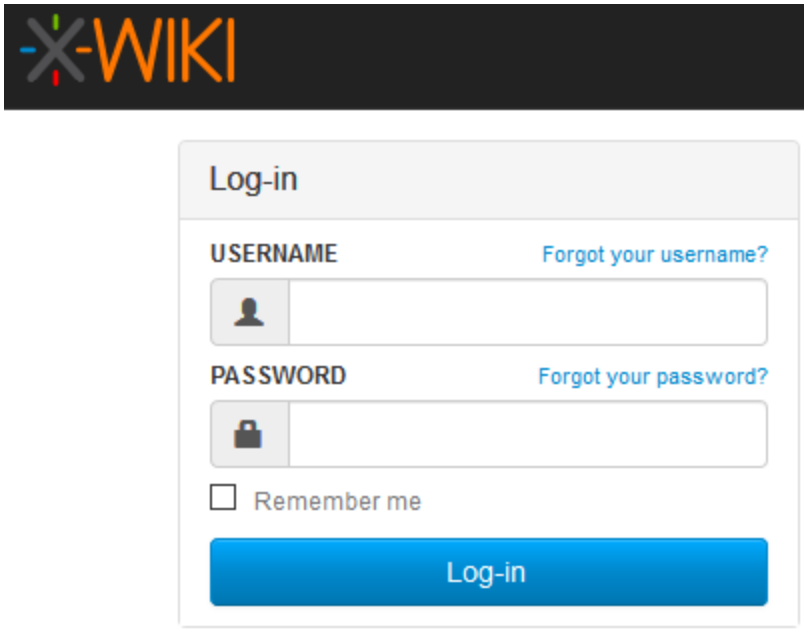
Once wiki pages exist, users can update them as new information becomes available.

1. For the desired object, display the wiki by clicking the **Go to Wiki** link. For details, refer to the **Viewing Wiki Metadata Pages from Web UI** topic or the **Viewing Wiki Metadata Pages from Workbench** topic.

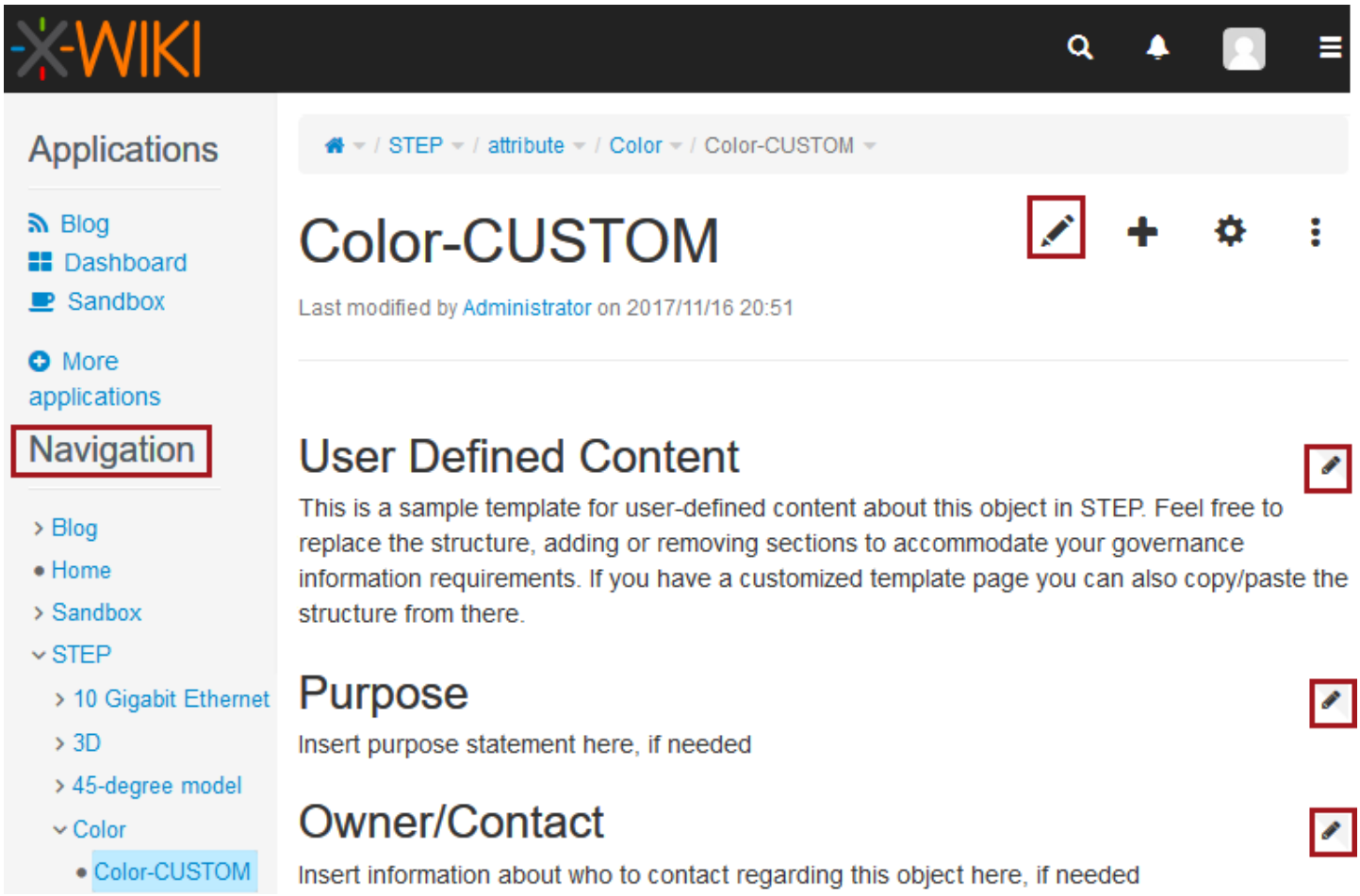
   The composite page is displayed as shown below and includes first the STEP metadata and then the CUSTOM data follows.



