SOLUTION ENABLEMENT

Product Lifecycle Management (PLM)

Release 10.0-MP3 (October 2020)

StiboSystems
MASTER DATA MANAGEMENT

Table of Contents

PLM Solution Enablement

The Product Lifecycle Management (PLM) solution enablement documentation provides different solutions for various PLM needs. The following documentation includes information and use cases in the following PLM areas:

- PLM Private Label Food Solution
- Change Reports
- Multi-Reference Editor

Note: It is recommended that users be familiar with the online help topics for STEP and PLM, in addition to being well-versed in using STEP, before beginning to work with PLM solution components.

PLM Change Reports Summary

On new product development, one of the more important functionalities is to improve collaboration between different user roles who are involved with bringing new products to market and with suppliers who are responding to the requests to bid for supplying the new products.

During the collaboration process, product data can experience multiples changes by different user roles. Each user group focuses on a specific set of data at a specific state or phase of the process. In private label food, there is a lot of collaboration back and forth between different internal user roles as well as with several suppliers during the process.

Clear visibility to changes in specifications and suppliers' responses to them throughout the process is needed by all parties to ensure that contractual agreements are well understood, and compliance standards are met.

PLM private label food uses Change Reports to improve the data review process.

Change Report Snapshot Overview

In STEP, historical versions of objects are stored as revisions, supplying a historical 'snapshot' of an object. For these revisions, the minimum timing threshold is 24 hours, and a revision is made when the time is exceeded. This represents a limitation since during the collaboration process product data can experience multiples changes by different user roles in a short period of time.

Snapshot Change Report is an alternative to STEP's revisions. In short:

- A Change Report can detail any changes that have been made during user-defined events.
- Static snapshots are taken and compared to the current data.
- Customers define which data point(s) to capture and when.
- They support complex data models like a recipe and packaging specification, including reference metadata and nested references.
- Data model changes will not remove data change history captured in the snapshots.
- A Change report snapshot will not be under revision control so it can be deleted at proper intervals, providing clean up to reduce object bloat.

See the Change Report Snapshot Setup topic to set up snapshots in this documentation.

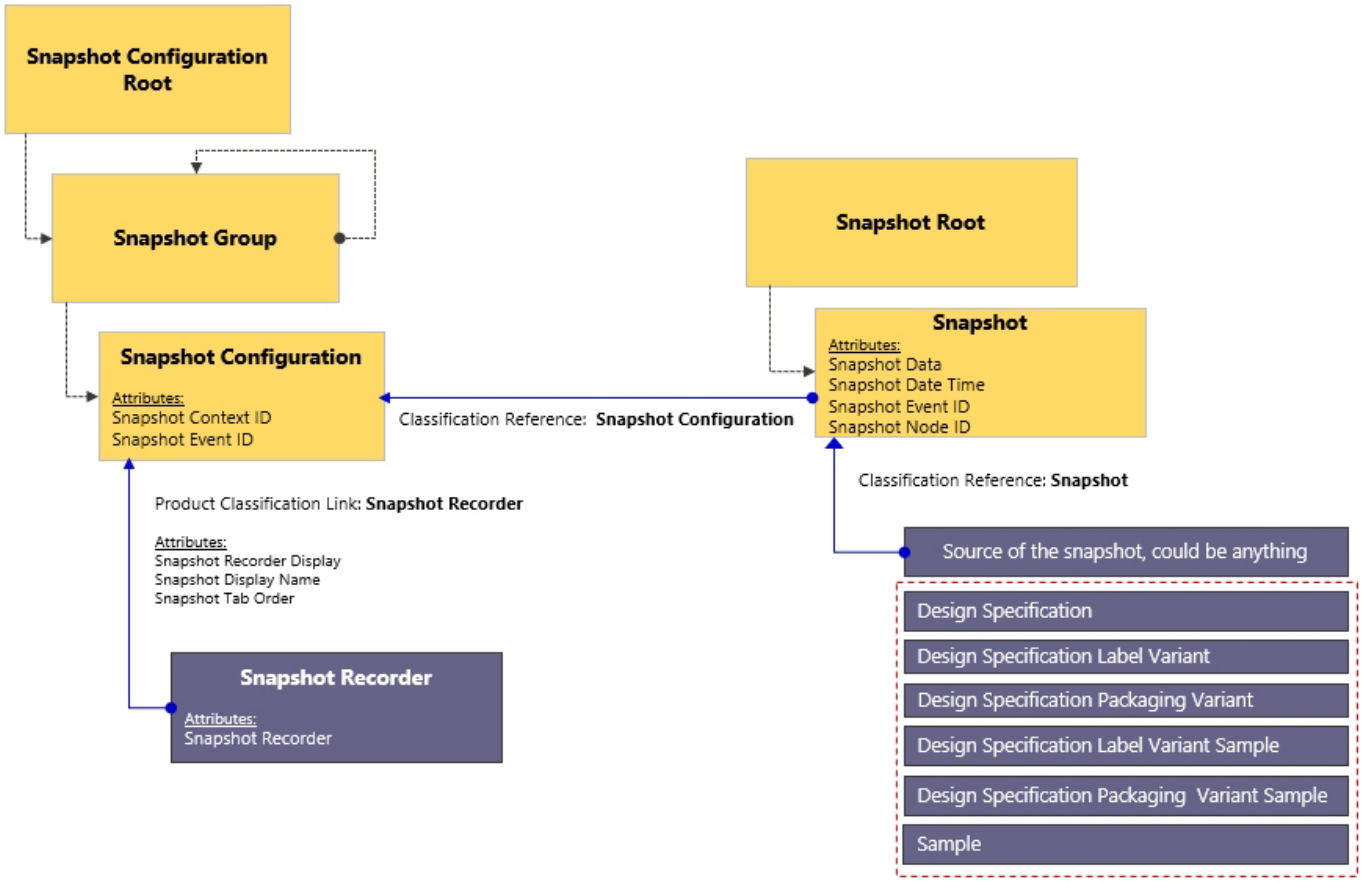
Change Report Snapshot Setup

A Change Report Snapshot needs a series of configurations to be enabled. See below the configurations included in Private Label Food Change Report Snapshot functionality.

- There is a required data model for storing snapshot definitions and snapshots.
- There is a required format for generating snapshots.
- There is a dependency on Product Summary Card. Change Report alerts will only appear on screens that are configured to use the Product Summary Card component.
- An add-on change-report component and license must be installed on your system.
- A snapshot business rule bind is used to support snapshot recorders.
- Business Rules are utilized.

Snapshot Data Model

The Change Report Snapshot is a fixed model. This model is for storing snapshot definitions and the snapshots created on data changes.



See the **Change Reports** documentation in the **Product Lifecycle Management** documentation for more information on the necessary objects, references, attributes, business rules, and snapshots needed for Change Reports Snapshots.

Snapshot Recorder Format

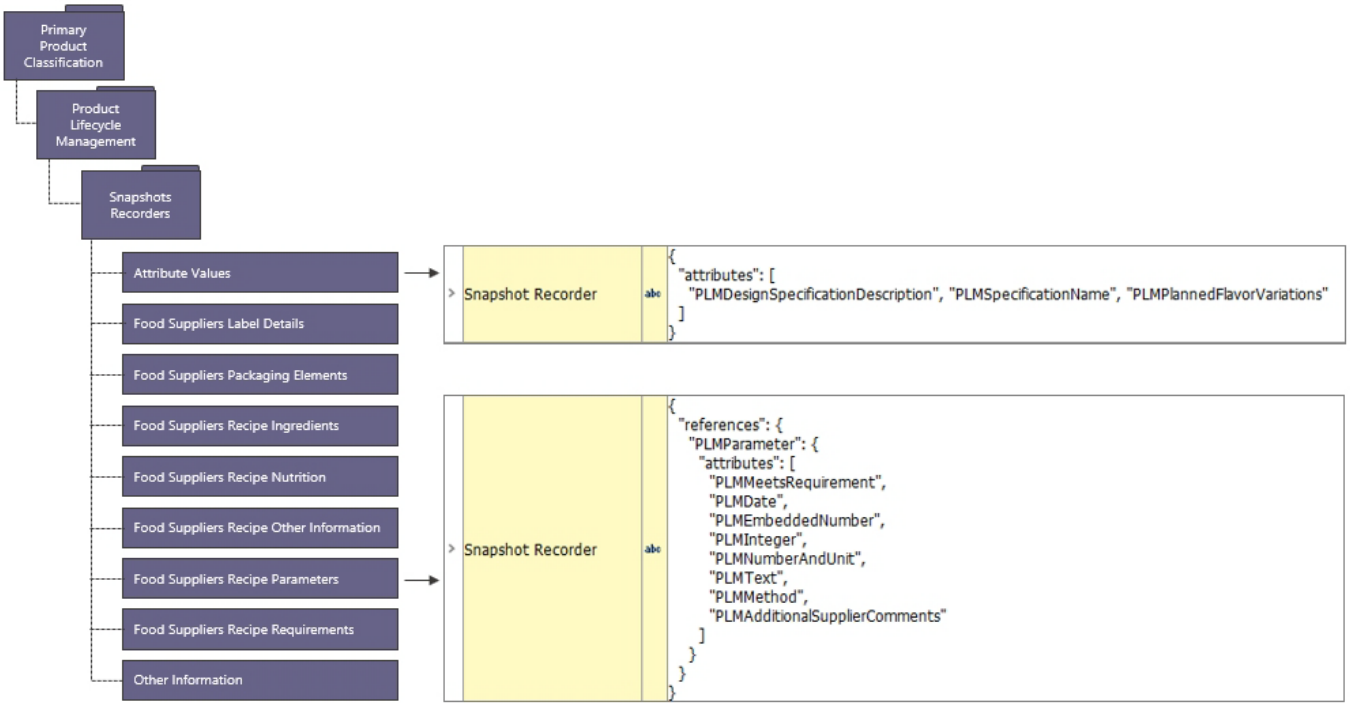
The Snapshot Recorder is a product object in STEP which stores a recorder text that defines which data must be captured in the snapshot. The format of the recorder text is a JSON string.

The JSON property attributes value is an array of JSON Objects.

For example, the JSON objects array is represented by:[{},{}]

```
{
"attributes": [    "PLMDesignSpecificationDescription",
"PLMSpecificationName"
]
}
```

In Private Label Food solution, Snapshots are organized in a one-level hierarchy :



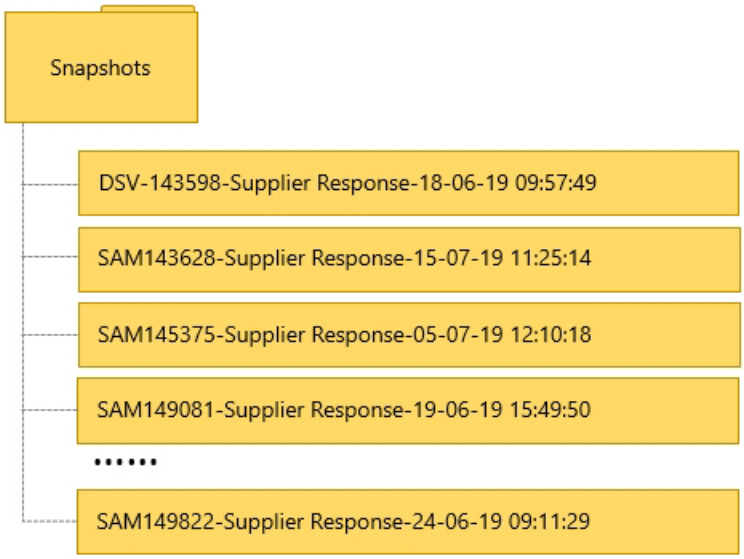
Snapshot Recorders are linked to one or many Snapshot Configuration(s) using the product classification link type Snapshot Recorder (ID SnapshotRecorder). This enables the re-use of Snapshot Recorders on many screens where the same data should be captured.

On the link between a Snapshot Recorder and a Snapshot Configuration are metadata attributes that are used to define tabs in the Change Report (Web UI experience).

For a list of examples of elements that can be included in a snapshot, see the **Elements in a Snapshot** topic in the **Change Reports** segment of the **PLM for Admins** section of the **Product Lifecycle Management** documentation. For more on Snapshots, see the **Snapshots** topic in this documentation.

Snapshots

Snapshots are saved on classification objects in JSON strings. One snapshot is captured for each Snapshot Recorder that is linked to the Snapshot Configuration for the screen. A reference is created between the Snapshot and the Snapshot Configuration that created it.

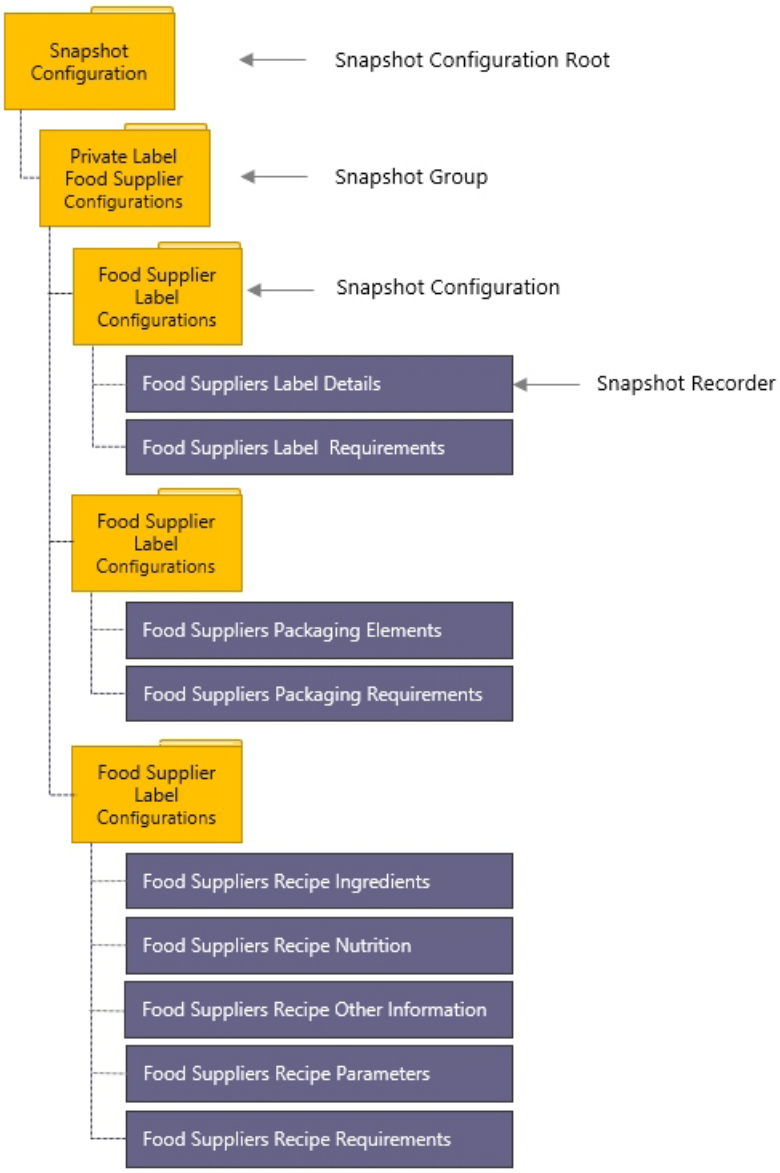


The Snapshot contains all of the data that was defined in the Snapshot Recorders configuration. The data of the Snapshot is organized by Recorder.

A Snapshot Configuration reference is created from the snapshot classification to the desired Snapshot Configuration.

Snapshot Configurations

Snapshot configurations are classifications kept in workbench, used for screens in Web UI, where they determine which contexts to capture data from, and any customer-defined change in events. This could be a change in a workflow state, a trigger by an inbound or outbound integration endpoint, or a change by derived events through an Event Processor. Once the defined change in an event has taken place, a snapshot recorder is used to help take note of the change and record any changes.



See the **Snapshot Configuration** topic in the **Change Reports** segment of the **PLM for Admins** section of the **Product Lifecycle Management** documentation.

Web UI Configurations

The Change Report Snapshot has been configured on an Evaluate Supplier Responses and Supplier Responses screens.

To enable the Change Report functionality in the Web UI, the Product Summary Card is required. It is an out-of-the-box component that can be configured to show either a preselected grouping of product information or a series of data points configured by the user.

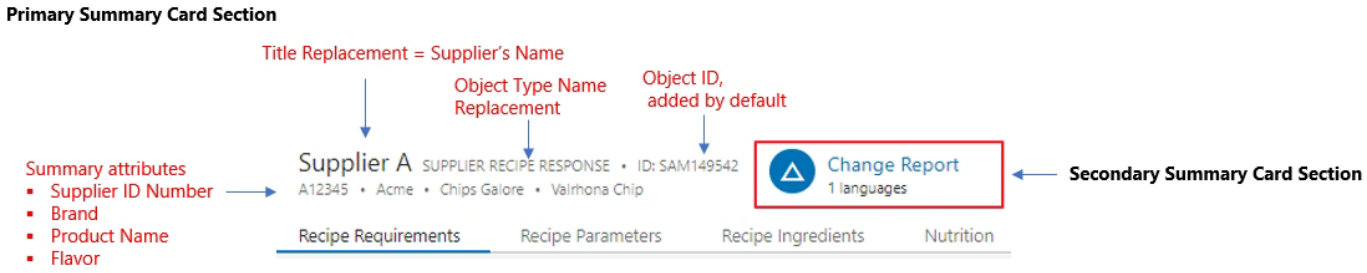
Product Summary Card Component in Private Label Food screens

The Product Summary Card provides users a collection of product information display just below the screen title.

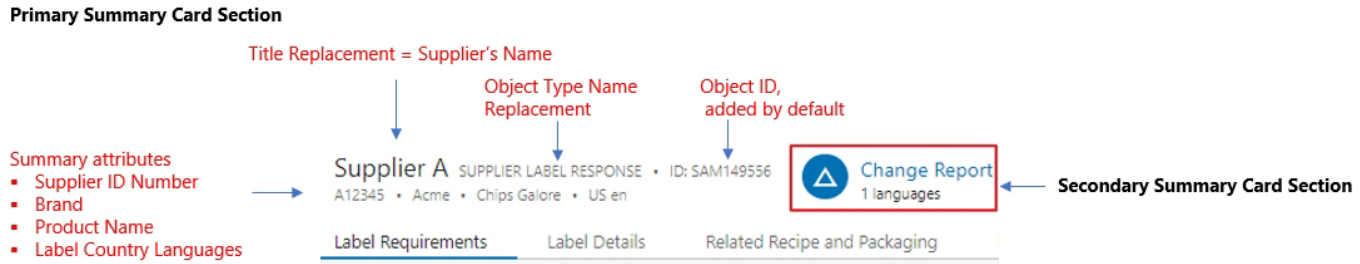
Private Label Food and Private Label Food Supplier Web UIs are both configured with the Product Summary Card component. It is a very helpful functionality to end-users since in the private label food solution different objects are used in a project, so different groups of information can be displayed based on the object in use, user role, and process state (task).

The following are examples of Primary Summary Card configurations in Private Label Food Solution.

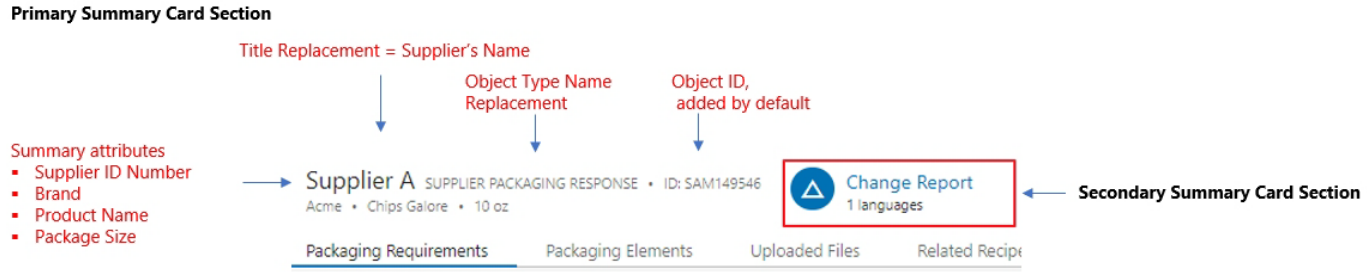
Supplier Recipe Response



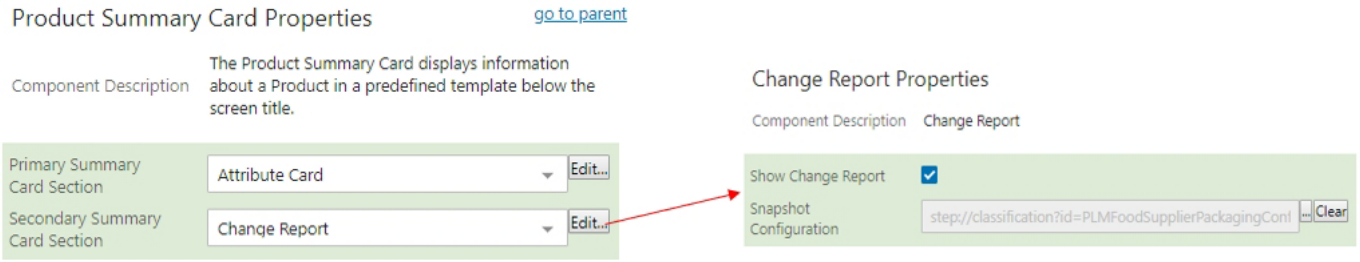
Supplier Label Response



Supplier Packaging Response



The Change Report component requires a license and is enabled in the Secondary Summary Card Section. Change Report component needs to be selected in the Secondary Summary Card and a Snapshot configuration specified.



The Secondary Summary Card section has been configured with parameters:

- Show Change Report: Checkbox enabled to display the Change Report button to the right of the Product Summary.
- Snapshot Configuration: (Snapshot configuration to be used). A parameter will be added to allow searching for a Snapshot Configuration. No other object types will be allowed.
- The Snapshot Configuration is used for the entire Web UI screen. It determines the contexts to capture data from and a customer-defined Event ID (e.g., supplier response or internal review) to identify the snapshot.
- Snapshot recorders can be created for each Web UI or for processing logic, workflow. They can be configured according to each customer requirements.
- On each snapshot recorder, on the Product to Classification Link Type 'SnapshotRecorder,' there are metadata attributes maintained. These determine factors about the Change Report so that each time the snapshot recorder is re-used, the information can be different.

For more information on attributes needed for snapshot recorders and Change Reports see the **Objects, References, and Attributes for Change Reports** topic in the **Change Reports** segment of the **PLM for Admins** section of the **Product Lifecycle Management** documentation.

Business Actions and Snapshots

In PLM Private Label Solution Food, business rules are created and configured to determinate when the snapshot should take place. These business rules for snapshots can be applied to workflow transitions or any other event that supports executing business rules.

In PLM Private Label Food solution, the PLM Food Supplier Snapshot business action is in use on the Initiate state of the Private Supplier Response workflow. When a Supplier Response (Recipe Response, Label Response, Packaging Response) is initiated in the workflow, a Snapshot will be created.

Note: Customers are responsible for creating business rules since each customer has different needs

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For more information on Snapshot business rules, see the **Business Rules and Snapshots** topic in the **Change Reports** segment of the **PLM for Admins** section of the **Product Lifecycle Management** documentation.

How a Change Report Works

Private label food out-of-the-box configuration includes a set of example configurations for capturing data changes in the Supplier Responses phase and Evaluation of the Supplier Responses.

Change Reports detect any changes that have been made during user-defined events only if the change has been defined in the recorder.

When a Supplier Response (Recipe Response, Label Response or Packaging Response) is sent to a Supplier to request his / her responses for Ingredients, Parameters, Requirements, and Nutrition Information, the Supplier Responses are initiated in the Private Label Food Supplier Response workflow.

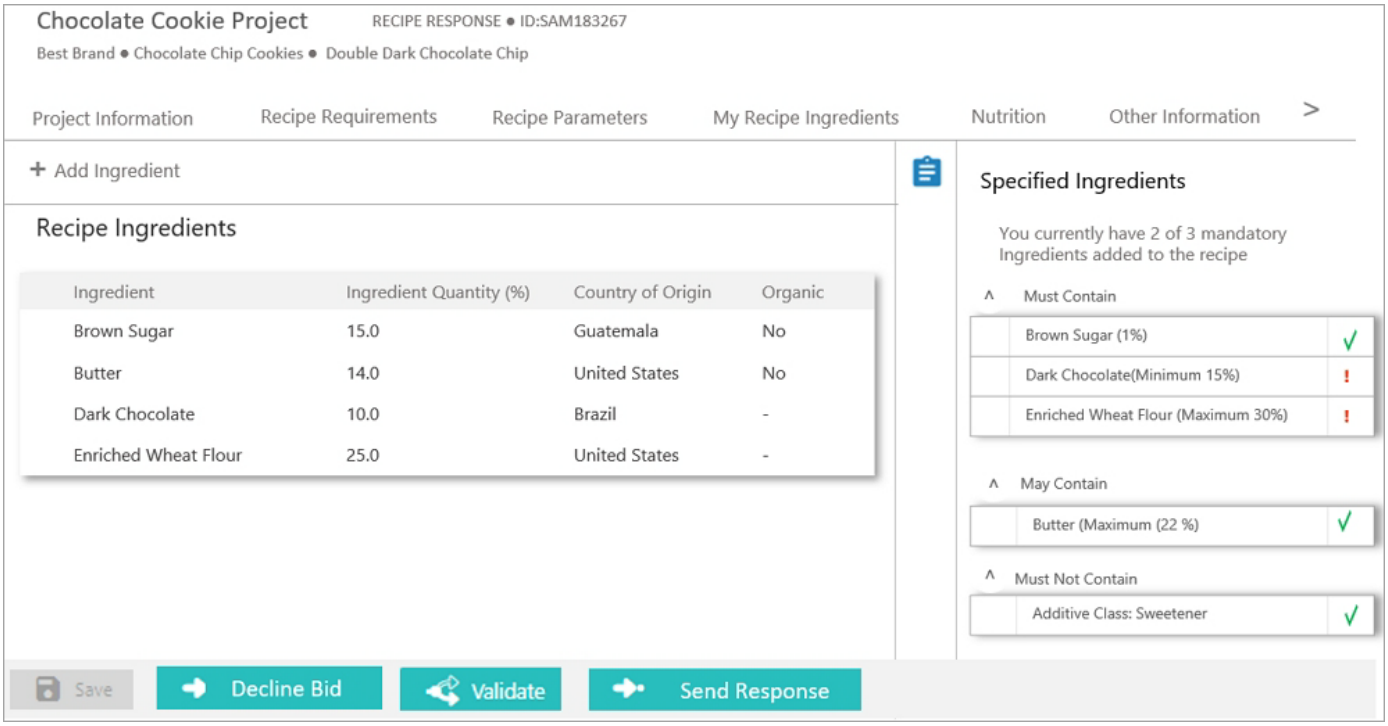
On entry to the Initiate state of the Private Label Food Supplier Response workflow, the PLM Food Supplier Snapshot business rule is executed, and the following actions will take place:

1. A Snapshot will be created. e.g., SAM183267-Supplier Response-12-07-19 13:51:49.
2. The supplier will then start working on supplier responses and respond with any required information. When finished, they select 'Send Response' and send it back to the customer (Buyer).
3. Once all Supplier Responses are received, all product specifications will be moved to the Evaluate Supplier Responses state of the Private Label Food Product Specification.
4. If the supplier completed all required information, it represents data changes so a new snapshot will be taken.
5. When a customer (buyer) starts reviewing the Supplier Responses, changes between the snapshot and the current data are detected, and the Change Report notification will be visible and active.

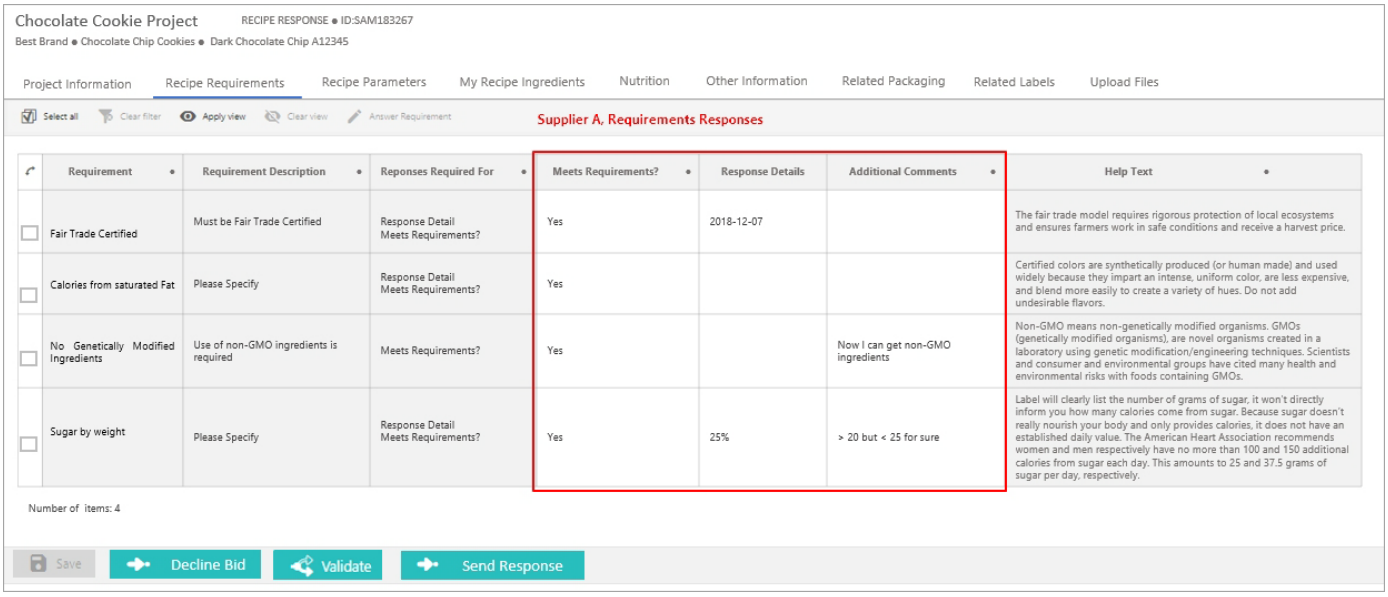
Use Cases for the Supplier User Response

Laura, from the Supplier A team, is responsible for answering the Recipe Response request received from the customer CIBUS. Laura accesses the Web UI for suppliers, opens the Chocolate Cookie Project Dark Chocolate Chip A12345 Recipe Response and starts the process to complete requested information for recipe ingredients, requirements, and parameters.

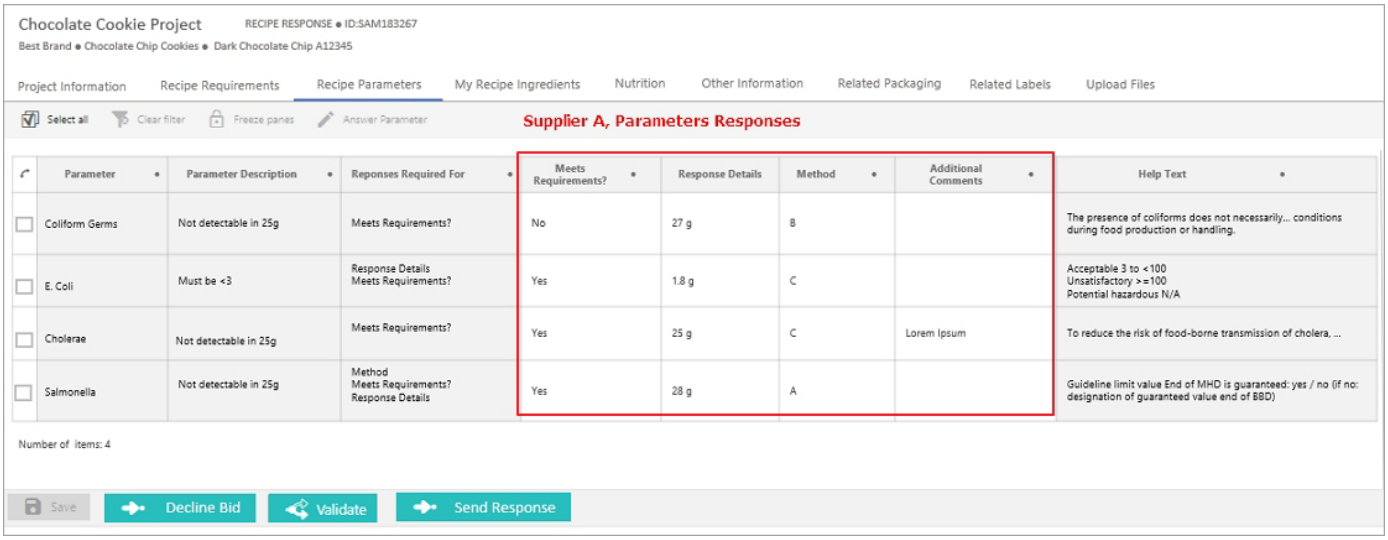
First, she enters the recipe ingredients, and for each ingredient added, she fills out the ingredients quantity, country of origin, and whether the ingredient is organic or not.



Laura completes all needed responses for requirements and responds if the product meets specified requirements. Responses details are added if needed, and she has the option to add additional comments.



Laura also completes responses for Parameters and Response. If the product meets specified parameters she can add responses details, add a method if is required, and have the option to add additional comments.



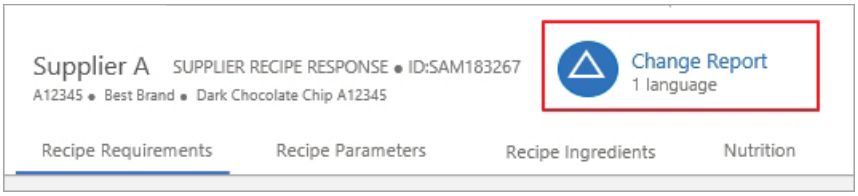
Laura completes the Recipe Response and clicks 'Send Response' to send it to the customer(Buyer).

Use Case for the Evaluate Supplier Response

When the Chocolate Cookie project reaches the Pending Evaluation state of the Private Label Food New Projects, all project specifications are in the Evaluate Supplier Responses state of the Private Label Food Product Specification. The quality manager user can start the process to evaluate supplier responses.

The quality manager user selects the Chocolate Cookie Project Dark Chocolate Chip 'Recipe Specification' from the Evaluate Supplier Responses task list and starts reviewing Supplier A's 'Recipe Response.'

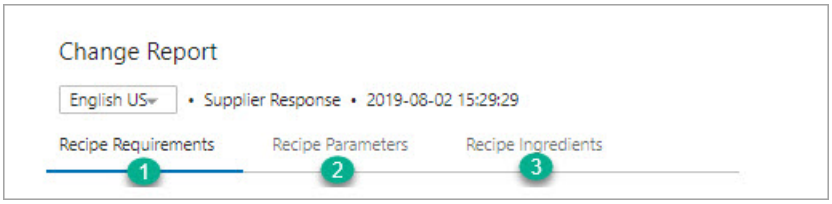
Since the Change Report component is active when the quality manager user opens the 'Recipe Responses' received from Supplier A, changes between the snapshot and the current data are detected and an active Change Report notification displays.



The notification will include an indication that changes were detected in one or more languages.

The quality manager user clicks on the Change Report notification, and a dialog displays showing a comparison of the changes that have taken place in the user login context. The dialog displays three tabs in this case since the Supplier performed changes to Recipe Ingredients, Requirements, and Parameters.

The name of the tabs is taken from the value of the attribute 'Snapshot Display Name' in the current context. If Snapshot Display Name is empty, the STEP ID will be shown.

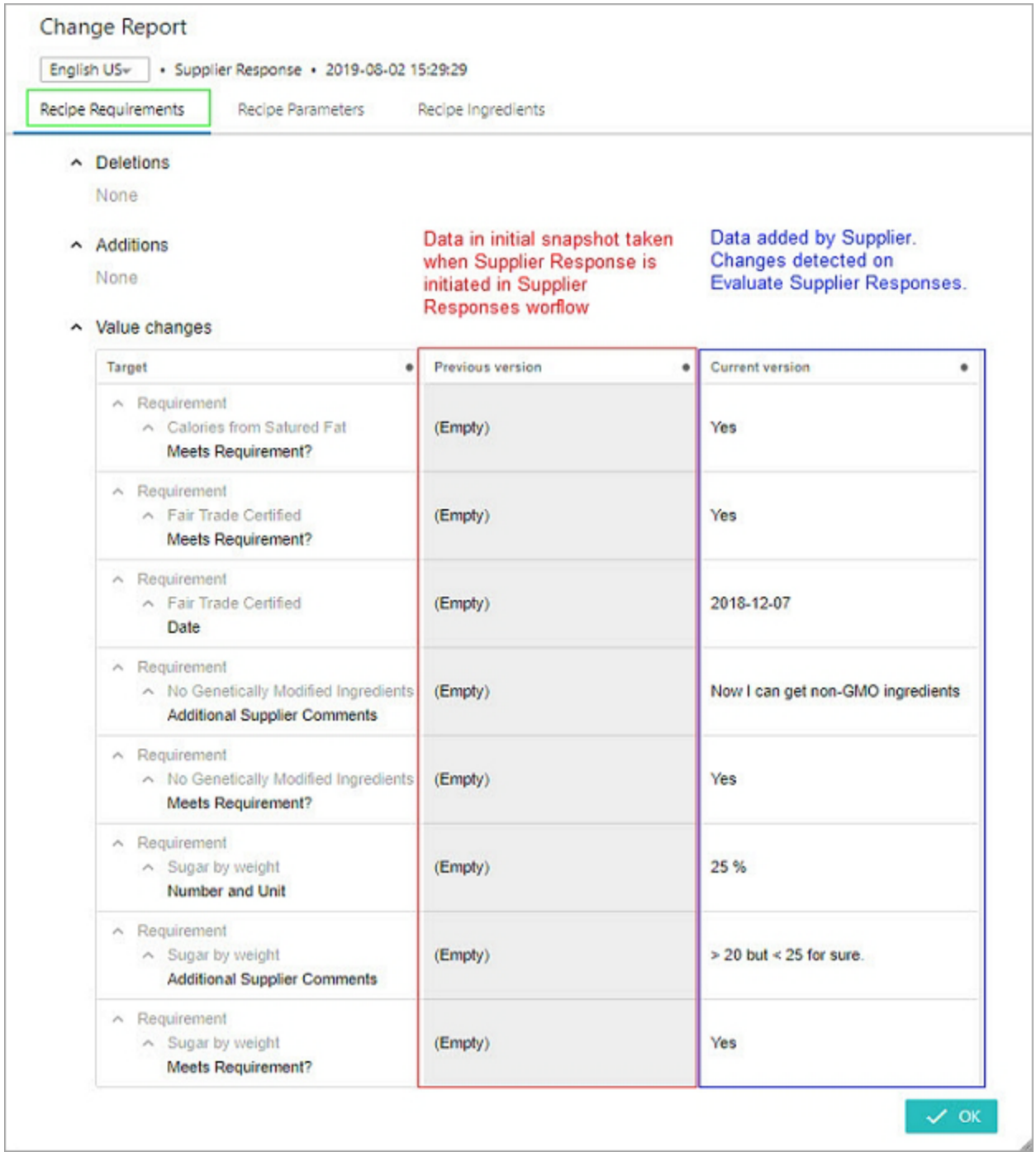


The order of the tabs is determined by the attribute Snapshot Tab Order on the link between the Snapshot Configuration and Snapshot Recorder. If the Snapshot Tab Order attribute is empty, the display order will be alphabetic.

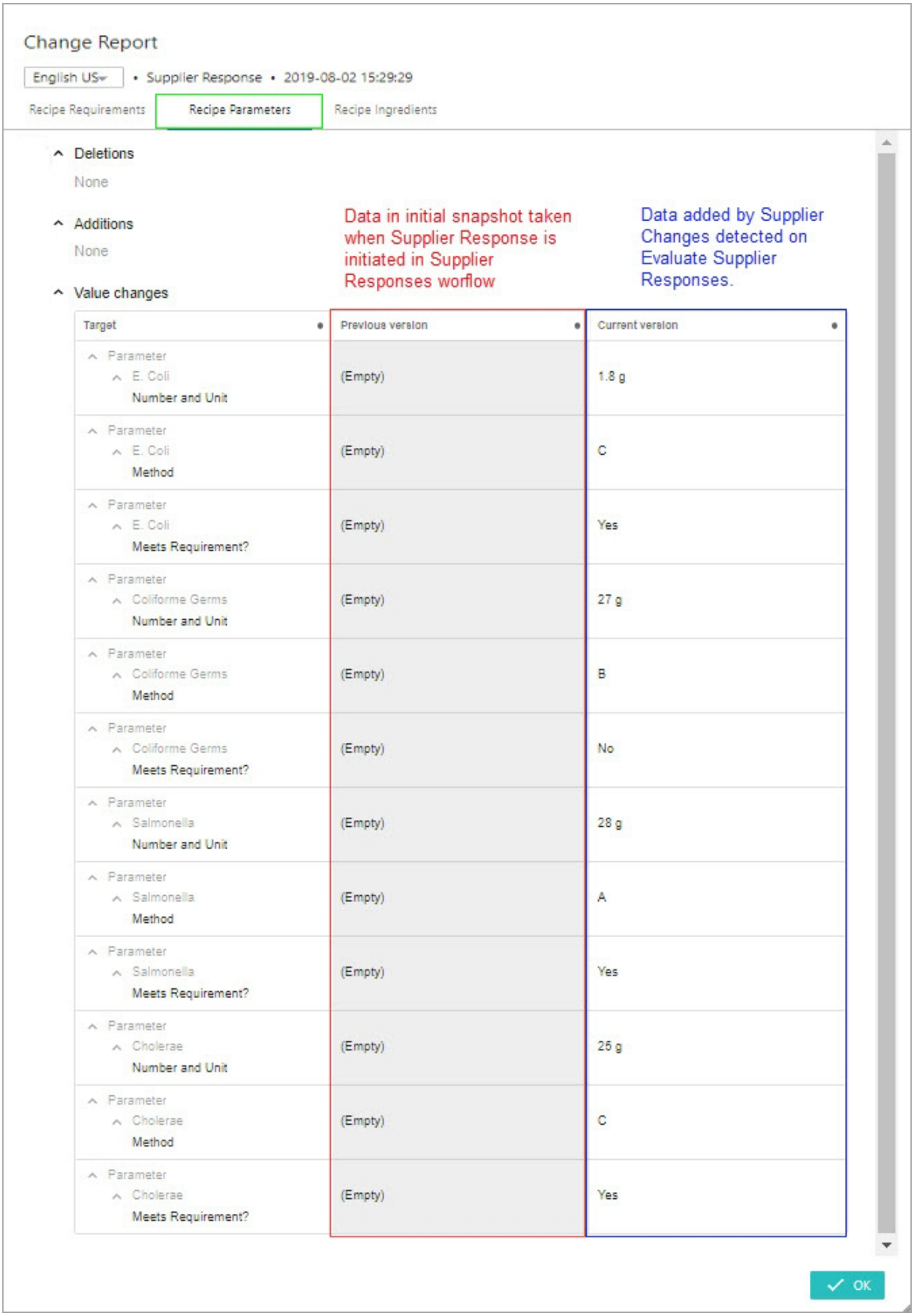
Each tab will display only the data that was defined by the Snapshot Recorder and only if there are changes between the current data and the last snapshot with the Event ID indicated on the Snapshot Configuration.

Each tab will group changes by the type of change. For example, a tab displaying changes for Requirements during an internal review can show new requirements that were added, values that were added to an existing requirement, deleted requirements, values that were deleted from an existing requirement, and any attribute value changes. The Additions, Deletions, and Value Changes sections can be collapsed by the user.

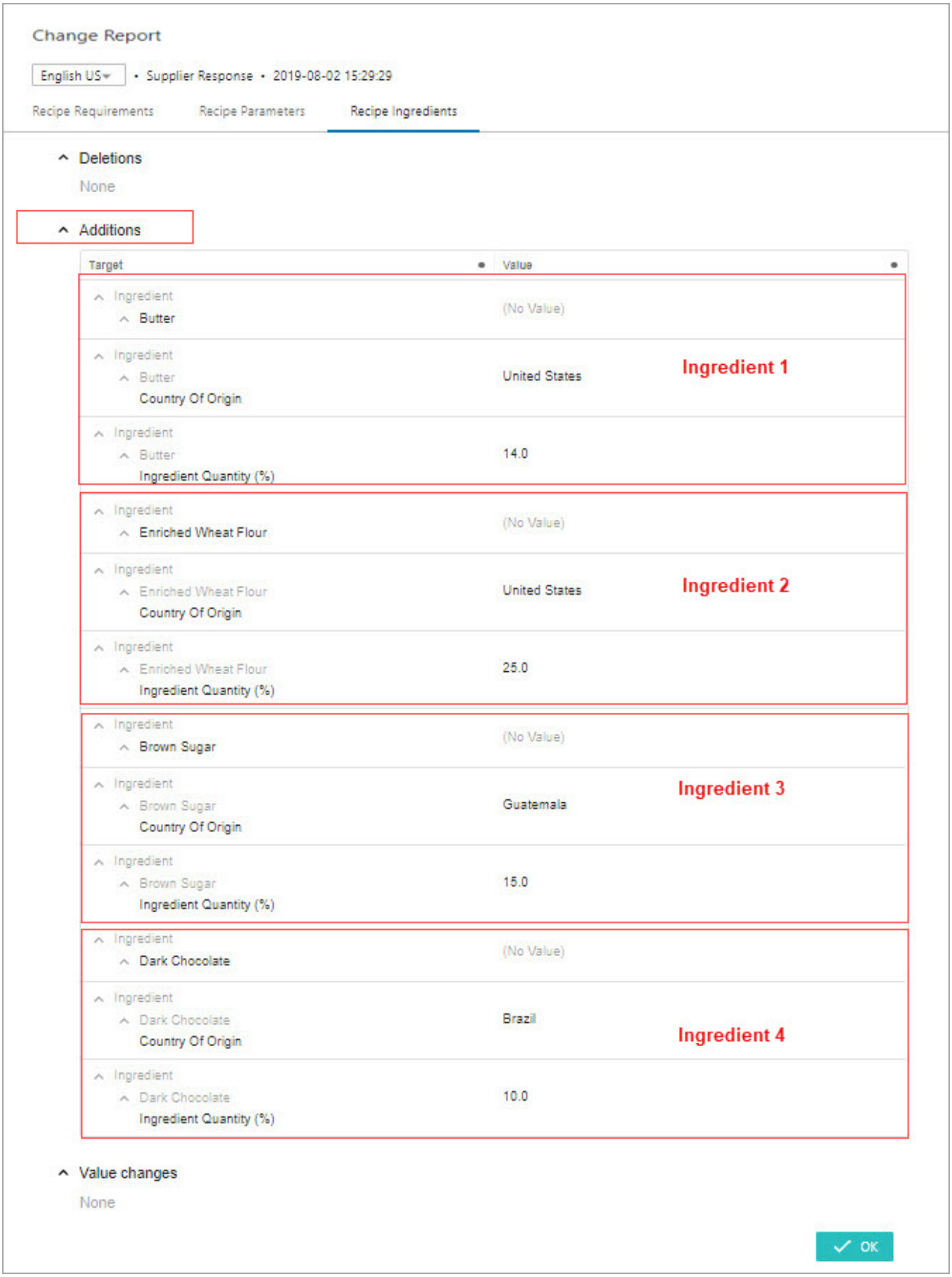
In this example of the Change Report Recipe Requirement tab, only value changes were made to the Recipe Requirements.



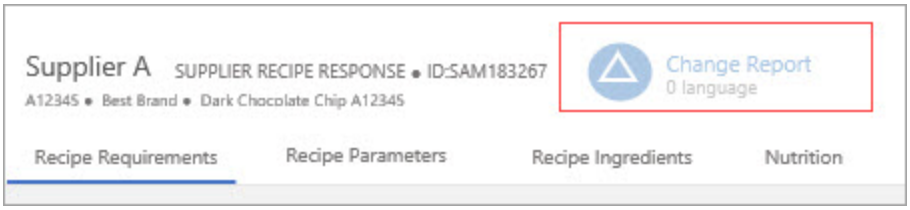
In this example of the Change Report Recipe Parameters tab, only value changes were made to the Recipe Parameters.


Change Report
English US
• Supplier Response • 2019-08-02 15:29:29
Recipe Requirements
Recipe Parameters
Recipe Ingredients
Deletions
None
Additions
None
Value changes
Data in initial snapshot taken when Supplier Response is initiated in Supplier Responses worflow
Data added by Supplier Changes detected on Evaluate Supplier Responses.
Target
Previous version
Current version
Parameter
E. Coli
Number and Unit
(Empty)
1.8 g
Parameter
E. Coli
Method
(Empty)
C
Parameter
E. Coli
Meets Requirement?
(Empty)
Yes
Parameter
Coliforme Germs
Number and Unit
(Empty)
27 g
Parameter
Coliforme Germs
Method
(Empty)
B
Parameter
Coliforme Germs
Meets Requirement?
(Empty)
No
Parameter
Salmonella
Number and Unit
(Empty)
28 g
Parameter
Salmonella
Method
(Empty)
A
Parameter
Salmonella
Meets Requirement?
(Empty)
Yes
Parameter
Cholerae
Number and Unit
(Empty)
25 g
Parameter
Cholerae
Method
(Empty)
C
Parameter
Cholerae
Meets Requirement?
(Empty)
Yes
OK

In this example of the Change Report Recipe Ingredients tab, only additions were made to the Recipe Ingredients.


Change Report
English US
• Supplier Response • 2019-08-02 15:29:29
Recipe Requirements
Recipe Parameters
Recipe Ingredients
Deletions
None
Additions
Target
Value
Ingredient
Butter
(No Value)
Ingredient
Butter
Country Of Origin
United States
Ingredient 1
Ingredient
Butter
Ingredient Quantity (%)
14.0
Ingredient
Enriched Wheat Flour
(No Value)
Ingredient
Enriched Wheat Flour
Country Of Origin
United States
Ingredient 2
Ingredient
Enriched Wheat Flour
Ingredient Quantity (%)
25.0
Ingredient
Brown Sugar
(No Value)
Ingredient
Brown Sugar
Country Of Origin
Guatemala
Ingredient 3
Ingredient
Brown Sugar
Ingredient Quantity (%)
15.0
Ingredient
Dark Chocolate
(No Value)
Ingredient
Dark Chocolate
Country Of Origin
Brazil
Ingredient 4
Ingredient
Dark Chocolate
Ingredient Quantity (%)
10.0
Value changes
None
OK

If there are no changes in the Change Report in any language, the Change Report notification will appear disabled and it is not clickable.



Capabilities, Considerations, and Limitations

Below are the current capabilities, performance considerations, and limitations to keep in mind when working with Change Reports.

Current Capabilities

Some of STEP's Web UI components allow viewing revisions of attribute values if the component has been configured to show historical revisions and if the user knows that they should click next to an attribute input field to see the revisions. Occasional users, like suppliers, may not remember that access to revision history requires hovering over a blank spot on the screen.

For PLM, most data used for specifications and responses are stored on reference metadata. The Web UI component that is most often used is a multi reference editor, where there is no capability for showing revisions at all.

Performance Considerations

To mitigate the risk of performance issues, it is recommended that snapshot recorders are defined to capture only the content that would change between events. For example, content that is maintained by internal users does not need to be part of a snapshot when suppliers submit their responses since user privileges should prevent suppliers from changing content that is maintained by internal roles.

Limitations

Change Report alerts will only appear on screens that are configured to use the Product Summary Card component.

Views of revisions will be limited to the current data and the last snapshot of the same type (eventId). Specific attributes and references on Web UI screens that have had changes will not show alerts as part of this development as there is a dependency on future development for deep linking.

Content within the Change Report dialog will not consider user privileges to see the data. All data that was captured in the snapshot will be shown if a user has privileges to view the change report. It will be up to each customer to ensure that the data that is defined in a Snapshot Recorder is appropriate for the users that will use the screens.

Solution Outline for Change Reports

Setup and Configurations	
Licensing	A separate license is required for Change Reports.Consult your implementation team for details.
Business Actions	• Customers are responsible for creating any business actions needed for creating Snapshots • Customers are responsible for creating Snapshot Configurations and Snapshot Recorders • Customers are responsible for the data model that supports the Change Reports.
Add-on Component	change-reports

For more information about Change Reports, see the **Change Reports** section of the **Product Lifecycle Management** documentation.

PLM Private Label Food Solution Enablement

Product Lifecycle Management (PLM) private label food solution simplifies your development process for products when capturing concepts and choosing suppliers.

To use the solution implementation, please see:

- PLM Private Label Food Solution Overview
- PLM Private Label Solution Implementation Guidelines

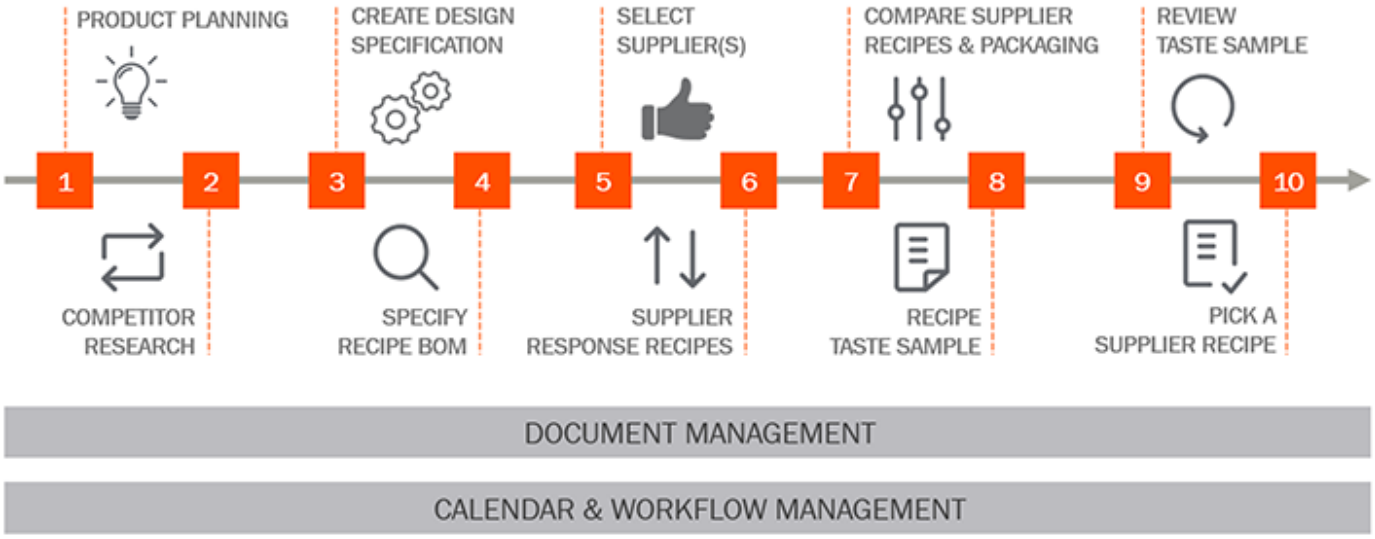
Note: This document is intended for administrators of the target system.

Pre-installation Requirements

- Version 9.1 or later must be running on your STEP system in order to install Stibo Systems PLM 9.1 Private Label Food Solution.
- It is recommended that users be familiar with the online help topics for STEP and PLM, in addition to being well-versed in using STEP, before beginning to work with PLM private label food solution components.

PLM Private Label Food Solution Overview

PLM private label food solution provides product development teams with a central repository where they can manage product specifications, ensures alignment of product specifications with ingredients parameters, and manage labeling and packaging requirements. This comprehensive solution enables and accelerates the process from capturing concepts, evaluating designs, and the final awarding of recipes.



In the competitive and highly regulated Food and Beverage industry, Product Lifecycle Management can provide a competitive edge that marks the difference between product success and failure.

PLM Private Label Food Implementation Guidelines

This guide introduces the PLM private label food solution available for STEP 9.1 or later. It covers the necessary actions that an admin user must take to set up the solution, as well as provide an overview of the end user functionality.