2. Log in to enable the editing functionality. Click the XWiki menu button ( ), then click the **Log-In** option to display the login dialog.



3. Type your username and password and click the **Log-in** button. Additional buttons are now available on the composite page.
4. Under the Navigation menu, select the **CUSTOM** version of the desired object. In the image below, the 'Color' attribute is being viewed, so the Color-CUSTOM page is selected.



5. Click the edit button ( ) for the section that will be modified, or click the edit button in the wiki page header to modify all sections.
6. Make any updates.
7. Click the **Save & Continue** button to stay in edit mode, or click **Save & View** to return to the custom page.

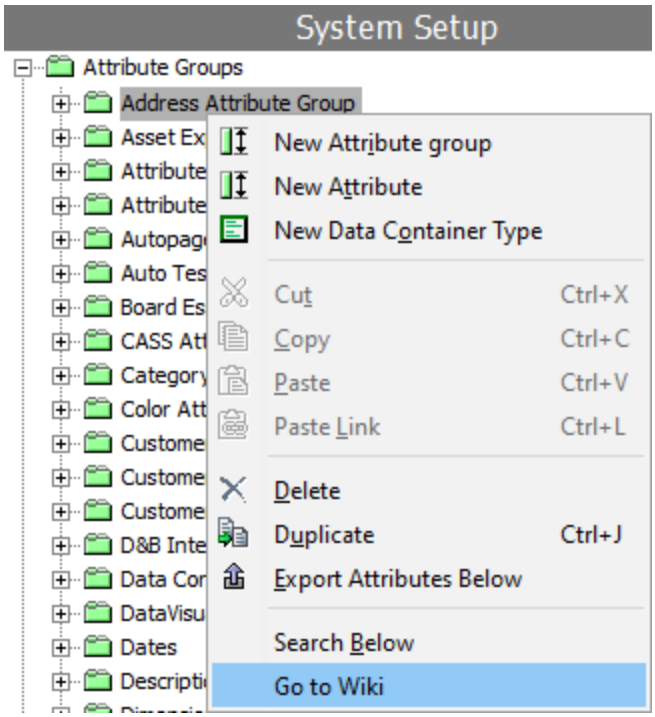
Viewing Wiki Metadata Pages from Workbench

Note: Data Catalog Connector: This functionality has been deprecated and is no longer supported and/or available for new installations. This documentation is retained as a reference only for customers already using the functionality and for whom it remains available in the current state. The functionality will be removed in the future so customers using this should make plans to transition away from their implementation of it.