The PLM private label food solution supports the recipe specification process, ingredients validations, and supplier's responses. To support these functionalities, new components have been developed. The new components are available once the PLM license has been applied. For additional questions about PLM licenses, contact your Stibo Systems account manager.

This user guide offers several PLM resources to aid in the implementation of the private label food solution:

- Food terminology used throughout the PLM private label food solution. For more information see the **Food Terminology for PLM Private Label Food Solution** topic in this section of the PLM enablement documentation.
- The data model used for PLM private label food solution. See the **Data Model for PLM Private Label Food Solution** section of this PLM enablement documentation.
- The asset types used in PLM private label food solution. See the **Asset Object Types for PLM Private Label Food Solution** topic in this PLM enablement documentation.
- The reference types used in PLM private label food solution. See the **Reference Object Types for PLM Private Label Food Solution** topic in this PLM enablement documentation.
- Workflows used throughout the private label food solution process. See the **Workflows for PLM Private Label Food Solution** topic in this PLM enablement documentation.
- An example use case for PLM private label food solution. See the **Use Case for PLM Private Label Food Solution** section of this PLM enablement documentation.
- Components and configurations needed for Web UI. See the **Web UIs used for PLM Private Label Food Solution PLM** topic in the PLM enablement documentation.

Note: It is recommended that users be familiar with online help topics for STEP and PLM, in addition to being well versed in using STEP, before beginning to install any PLM private label food solution components. See the **Product Lifecycle Management** documentation for more information on setup and use of the private label food solution.

Food Terminology for PLM Private Label Food Solution

The following are terms commonly used in the private label food industry:

Private Label

Private label products or services, which include a wide range of goods and services such as food, cosmetics, web hosting, etc., are often manufactured or provided by one company but are for sale under another company's brand. The agreement between the manufacturer and the retailer governs their relationship.

The appeal of private label products to private-label buyers is that they are easy to produce in large volumes and are inexpensive to manufacture, generating extra profit without a lot of extra work. Should sales begin to drop, the private-label buyer can stop buying and re-selling the product.

The greatest challenges of the food industry are the competitive market, the fact that each food product needs to meet a set of sanitary and quality requirements, and the need for each ingredient to satisfy specific quality testing parameters.

Recipe

There are different concepts and definitions about a food recipe. For example, a recipe is a list of food ingredients and a sequence of instructions that describe how to combine them to obtain a new product or an ingredient. When using the term 'food ingredient,' it includes food additives, which are substances added to foods for specific technical and/or functional purpose during processing, storage or packaging.

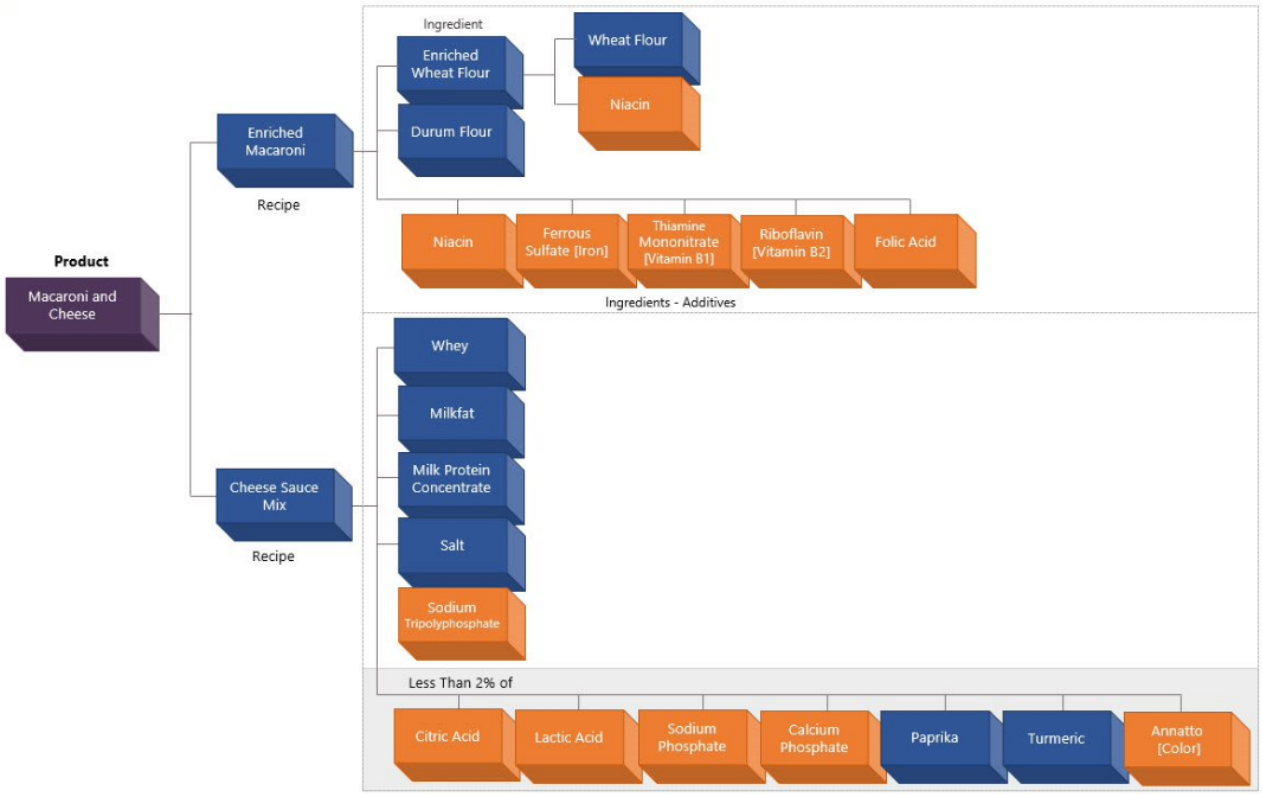
There are distinct types of ingredients in the food area. To explore each ingredient type, review the following food recipe example.

The recipe for Macaroni and Cheese ingredients is a compound recipe which includes two recipes: one for Enriched Macaroni and one for Cheese Sauce Mix.

Recipe for Macaroni and Cheese:

- Enriched Macaroni:
  - Wheat Flour
  - Durum Flour
  - Niacin
  - Ferrous Sulfate [Iron]
  - Thiamin Mononitrate [Vitamin B1]
  - Riboflavin [Vitamin B2]
  - Folic Acid
- Cheese Sauce Mix:
  - Whey
  - Milkfat
  - Milk Protein Concentrate

  - Salt
  - Sodium Tripolyphosphate
- Contains Less than 2% of: Citric Acid, Lactic Acid, Sodium Phosphate, Calcium Phosphate, with Paprika, Turmeric, and Annatto Added for Color, Enzymes, Cheese Culture).



Additives

Additives are substances, either occurring naturally or man-made, that are intentionally added to food – usually in small quantities – to assist in its processing or to improve certain characteristics. Some characteristics it can improve are:

- aroma
- color
- consistency
- taste
- texture
- packaging
- shelf life.

Normally, they are never consumed as a food itself, nor are they used as individual food ingredients. Additives are not considered nutritional even if they have some nutritive value, and the same additive can be used for many different purposes.

A few additive examples are:

- **Preservatives**: ascorbic acid, calcium sorbate, and sodium nitrite
- **Color additives**: fruit and vegetable juices, yellow 5, and beta-carotene
- **Flavors and spices**: 'real' vanilla or 'artificial' vanilla

E Numbers

E numbers, where the 'E' stands for 'Europe,' are codes for substances that are permitted to be used as food additives within the European Union and European Food Safety Authority (EFTA). Commonly found on food labels, their approval and safety assessments are the responsibility of the European Food Safety Authority.

INS Number

International Numbering System (INS) numbers are an international numerical system agreed upon and assigned by the Codex Alimentarius committee to identify each food additive. INS numbers generally correspond to E numbers for the same compound, for example, INS 102, Tartrazine, is also E102. INS numbers are not unique, and in fact, one number may be assigned to a group of like compounds.

Use Case for PLM Private Label Food Solution

The following use case illustrates how the PLM private label food solution can help to specify and source your products as well as how to sell them with your own label.

CIBUS Company's Private Label Project Use Case

The CIBUS company is a global food brand which markets and sells largely to North America, Europe, and Latin America. CIBUS sells directly to its consumers via local supermarkets, convenience stores, and various channels.

The merchandiser team has conducted market research about favorite and popular ready-made combinations meals – not ready-to-eat food trends. CIBUS findings were that more consumers want 'free-from' products. Food and beverages free of ingredients that contain artificial colors and flavors, preservatives and GMOs (Genetically Modified Organisms) are the new preferences of consumers. After evaluating the market research results, the merchandiser team decided to add a new private label product, called Macaroni & Cheese, to their ready-made combinations meals – not ready-to-eat product line.

1. The initial phase is programmed to sell the Macaroni & Cheese products in the United States. In a future phase, the Macaroni & Cheese products will be introduced to Canada, Europe, and Latin America markets.

   To continue with the private label Macaroni & Cheese project, the merchandiser team will complete a competitive analysis to identify competitor product characteristics such as:

   - Brand
   - Competitor Product Price
   - Net Content Options
   - Competitor Product Claims
   - Competitive Product Ingredient
   - Competitive Product Packaging Description

   After five competitive products were analyzed, the merchandising and quality teams decided to continue with the private label Macaroni & Cheese project.

2. Macaroni & Cheese will be available in two product variations: Original and Spirals Pasta. Each variation will be offered in the packaging size 7.25 oz (206g).
3. To ensure that the Macaroni & Cheese products will capture consumer preferences, the merchandising and quality teams have identified the following deferential factors that will impact the consumer decision:
   - Need to improve upon competitors' product quality
   - Competitor product pricing
   - Specify package size and label
   - Packaging detailed description
   - Specify if a product is suitable for a diet
   - Specify all organic ingredients
   - Identify if it is a 'free-from' product
4. As part of the initiative to improve product quality, the merchandising team decided to adopt a system to specify product ingredients, labels, and package requirements for the project. This system will provide a detailed view

of each of the specifications needed for the product and act as a source to validate and guarantee that all regulations are satisfied.

The product specification system will include the following functionalities:

- Create a detailed recipe specification and be able to select which ingredient can or cannot be contained in the product recipe, as well as be able to specify the minimum or maximum quantities allowed in the product recipe
- Specify the food's physical and chemical properties, and microbiological limits for testing parameters for the recipe
- Specify the requirements for the recipe, packages, and labels
- Handle products with composite recipes

Adopting the product specification system will also provide a tool to enhance the supplier selectivity process and:

- Have a coordinated and detailed sampling, process, and functionality to request a recipe specification, label specification, and packaging specification to prospective suppliers
- Can compare and rank supplier responses and award the product that meets the quality and standard food requirements
- Collect additional product information from the supplier such as: Nutritional Values, Declaration of Allergens, Certificates (Non-GMO, Organic Certified), Preparation Instructions, and Handling Statements
- Establish a response period and be able to request further information from the supplier when it is needed

To accomplish label regulations established in some of the countries where CIBUS plans to sell the product, and to achieve cost efficiencies for the production of the packaging, labels will be printed in multiple languages.

The food label needs to describe specific amounts contained in each package, and display information printed in one or more languages for each market where the Macaroni & Cheese will be sold. As a competitive advantage, products sold in the United States will have labels printed in English and Spanish, whereas products sold in Canada will have labels in English and French to accommodate law requirements.

A quality manager and a purchasing manager will review and validate that all necessary label requirements are specified.

5. Another important factor to ensure compliance is to have a traceability record for each ingredient in the recipe. Knowing the country of origin will help to validate, search, and follow-up recall.
6. Once all specifications are completed, prospective suppliers can be selected and specifications (recipe, label, and packaging) will be sent to each one.

   Suppliers will have the ability to specify recipes, packages, and labels. Additionally, suppliers will need to:

   - Add all ingredients used in the recipe proposal and see the ingredients specified by customer
   - Answer specified requirements and parameters for recipe proposal
   - Answer specified requirements for label proposal
   - Answer specified requirements for packaging proposal

   The solution will provide suppliers with a feature to execute quick validations between their specified ingredients and ingredients detailed in the project. This reduces the back-and-forth communication time and helps the supplier to respond with the best offering that will meet the needs of the company.

7. The solution enables quality and purchasing teams to evaluate supplier responses by comparing the responses received from suppliers, and rank suppliers' proposals for each specification based on their evaluation.
8. The purchasing team will review the evaluated and ranked responses received from suppliers and must decide which supplier(s) to award the contract to based on their ranking and on a combination of recipes and packaging that they are able to produce for delivery in specific countries.
9. The solution will include a library recipe based on the number of awarded recipes for a project.
10. To keep a record of the sourcing process, a finalized project file must be preserved. Project-related objects for suppliers that were not awarded the contract must be deleted.
11. An important benefit of having the projects in the same system with the PMDM product is that for each of the awarded PLM labels, a PMDM product will be created and started in the PMDM New Product introduction workflow.

    With the implementation of the specification process for the private label food solution, the merchandising and quality teams expect the following benefits:

    - Increase in sourcing efficiencies
    - Increase in product quality
    - Standardization of recipe specifications
    - Reduction of cost
    - Fast time to market
    - Allow for product ingredients traceability
    - Reduction in process time since suppliers can do an ingredients quick validation
    - Supplier selection through an evaluation process
    - Increase in visibility of the status of each specification and the corresponding supplier response
    - Ability to cancel any requests to suppliers who have not responded in time
    - Ability to cancel one or more of the specifications because of changing business needs

Data Model for PLM Private Label Food Solution

New product development from the firm's own research and development team refers to original products, product improvements, product modifications, and new brand development. For the private label food solution, the work process starts after ideation, beginning with a competitive analysis and ending after one or more suppliers are selected to produce the products.

The PLM private label food solution provides a tool to manage the product development process with a central repository for product specifications. It also ensures the alignment of product specifications with ingredients, requirements, quality testing parameters, labeling, and packaging requirements. A series of objects are defined to handle the different pieces of information required in the food product development process. To see a detail definition of each object please review the following data model documentation topics.

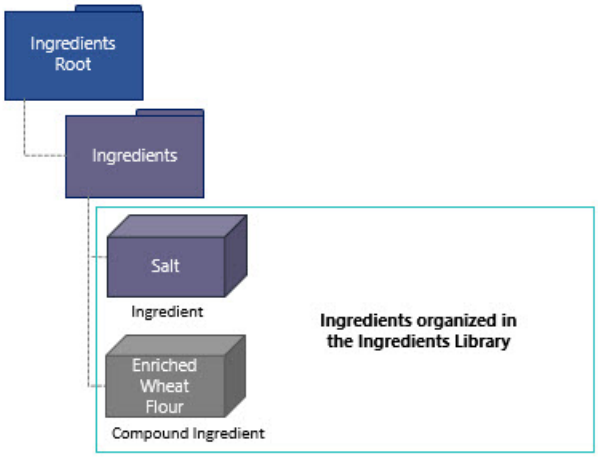
- Recipe Specification and Recipe Response Object Types
- Specified Ingredients
- Supplier Responses Ingredients
- Additive Object Types
- Parameters
- Requirements
- Competitive Product Food
- Design Specification
- Variant Object Types
- Sample Object Types
- Primary Product Classification
- Alternate Classification Hierarchies
- Suppliers
- Asset Object Types for PLM Private Label Food Solution
- Reference Object Types for PLM Private Label Food Solution

Note: Additional data may very well be applicable to include in a PLM Private Label solution but is not covered by these guidelines.

Recipe Specification and Recipe Response Object Types

The PLM private label food solution has two different uses for the food recipe concept:

1. A recipe specification is where the customer specifies ingredients and a set of requirements and quality standards.
2. A supplier response is where suppliers will list all ingredients that are used to make up a finished product and where they will respond to the set of requirements and quality standards specified by the customer.



There are different types of ingredients in a recipe:

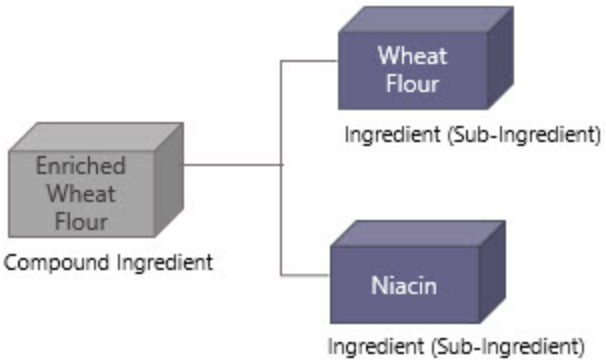
Ingredient

An ingredient is a single element, part or substance used in a recipe preparation.

Compound Ingredient

A compound ingredient is an ingredient made up of multiple ingredients and additives.

For example, Enriched Wheat Flour is made up of more than one ingredient: Wheat Flour and Niacin.



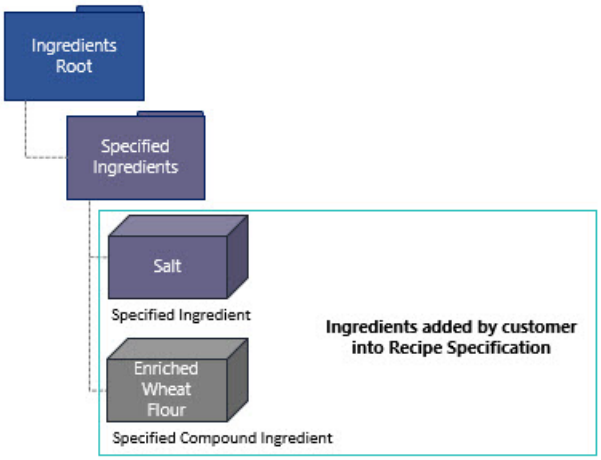
Sub-Ingredient

A sub-ingredient is a part or compound of another ingredient.

Specified Ingredients

Specified ingredients are ingredients added by a customer to a recipe specification. It is used to list the ingredients that must be included or excluded in the product recipe provided by the suppler.

- For any specified ingredient, the 'Allowance' must be filled out (is mandatory). 'Ingredient Precision,' and 'Ingredient Quantity' are needed for more precise validation but they are not required. Any other configurable attributes, such as 'Country of Origin' or 'Organic' (if applicable) are optional to specify.



Specified Compound Ingredient

When a user specifies ingredients for a recipe, they search the ingredient library. When a compound ingredient is chosen, a copy of it is made as a specified compound ingredient so that each instance can add its own unique sub-ingredients to it, and parameters can be attached to it without permanently attaching that parameter to the library compound ingredient. Since parameters may be different based on how the compound ingredient is used, this keeps the library ingredients neutral.

Specified Ingredient

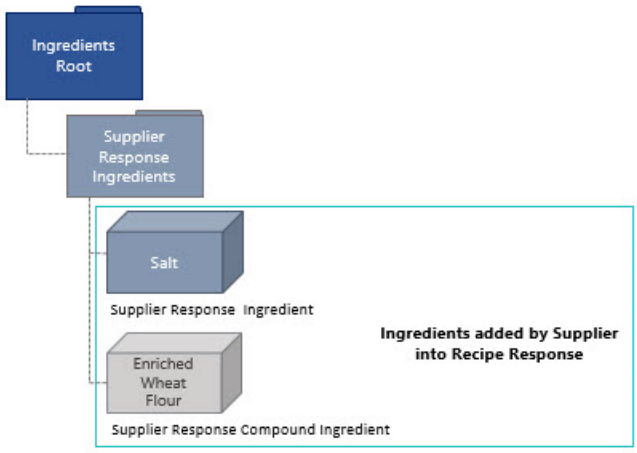
When a user specifies ingredients for a recipe, they search the ingredient library. When an ingredient is chosen, a copy of it is made as a specified ingredient so that parameters can be attached to it without permanently attaching that parameter to the library ingredient. Since parameters may be different based on how the ingredient is used, this keeps the library ingredients neutral.

Specified Ingredients

Ingredient	Ingredient Type	Ingredient Allowance	Ingredient Precision	Ingredient Quantity (%)	Specification Details
Whey	Compound ingredient	Must Contain	Maximum	10	-
Milkfat	Compound ingredient	May Contain	Maximum	20	-
Milk Protein	Compound ingredient	Must Contain	Maximum	15	-
Salt	Ingredient	May Contain	Maximum	2	-
Thickener: Sodium Triphosphate	Additive	May Contain	-	-	-
Antioxidant: Citric Acid	Additive	Must Contain	Maximum	2	-

Supplier Responses Ingredients

Supplier response ingredient types are listed below.



Supplier Response Compound Ingredient

When a supplier adds ingredients to a recipe, they search the ingredient library. When a compound ingredient is chosen, a copy of it is made as a supplier response compound ingredient so that each supplier can add their own sub-ingredients to it and so that parameters can be attached to it without permanently attaching that parameter to the library compound ingredient. Since parameters may be different based on how the compound ingredient is used, this keeps the library ingredients neutral.

Supplier Response Ingredient

When a supplier adds ingredients to a recipe, they search the ingredient library. When an ingredient is chosen, a copy of it is made as a supplier response ingredient so that parameters can be attached to it without permanently attaching that parameter to the library's ingredient. Since parameters may be different based on how the compound ingredient is used, this keeps the library ingredients neutral.

Recipe Ingredients

Ingredient	! Ingredient Quantity (%)	Country Of Origin
Whey	80	United States
Stabilizer: Sodium Caseinate	80	United States
Milkfat	25	United States
Milk Protein	10	United States
Salt	1	United States
Antioxidant: Citric Acid	2	United States
Acidity Regulator: Lactic Acid, L-, D- And Dl-	1	United States
Paprika	1	India
Colour: Annatto Extracts	1	Mexico

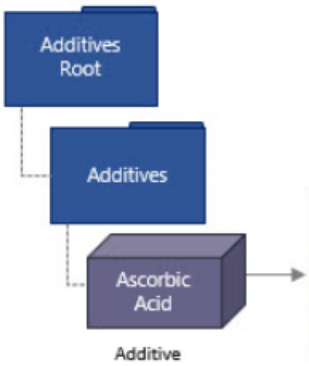
Note: The private label food solution includes an ingredients classification, where ingredients are classified into groups based on the food type.

Additive Object Types

In the PLM private label food solution, the additives (ingredients) are defined by the following objects types.

Additive

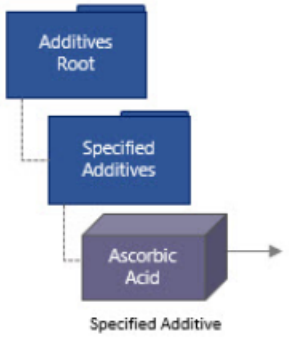
Additive represents an additive in the library. An additive can be a natural or synthetic substance that is added to commercially prepared foods for a specific purpose, such as a preservative, thickener, color retention agent, etc.



Name	Ascorbic Acid, Vitamin C
E Number	E300
INS Number	300
Mandatory Supplier Response	Guaranteed Country of Origin

Specified Additive

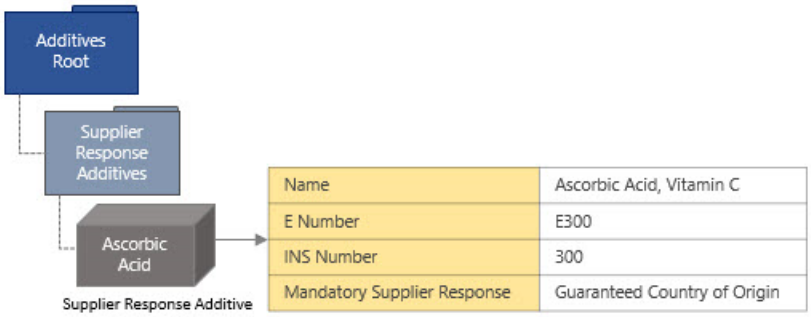
A specified additive is used by the developed components for specifying additives. A user searches an additive library and chooses a class plus an additive. A copy of the additive is saved as a specified additive.



Name	Ascorbic Acid, Vitamin C
E Number	E300
INS Number	300

Supplier Response Additive

A supplier response additive represents an additive used in the supplier's recipe. A copy of an additive is made for each supplier who then selects and adds the needed additive(s) for their recipe.

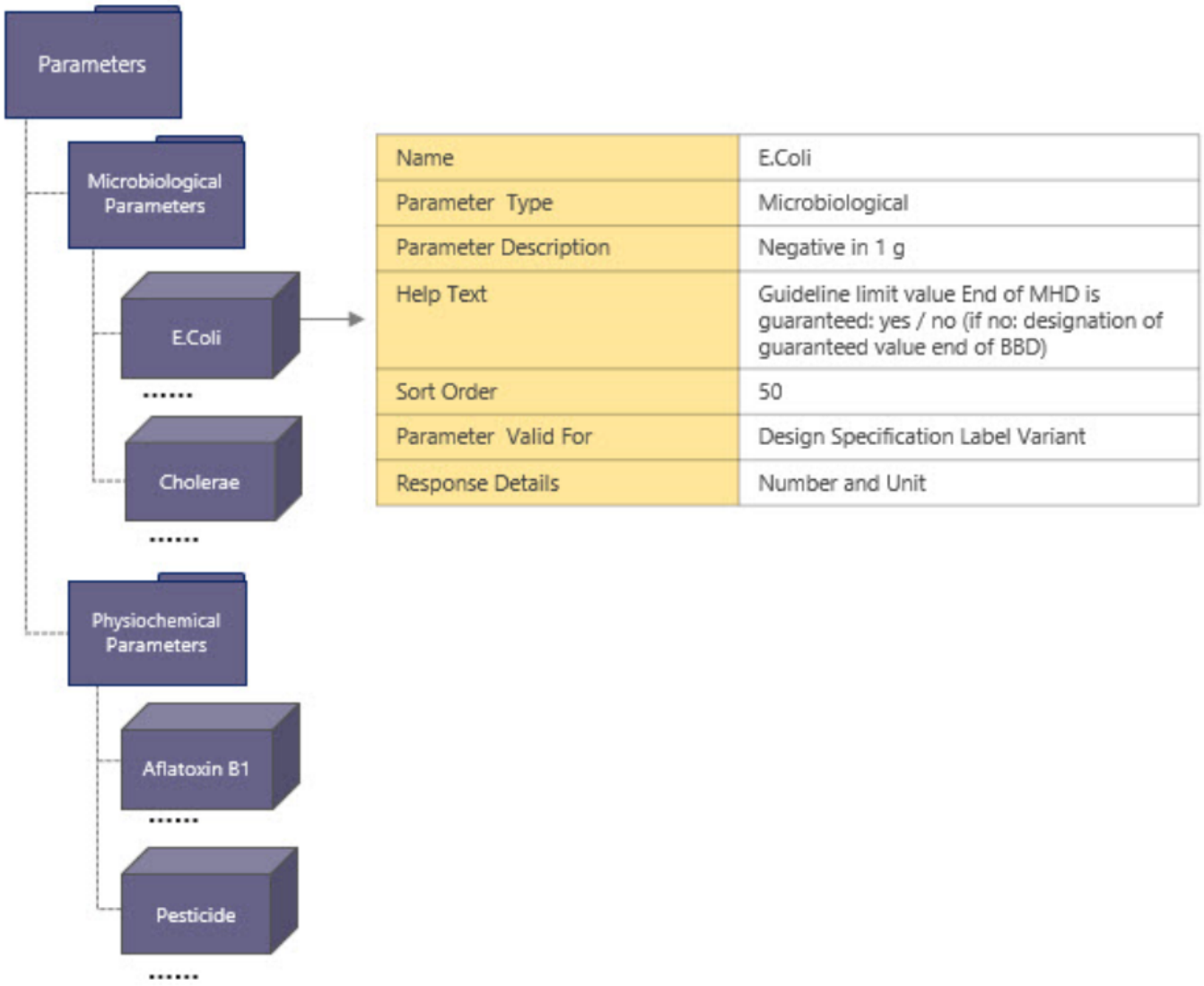


Note: The private label food solution includes an additives library, where food additives are classified by the function they serve in food processing.

Parameters

Parameters set measurable laboratory testing thresholds for each property and hold information about food quality that must be met for the recipe. There are two different types of parameters, Microbiological, and Physiochemical.

The PLM private label food solution data model includes a parameters hierarchy where parameters are organized by parameter type. These are based on GS1's valid values for the attributes Microbiological / organismCode and PhysioChemical CharacteristicCode.