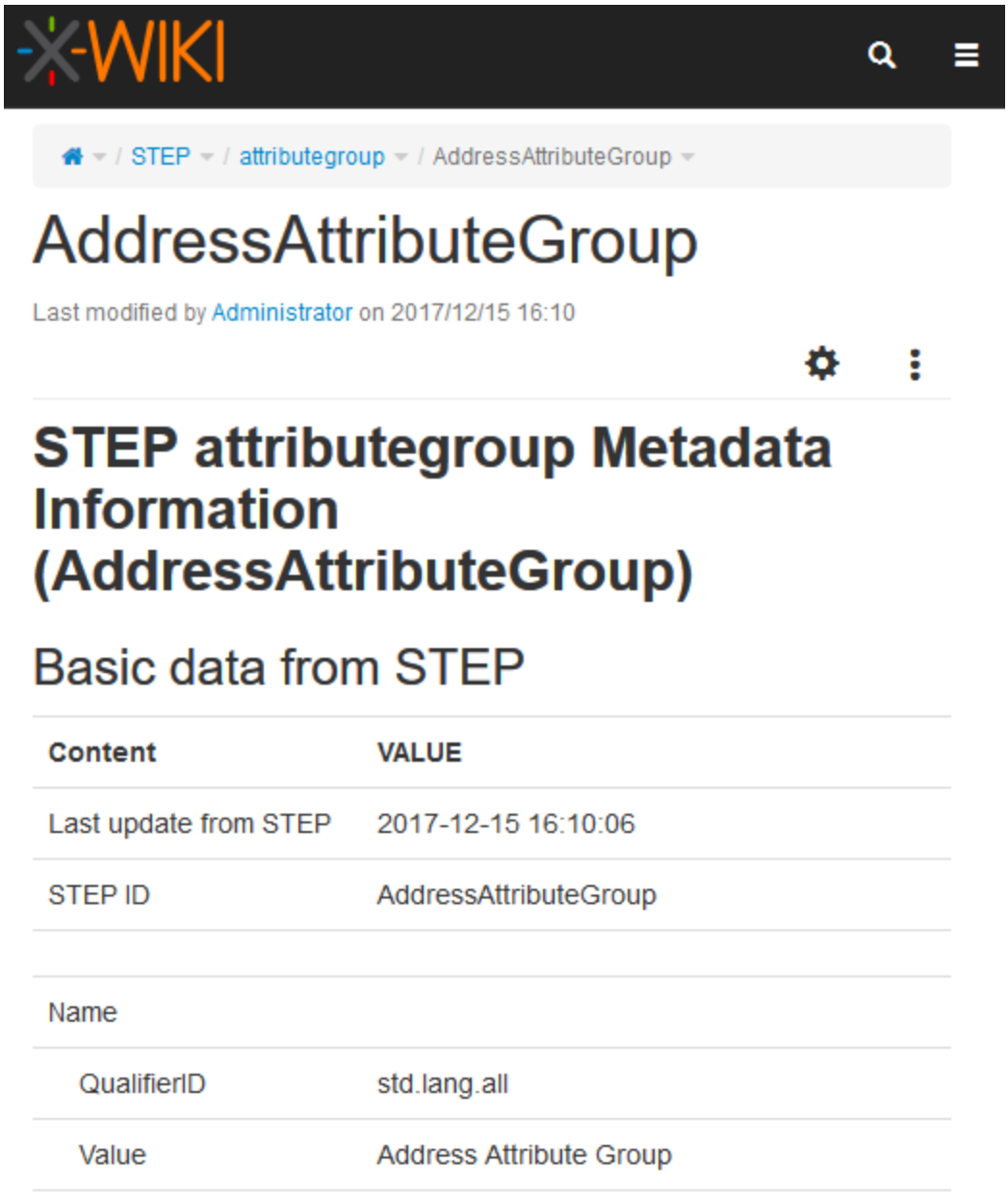
Once the setup is complete, the OIEP is running, and the wiki is running, no additional steps are required to access the wiki from workbench. Using the default setup, invoking the OIEP creates and modifies wiki pages.