Note: Customers are responsible for populating the thresholds according to their standards. They are also responsible for providing help text to suppliers and indicating any mandatory responses.

Requirements

Requirements hold information about food standards to be met by the food chain process. It ensures that the food is safe and is of good quality. Requirements are also typically used to specify what the physical characteristics of a food are such as: aroma, flavor, texture, color, consistency.

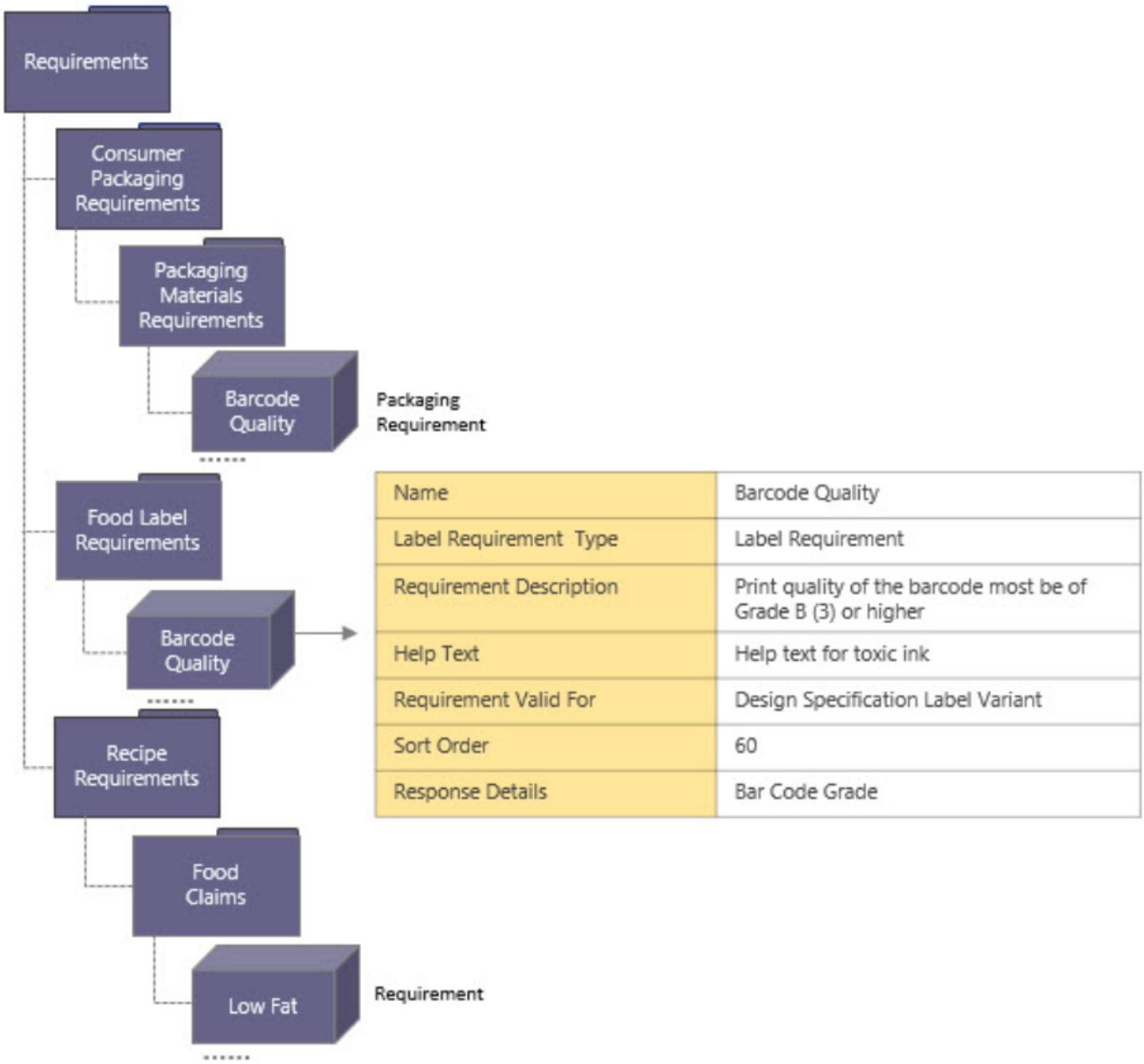
Some examples of different types of requirements are Food Claim Requirements, Label Requirements, and Quality Requirements

An example of a Quality Requirement would be:

Best-before date: for food for sale, this means the date up to which the food for sale will remain fully marketable and will retain any specific qualities that were expressed or implied.

It needs to remain in:

- An intact package during its storage
- Is stored in accordance with any storage conditions applicable under Standard 1.2.6

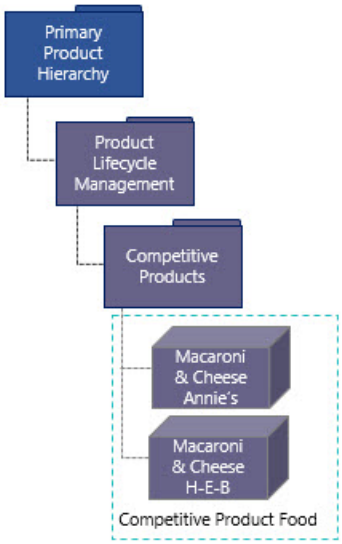


Note: These requirements are just examples. Project teams should expect to build these out and any detailing values.

Competitive Product Food

A competitive product food represents similar products to the product that a customer is evaluating for production. In the PLM private label food solution, a competitive product food is used to collect relevant information on similar products that already are on the market. Such information collected to compare could include brands, pricing, ingredients, product claims, and product images.

A competitive product can be added from a project. As a competitive product food is added to the comparison, a competitive product food object is created and linked to the project.



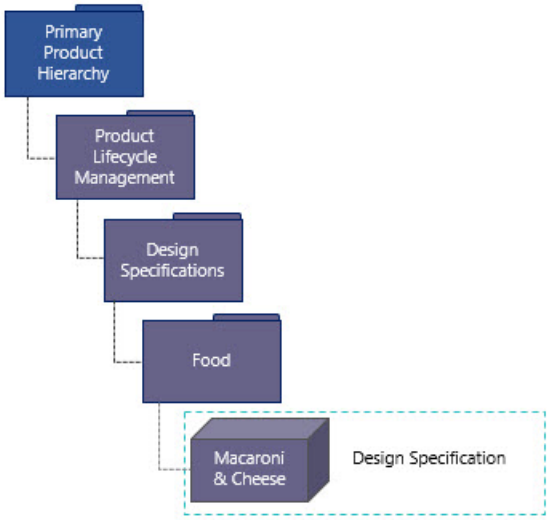
For a competitive product, an example of some attributes that might be included are the following:

Competitive Product Genera Information	Ingredients
Competitive Product Name	Ingredient 1
Brand	Ingredient 2
Price	Ingredient 3
Net Content Options	Ingredient 4
Competitive Product Claims	Ingredient 5
Packaging Description	Ingredient 6
URL	Ingredient 7
Last Updated	Ingredient 8
	Ingredient 9

Design Specification

A design specification represents the entire project and is a high-level place to gather input for new products. A design specification could represent multiple products. For food, it could represent multiple packages sizes, flavors, and language(s) on the final product label. For detailed specifications, variants are created for each option and specified under the design specification.

Projects are organized in a one-level hierarchy.



For a project, some attributes that might be included are the following:

Project Information	Product Variations	Commercial
Project Name Product Name Brand Description Project Type Product Category For Sale in Countries Label Country / Languages Planned Flavor Variations	Are product variations composite?	Item Cost Estimate (Range) Planned Gross Margin (%) Planned Quantity Planned Revenue

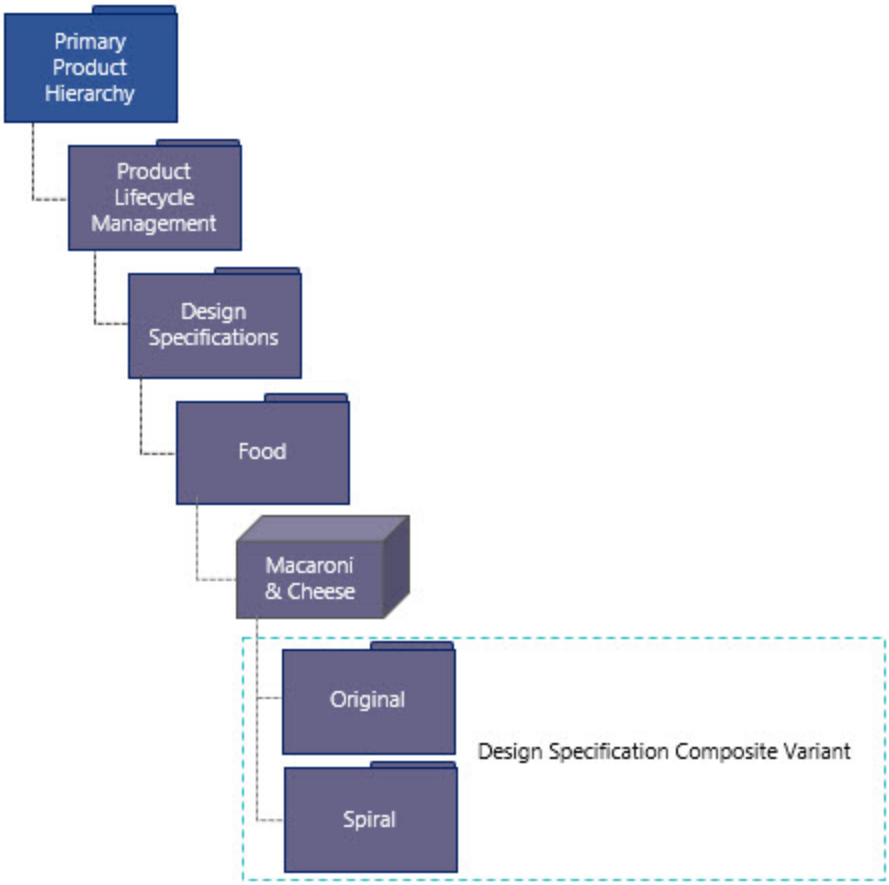
Project Information	Product Variations	Commercial
Planned Packaging Sizes New Branding Required? Need By Date Sourcing Strategy Design Specification Critical Design Specification Type Project Justification Project Start Date Key Product Claims / Benefits Marketing Messaging Target Market Segment		

Variant Object Types

The following variant object types are required for the PLM private label food solution data model to work.

Design Specification Composite Variant

A Design Specification Composite Variant represents a specification for a product variation that requires more than one recipe, such as a box of macaroni and cheese, which contains separate recipes for the macaroni and the cheese sauce.

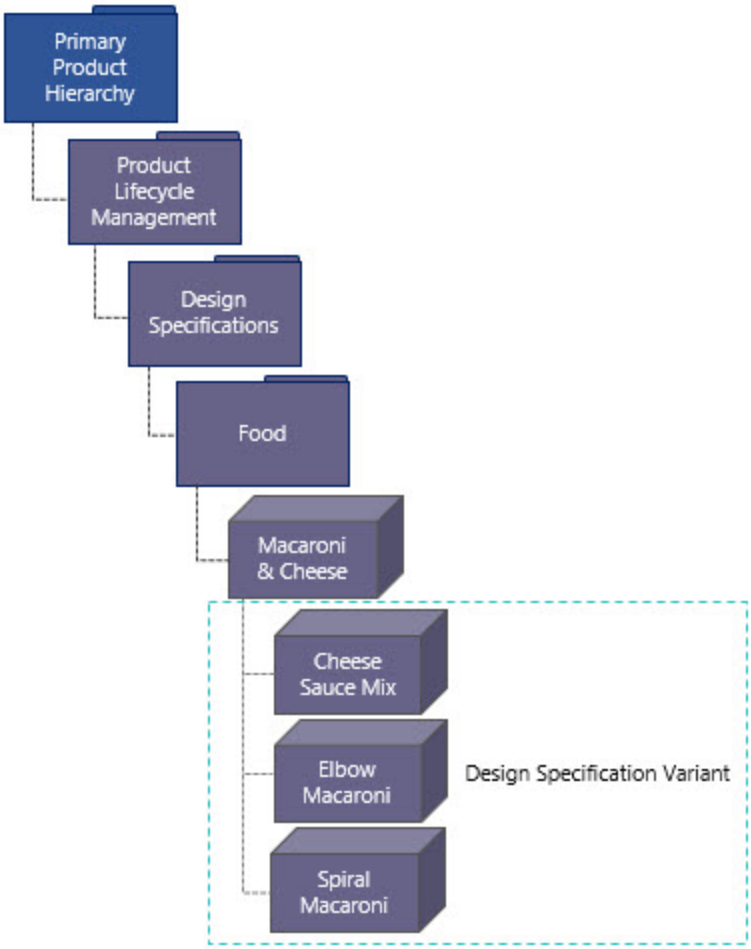


Design Specification Variant

A design specification variant (recipe specification) represents a flavor variation for one or more new products. Details about specifications, requirements, and parameters for each flavor variation are collected on this object.

For example, the Macaroni and Cheese Project will have two flavor variations:

- Elbow Macaroni
- Spirals Macaroni

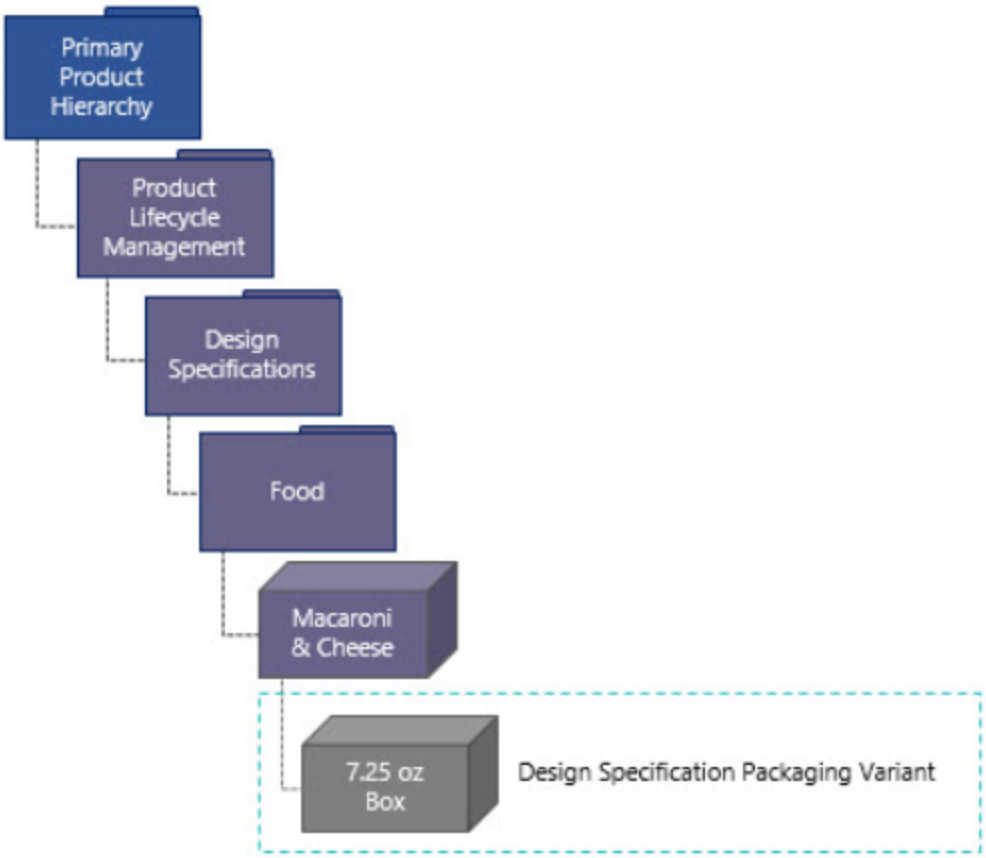


For a recipe specification, some attributes or object types that might be included are the following:

Recipe Information	Specified Ingredients	Recipe Requirements	Recipe Parameters
Flavor Description	Ingredient Ingredient Allowance Ingredient Precision Ingredient Quantity Specification Details	Requirement Type Requirement Description Help Text Sort Order	Parameter Type Help Text Sort Order

Design Specification Packaging Variant

A design specification packaging variant (packaging variant) represents a package size variation for one or more new products. A packaging variant description and requirements are collected on this object. In the example below, the Macaroni & Cheese Project will be produced in one package size: 7.25 oz.



For a packaging variant, some of the following attributes may apply:

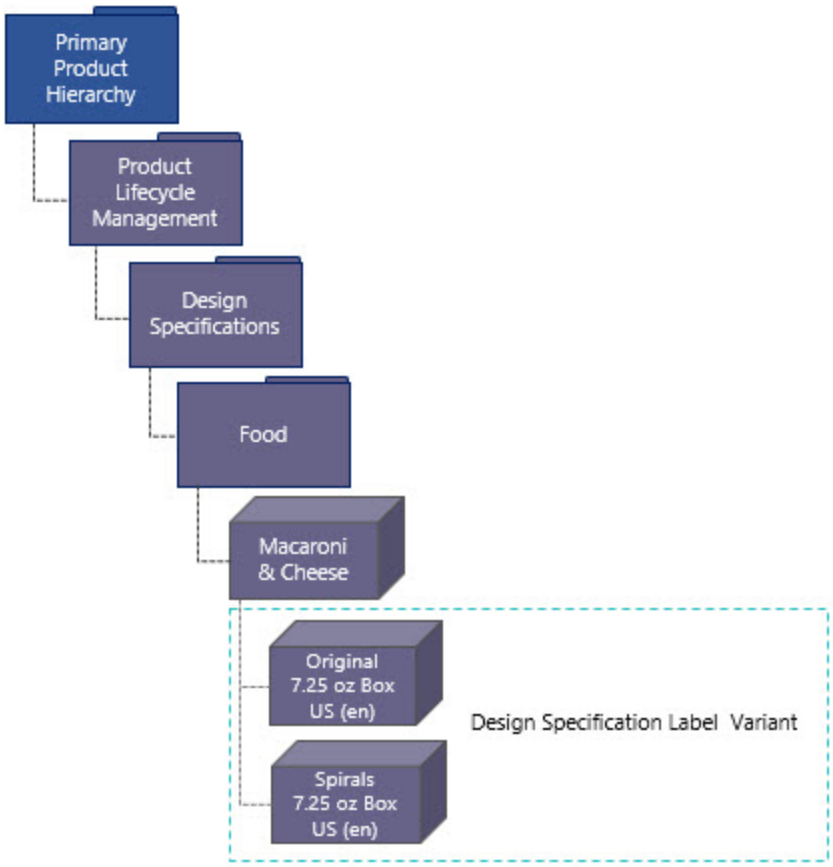
Packaging Specification	Packaging Requirements
Packaging Name Packaging Variant Description	Type Requirement Description Help Text Sort Order

Note: For each packaging specification, three 'Packaging Elements' will be created underneath the Packaging Elements node.

- Consumer Packaging (Packaging Level 1)
- Packaging Element (Packaging Level 2)
- Packaging Tray (Packaging Level 3)

Design Specification Label Variant

This represents a label variation for one or more new products. A label variant represents a unique combination of one flavor variation, one packaging variant, and one set of languages on the product label. It represents the final item.



For a label variant, some attributes that might be used are the following:

Item Information	Commercial Item Information	Label Requirements
Unique Identifier (product SKU, GTIN)	Item Quantity Target Item Cost Target Item Suggested Retail Target	Label Requirement Type Requirement Description Requirement Valid For

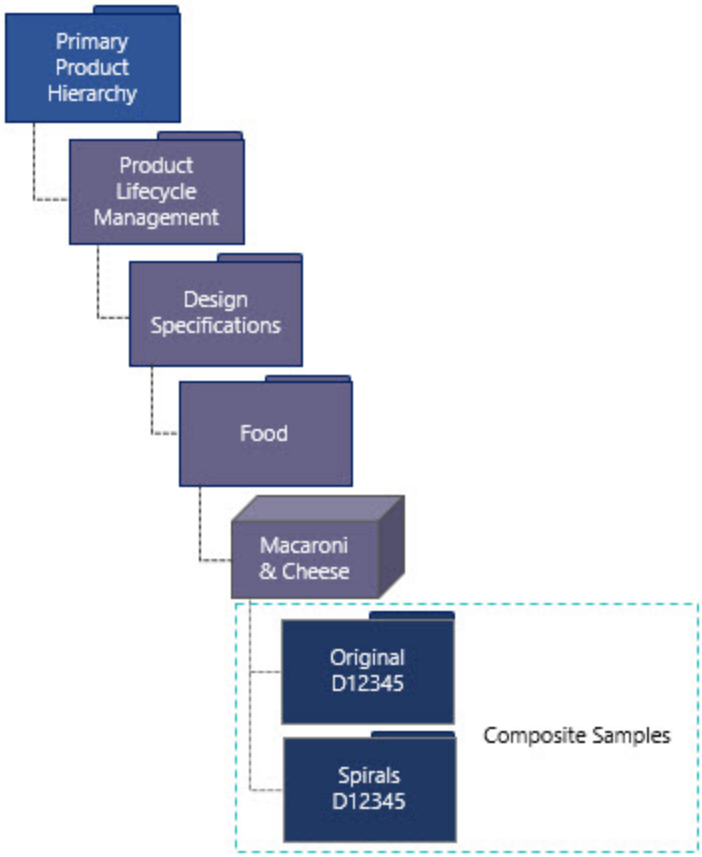
Item Information	Commercial Item Information	Label Requirements
	Item Revenue Target Item Gross Margin (%) Target	Help Text Sort Order

Sample Object Types

The following sample object types are required for the PLM private label food solution data model to work.

Composite Sample

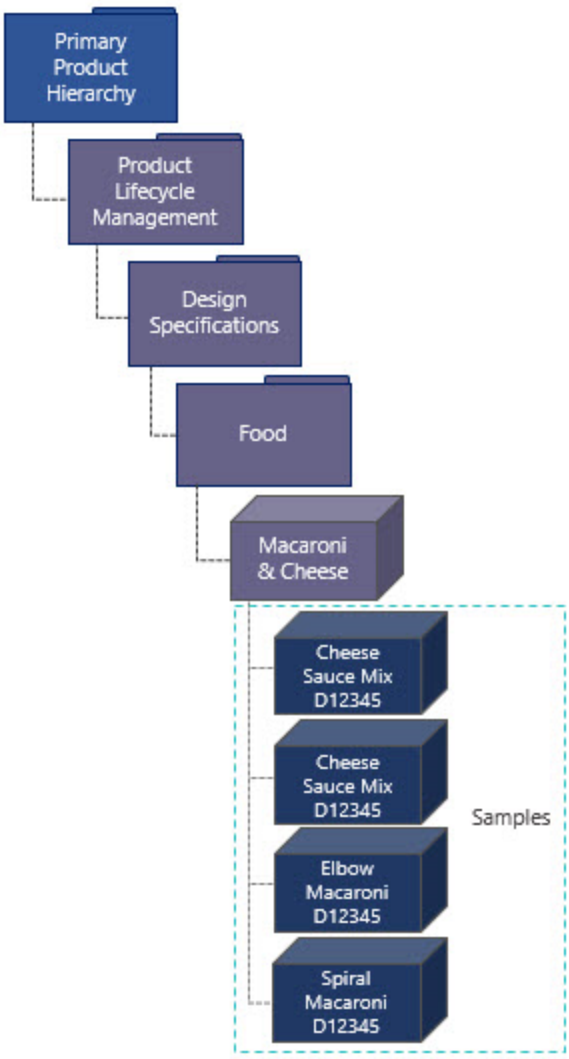
Composite Sample represents a product variation that contains more than one recipe. It is where suppliers see an overview of the product, the recipes contained in the product and enter data that is relevant to the product as a whole.



Sample

A Sample, also known as a Supplier Response, is an object that is created for each supplier who should respond to recipe specifications. This is where the supplier details the proposed recipe based on the specification received from the customer.

Each supplier has one equivalent object per variant where they respond to the specifications. All objects displayed underneath the Macaroni and Cheese Project in the image below are used to handle Suppliers' recipes.



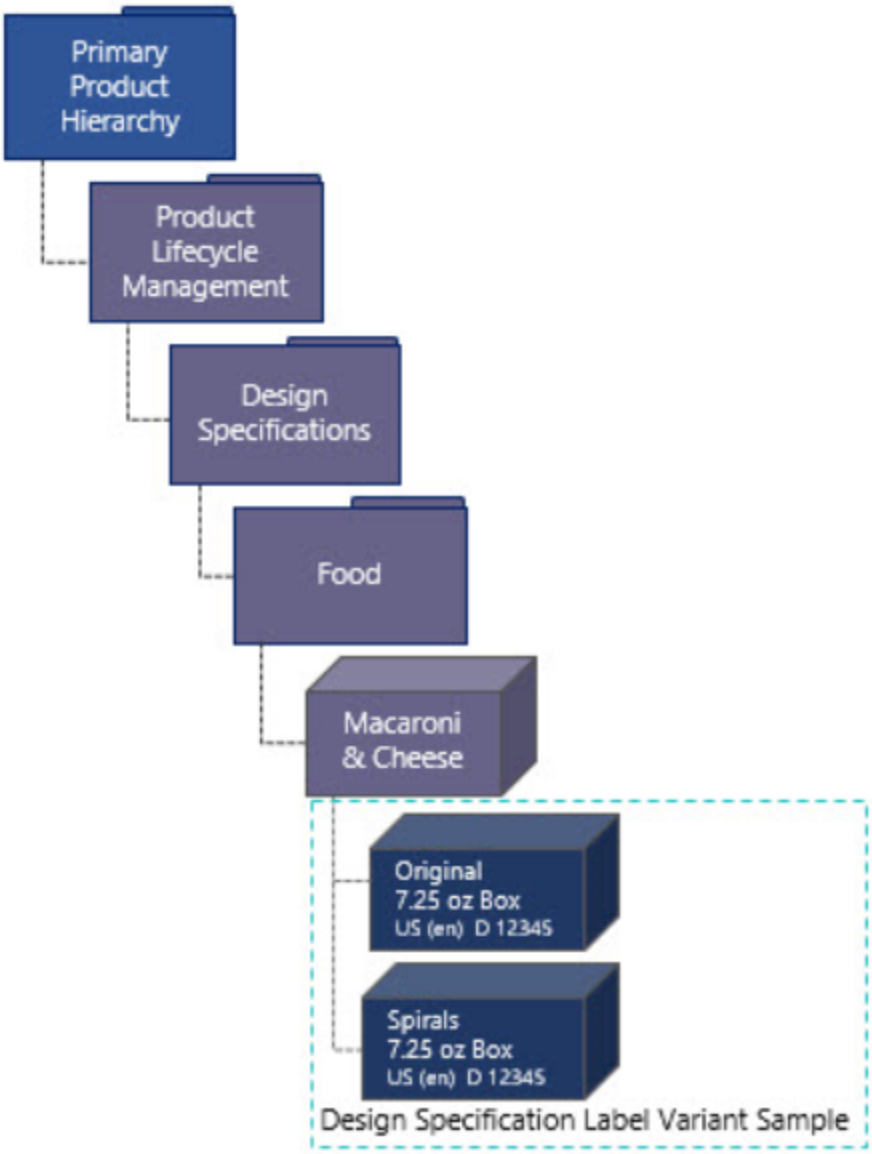
For a recipe response, some attributes that might be included are the following:

Recipe Requirements	Recipe Parameters	Recipe Ingredients
Meets Requirement? Response Detail Additional Comments	Meets Requirement? Response Detail Method Additional Comments	Ingredient Ingredient Quantity % Country of Origin

Additionally, a supplier can provide Nutritional Information and Other Information related to the product.

Label Variant Sample

This is an object that is created for each supplier who should respond to package label specifications.



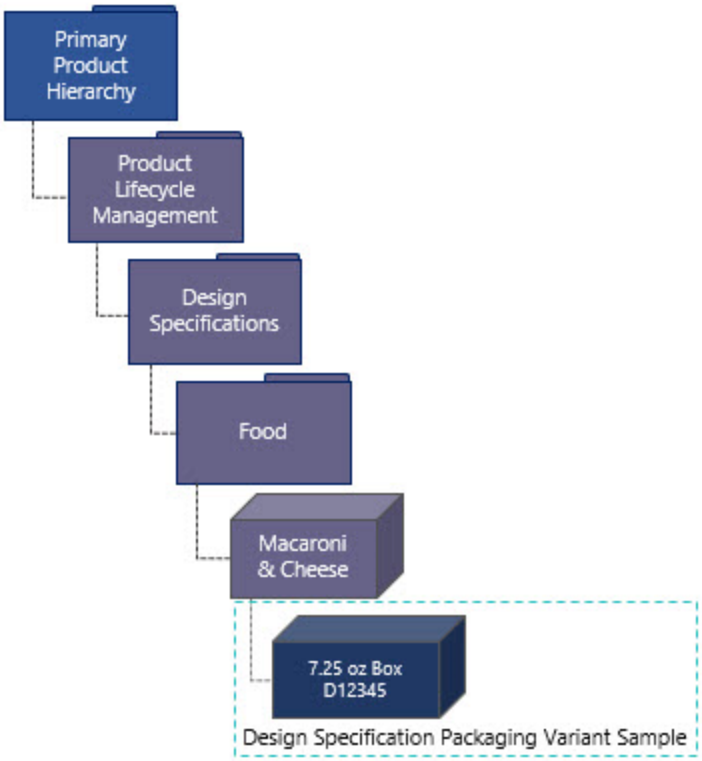
For a label response, some attributes that might be included are the following:

Label Requirements	Label Details	Applicable Recycling Codes
Meets Requirement? Response Detail	Barcode Placement Running Direction Of Barcode	List of values to select applicable recycling codes

Label Requirements	Label Details	Applicable Recycling Codes
Additional Supplier Comments Help Text	Net Content (Imperial) Net Content (Metric) Net Weight (Imperial) Net Weight (Metric) Applicable Recycling Codes	

Packaging Variant Sample

An object that is created for each supplier who should respond to packaging specifications.



For a recipe response, some attributes that might be included are the following:

Packaging Requirements	Packaging Elements
Meets Requirement?	Packaging Level

Packaging Requirements	Packaging Elements
Response Detail Additional Supplier Comments	Packaging Type Packaging Element Type Packaging Element Description Packaging Material Function Packaging Material Type Packaging Material Type (other) Is Material Recyclable Packaging Material Color Packaging Height Packaging Depth Packaging Width Packaging Diameter Packaging Material Thickness

Note: For each Packaging specification, three Packaging Elements will be created underneath the Packaging Elements node: Consumer Packaging (Packaging Level 1), Packaging Element (Packaging Level 2), Packaging Tray (Packaging Level 3)

Primary Product Classification

Each object type in the Product Lifecycle Management 10.0 hierarchy is listed below, along with the purpose of the object type. PLM Private Label Food solution specifically does not use a product categorization to avoid coming into conflict with existing PMDM product categorization.

Primary Product Classification

Object Type Name	Object Type ID	Purpose
Product Lifecycle Management	ProductLifecycleManagementProductRoot	A root node of the hierarchy that contains all PLM products.
Competitive Products	PLMCompetitiveProductsRoot	A root level for organizing competitive product foods.
Competitive Product Food	PLMCompetitiveProductFood	Represent similar products to the product that a customer is evaluating to produce.
Design Specifications	PLMDesignSpecificationsRoot	Root level for organizing specifications.
Design Specification Level 1	PLMDesignSpecificationLevel1	A broad categorization for design specifications so that attribution can be controlled by the type of product being produced.
Design Specification	PLMDesignSpecification	Represents a high-level place to gather input for new products. Design Specification could represent multiple products. For food, it could represent multiple package size + flavor + label languages. For detailed specifications, variants are created for each option and specified there.

Object Type Name	Object Type ID	Purpose
Design Specification Composite Variant	PLMDesignSpecificationCompositeVariant	Represents a flavor variation that includes more than one recipe, such as Macaroni & Cheese
Design Specification Label Variant	PLMDesignSpecificationLabelVariant	They represent the eventual item (GTIN, EAN, UPC) and represents exactly one unique combination of flavor variation and packaging variation. They define which languages appear on the label. While they do display some things from the variants, such as the recipe nutrition info, and the packaging variants net content, labels do not own that info.
Design Specification Packaging Variant	PLMDesignSpecificationPackagingVariant	This specifies packaging options and requirements. Packaging may have many elements such as: consumer packaging, tray inside the consumer packaging, shelf tray, etc...
Design Specification Variant	PLMDesignSpecificationVariant	Represents a flavor variation for one or more new products. Details about the recipe are collected on this object.
Label Variant Sample	PLMLabelVariantSample	An object that is created for each supplier who should respond to package label specifications.
Packaging Variant Sample	PLMPackagingVariantSample	An object that is created for each supplier which

Object Type Name	Object Type ID	Purpose
		responds to a package label specifications.
Sample	PLMSample	The sample object represents the specified recipe in the private label food solution.
Composite Sample	PLMCompositeSample	Composite Sample represents the supplier response for a flavor variation that includes more than one recipe
Materials Root	PLMMaterialsRoot	A root level for organizing materials.
Additives Root	PLMAdditivesRoot	A root level for organizing additives.
Additives	PLMAdditives	A root level for organizing the additive library.
Additive	PLMAdditive	Represents an additive in the library. An additive can be a natural or synthetic substance that is added to commercially prepared foods for a specific purpose, such as a preservative, thickener, color retention agent, etc...
Specified Additives	PLMSpecifiedAdditives	Parent for storing specified additives. In Tree, a parent level of the same ID must exist. Additive specifications are stored on the reference between a flavor variant and

Object Type Name	Object Type ID	Purpose
		the additive. Because the additive could be used multiple times in the same specification, a copy is created each time it is specified. A version for the suppliers' responses is needed, so a Supplier Response Additive is created.
Specified Additive	PLMSpecifiedAdditive	Used by the developed components for specifying additives. A user searches an additive library and chooses a class plus an additive. A copy of the additive is saved as a specified additive.
Supplier Response Additives	PLMSupplierResponseAdditives	A root level for organizing Suppliers Response additives.
Supplier Response Additive	PLMSupplierResponseAdditive	Represent an additive used in a supplier's recipe.
Ingredients Root	PLMIngredientsRoot	A root level for organizing ingredients.
Ingredients	PLMIngredients	A level for organizing ingredients in the ingredient library.
Compound Ingredient	PLMCompoundIngredient	This represents ingredients in the library that are made up of other ingredients, e.g., enriched flour may be made from wheat flour, iron, and niacin, which are sub-ingredients.

Object Type Name	Object Type ID	Purpose
Ingredient	PLMIngredient	Represents an ingredient in the ingredient library.
Specified Ingredients	PLMSpecifiedIngredients	A level for organizing ingredients added by suppliers.
Specified Compound Ingredient	PLMSpecifiedCompoundIngredient	When a user specifies ingredients for a recipe, they search the ingredient library. When a compound ingredient is chosen, a copy of it is made as a specified compound ingredient so that parameters can be attached to it without permanently attaching that parameter to the library compound ingredient. Since parameters may be different based on how the compound ingredient is used, this keeps the library ingredients neutral.
Specified Ingredient	PLMSpecifiedIngredient	When a user specifies ingredients for a recipe, they search the ingredient library. When an ingredient is chosen, a copy of it is made as a specified ingredient so that parameters can be attached to it without permanently attaching that parameter to the library ingredient. Since parameters may be different based on how the ingredient is used, this keeps the library ingredients neutral.

Object Type Name	Object Type ID	Purpose
Supplier Response Ingredients	PLMSupplierResponseIngredientRoot	A root level for organizing supplier response ingredients.
Supplier Response Compound Ingredient	PLMSupplierResponseCompoundIngredient	When a supplier adds ingredients to a recipe, they search the ingredient library. When a compound ingredient is chosen, a copy of it is made as a supplier response compound ingredient so that parameters can be attached to it without permanently attaching that parameter to the library compound ingredient. Since parameters may be different based on how the compound ingredient is used, this keeps the library ingredients neutral.
Supplier Response Ingredient	PLMSupplierResponseIngredient	When a supplier adds ingredients to a recipe, they search the ingredient library. When an ingredient is chosen, a copy of it is made as a supplier response ingredient so that parameters can be attached to it without permanently attaching that parameter to the library's ingredient. Since parameters may be different based on how the compound ingredient is used, this keeps the library ingredients neutral.
Packaging Elements Root	PLMPackagingElementsRoot	Root for packaging

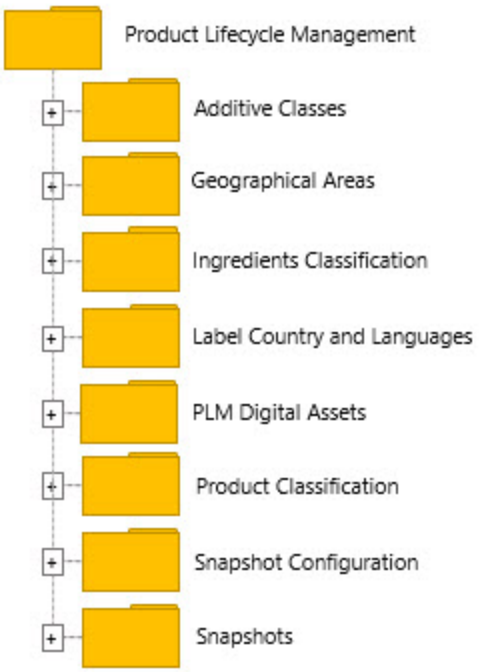
Object Type Name	Object Type ID	Purpose
		elements. Sub-roots for specified packaging elements and supplier response packaging elements.
Packaging Elements	PLMPackagingElements	Root level for specified packaging elements.
Packaging Element	PLMPackagingElement	Used for capturing specifications of each packing element. e.g., A foil wrapper on a chocolate piece is a packaging element, a tray to hold and protect the chocolates is a separate element, and the box that the tray goes into is another element.
Supplier Response Packaging Elements	PLMSupplierResponsePackagingElements	Root level for all supplier response packaging elements.
Supplier Response Packaging Element	PLMSupplierResponsePackagingElement	Represents the supplier's version of a specified packaging element so that the supplier can provide information about what they propose for each element.
Parameters	PLMParametersRoot	A root level for organizing Parameters.
Parameters Level 1	PLMParametersLevel1	A broad categorization for parameters used for organizing different types of parameters.

Object Type Name	Object Type ID	Purpose
Parameter	PLMParameter	Used to specify the quality testing tolerances of each microbiological or chemical property that may be present in food. e.g., Must be undetectable in 100 mg.
Requirements Root	PLMRequirementsRoot	A root level for organizing requirements.
Requirements Level 1	PLMRequirementsLevel1	A broad categorization for requirements used for organizing different types of requirements.
Requirements Level 2	PLMRequirementsLevel2	A broad categorization for requirements used for organizing different subtypes of requirements.
Requirement	PLMRequirement	Holds information about requirements for a recipe.
Label Requirement	PLMLabelRequirement	Holds information about requirements for labeling of a product variation.
Packaging Requirement	PLMPackagingRequirement	Holds information of requirements for a packaging variation.

For more information on Snapshots and Snapshot Recorders, see the **Snapshot Configurations** and the **Snapshot Recorders** topics in the **Change Reports** segment of the **PLM for Admins** section of the **Product Lifecycle Management** documentation.

Alternate Classification Hierarchies

The private label food solution implementation uses six alternate classifications. Each is described in the subsequent sections.

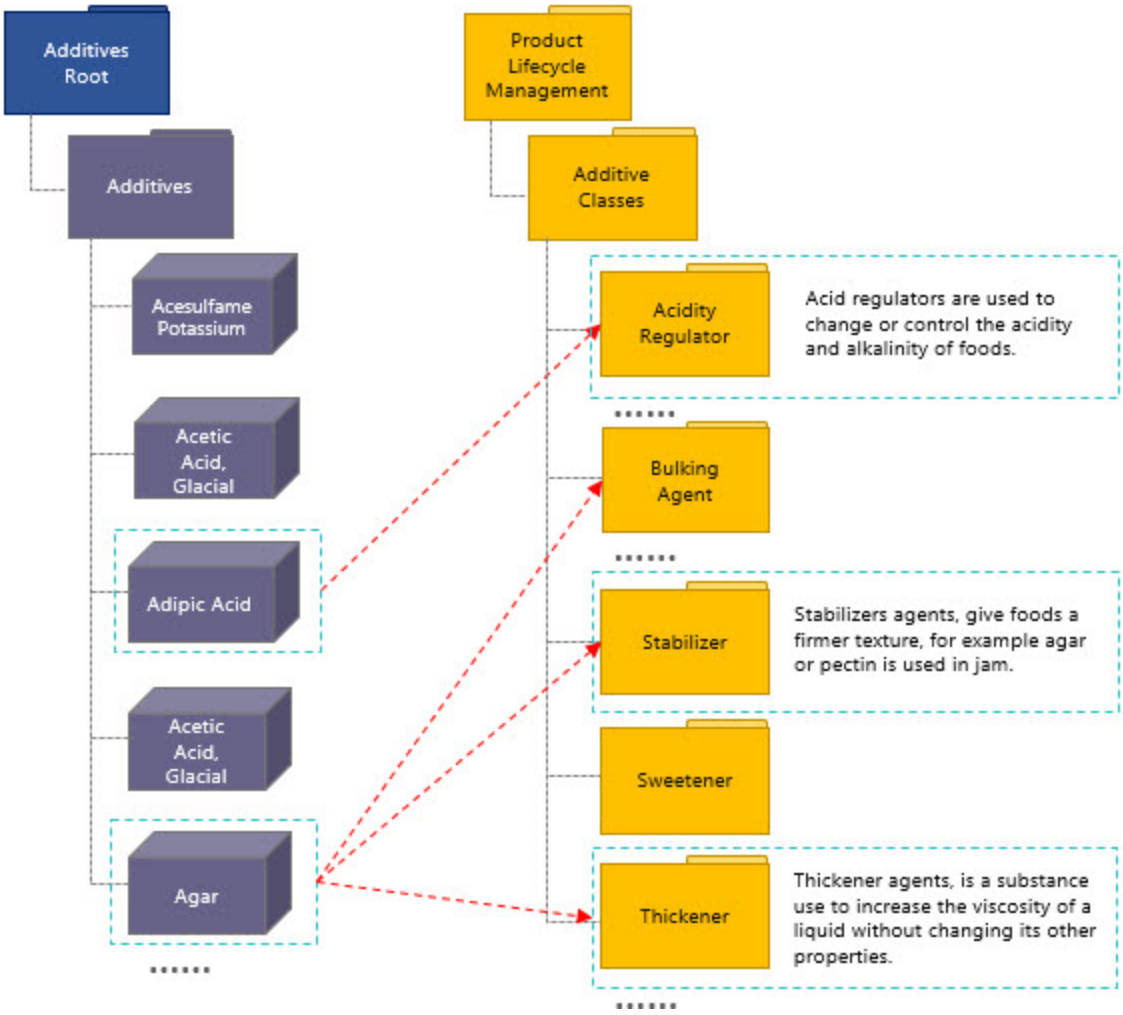


Object Type Name	Object Type ID	Purpose
Product Lifecycle Management	ProductLifecycleManagementClassifRoot	The root node of the Product Lifecycle Products.

Additive Classes

Organizes additives into one or more classes, based on classifications of GSFA (General Standard for Food Additives), an international standard administered by the Codex Alimentarius Commission.

For example, the same additive can be used as an acidifier or a color retention agent. On product labels, the purpose of the additive must be declared along with the additive.



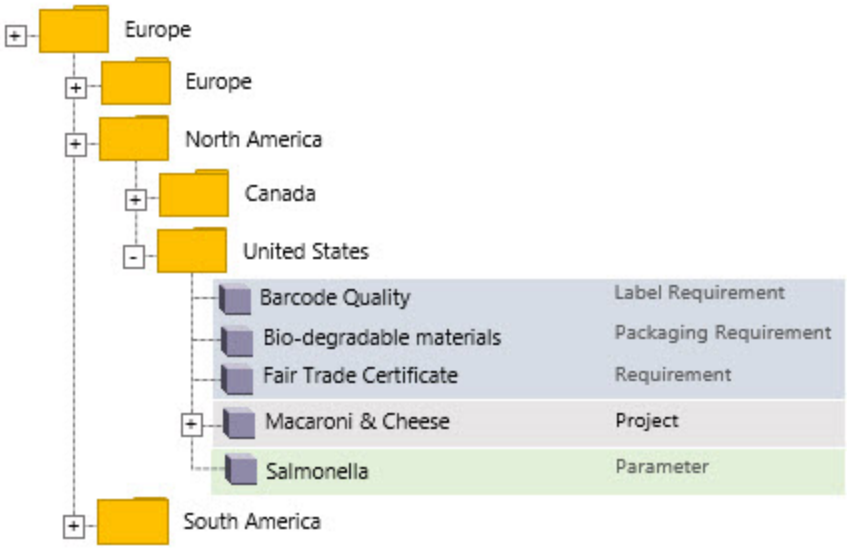
Object Type Name	Object Type ID	Purpose
Additive Class Root	PLMAdditiveClassRoot	A top-level organization level for additive classes.
Additive Class	PLMAdditiveClass	Organizes additives into one or more classes, based on classifications of GSFA (General Standard for Food Additives), an international standard administrated by the Codex Alimentarius Commission. An additive is classified according to the purpose function.

Object Type Name	Object Type ID	Purpose
		For example, the same additive can be used as an acidifier or a color retention agent. On a product label, the purpose of the additive must be declared along with the additive.

Geographical Areas

Organization for geographic areas of the world where the customer may sell their products. It includes regions and countries.

Countries classification is used to relate projects to countries where the product is intended to be sold. Also used to relate requirements and parameters so specific values of a basic requirement or parameter can be tailored for the country where it will be sold. The requirement or parameters can vary based on regulations or standards for that country.

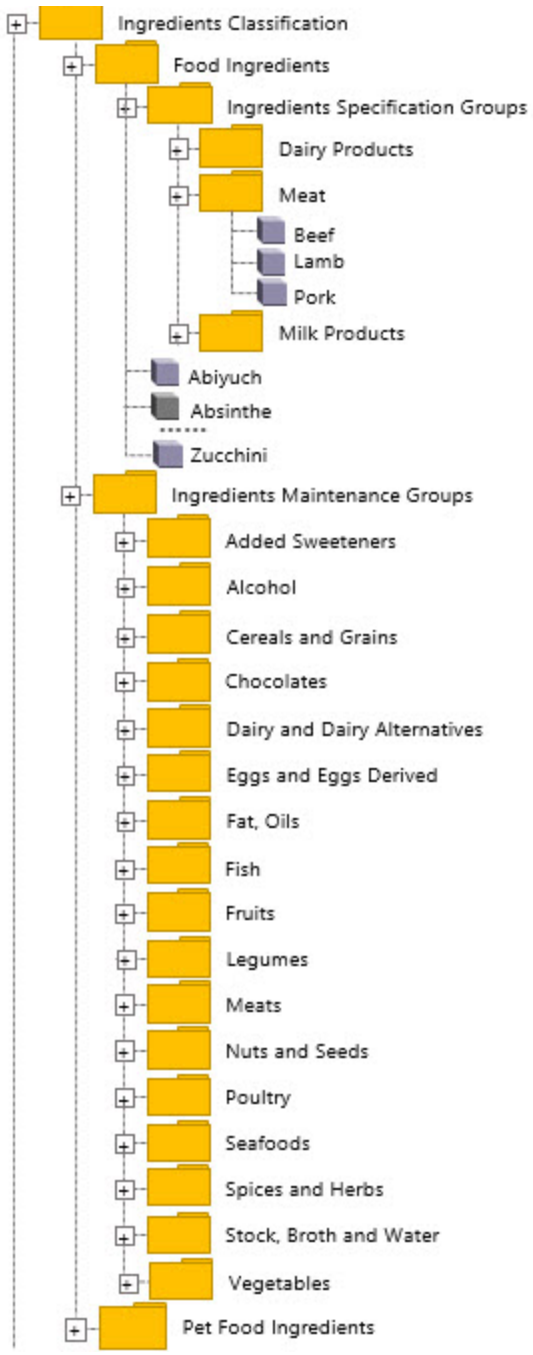


Object Type Name	Object Type ID	Purpose
Geographical Areas Root	PLMGeographicalAreasRoot	A top-level organization level for geographic areas of the world where the customer may sell their products.

Object Type Name	Object Type ID	Purpose
Country	PLMCountry	A classification for countries. This classification is used to relate Design Specifications to countries where the product is intended to be sold. Also used to relate requirements and parameters to countries so that the requirement or parameters can vary based on regulations or standards for that country.
Region	PLMRegion	An organization level for countries. (optional)

Ingredients Classification

Ingredients classifications organize ingredients in groups based on their allowable purpose, like whether food is intended for animals or humans. This allows ingredient searches used in the Web UI to specify ingredient component result in only relevant ingredients. It categorizes ingredients into relevant groupings for maintenance purposes and for specifying a group of ingredients that may be allowable.



Object Type Name	Object Type ID	Purpose
Ingredients Classification Root	PLMIngredientsClassificationRoot	Classification for ingredients; supports finding different ingredients under Food or Pet Food.

Object Type Name	Object Type ID	Purpose
Ingredient Maintenance Groups	PLMIngredientMaintenanceGroups	Categorizes ingredients into relevant groupings for maintenance.
Ingredient Purpose	PLMIngredientPurpose	Organizes groups of ingredients by their allowable purpose, e.g., Food vs Pet Food so that ingredient searches result in only relevant ingredients.
Ingredient Group	PLMIngredientGroup	Categorizes ingredients into relevant groupings for maintenance purposes and also for specifying a group of ingredients that may be allowable.
Ingredient Specification Groups	PLMIngredientSpecificationsGroups	Organizes groups of Specification ingredients.
Ingredient Specification Group	PLMIngredientSpecificationGroup	Categorizes ingredients into relevant groupings for specifying a group of ingredients that may be allowable.

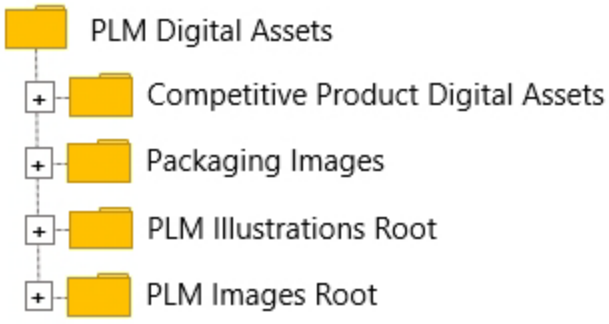
Label and Country Language

The label and country language hierarchy is an object that will hold attributes containing country code and language code for a label variation. It is recommended classification names to represent country name plus language code(s).

Object Type Name	Object Type ID	Purpose
Label Country and Languages Root	PLMLabelCountryAndLanguagesRoot	Root level for storing the language bundle library.
Label Country and Languages	PLMLabelCountryAndLanguages	An object that will hold attributes containing country code and language code for a label variation. Recommended classification names to represent country name plus language code(s).

PLM Digital Asset

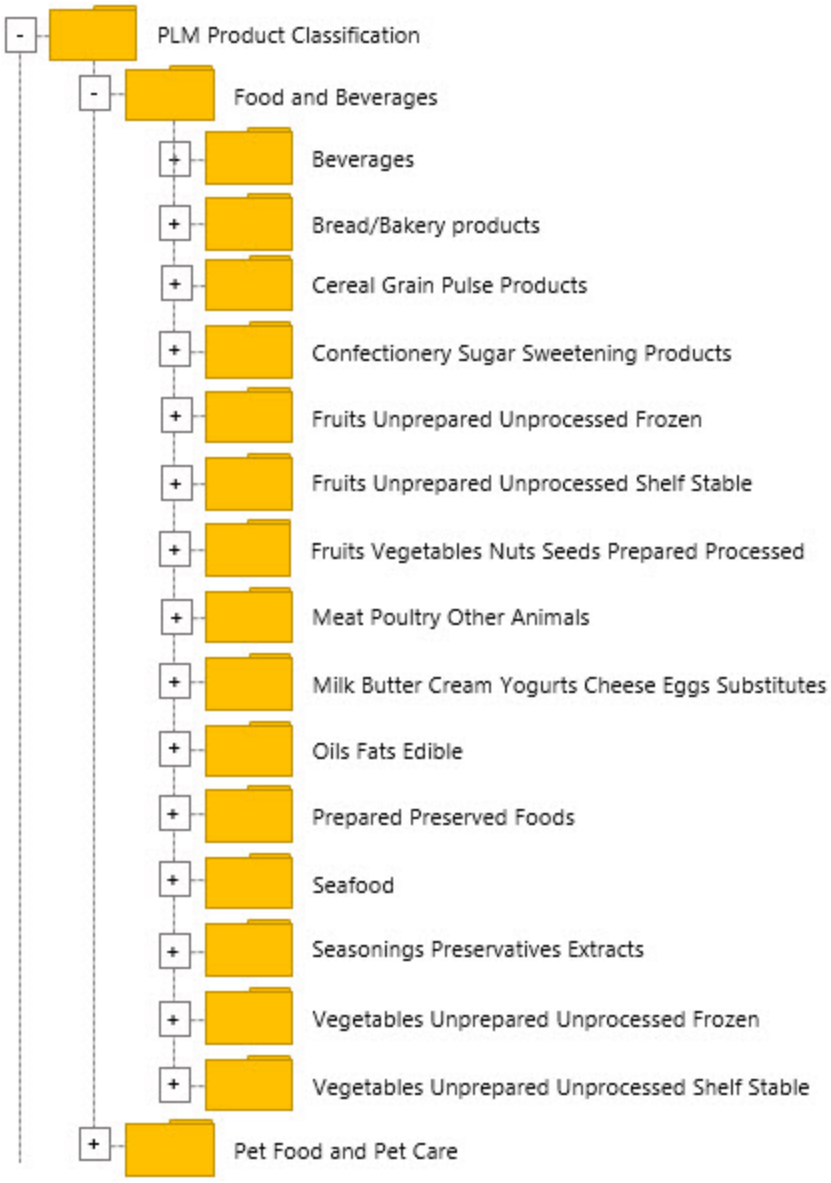
The PLM digital asset hierarchy organizes product lifecycle digital images uploaded or inserted by the customer. Food images will be located at:



Object Type Name	Object Type ID	Purpose
Digital Assets Root	PLMDigitalAssetsRoot	A top-level organization level for digital assets.
Competitive Product Digital Assets	PLMCompetitiveProductDigitalAssetsRoot	A top-level organization level for competitive digital assets.
Packaging Images	PLMPackagingImagesRoot	A top-level organization level for packaging digital assets.
PLM Illustrations Root	PLMIllustrationsRoot	A top-level organization level for PLM illustration digital assets.
PLM Images Root	PLMImagesRoot	A top-level organization level for PLM digital assets.

PLM Product Classification

The PLM product classification hierarchy organizes products based on GS1's Global Product Classification. The lowest level is used to organize projects, requirements, and parameters. This allows specific values of parameters and requirements to vary by the type of product being produced.



Object Type Name	Object Type ID	Purpose
PLM Product Classifications	PLMProductClassificationsRoot	An organization level for products based on GS1's Global Product Classification.
PLM Product Segment	PLMProductSegment	An organization level for products.
PLM Product Family	PLMProductFamily	An organization level for products.

Object Type Name	Object Type ID	Purpose
PLM Product Class	PLMProductClass	An organization level for products.
PLM Product Group	PLMProductGroup	An organization level for Design Specifications, Requirements, and Parameters. Allows specific values of Requirements and Parameters to vary by the type of product being produced.

Suppliers

Each object in the Suppliers hierarchy is listed below, along with the purpose of the object type.

Note: The following supplier configurations are necessary for the Private Label Food demo to work properly. If the target system already has suppliers configured with different IDs in the global system set up, existing supplier set ups can be used; however, business rules used for the demo should be modified for the alternate set up.