The availability of a 'Go to Wiki' link is restricted only by the display of the system setup object and no additional privileges are required. Although many system setup objects include a wiki link, not all of them are supported in creating a wiki page. The objects that do trigger events for wiki are listed in the **Creating Wiki Metadata Pages** topic. For a list of objects that do not trigger events or wiki pages, refer to the **Events Not Triggered** topic in the **System Setup** documentation.

In workbench, the 'Go to Wiki' link can be accessed from the right-click menu.

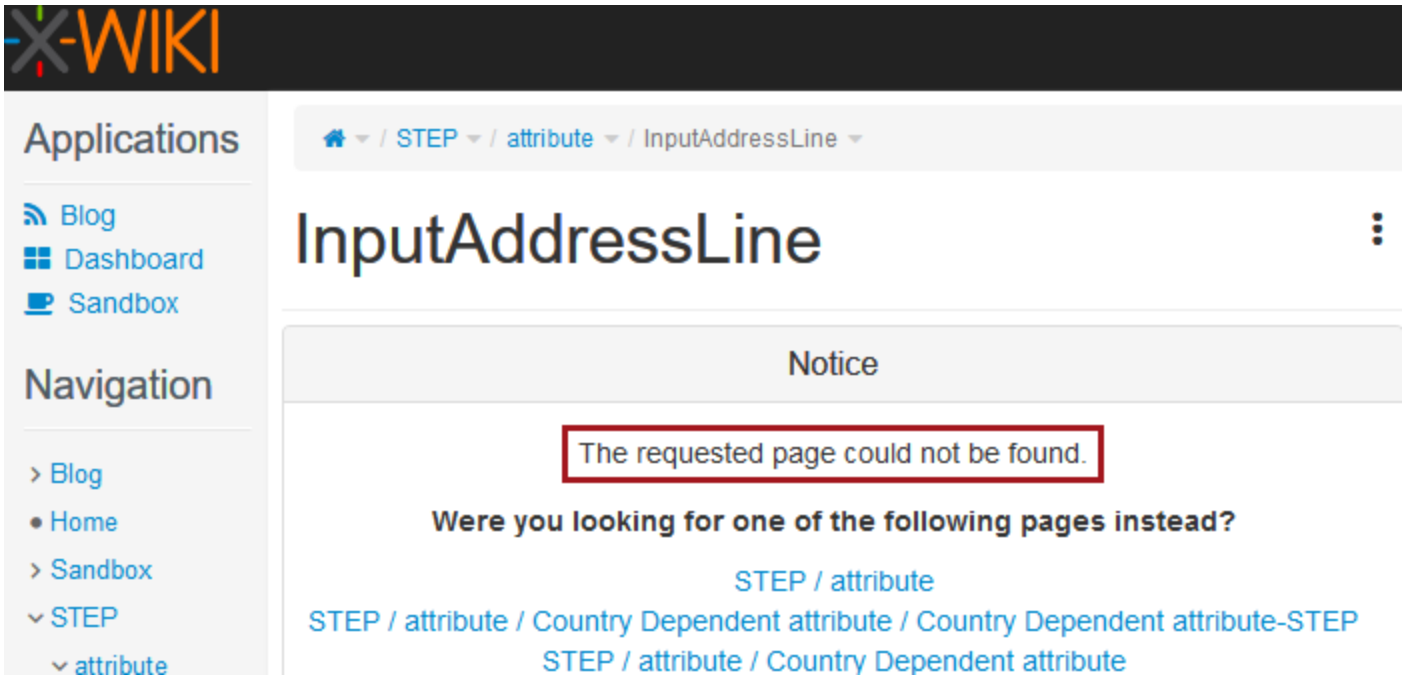


Click the link to display the wiki page in the user's default browser with the object's ID as the title.