Object Type Name	Object Type ID	Purpose
Suppliers Group Root	SupplierGroupRoot	Root node of the hierarchy.
Suppliers Root	SuppliersRoot	The root node for each supplier; each supplier is assigned one root. Privileges for the associated supplier user group are tied to this node.
Suppliers Assets	SuppliersAssets	Organizational folder to hold all assets for the supplier; all assets uploaded via a supplier item Web UI are linked using the SupplierAsset reference.
Suppliers Batches	SuppliersBatches	Organizational folder to hold all batches for the supplier; default object created with each new supplier, but not utilized for the implementation.
Suppliers Products	SuppliersProducts	Organizational folder to hold all supplier items for the supplier; all supplier items uploaded via a supplier item Web UI are linked using the SupplierLink reference.
Suppliers Contacts	PLMSupplierContacts	Use to collect supplier contact information. Not used in PLM Private Label Solution.

Asset Object Types for PLM Private Label Food Solution

Each asset used in the implementation is described in the table below.

Object Type Name	Object Type ID	Purpose
Punch Template	PLMPunchTemplate	Punch template is a drawing that would be used for packaging producer, e.g., flattened perspective of a box, showing where flaps are, where resealable closure is, etc.
Supplier Response Record	SupplierResponseRecord	An asset object type for storing the HTML document for a supplier's bid record.

Reference Object Types for PLM Private Label Food Solution

Each reference used in the implementation is described in the table below.

Product References Types

Reference Name	Reference ID	Purpose
Additive	PLMAdditive	Used to relate additives, specified additive and supplier response additive to a recipe (design variants, sample).
Competitive Product	PLMCompetitiveProduct	Used to relate a Competitive Product Food to a Design Specification.
Composite Sample	PLMCompositeSample	Relates a supplier's composite response to their own recipe proposals that are used in the composite product.
Composite Sample Packaging	PLMCompositeSamplePackaging	Relates supplier’s composite recipe proposals to one or more packaging proposals that are valid options.
Composite Variant Packaging	PLMCompositeVariantPackaging	Relates recipe specifications that are composite products to one or more packaging specifications that are valid options.
Composite Variant Sample	PLMCompositeVariantSample	Relates a retailer’s composite product specification to the supplier's composite product proposal.
Composite Variant Specification	PLMCompositeVariantSpecification	Relates a retailer’s composite specification to recipes that are used in the composite product.

Reference Name	Reference ID	Purpose
Ingredient	PLMIngredient	Relates a recipe (Design Specification Variant) to ingredients that are used to specify which ingredients can or cannot be used in a recipe. Also used to relate a supplier's sample (Sample) to ingredients in recipes that the supplier offers.
Label Requirement	PLMLabelRequirement	Used to relate a Design Specification Label Variant or Label Variant Sample to a Requirement. Allows for display and maintenance of specific types of requirements on Web UI screens.
Label Variant Sample	PLMLabelVariantSample	Relates a Design Specification Label Variant to a supplier response object (Label Variant Sample).
Packaging Element	PLMPackagingElement	Relates a Design Specification Packaging Variant to elements that make up the packaging. Also relates a Packaging Variant Sample to supplier response objects for the packaging elements. Valid attributes are the same as for requirements.
Packaging Requirement	PLMPackagingRequirement	Used to relate Design Specification Packaging Variant, Packaging Element, Packaging Variant Sample or Supplier Response Packaging Element to a Requirement. Allows for display and maintenance of specific types of

Reference Name	Reference ID	Purpose
		requirements on Web UI screens.
Packaging Variant Sample	PLMPackagingVariantSample	Relates the Design Specification Packaging Variant to supplier response objects for the packaging.
Parameter	PLMParameter	Relates to recipe specifications (Design Specification Variant), Ingredients, Compound Ingredient, Specified Ingredient, Specified Compound Ingredient, Supplier Response Ingredient, Supplier Response Compound Ingredients, to Parameters so that requirements for quality testing thresholds can be set.
PMDM Library Recipe	PMDMLibraryRecipe	Relates a PMDM product to a finalized recipe in the retailer's recipe library.
PMDM Source Project	PMDMSourceProject	Relates a PMDM product to the Design Specification (project) that resulted in the PMDM product.
Recipe Source Project	PLMRecipeSourceProject	Relates a finished recipe in the library to the Design Specification for the project.
Recipe Source Sample	PLMRecipeSourceSample	Relates a finished recipe in the library to the original supplier's recipe proposal.
Related Label Packaging	PLMRelatedLabelPackaging	Relates Design Specification Label Variant and Label Variant Sample objects to Design Specification Packaging Variant and Packaging Variant Sample

Reference Name	Reference ID	Purpose
		objects.
Related Packaging	PLMRelatedPackaging	Relates a Design Specification Variant (Recipe Specification) to a Design Specification Packaging Variant (packaging specification). Also used to relate a Sample (Recipe Response) to valid Packaging Variant Samples.
Related Recipe	PLMRelatedRecipe	Relates a Design Specification Label Variant (label specification) to one Design Specification Variant (Recipe Specification) or Design Specification Composite. It also relates the supplier's Label Variant Sample to one Sample or Composite Sample.
Related Specification	PLMRelatedSpecification	Relates a Design Specification to Recipe Specification, Packaging and Label variant of the product.
Requirement	PLMRequirement	Relates recipe specifications (Design Specification Variants) and recipe proposals (Samples) to recipe requirements.
Sample	PLMSample	Relates a recipe specification (Design Specification Variant) to each supplier's response (sample) object for the product variation.
Specified Additive	PLMSpecifiedAdditive	Relates an additive in the library to a specified additive.
Specified Ingredient	PLMSpecifiedIngredient	Relates ingredients (Ingredient, Compound ingredient) in the ingredient library to the recipe's specified ingredients (Specified or Compound Ingredient).

Reference Name	Reference ID	Purpose
Sub-ingredient	PLMSubIngredient	Relates compound ingredient to sub-ingredients, which can be normal ingredients or compound ingredients. Indicates which ingredients are used in a Compound Ingredient in a recipe.
Sub-Ingredient Additive	PLMSubIngredientAdditive	Relates a compound ingredient (Specified Compound, Supplier Response Compound) in a recipe with a sub-ingredient that is an additive (Specified Additive or Supplier Response Additive).
Supplier's Equivalent	PLMSuppliersEquivalent	Relates ingredients, additives and packaging element in the library with copies of those ingredients, additives and packaging element that the supplier is using for their recipes. Allows traceability between the library ingredient and those ingredients that are used in the supplier recipes.
Supplier Response	PLMSupplierResponse	Relates a Design Specification to supplier response objects for the project. Used to store rankings on each of the samples so that there is a view from the Design Specification of all supplier responses.

Images and Documents Reference

Object Type Name	Object Type ID	Purpose
Primary Product Image	PrimaryProductImage	Links Product and Supplier Items to Product Image objects. Upper levels of the Products hierarchy can also be linked as the reference is inherited. Multiples are not allowed as each product or Supplier Item may have only a single primary image assigned to it.
Product Image	ProductImage	Used for the additional product images for a product.
Punch Template	PLMPunchTemplate	Links Packaging Variant objects and Recipe to a Punch Template asset.

Classification References

Object Type Name	Object Type ID	Purpose
Additive Class	PLMAdditiveClass	Used by the PLM developed component for specifying recipes. This reference specifies an entire class of additives that may or may not be used in recipes.
Ingredient Options	PLMIngredientOptions	Used by the PLM developed component for specifying and building recipes. Creates a reference from a category of Design Specifications to the root of an ingredient classification so that the list of ingredient options can be controlled via classification. For example, pet food contains ingredients that

Object Type Name	Object Type ID	Purpose
		should not be options for human-grade food.
Ingredient Specification Group	PLMIngredientSpecificationGroup	Used to group similar ingredients that can then be specified to must be, must not be or may be contained in a recipe.
Selected Supplier	PLMSelectedSupplier	Used to connect a Design Specification directly to one or more suppliers that are selected to bid on a new private label food product.
Snapshot	Snapshot	Relates the object that has a snapshot to its snapshot.
Snapshot Configuration	SnapshotConfiguration	Links the Snapshot Configuration with the snapshot.

Product to Classification Link

Object Type Name	Object Type ID	Purpose
Additive Classification	PLMAdditiveClassification	Relates an additive to the Additive Class classification according to the additive function in the recipe.
Ingredient Classification	PLMIngredientClassification	A root level for ingredient classification that breaks down the purpose for ingredients (e.g., food or pet food) and allows ingredients to be classified in one or more ways.
Label Country and Languages	PLMLabelCountryAndLanguages	Relates a label variant to the Label Country and Languages classification that the variant represents.

Object Type Name	Object Type ID	Purpose
PLM Product Category	PLMProductCategory	A product-centric classification used for classifying Design Specifications so that attribution can be controlled. Also used for product-centric Design Specification templates with Requirements and Parameters already linked to the templates to reduce effort by users when new Design Specifications are made. Relates a Design Specification to a product category for the product. Also relates requirements and parameters to product categories so that the default requirement or parameter's descriptions and help text can be tailored for the category.
Required for Geography	PLMRequiredForGeography	Relates a Design Specification to one or more countries where the product(s) are intended to be sold. Also relates requirements and parameters to a country so that the default requirement or parameter's descriptions and help text can be tailored for regulations in each country.
Supplier Link	SupplierLink	Classifies suppliers' materials, samples, and other product objects into a folder which is used to control user privileges.

Workflows for PLM Private Label Food Solution

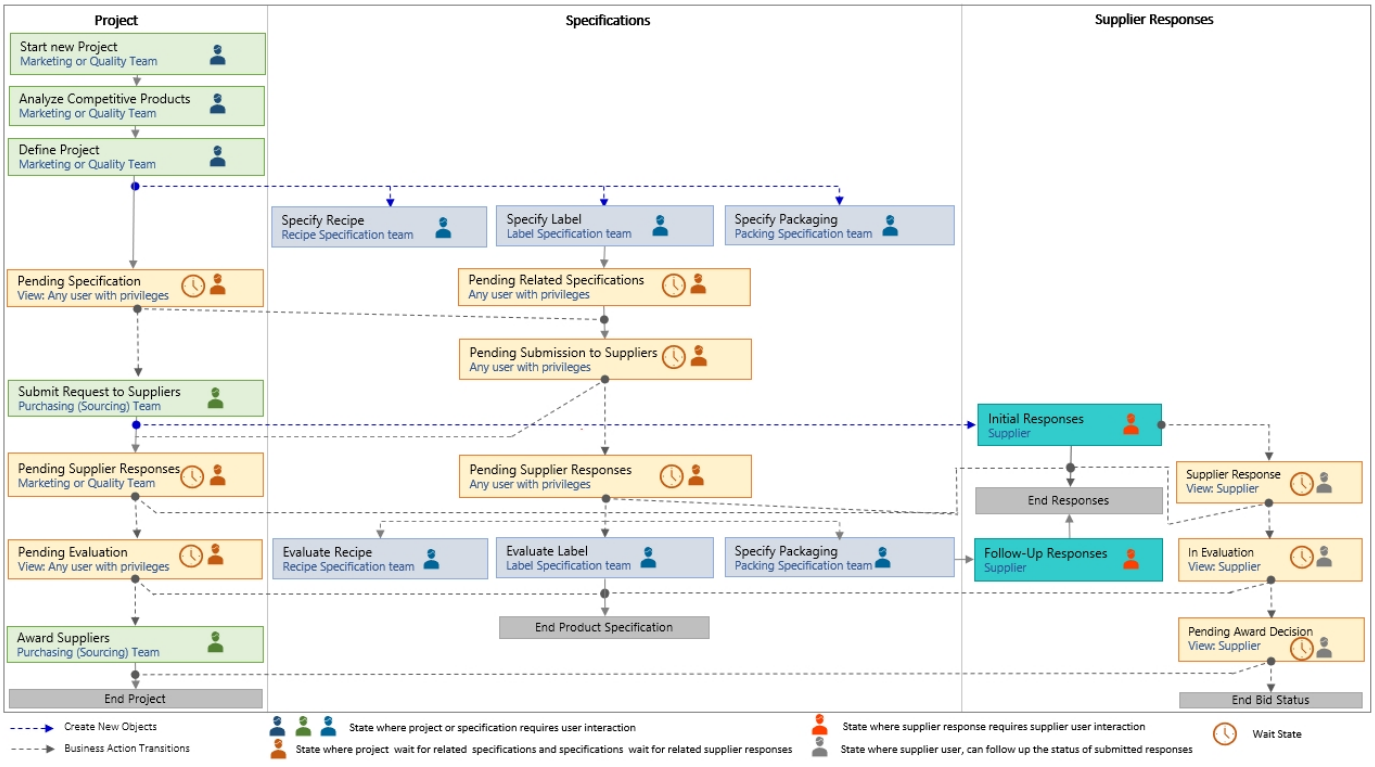
A series of four workflows are used to manage the process of designing and selecting suppliers for a new private label food introduction. This series of workflows manage a single project concept. The concept may be for a recipe having multiple flavor variations and multiple packaging configurations to be sold in more than one country – each having its own product label languages and requirements.

Although separate workflows are used, communication between them is critical to track the progress of the various pieces used to handle the specifications and the suppliers' responses. For this, a series of status attributes are used to provide a view of the progress of the related specifications and supplier responses.

Separate but integrated workflows are used to handle different objects in the process, and the specific processes for them are:

- The common aspects of the product on Design Specification, which represents the entire project.
- The specifications for variants of recipe, packaging, and labels.
- The suppliers' responses to the specifications for recipes, packaging, and labels.
- Track the status of the supplier's responses after they have been submitted to the customer

Status updates between the three workflows must take place throughout so that the progress of work on recipes and packaging is visible at the overall project level, the status of suppliers' responses is visible for each recipe and packaging specification, and the status of each supplier's work is visible at the response level.



Private Label Food New Project Workflow

This workflow captures information that is relevant for the overall project on the Design Specification, which represents the overall concept of the new product or group of products but not the details of recipe, packaging, or labeling variations. The Design Specification defines the type of product, the markets where the product should be sold, commercial goals, and other fundamental aspects of the product. Suppliers are also selected for the project and awarded the project at the end. The overall progress of the Design Specification is tracked through these states as a view to the overall progress of the project.

Start a New Project – Initial state	**Private Label Food New Project Workflow**
Role: Marketing or Quality team member	
Pre-Conditions: ▪ Identify Countries where the product is intended to be sold ▪ Identify the appropriate product category ▪ Link default requirements and quality testing parameters to the appropriate product classification and countries where the product is intended to be sold so that they can be automatically applied where appropriate in later steps ▪ Identify if product variations are Composites	
Details: Create a new Project (Design Specification object). A few basic pieces of information are entered on the project. (*: Remarks mandatory attributes).	
Inputs: ▪ * Project Name ▪ * Brand ▪ * Product Name ▪ * Description ▪ * Are Product Variations Composites? ▪ * Project Category (select parent) ▪ * Product Category: Project must be linked to the Product Classification. ▪ * For Sale in Countries: Project must be linked to the countries where it is intended to be sold.	
Buttons **Save**: Create new Project	

Analyze Competitive Product - state	Private Label Food New Project Workflow
Role: Marketing or Quality team member	
Pre-Conditions: ▪ Identify competitor products	
Details: The purpose of this state us to compare an idea of a new product with similar products that are already on the market to gather pricing, ingredients, product claims or other information for those products. The result is to determine whether the new product idea will be viable and how to position and price it. User can create competitive products, as they are added a business rule will link them to the current project.	
Inputs: ▪ Competitive Product Name ▪ Brand ▪ Price ▪ Net Content Options ▪ Competitive Product Claims ▪ Packaging Description ▪ URL(where information was found) ▪ Last Updated ▪ Ingredients (There are 9 fields configures for ingredients) ▪ Primary Product Image ▪ Additional Images (Product Images)	
Buttons **Cancel Project:** Execute a business rules that updates the status of the project with the date-time and user- name when a project is cancelled. Status of This Specification = Cancelled by [" + user + "] [" + isoDate + "] **Add Competitive Product:** Creates a competitive product and a reference to it from the Project so that the analysis is visible throughout the life of the project **Continue Project:** Project is submitted to Define Project state, and task list of projects in state Analyze Competitive Products will be displayed.	
On entry to this state status are updated to:	
Status of Related Specifications	Specifications not defined
Status of Supplier Responses	Not submitted to suppliers
Status of This Specification	In progress
Attribute Project Name is updated with STEP Name value	

Define Project - state	Private Label Food New Project Workflow
Role: Product Manager	
Pre-Conditions: ▪ Have completed competitive product analysis ▪ Identify Countries where the product is intended to be sold (It was done in previous state) ▪ Define Languages bundles for each country where the product will be sold that should appear in the packaging labels. ▪ Parameters and Requirements defined.	
Details: In this state user adds additional details of the new project. There a group of attributes that needs to be completed. Then a business action based in some of those values will generate objects that are used to specify about the new recipe, packaging and labels.	
Inputs: Project Information: Some of the following information was captured when project was created (•) ▪ Project Name (•) ▪ Product Name (•) ▪ Brand (•) ▪ New Brand Required? ▪ Description (•) ▪ Project Start Date ▪ Need By Date ▪ Sourcing Strategy ▪ Design Specification Critical? ▪ Design Specification Type ▪ Project Justification ▪ Key Product Claims / Benefits ▪ Marketing Messaging ▪ Target Market Segment ▪ * **For Sale in Countries (•)**: It was done in previous state, but user can modify actual values. ▪ * **PLM Product Category (•)**: ▪ * **Label Country Languages:** User defines the languages bundles that should appear on the packaging labels based on geographic regions where the product will be sold Product Variations ▪ Are Product Variations Composite?(•), this value is entered in the initial state; it is only shown in this state to determinate which tab is shown for defining specifications. If Yes, Add Planned Variations, add a row for each combination of product variation plus recipe in the variation plus packaging size. If No, add a row for each combination of product variation plus packaging size. Project Commercial Information: ▪ Item Cost Estimated (Range) ▪ Planned Gross Margin (%) ▪ Planned Quantity ▪ Planned Revenue	
Buttons: **Cancel Project** Execute a business rules that updates the status of related objects when a project or specification is cancelled with the date-time and user-name.	
Project Definition Complete Execute a business action that creates product specifications for each flavor variation(recipes), each packaging variation and each variation of product labels and relates them to the project. Copies default values from Requirements and Parameters to the reference between the variants and Requirements and Parameters. If project is a composite an additional object (composite variation) will be created for each flavor variation (recipe), in this case composite variations, packaging specifications and label specification will be initiated in the Private Label Food Product Specification workflow. If project is not composite product specifications, flavor variations (recipes), packaging specifications and label specification will be initiated in the Private Label Food Product Specification workflow. Project will be transitioned to Pending Specification state of the Private Label New Project Workflow.	
On entry to this state, project status will not be updated:	
Status of Related Specifications	Specification not defined
Status of Supplier Responses	Not submitted to suppliers
Status of This Specification	In progress
Additionally, the status of each of the flavor variations (recipes / composite), packaging specifications and label specification will be updated.	
On transition to Pending Specification state, a business rule validate that the recipe(s) has a product category and moves the specification into the specify workflow state.	

Pending Specification – state	**Private Label Food New Project Workflow**
Role: Any user with privileges can see what's pending	
Pre-Conditions: ▪ Have completed a Project Definition	
Details: This a holding state for the project while related product specifications (flavor, packaging sizes and labels variants) are being defined in the PLM Private Label Food Product Specification workflow. The Project does not move to additional states until all related product specifications have been defined and are ready to send to suppliers for their bids.	
Inputs: None, non-editable state	
Buttons: None	
On entry to this state a global business action update project status:	
Status of Related Specifications	(0) of (n) specified (0) cancelled
Status of Supplier Responses	Not submitted to suppliers
Status of This Specification	In progress

Submit Request to Suppliers – state	Private Label Food New Project Workflow
Role: Purchasing team member	
Pre-Conditions: ▪ Have completed Product Specifications	
Details: When all related specification have been specified, a business action in the product specification workflow moves the project to this state so that one or more suppliers can be selected so that a request to participate in the bid can be sent to them. Submitting to suppliers from the Project best allows sending Supplier Responses to multiple suppliers with one interaction.	
Inputs: * Request Response By (a deadline for the bid) *Selected Suppliers (suppliers from supplier classification)	
Buttons: **Cancel Project:** Execute a business rules that updates the status of related objects when a project or specification is cancelled with the date-time and user-name. **Submit to Suppliers:** Project is submitted to Pending Supplier Responses.	
On entry to this state, project status will not be updated:	
Status of Related Specifications	(n) of (n) specified (0) cancelled
Status of Supplier Responses	Not submitted to suppliers
Status of This Specification	In progress
On transition (submit) leaving Submit Request to Suppliers, creates Supplier Responses for the Specification variants, names them, copies requirements and parameter values from the Specifications variant to the reference from Supplier Responses to requirements or parameters. ▪ Supplier Responses are linked to Supplier's Product Classification ▪ Create reference from the Project to the supplier response objects ▪ Create reference from the Specification to supplier response objects ▪ Write Supplier Information (Supplier ID, Supplier Name) to the Supplier Responses ▪ Supplier Responses are initiated Private Label Food Supplier Response workflow. ▪ E-mail notification is sent to each supplier selected to participate in the bid. ▪ Project will be moved to Pending Supplier Responses state in the Private Label Food New Project workflow. Specifications are moved to Pending Supplier Responses state in the Private Label Food Product Specification workflow. And specification status values are updated.	

Pending Supplier Responses – state	**Private Label Food New Project Workflow**
Role: Any user with privileges can see what's pending	
Pre-Conditions: ▪ Have completed a Supplier selection and sent request to selected suppliers.	
Details: This a holding state. The project waits in this state while the suppliers respond to the request for information. When all responses are finished in the Supplier Response workflow, the project transitions from this state to Pending Evaluation state.	
Inputs: None, non-editable state	
Buttons: None	
When Project enters the Pending Supplier Responses state, a business rule finds all related variants and transition them to the pending Supplier Responses state of the Private Label Food Product Specification workflow.	
On entry to this state a business rules update project status attributes:	
Status of Related Specifications	(n) of (n) specified (0) cancelled
Status of Supplier Responses	(n) specifications, (m) suppliers, (p) responses requested (0) declined/no response (p) of (p) responses pending
Status of This Specification	In progress

Pending Evaluation – state	**Private Label Food New Project Workflow**
Role: Any user with privileges can see what's pending	
Pre-Conditions: ▪ Have completed a Supplier selection and sent request to selected suppliers.	
Details: This a holding state. The project waits in this state while the suppliers respond to the request for information. The Project does not move to additional states until all supplier responses have been returned and have been evaluated in the Product Specification workflow.	
Inputs: None	
Buttons: None	
On entry to this state project status attributes will not be updated:	
Status of Related Specifications	(n) of (n) specified (0) cancelled (0) of (n) evaluated
Status of Supplier Responses	(n) specifications, (m) suppliers, (p) responses requested (0) declined/no response (0) require follow-up (0) of (p) evaluated
Status of This Specification	In progress

<table>
<tr><th>Award Suppliers – state</th><th>Private Label Food New Project Workflow</th></tr>
<tr><td colspan="2">Role: Purchasing (sourcing) team member</td></tr>
<tr><td colspan="2">Pre-Conditions:
Supplier Reponses have been evaluated and ranked.</td></tr>
<tr><td colspan="2">Details: After supplier responses have been evaluated and ranked, someone must decide which supplier(s) award the contract. That is done in this state.

Ranking is reviewed for related recipe specification, and packaging specifications.

One or more suppliers are awarded the bid. This is based on their ranking and on a combination of recipes and packaging that they are able to produce for delivery in specific countries.

On entry to this state sample responses for the current project in the In Evaluation state of the Private Label Food Supplier Bid Status workflow will be transitioned to Pending Award Decision state of Private Label Food Supplier Bid Status workflow.</td></tr>
<tr><td colspan="2">Inputs:

Awarded Bid?: Enter Yes or No to award a supplier or suppliers.</td></tr>
<tr><td colspan="2">Buttons

Cancel Project: Executes a business rules that updates the status of the project with the date-time and user-name when a project is cancelled.

Validate: Each Label Response that is reference by the current project is awarded. If a condition fails a warning message will be displayed.

Award Complete: Send the project to End Project state.

On Transition to End Project state, update status of the project to:</td></tr>
<tr><td>Status of Related Specifications</td><td>(n) of (n) completed
(0) cancelled
(n) of (n) evaluated
(0) awarded</td></tr>
<tr><td>Status of Supplier Responses</td><td>(n) specifications, (m) suppliers, (p) responses requested
(0) declined/no response
(p) of (p) evaluated
(0) awarded</td></tr>
<tr><td>Status of This Specification</td><td>Completed [ISO Date]</td></tr>
<tr><td colspan="2">And execute business actions:

Business action PLM Food Create Recipe Library, create the library recipe(s) based on the number of awarded recipes for a project.

Business action PLM Food Finalize Project (PLMFoodFinalizeProject) reparent the PLM project and deletes any project related objects that was not awarded.

The business action PLM Food Create PMDM Product (PLMFoodCreatePMDMProduct) will create a PMDM product for each of the awarded PLM labels and copy a number of PLM values to it.</td></tr>
</table>

End Project – state	**Private Label Food New Project Workflow**
Role: System	
Pre-Conditions: ▪ Have completed Award Suppliers.	
Details: This is the final state of the Private Label Food new Project workflow. The project status will be updated and project is removed from workflow.	
Inputs: None	
Buttons: None	
On entry to this state business rule update project status attribute:	
Status of Related Specifications	(n) of (n) specified (0) cancelled (0) of (n) evaluated
Status of Supplier Responses	(n) specifications, (m) suppliers, (p) responses requested (0) declined/no response (0) require follow-up (0) of (p) evaluated
Status of This Specification	In progress

Private Label Food Product Specification Workflow

The Private Label Food Product Specification Workflow allows for the independent design and evaluation of recipes, packaging, and label variants. The workflow will allow users to see task lists for pieces that need specifications and also enables for evaluation of supplier responses by comparing the responses. Suppliers proposals for each specification are ranked based on their evaluations.

Initial – state	Private Label Food Product Specification
Role: Stibo Systems	
Pre-Conditions: ▪ Have completed a Project Definition.	
Details: Set specification status and copy default requirements and parameters based on product category.	
Inputs: None	
Actions: ▪ Upon initiation into this workflow, evaluate the object type.	
On entry: ▪ Local Business action set attribute value Status of This Specification to 'Pending Specification.'	
On transition from Initial state to Initial to Specify Recipe state: ▪ Business Condition PLM Food Recipe Object Type Condition evaluate if current object is a Design Specification Variant or a Design Specification Composite Variant.	
On transition from Initial state to Initial to Specify Packaging state: ▪ Business Condition PLM Food Packaging Object Type Condition evaluate if current object is a Design Specification Packaging Variant.	
On transition from Initial state to Initial to Specify Label state: ▪ Business Condition PLM Food Label Object Type Condition evaluate if current object is a Design Specification Label Variant.	

Specify Recipe – state	Private Label Food Product Specification Workflow
Role: Quality (recipe specification) team member	
Pre-Conditions: ▪ Have completed a Project Definition	
Details: Each of the product recipe specification must be specified in more details. In this workflow the recipe specification, packaging specification, label specification will be done in separate states. ▪ Ingredients are specified for each recipe variation (flavor) ▪ Default recipe requirements and recipe parameters are reviewed and modified if needed. • Regulations and quality standards vary by country and product category. Requirements and parameters have been attached to specifications automatically based on their classifications, but the Quality Manager or Purchaser may modify, add or remove these as needed.	
Inputs: If product variations are composites, each recipe in the composite variant must be specified. **Specification Information** ▪ Flavor Description **Recipe Specification** ▪ Flavor Description Specify Ingredients Not all ingredients are included in the recipe specification. It is used to list the ingredient that must be included or excluded in the supplier sample recipe. ▪ Specify Ingredients: Allowance, Ingredient Precision, Ingredient Quantity (Configurable attributes, e.g. Country of origin, is organic, etc.) ▪ Specify Requirements: Requirement Description, Help Text, Sort Order ▪ Specify Parameters: Parameter Description, Help Text, Sort Order	
Buttons: **Cancel Specification** Execute a business rules that updates the status of related objects when a project or specification is cancelled with the date-time and user-name.	
Specification Complete On transition from current state to Pending Related Specifications state, global business rules action will update attribute version Number to "1" and update Status of This Specification to Specification attribute to Specification Complete [ISO Date]	
On entry to this state project status attributes will not be updated. Status of Related Specifications and Status of Supplier Responses will be updated on entry to Pending Related Specifications	
Status of Related Specifications	(0) of (n) specified(0) cancelled
Status of Supplier Responses	Not submitted
Status of This Specification	Pending Specification

Specify Packaging – state	**Private Label Food Product Specification Workflow**

Role: Quality (packaging specification) team member

Pre-Conditions:

- Have completed a Project Definition

Details: Each of the product packaging specification must be specified in more details. In this workflow the recipe specification, packaging specification, label specification will be done in separate states.