Page Not Found

When a 'Go to Wiki' link is clicked but an event has not been processed by the OIEP to create a wiki page, as shown below, a message is displayed by the wiki that the requested page is not found. In this case, you can make a change on the object to trigger an event, or use the republish option to generate the missing page as described in the **Creating Wiki Metadata Pages** topic.


X-WIKI
Applications
Blog
Dashboard
Sandbox
Navigation
Blog
Home
Sandbox
STEP
attribute
STEP / attribute / InputAddressLine
InputAddressLine
Notice
The requested page could not be found.
Were you looking for one of the following pages instead?
STEP / attribute
STEP / attribute / Country Dependent attribute / Country Dependent attribute-STEP
STEP / attribute / Country Dependent attribute

Viewing Wiki Metadata Pages from Web UI

Note: Data Catalog Connector: This functionality has been deprecated and is no longer supported and/or available for new installations. This documentation is retained as a reference only for customers already using the functionality and for whom it remains available in the current state. The functionality will be removed in the future so customers using this should make plans to transition away from their implementation of it.

Once the setup is complete, the OIEP is running, and the wiki is running, additional steps may be required to access the wiki from Web UI as defined in the **Prerequisites** section below. Using the default setup, invoking the OIEP creates and modifies wiki pages.

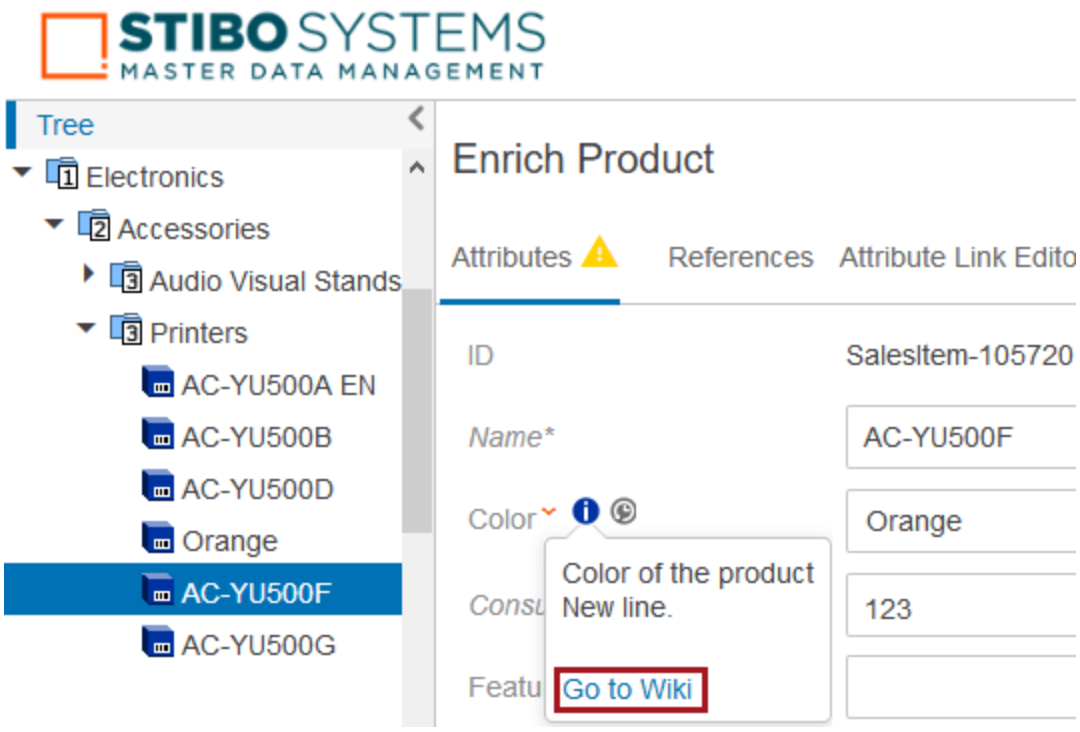
The availability of a 'Go to Wiki' link is restricted only by the display of the system setup object and no additional privileges are required. Although many system setup objects include a wiki link, not all of them are supported in creating a wiki page. The objects that do trigger events for wiki are listed in the **Creating Wiki Metadata Pages** topic. For a list of objects that do not trigger events or wiki pages, refer to the **Events Not Triggered** topic in the **System Setup** documentation.

Prerequisites

1. For the 'Go to Wiki' link to be displayed in Web UI, the OIEP must exist in workbench. Creation of the OIEP is handled by the Wiki Metadata installation, as described in **Initial Setup for Wiki Metadata**.
2. Enabling the 'Go to Wiki' link involves the following setup, based on the screen or component, as defined in the following **Using a Web UI** topics:
   - For components that include the Display Context Help parameter, when that parameter is enabled, the link is displayed on the information popup. For configuration information, refer to the **Attribute Help Text in Web UI**.
   - For the **Attribute Link Editor Screen**, the Attribute Link Wiki Header can be added in the Headers parameter.
   - For the **Attribute Management Screen**, on the Tab Control child component > Tab Page (Attribute Details) > Node Editor > Row child component > add the Wiki Link Value component.
   - No additional configuration is needed to display the link on the Status Selector Homepage widget or the **Status Selector Homepage Widget**.

View Wiki Pages

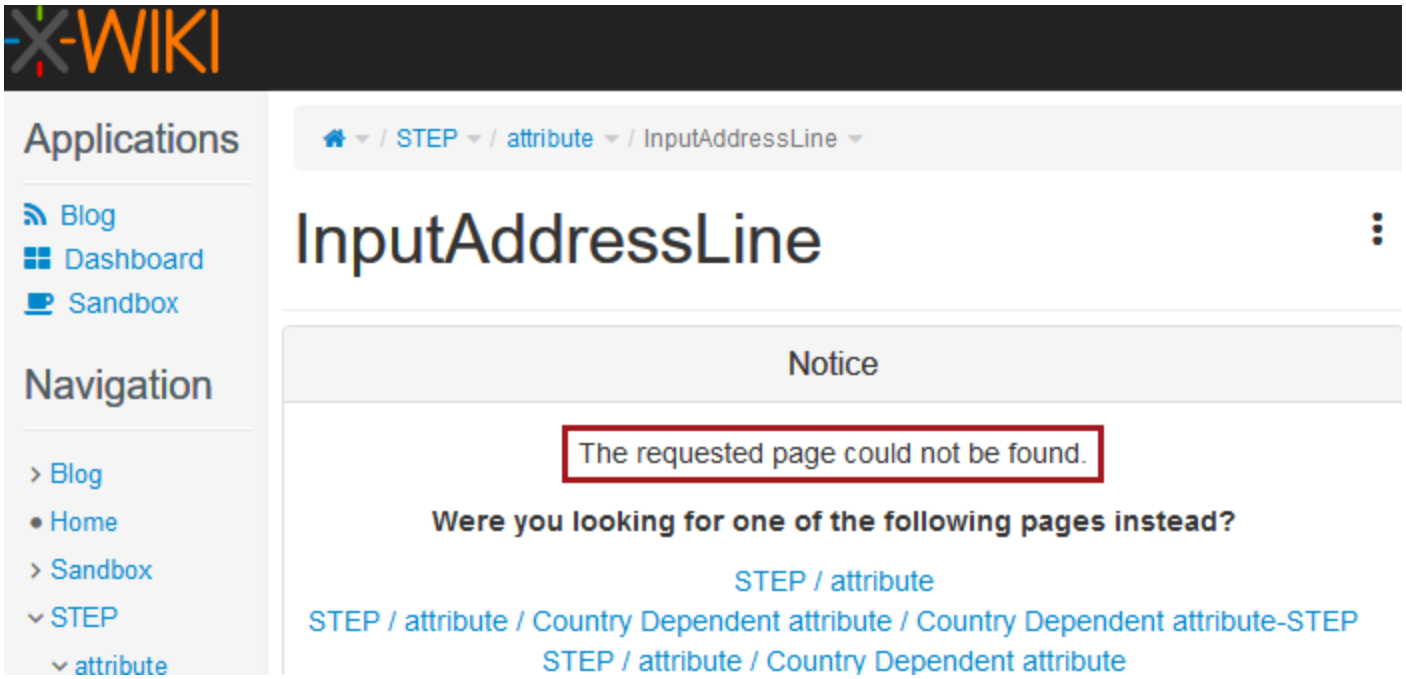
In Web UI, the 'Go to Wiki' link can be accessed from the blue information icon which is displayed by hovering over a label.