- Packaging is specified for each variation (packaging type and size)
- Default packaging requirements are reviewed and modified if needed.
    - Regulations and quality standards vary by country and product category. Packaging Requirements have been attached to specifications automatically based on their classifications, but the Quality Manager or Purchaser may modify, add or remove these as needed.

Inputs:

If product variations are composites, each recipe in the composite variant must be specified.

Packaging Specification

- Packaging Name
- Packaging Variant Description
- Complete Packaging specifications if needed (Consumer Packaging, Packaging Element, Packaging Tray).

  Add for each packaging element the following information:
    - Packaging Type (Default)
    - Packaging Element Description
    - Packaging Material Function
    - Packaging Material Type
    - Packaging Height
    - Packaging Depth
    - Packaging Width
    - Packaging Diameter
    - Packaging Level
    - Primary or Secondary?
    - Primary Image (Reference)

Packaging Requirements

Requirement Description, Help Text, Sort Order.

Buttons:

Cancel Specification

Execute a business rules that updates the status of related objects when a project or specification is cancelled with the date-time and user-name.

Specification Complete

On transition from current state to Pending Related Specifications state, global business rules action will update attribute version Number to "1" and update Status of This Specification attribute to Specification Complete [ISO Date]

On entry to this state project status attributes will not be updated. Status of Related Specifications and Status of Supplier Responses will be updated on entry to Pending Related Specifications

Status of Related Specifications	(0) of (n) specified(0) cancelled
Status of Supplier Responses	Not submitted
Status of This Specification	Pending Specification

Specify Label – state	Private Label Food Product Specification Workflow
Role: Quality (Label specification) team member	
Pre-Conditions: ▪ Have completed a Project Definition	
Details: Each of the product label specification must be specified in more details. In this workflow the recipe specification, packaging specification, label specification will be done in separate states. ▪ Label are specified for each variation (label country / languages) ▪ Default requirements are reviewed and modified if needed. • Regulations and quality standards vary by country and product category. Label Requirements have been attached to Label specifications automatically based on their classifications, but the Quality Manager or Purchaser may modify, add or remove these as needed.	
Label Specification ▪ Unique Identifier (UPC, GTIN) it is the SKU. ▪ Commercial Item Information: Item Quantity Target, Item Cost Target, Item Suggested Retails Target, Item Revenue Target, Item Gross margin (%) Target. **Label Requirements** Requirement Description, Help Text, Sort Order	
Buttons: **Cancel Specification** Execute a business rules that updates the status of related objects when a project or specification is cancelled with the date-time and user-name.	
Specification Complete On transition from current state to Pending Related Specifications state, global business rules action will update attribute version Number to "1" and update Status of This Specification attribute to Specification Complete [ISO Date]	
On entry to this state project status attributes will not be updated. Status of Related Specifications and Status of Supplier Responses will be updated on entry to Pending Related Specifications	
Status of Related Specifications	(0) of (n) specified(0) cancelled
Status of Supplier Responses	Not submitted
Status of This Specification	Pending Specification

Pending Related Specification – state	**Private Label Food Product Specification Workflow**
Role: Any user with privileges can see what's pending	
Pre-Conditions: ▪ Have completed a Product Specification	
Details: This is a waiting state where the product specifications (variants) wait until all related specifications for the Project have been specified. This will ensure that the complete set of information is sent to suppliers for responses at the same time. ▪ Each product specification enters this state after action Specification Complete has been executed. At Specify Recipe, Specify Packaging or Specify Label state. ▪ Each time a product specification enters this state, the status of the related specifications will be updated to show that the product specification has been specified. ▪ When all related product specifications have been specified, the Project will be transitioned out of Pending Specification state in the Private Label Food New Projects then suppliers can be selected to bid on the product ▪ Transition all related specifications to the Pending Submission to Suppliers state of the current workflow. And update product specification status.	
Inputs: None, non-editable state	
Buttons: None	
On entry to this state a global business rules, PLM Pending Related specifications will be executed and find the source of the reference Related Specification. Identify all related specifications to the project then verify if each related Specification is in the Pending Related Specifications state. If all related specifications are in the Pending Related Specifications state, submit each specification to Pending Submission to Supplier state. Verify if the project is in the Pending Specification state of the PLM Private Food New Project workflow. If true submit it to Submit Request to Suppliers state of the PLM Private Label Food New Project workflow and execute function update status of Status of the Design Specification and Status of Related Variants. Then execute PLM Food Update Status business action to update attribute Status of Related Specifications:	
Status of Related Specifications	(n) of (m) specified (0) cancelled
Status of Supplier Responses	Not submitted [not update needed] – no updated
Status of This Specification	Specification completed [ISO Date] – no updated

Pending Submission to Suppliers – state	**Private Label Food Product Specification Workflow**
Role: Any user with privileges can see what is pending	
Pre-Conditions: ▪ Have completed all product specifications	
Details: When all related specifications for the project have been completed, a business action moves all specifications to this state. All related specifications will wait here until the Buyer has selected suppliers for the bid and created samples for their responses. ▪ Supplier to participate in the bid are selected at Project level.	
Inputs: None, non-editable state	
Buttons: None	
On entry to this state specification status is not updated.	
Status of Related Specifications	(n) of (n) specified (0) cancelled
Status of Supplier Responses	Not submitted
Status of This Specification	Specification completed [ISO Date]

Pending Supplier Responses – state	**Private Label Food Product Specification Workflow**
Role: Any user with privileges can see what is pending	
Pre-Conditions: ▪ Have completed a Supplier selection and sent request to selected suppliers.	
Details: After suppliers were chosen for the project and the request for information was sent to them, a business action moves the specifications into this state. This a holding state until all chosen suppliers have replied to all related specifications, or until someone decides not to wait any longer and cancels the suppliers bid request due to lack of response. The status of each product specification will be updated by a business action in the Supplier Responses workflow as each supplier response is submitted from suppliers. When all supplier responses are finished in the Supplier Responses workflow, a business action in that workflow will move all related specifications to the Evaluate Responses state the Private Label Food Product Specification workflow and transition the Project from Pending Supplier Responses state to Pending Evaluation state in Private Label Food New Project workflow.	
Inputs: None, non-editable state	
Buttons: None	
Status of Related Specifications	(n) of (n) specified (0) cancelled
Status of Supplier Responses	(m) suppliers, (p) responses requested (0) declined/no response (p) of (p) responses pending
Status of This Specification	Specification completed [ISO Date]
On transition from Pending Supplier Response state to Evaluate Recipe Response state: Business Condition PLM Food Recipe Object Type Condition evaluate if current object is a Design Specification Variant or a Design Specification Composite Variant.	
On transition from Pending Supplier Response state to Evaluate Packaging state: Business Condition PLM Food Packaging Object Type Condition evaluate if current object is a Design Specification Packaging Variant.	
On transition from Pending Recipe Response state to Evaluate Label Response state: Business Condition PLM Food Label Object Type Condition evaluate if current object is a Design Specification Label Variant.	

Evaluate Recipe Responses - state	Private Label Food Product Specification Workflow
Role: Quality (recipe specification) team member	
Pre-Conditions: ▪ Supplier Recipe Reponses have been completed and submitted by suppliers ▪ Each product specification has all related specification completed	
Details: Once all supplier responses have been submitted by all suppliers or an authorized user decides not to wait any longer the responses from suppliers will be evaluated and ranked. ▪ Comparison of supplier responses to recipe specification (ingredients) ▪ Comparison of supplier responses to recipe requirements and parameters. ▪ Comparison of supplier responses to recipe parameters. ▪ Comparison of supplier responses to Nutrition Information. ▪ Comparison of supplier responses to Allergen Statement, Storage Serving, Diet Information and Claims Information. ▪ Optional, if customer needs clarification about a response or more information from the supplier, the supplier response may be returned to the supplier for follow up	
Inputs: Supplier Response Ranking, user enters a ranking of suppliers based on their responses. If the supplier response needs to be sent back to supplier for clarifications the follow-up responses date needs to be entered. All remaining supplier responses are ranked according to their evaluation. **Recipe Response** ▪ Comparison of supplier responses(recipe) to recipe specification (ingredients) use compare ingredients component ▪ Comparison of supplier responses(recipe) to recipe specification (requirements) use compare requirements component ▪ Comparison of supplier responses(recipe) to recipe specification (parameters) use compare parameters component ▪ Compare supplier's responses(recipe) nutritional information. ▪ Compare other foods characteristics: Allergen statement, Storage and Serving Information, Diet Information, Claims Information ▪ Rank the supplier's response	
Buttons: **Cancel Specification** Execute a business rules that updates the status of related objects when a project or specification is cancelled with the date-time and username.	
Supplier Follow Up – toolbar action Update Supplier Response Routing attribute value to "Follow-Up" Initiate the Supplier Response (Recipe Response) into Supplier Response workflow. Update the status of Status of this Supplier Response to: Follow-up requested by [username] [ISO Date]	
Evaluation Complete Set the status of the current product specification to: Evaluation completed [ISO Date] On entry to Evaluate Responses state, find all related Supplier Responses of the current product specification that are in the Private Label Food Supplier Bid Status workflow, and submit to the In Evaluation state of the Private Label Food Supplier Bid Status workflow.	
On transition to End Specification state, a business update specification Status of This Specification attribute: to Evaluation Completed [ISO Date]	
Status of Related Specifications	(n) of (n) specified (0) cancelled
Status of Supplier Responses	(m) suppliers, (p) responses requested (0) declined/no response (0) required follow-up (p) of (p) evaluated
Status of This Specification	Evaluation completed [ISO Date]
On entry to End Specification state, a global business evaluates if there are no more related specifications on the Private Label Food Product Specification workflow and submit the project Award Suppliers state of the Private Label Food New Project.	
On entry to End Specification state, remove the current product specification from workflow.	

Evaluate Packaging Responses – state	Private Label Food Product Specification Workflow
Role: Purchasing (packaging) team member	
Pre-Conditions: ▪ Supplier Reponses have been completed and submitted by suppliers ▪ Each product specification has all related specification completed	
Details: Once all supplier responses have been submitted by all suppliers or an authorized user decides not to wait any longer the responses from suppliers will be evaluated and ranked. ▪ Comparison of packaging requirements and other packaging-related responses. ▪ Optional, if customer needs clarification about a response or more information from the supplier, the supplier response may be returned to the supplier for follow up	
Inputs: Supplier Response Ranking, user enters a ranking of suppliers based on their responses. If the supplier response needs to be sent back to supplier for clarifications the follow-up responses date needs to be entered. All remaining supplier responses are ranked according to their evaluation. **Packaging Response** ▪ Comparison of Packaging Response to Packaging Specification requirements. use compare requirements component ▪ Rank the supplier's response	
Buttons: **Cancel Specification** Execute a business rules that updates the status of related objects when a project or specification is cancelled with the date-time and user-name.	
Supplier Follow Up – toolbar action Update Supplier Response Routing attribute value to "Follow-Up" Initiate the Supplier Response (Packaging Response) into Supplier Response workflow. Update the status of Status of this Supplier Response to: Follow-up requested by [username] [ISO Date]	
Evaluation Complete Set the status of the current product specification to: Evaluation completed [ISO Date] On entry to Evaluate Responses state, find all related Supplier Responses of the current product specification that are in the Private Label Food Supplier Bid Status workflow, and submit to the In Evaluation state of the Private Label Food Supplier Bid Status workflow.	
On transition to End Specification state, a business update specification Status of This Specification attribute: to Evaluation Completed [ISO Date]	
Status of Related Specifications	(n) of (n) specified (0) cancelled
Status of Supplier Responses	(m) suppliers, (p) responses requested (0) declined/no response (0) required follow-up (p) of (p) evaluated
Status of This Specification	Evaluation completed [ISO Date]
On entry to End Specification state, a global business evaluates if there are no more related specifications on the Private Label Food Product Specification workflow and submit the project Award Suppliers state of the Private Label Food New Project.	
On entry to End Specification state, remove the current product specification from workflow.	

End Specification – state	Private Label Food Product Specification Workflow
Role: System	
Pre-Conditions: ▪ Have completed Product Specification.	
Details: This is the final state of the Private Label Food Product Specification workflow. The specification and related specification will be removed from workflow. Project is submitted to Award Suppliers.	
Inputs: None	
Buttons: None	
On entry to this state business rule review when the last related variant leaves the workflow, submit Design Specification to Award	

Private Label Food Supplier Responses

This workflow is used to allow independent work on samples by various suppliers.

Initiate- state	**Private Label Food Supplier Responses**
Role: Stibo Systems	
Pre-Conditions: ▪ Have completed product specifications. ▪ Select Supplier to participate in the bid	
Details: A Supplier Response (Composite Recipe Response, Recipe Response, Packaging Response or Label Response) can be initiated into the Private Label Food Supplier Response to either an initial response task or a follow-up task. The Supplier Response (Composite Recipe Response, Recipe Response, Packaging Response or Label Response) is evaluated to determine whether it requires an initial response or a follow-up response. A Snapshot is created and saved to compare it with changes made by a supplier when a supplier completes a supplier response and send it to the customer. A business rules routes the supplier response to the appropriate task based the value for attribute Supplier Response Routing. An email is sent to the supplier to let them know that they have been requested to respond to a bid.	
Inputs: None	
Actions: ▪ Upon initiation into this workflow, route Supplier Response based in the value for the attribute Supplier Response Routing	
On entry: Business action PLM Food Supplier Snapshot is executed, and snapshot is generated. Information included in the snapshot will vary dependent on the object type Packaging Variant Sample, Label Variant Sample and Sample.	
On transition from Initiated state to Initial Response state: ▪ Find supplier's email address for each supplier response ▪ Send an email for each supplier response	
On transition from Initiated state to Follow-Up Response state: ▪ Find supplier's email address for each supplier response ▪ Send an email for each supplier response	

Initial Response- state	Private Label Food Supplier Responses
Role: Supplier team member	
Pre-Conditions: ▪ Have completed product specifications. ▪ Select Supplier to participate in the bid ▪ Supplier Responses were created and submitted to supplier's for bids.	
Details: Supplier will see a task list of the Supplier Responses (Recipe Response, Packaging Response or Label Response) that they can respond to. ▪ Supplier can choose one to work or can select one or more and decline to the bid. Each supplier will be notified that there are Suppliers Responses to respond to. ▪ Respond to Supplier Responses (Composite Recipe Response, Recipe Response) adding their recipe ingredients and requirements and parameters. ▪ Respond to Supplier Responses (Packaging Response) packaging requirements and packaging elements. ▪ Respond to Supplier Responses (Label Response) label requirements and label details.	
Inputs: **Recipe Response** ▪ Respond Recipe Requirements ▪ Respond Recipe Parameters ▪ Respond Recipe Ingredients ▪ Respond Nutrition Information ▪ Respond Other Information: Recipe Number, Preparation Instructions, Handling Statements, Suitable for Diet Type, Organic and GMO information. ▪ Optional Upload Files	
Packaging Response ▪ Respond Packaging Requirements ▪ Respond Packaging Elements if needed. ▪ Optional upload illustration of the consumer packaging, including all print- and packaging-related provisions. Illustration should include a clear indication of the overall dimensions, position of the bar code, tear flaps and non-printable surfaces. Must be provided in .eps and .pdf or tif file format.	
Label Response ▪ Respond Label Requirements ▪ Respond Label Details: Barcode Placement, Running Direction of Barcode, Applicable Recycling Codes ▪ Optional Upload Files	
Buttons: **Decline Bid** Capture status on the Supplier Response, the status of related Supplier Responses and Product Specifications will be updated with a business rules upon entry to the End Response state.	
Validate Validate whether the supplier has provided answers to the mandatory attributes on each requirement and/or parameter. If there are attributes that require responses on the reference and the attribute have not value. There is an error. Error message should be ordered by the attribute Sort order which appears on the requirements reference.	
Send Response This action Submit Supplier Response (Composite Recipe Response, Recipe Response, Label Response or Packaging Response), to End Responses state of the Private Label Supplier Response. Business action PLM Food Email Supplier Record will create a supplier bid record for the current object and send an email to the supplier. Business action, PLM Food Create Supplier Record will create an asset for the supplier bid record and link it to the Supplier Response (Composite Recipe Response, Recipe Response, Label Response or Packaging Response).	
On entry to Initial Response state, a local business update Supplier Response status:	
Status of This Response	Pending Initial response
On transitions out of the Initial Response state, update Status of This Response of the current Supplier Response with: Submitted by [user ID] [ISO Date]. Create a Supplier Record Send email to supplier with a supplier record	
On entry to End Response state, a local business update project status: ▪ Update Version Number ▪ Update Status	

Follow - Up – State	Private Label Food Supplier Responses
Role: Supplier team member	
Pre-Conditions: ▪ Evaluated product specification.	
Details: When supplier Responses are being evaluated in the Private Label Food Product Specification workflow, the customer may have questions about a response or may need some clarification about the response that was given. Customer may add comments or questions to the Supplier Response and return the Supplier Response to the Private Label Food Supplier Response workflow and routed to Follow-up Response task for the supplier to complete requested information. ▪ Supplier is notified that follow-up is needed ▪ Supplier sees comments or questions that require clarification ▪ Supplier may choose to decline the bid ▪ Supplier may not respond.	
Inputs: ▪ Supplier responds ▪ Supplier return responses to customer	
Buttons: **Decline Bid** Capture status on the Supplier Response, the status of related Supplier Responses and Product Specifications will be updated with a business rules upon entry to the End Response state.	
Validate Validate whether the supplier has provided answers to the mandatory attributes on each requirement and/or parameter. If there are attributes that require responses on the reference and the attribute have not value. There is an error. Error message should be ordered by the attribute Sort order which appears on the requirements reference.	
Send Response This action Submit Supplier Response (Composite Recipe Response Recipe Response, Label Response or Packaging Response), to End Responses state of the Private Label Supplier Response. Business action, PLM Food Email Supplier Record will create a supplier bid record for the current object and send an email to the supplier. Business action, PLM Food Create Supplier Record will create an asset for the supplier bid record and link it to the Supplier Response (Composite Recipe Response, Recipe Response, Label Response or Packaging Response).	
On transitions out of the Follow Up Response state, update Status of This Response of the current Supplier Response with: Follow-up submitted by [user ID] [ISO Date] Create a Supplier Record Send email to supplier with Supplier record	
On entry to End Response state, a local business update project status: ▪ Update Version Number ▪ Update Status	

Private Label Food Supplier Bid Status

This workflow is used to provide suppliers a view of the status of their open bids after the supplier has initially submitted the bid. Since the supplier's samples are removed from the Supplier Response Workflow after submitting a bid or responding to a request for a follow-up, this small workflow will provide the supplier a dashboard and quick link to a list of their responses that are still to be evaluated, or that are being considered for the bid.

This workflow is not intended to allow suppliers to modify their bids, only to view them.

Supplier Response Period- state	**Private Label Food Supplier Bid Status**
Role: Supplier	
Pre-Conditions: ▪ Have completed Supplier Response	
Details: Supplier Response (Composite Recipe Response, Recipe Response, Packaging Response or Label Response) will be automatically initiated into the workflow via business rules as they enter to End Responses state of the Private Label Supplier Responses workflow. Show the supplier a list of their Supplier Responses that have been submitted to customer but not yet evaluated because other responses are still pending. ▪ Supplier can export the list of Supplier Responses on Supplier Response Period state to excel ▪ Supplier can review what they submitted (read-only version of the sample that they submitted)	
Inputs: None	
Actions: None	
Business Actions: ▪ Supplier Responses will be moved out of this state by business rules in other workflows.	

In Evaluation- state	Private Label Food Supplier Responses
Role: Supplier	
Pre-Conditions: ▪ Have completed Supplier Response	
Details: Supplier Response (Create a Supplier Record, Recipe Response, Packaging Response or Label Response) will be automatically initiated into the workflow via business rules as they enter to End Responses state of the Private Label Supplier Responses workflow. Show the supplier a list of their Supplier Responses that have been submitted to customer but not yet evaluated because other responses are still pending. ▪ Supplier can export the list of Supplier Responses on Supplier Response Period state to excel ▪ Supplier can review what they submitted (read-only version of the sample that they submitted)	
Inputs: None	
Actions: None	
Business Actions: ▪ Supplier Responses will be moved out of this state by business rules in other workflows.	

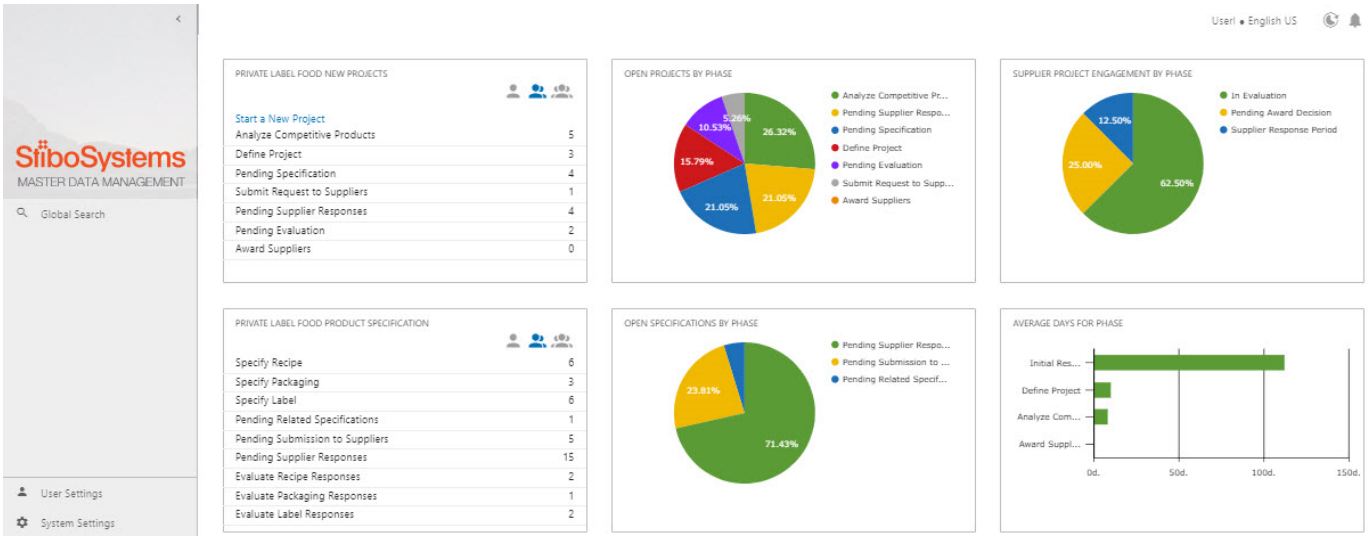
Pending Award Decision - state	Private Label Food Supplier Responses
Role: Supplier	
Pre-Conditions: ▪ Have completed Supplier Response	
Details: Supplier Response (Create a Supplier Record, Recipe Response, Packaging Response or Label Response) will be automatically initiated into the workflow via business rules as they enter to End Responses state of the Private Label Supplier Responses workflow. Show the supplier a list of their Supplier Responses that have been submitted to customer but not yet evaluated because other responses are still pending. ▪ Supplier can export the list of Supplier Responses on Supplier Response Period state to excel ▪ Supplier can review what they submitted (read-only version of the sample that they submitted)	
Inputs: None	
Actions: None	
Business Actions: ▪ Supplier Responses will be moved out of this state by business rules in other workflows.	
On entry to End state, a global business removes current object from the workflow.	

Web UIs used for PLM Private Label Food Solution

PLM private label food solution provides three UI configurations.

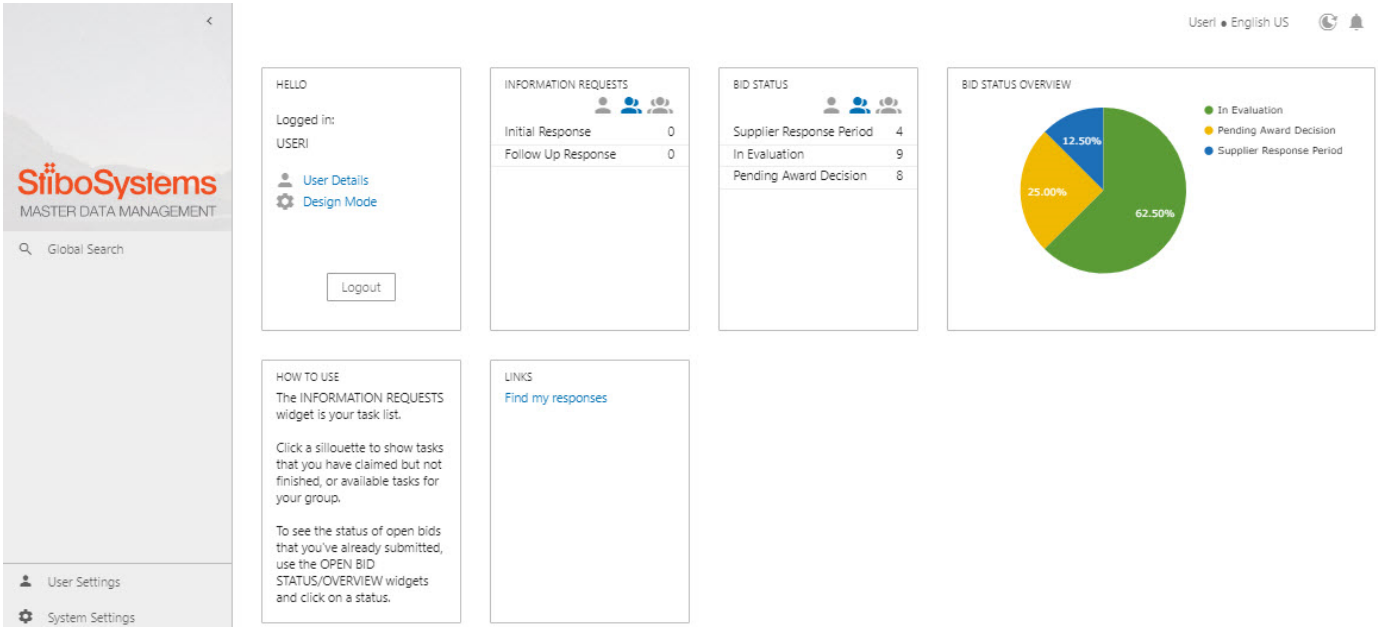
Private Label Food Web UI

The Primary Label Food Web UI configuration supports the Private Label Food New Project workflow and the Private Label Food Product Specification workflow.



Private Label Food Web UI for Suppliers

The configuration for the Private Label Food Web UI for suppliers supports the Private Label Food Supplier Responses Workflow. This UI configuration will facilitate independent work on supplier responses by various suppliers.