Click the link to display the wiki page in the user's default browser with the object's ID as the title.

Page Not Found

When a 'Go to Wiki' link is clicked but an event has not been processed by the OIEP to create a wiki page, as shown below, a message is displayed by the wiki that the requested page is not found. In this case, you can make a change on the object to trigger an event, or use the republish option to generate the missing page as described in the **Creating Wiki Metadata Pages** topic.


X-WIKI
Applications
Blog
Dashboard
Sandbox
Navigation
Blog
Home
Sandbox
STEP
attribute
STEP / attribute / InputAddressLine
InputAddressLine
Notice
The requested page could not be found.
Were you looking for one of the following pages instead?
STEP / attribute
STEP / attribute / Country Dependent attribute / Country Dependent attribute-STEP
STEP / attribute / Country Dependent attribute

Workspaces

A workspace can be perceived as a set of independent ‘copies’ of workspace revisable database objects. A workspace is thus an area in the database that provides a snapshot of all objects in the database. Objects that are subject to approval can be maintained within one workspace without affecting the snapshot in other workspaces.

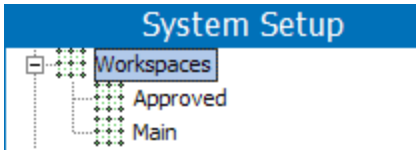
The data in STEP is logically divided in to 'workspaces.' Standard STEP installations come with two workspaces which are named Main and Approved. The Main workspace represents unapproved revisions of the data and the Approved workspace represents approved revisions of the same data.

Hence, the Main workspace serves as an area for acquiring and maintaining data and the relation between data. Importing, enriching and categorizing data is done in the Main workspace. The Approved workspace stores data revisions that are deemed fit for production purposes - data that is ready to be published / exported to third-party systems.

The transition of data revisions from the Main workspace to the Approved workspace is referred to as Approval. Approvals can be performed manually or programmatically.

Data revisions that are approved will be marked as 'Approved' in the Main workspace. If approved data changes in the Main workspace e.g., is edited by a user, it becomes unapproved and must be re-approved to have the latest data made available in the Approved workspace. Hence, validation of data prior to approval becomes of main concern.

Workspaces are maintained in System Setup > **Workspaces**.



Important: Data maintained in System setup, such as attributes, LOVs, units, and so forth are valid for all workspaces. Objects that are not subject to approval appear identically in all workspaces.

Standard Workspaces

The following describes the standard workspaces:

Workspace	Description	Example
Main	Maintenance area (can be edited)	Used as a the standard maintenance area for objects.
Approved	Approved area (cannot be edited)	Used for objects that have been formally approved and are ready for e.g., translation or publishing. Objects are copied to the Approved Workspace via the menu option: Object >Approve object, or automatically upon system approval events.

Considerations

- The Main and Approved workspace are system defined workspaces and cannot be deleted or modified.
- A system can only hold one Main workspace and one Approved workspace.
- Data in different workspaces can be synchronized.
- 'Externally Maintained' attributes do not need approval. The values get populated in the Approved workspace when the value is added / edited in the Main workspace.

Maintaining Workspaces

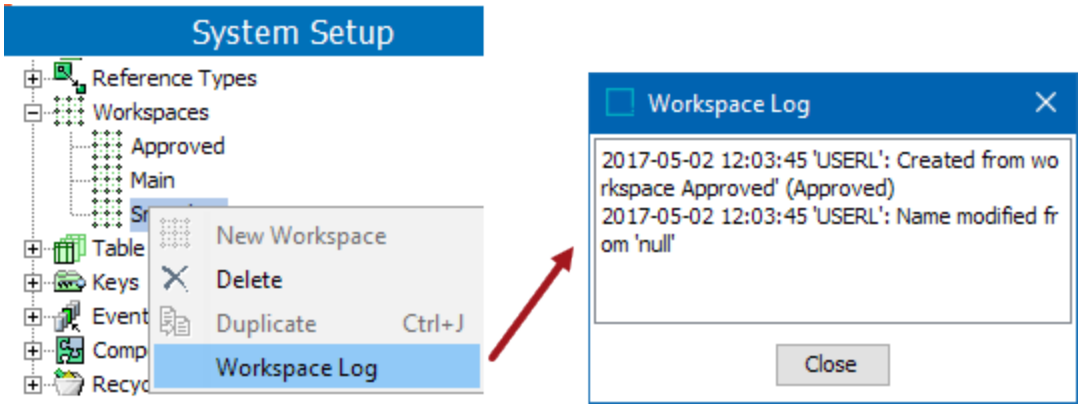
The following information is about how to properly maintain workspaces created outside of the Main and Approved workspaces. All workspaces are maintained in System Setup under the Workspaces node.

Creating Workspaces

You cannot create new workspaces. Workspaces created prior to STEP 9.2 are still accessible in later versions but cannot be duplicated.

Workspace Log

To view the activity and changes that has taken place in a workspace, go to System Setup and right-click on the workspace to view the logs for the particular workspace selected.



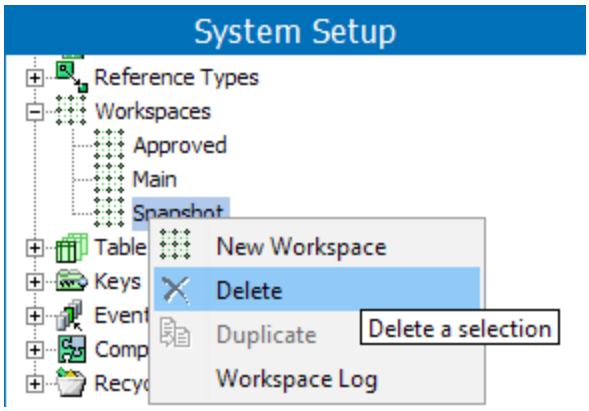
Deleting Workspaces

If a workspace is no longer needed, it can be deleted. Before deleting a workspace, make sure to transfer data that should be kept to another workspace before deleting. Deleting a workspace is very time consuming. The Main and Approved workspaces cannot be deleted.

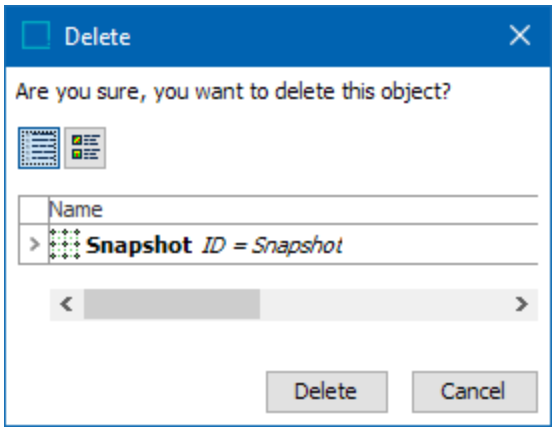
For Oracle databases, this action requires single-update mode (SUM), as defined in the Single-Update Mode topic. For Cassandra databases, this action uses Lock-free Schema Change (LFSC) functionality, as defined in the Lock-free Schema Change topic.

Note: The workspace for a current Object is selected from the **Workspaces** list (upper right corner).

1. In System Setup, open **Workspaces**, and then click the workspace to be deleted.
2. Right-click, and select **Delete**.



3. A **Delete Warning** dialog box appears. Click **Delete** to delete the workspace.



Note: It is not possible to delete the Main workspace and the Approved workspace.