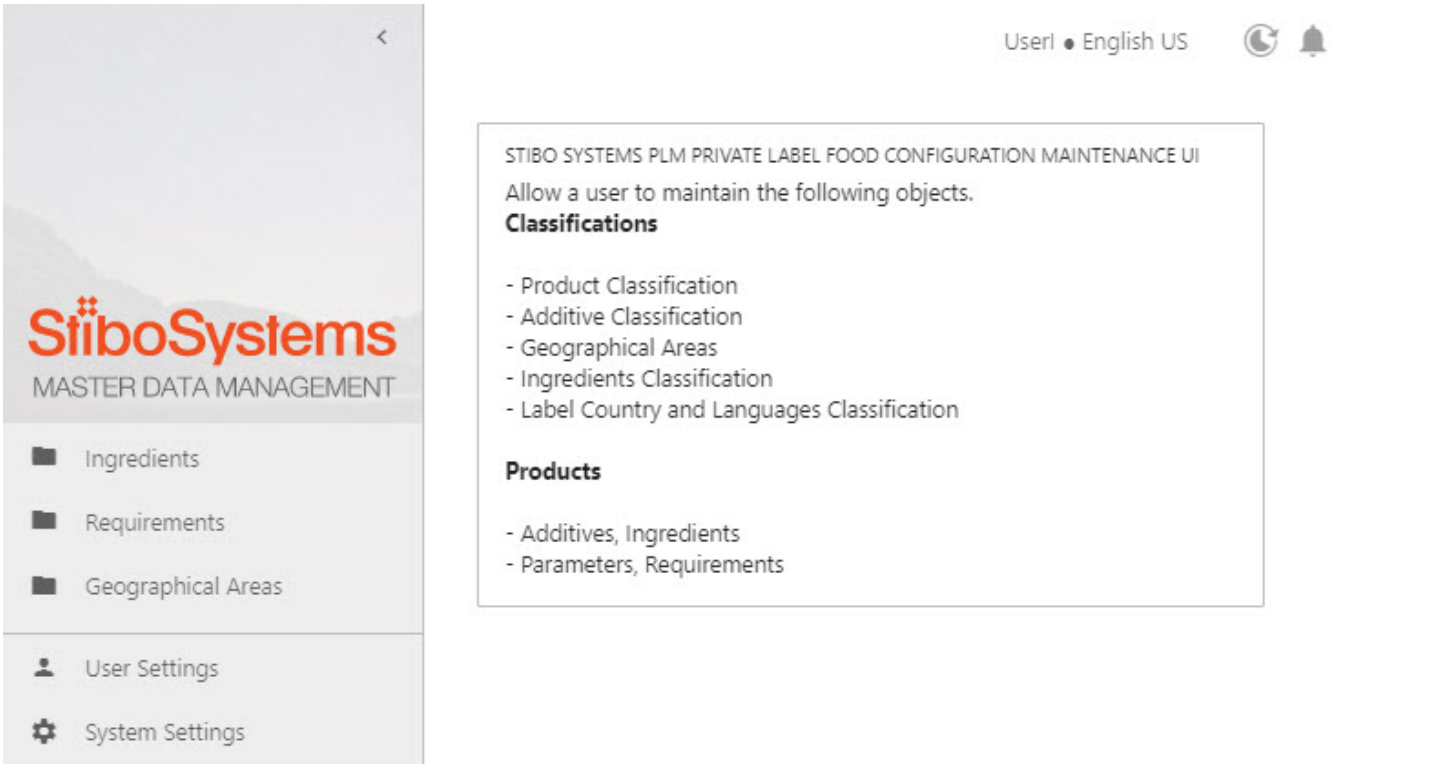


Private Label Food Configuration Maintenance Web UI

The Private Label Food Configuration Maintenance Web UI configuration will support the maintenance of the following objects:

- Product Classification
- Additive Classification
- Geographical Areas
- Ingredients Classification
- Label Country
- Languages Classification.

Additionally, it supports Additives, Ingredients, Parameters, and Requirements.



Note: This Web UI is not controlled by a workflow.

For more details, contact your Stibo Systems account manager or partner manager.

Web UI New Components

Please review the online help documentation for the following:

- PLM for Admins
- PLM for Users

STEPXML Configuration Files

For more details, contact your Stibo Systems account manager or partner manager.

PLM to PMDM Transformation Overview

An important benefit of having PLM in the same STEP system where product master data management takes place is that pertinent details can be made available earlier to Data Stewards who need to enrich newly introduced items. These newly enriched items will then be published on websites or made available for other channels. A project in the Private Label Food solution is complete when suppliers are awarded. One PMDM product is created for each of the awarded labels in the finalized project.

The PMDM product will be linked to a recipe object containing all the detailed information about the ingredients and nutritional data, and it will also be linked to the finalized PLM project, enabling the PMDM user to easily view additional information about the PLM project.

The following artifacts were created for this functionality:

- Recipe Library Data model
- A business rule for creating a library recipe for the awarded recipe(s)
- A business rule for finalizing a PLM project, removing objects that are not awarded and moving the PLM project into a finalized library
- A business rule for creating PMDM products for each of the awarded PLM labels and to start the PMDM product in a PMDM new product introduction workflow

Note: PLM Private Label Food Solution to PMDM transformation will be done using standard STEP platform capabilities, and no additional Web UI components was developed as part of this functionality.

Recipe Library

A library recipe is an object that is generated from the awarded supplier recipe and stored in a library so that users can view the recipe. The library recipe is also linked to the PMDM product in case additional information about the recipe needs to be reviewed.

Data Model

The recipe library is organized with the following Product object hierarchy:

Object Type ID	Object Type Name	Description
PLMRecipeLibraryRoot	Recipe Library Root	The root object type for the recipe library
PLMRecipeLibraryGroup	Recipe Library Group	A self-referenced object type to organize the library recipes
PLMLibraryRecipe	Library Recipe	The library recipe

A library recipe has three data containers for storing nutrition values, nutrition daily values, and all other information from the supplier recipe.

Data Container ID	Data Container Name	Description
PLMLibraryRecipeValues	Library Recipe Values	Data container for storing attribute values from the supplier recipe
PLMLibraryRecipeNutritionValues	Library Recipe Nutrition Values	Data container for the recipe's nutritional values
PLMLibraryRecipeNutritionDVValues	Library Recipe Nutrition DV Values	Data container for the recipe nutritional daily values

All attributes for the library recipes are located in the attribute group Library Recipe Values (PLMLibraryRecipeValues).

Attribute ID	Attribute Name	Description
PLMLibraryRecipeAttributeID	Library Recipe Attribute ID	Storing the STEP ID for the source attribute
PLMLibraryRecipeAttributeName	Library Recipe Attribute Name	Storing the STEP name for the source attribute
PLMLibraryRecipeAttributeValue	Library Recipe Attribute Value	Storing the value

Finalized Project

A finalized project is where a supplier has been awarded, the project will be moved out of the design specification hierarchy of active projects, and any objects that are not part of the awarded recipe(s) will be deleted.

Data Model

The recipe library will be organized with the following Product object hierarchy:

Object Type ID	Object Type Name	Description
PLMFinalizedProjectRoot	Finalized Project Root	The root object type for the finalized projects
PLMFinalizedProjectGroup	Finalized Project Group	A self-referenced object type to organize the finalized projects
PLMDesignSpecification	Design Specification	The PLM project

Creating a PMDM Product

When a PLM project has been awarded to one or more suppliers, a PMDM product is created for each of the awarded labels. This configuration is an example of how the PLM to PMDM product transformation can be done. Project implementations should be tailored to classify the new product in the existing PMDM product hierarchy.

When a PLM project is created it is linked to a product category which is a GS1 global product classification. For PMDM products a similar hierarchy is created, and the PMDM product is placed in the same location in the GPC hierarchy as the PLM project.

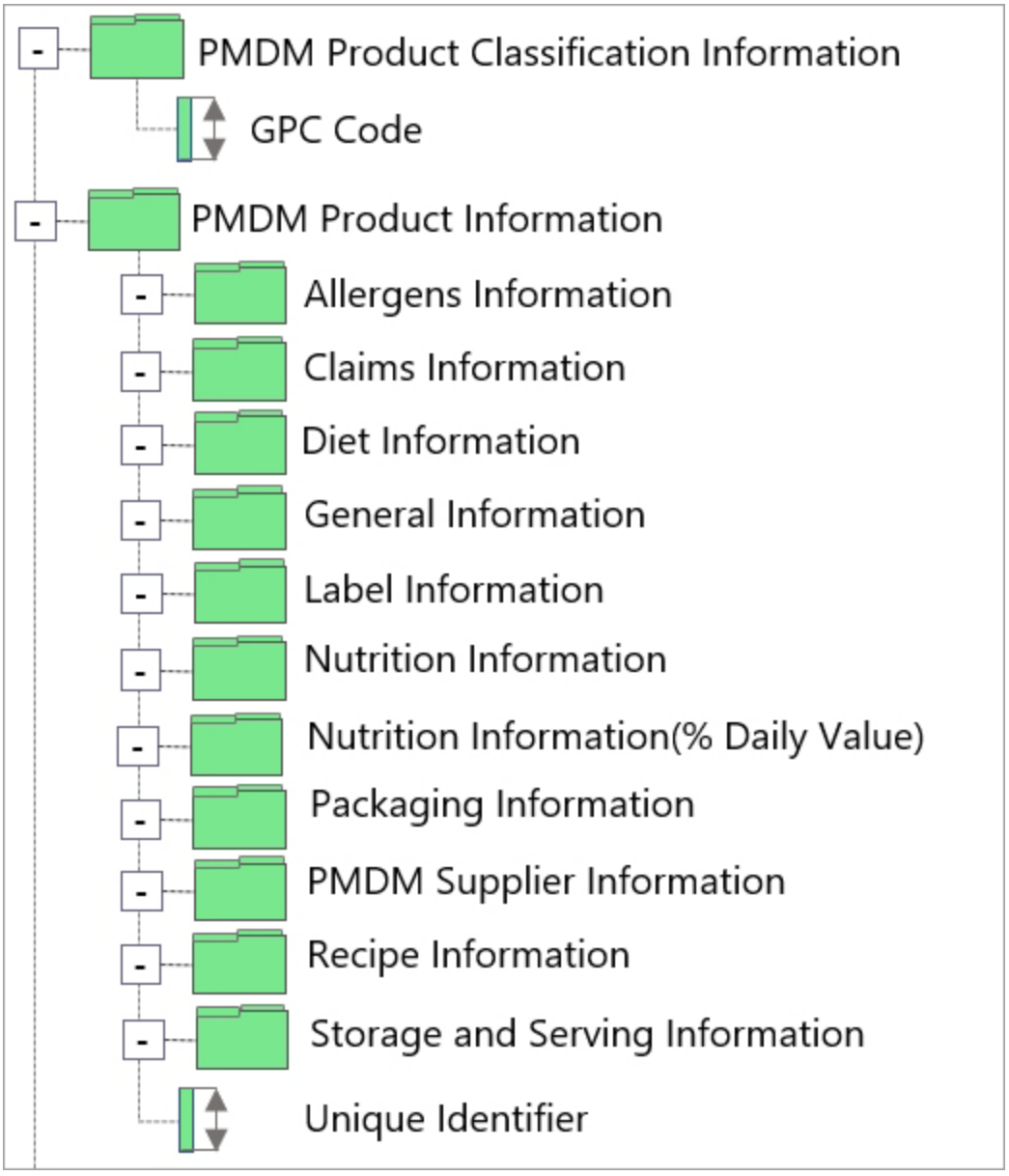
A PMDM product will be populated with a number of values from the PLM project.

Data Model

Products are created in a GPC hierarchy (PMDM Product Classifications). This classification can be replaced with the existing PMDM product hierarchy by modifying a business action.

Object Type ID	Object Type Name	Description
PMDMProductClassificationsRoot	PMDM Product Classifications	Root object type for GPC classification
PMDMProductSegment	PMDM Product Segment	Following GPC standard
PMDMProductFamily	PMDM Product Family	Following GPC standard
PMDMProductClass	PMDM Product Class	Following GPC standard
PMDMProductGroup	PMDM Product Group	Following GPC standard
PMDMProduct	PMDM Product	The PMDM product

Attributes for the PMDM product are all located in the attribute group PMDM Product Information.


PMDM Product Classification Information
GPC Code
PMDM Product Information
Allergens Information
Claims Information
Diet Information
General Information
Label Information
Nutrition Information
Nutrition Information(% Daily Value)
Packaging Information
PMDM Supplier Information
Recipe Information
Storage and Serving Information
Unique Identifier

Private Label Food New Project Web UI

In the existing solution for private label food, the business action PLM Food Award Bid (PLMFoodAwardBid) has been modified to include the business actions described below.

PLM Food Award Bid

- **Business Rule ID**: PLMFoodAwardBid
- **Scope**: Global (Action)
- **Dependencies**: N/A
- **Valid Object Types**: Design Specification
- **Trigger**: On transition out of Award Bid state of the Private Label Food new Project workflow
- **STEP Workflow using this Business Rule**: PLMPrivateLabelFoodNewProject
- **Business Rules using this Business Rules**: N/A
- **Description**: Validate the status of all Label Variant Sample objects related to the Label Variant Specification for the current project. If the value of attribute Status of This Response is (Declined by, No Response, or Canceled by), return true. Then validate if the value of attribute Awarded Bid in each Label Variant Sample is equal to 'Y,' if it is not, return Submit error message:
- **Referenced Other BA Business Action**: N/A

PLM Food Create Recipe Library

The business action PLM Food Create Recipe Library (PLMFoodCreateRecipeLibrary) creates the library recipe (s) based on the number of awarded recipes for a project.

It is valid for the Design Specification (PLMDesignSpecification) object type, and it has two binds:

- Node for the current object
- Manager for the STEP manager

The main flow of the business action is:

- Get a list of the awarded recipes
- Get (if the project group already exists) or create the library group the library recipe will be created under. The hierarchy for the library recipe has two levels. As shown in the image below, the top level is the name of the parent of the project of the recipe, the Design Specification Level 1 (PLMDesignSpecificationLevel1) object. The next level is the name of the product category the project is linked to, the name of the target of the PLMProductCategory reference.

- Link the library recipe to the recipe source sample, PLMRecipeSourceSample
- Link the library recipe to the recipe source project, PLMRecipeSourceProject
- Link the library recipe to the supplier, PLMRecipeSupplier
- Set the recipe revision number
- Copy values from the supplier recipe to the library recipe
- Populate the data containers with nutritional values, nutritional daily values and all other values from the supplier recipe.
- Generate an ingredients list from the supplier recipe and save it to the library recipe

PLM Food Finalize Project

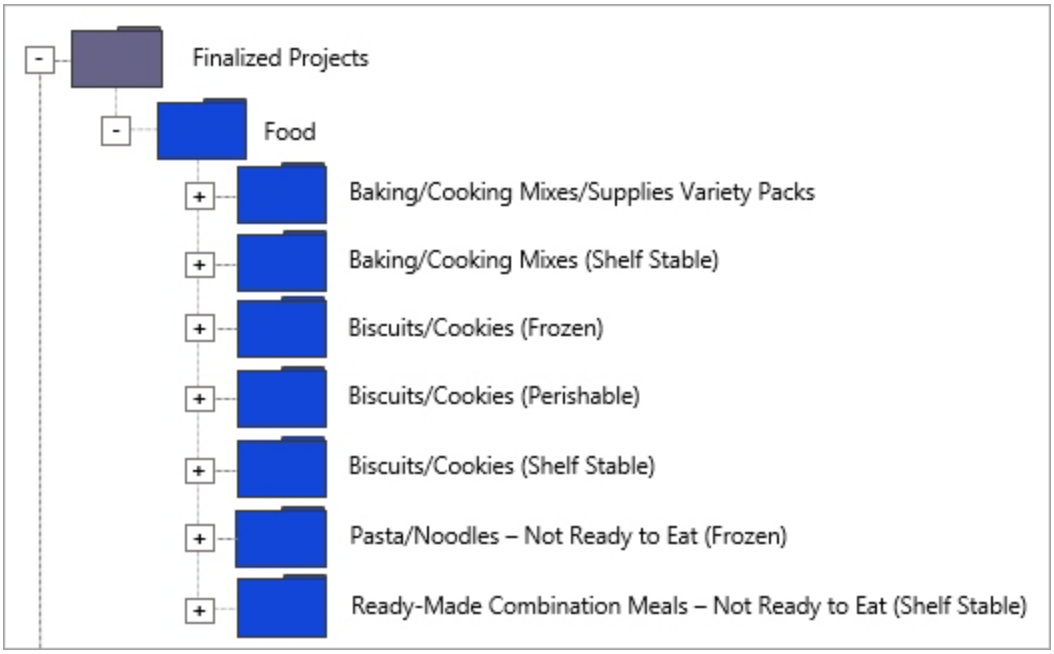
The business action PLM Food Finalize Project (PLMFoodFinalizeProject) reparents the PLM project and deletes any project related objects that were not awarded.

It is valid for the Design Specification (PLMDesignSpecification) object type, and it has two binds:

- Node for the current object
- Manager for the STEP manager

The main flow of the business action is:

- Get (if the project group already exists), or create the finalized project group the project will be moved to. The hierarchy for the finalized projects has two levels. The top level is the name of the parent of the project of the recipe, the Design Specification Level 1 (PLMDesignSpecificationLevel1) object. The next level is the name of the product category the project is linked to, the name of the target of the PLMProductCategory reference.



- Reparent the project to the finalized project group
- Delete none awarded labels
- Deleted none awarded samples
- Delete none awarded variants

Note: When the samples and variants are deleted, all of the of the related specified ingredients, supplier response ingredients, and packaging elements are also deleted.

PLM Food Create PMDM Product

The business action PLM Food Create PMDM Product (PLMFoodCreatePMDMProduct) creates a PMDM product for each of the awarded PLM labels and copies a number of PLM values to it.

It is valid for the Design Specification (PLMDesignSpecification) object type, and it has two binds:

- Node for the current object
- Manager for the STEP manager

The main flow is:

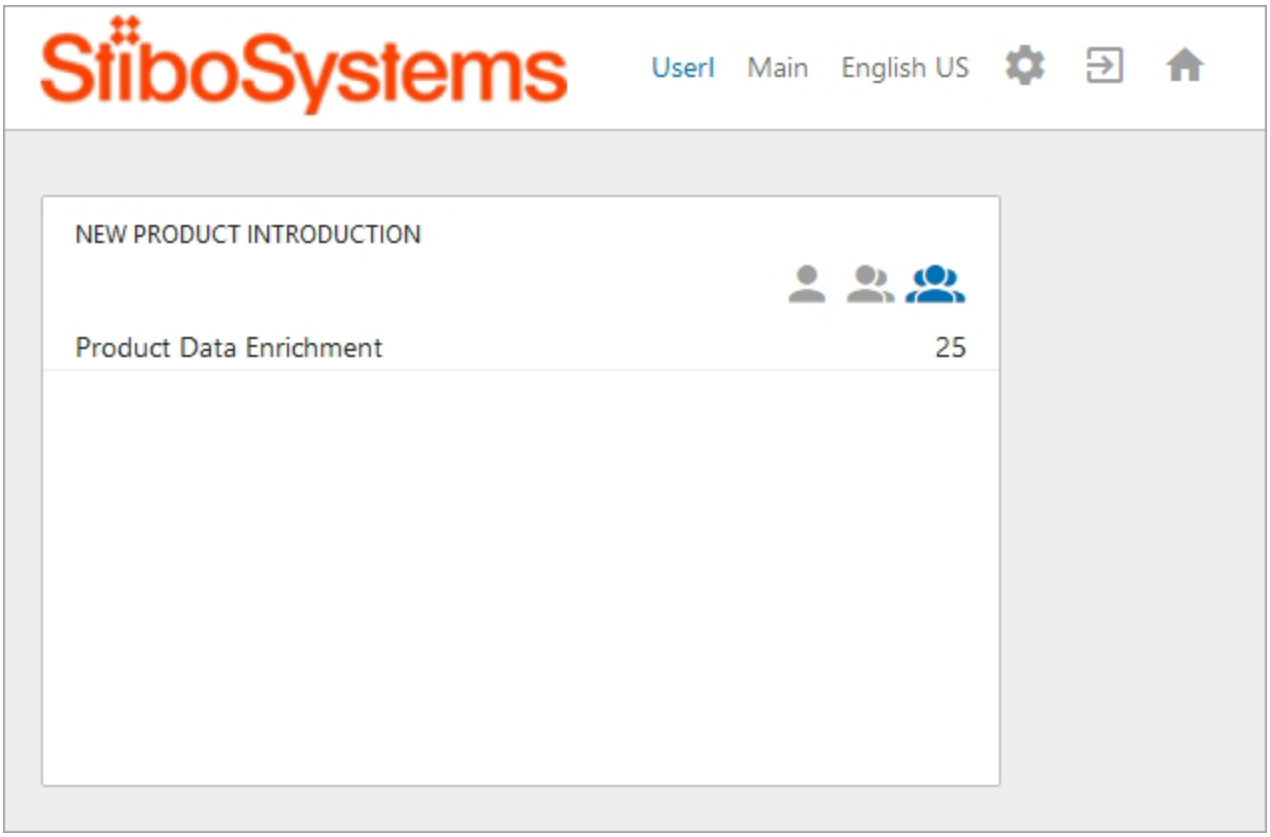
- Get awarded labels
- Get the GPC product category (based on PLM project)
- Create PMDM product
- Copy values from the PLM label to the PMDM product
- Copy values from the PLM packaging to the PMDM product
- Copy values from the PLM recipe to the PMDM product
- Link the PMDM product to the library recipe

Web UI PMDM New Product Introduction

The 'PMDM New Product Introduction' Web UI is intended to be used to enrich the PMDM product, making it ready for selling in multiple channels.

The Web UI includes a simple workflow for demo purposes, PMDM New Product Introduction, with two workflow states: Product Data Enrichment and End.

Note: Most Web UIs are configured to not show the last 'End' state. The image below reflects this common configuration.



Note: No data exists for enrichment in the sample PMDM New Product Introduction Web UI. This is an example that will be extended based on the specific need for the user.

Use Case

In the images below, after supplier responses (Recipe, Packaging, and Label) for the Chocolate Cookie product have been evaluated and ranked, the purchasing (sourcing) team has decided to award the contract to Supplier A.

Chocolate Cookie Project DESIGN SPECIFICATION ● ID:DS-145642

Best Brand ● Chocolate Chip Cookies

Supplier Ranking | Related Specifications | Project Information | Competitive Analysis

Clear filter | Freeze panes

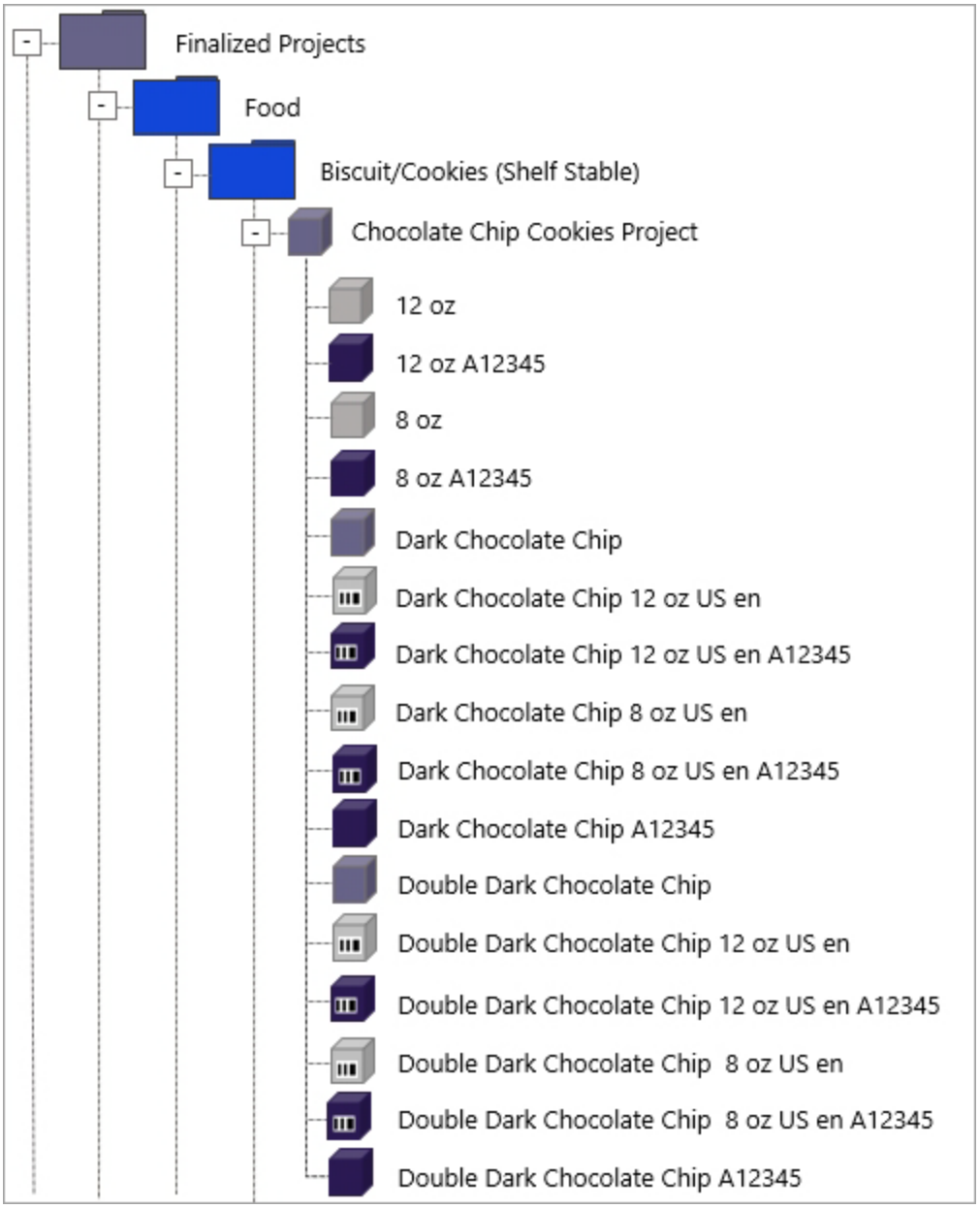
Supplier's Name	Supplier's ID Number	Type	Specification Name	Recipe Number	Supplier Response Ranking	Awarded Bid?	Status of This Response
Supplier A	A12345	Recipe Response	Chocolate Chip Cookies Dark Chocolate Chip A12345	R-145716	7		Evaluation completed [2019-04-10]
Supplier A	A12345	Recipe Response	Chocolate Chip Cookies Double Dark Chocolate Chip A12345	R-145718	7		Evaluation completed [2019-04-10]
Supplier A	A12345	Packaging Response	Chocolate Chip Cookies 8 oz A12345				Evaluation completed [2019-04-10]
Supplier A	A12345	Packaging Response	Chocolate Chip Cookies 12 oz A12345		8		Evaluation completed [2019-04-10]
Supplier A	A12345	Label Response	Chocolate Chip Cookies Dark Chocolate Chip 8 oz US en A12345		7	Yes	Evaluation completed [2019-04-10]
Supplier A	A12345	Label Response	Chocolate Chip Cookies Dark Chocolate Chip 12 oz US en A12345		8	Yes	Evaluation completed [2019-04-10]
Supplier A	A12345	Label Response	Chocolate Chip Cookies Double Dark Chocolate Chip 8 oz US en A12345		7	Yes	Evaluation completed [2019-04-10]
Supplier A	A12345	Label Response	Chocolate Chip Cookies Double Dark Chocolate Chip 12 oz US en A12345		8	Yes	Evaluation completed [2019-04-10]
Supplier B	B12345	Recipe Response	Chocolate Chip Cookies Dark Chocolate Chip B12345	R-145717	9		Evaluation completed [2019-04-10]
Supplier B	B12345	Recipe Response	Chocolate Chip Cookies Double Dark Chocolate Chip B12345	R-145719	9		
Supplier B	B12345	Packaging Response	Chocolate Chip Cookies 8 oz B12345				Evaluation completed [2019-04-10]
Supplier B	B12345	Packaging Response	Chocolate Chip Cookies 12 oz B12345		9		Evaluation completed [2019-04-10]
Supplier B	B12345	Label Response	Chocolate Chip Cookies Dark Chocolate Chip 8 oz US en B12345		8		Evaluation completed [2019-04-10]
Supplier B	B12345	Label Response	Chocolate Chip Cookies Dark Chocolate Chip 12 oz US en B12345		9		Evaluation completed [2019-04-10]
Supplier B	B12345	Label Response	Chocolate Chip Cookies Double Dark Chocolate Chip 8 oz US en B12345		9		Evaluation completed [2019-04-10]
Supplier B	B12345	Label Response	Chocolate Chip Cookies Double Dark Chocolate Chip 12 oz US en B12345		9		Evaluation completed [2019-04-10]

Number of items: 16

Reset | Save | Cancel Project | Validate | Award Complete

A purchasing team member executes the action Award Complete, and with this action, the Chocolate Cookie project has been finalized. The new product needs to start the lifecycle in the PMDM system.

As shown below, Chocolate Chip Cookies Project is moved to the Finalized Projects hierarchy.

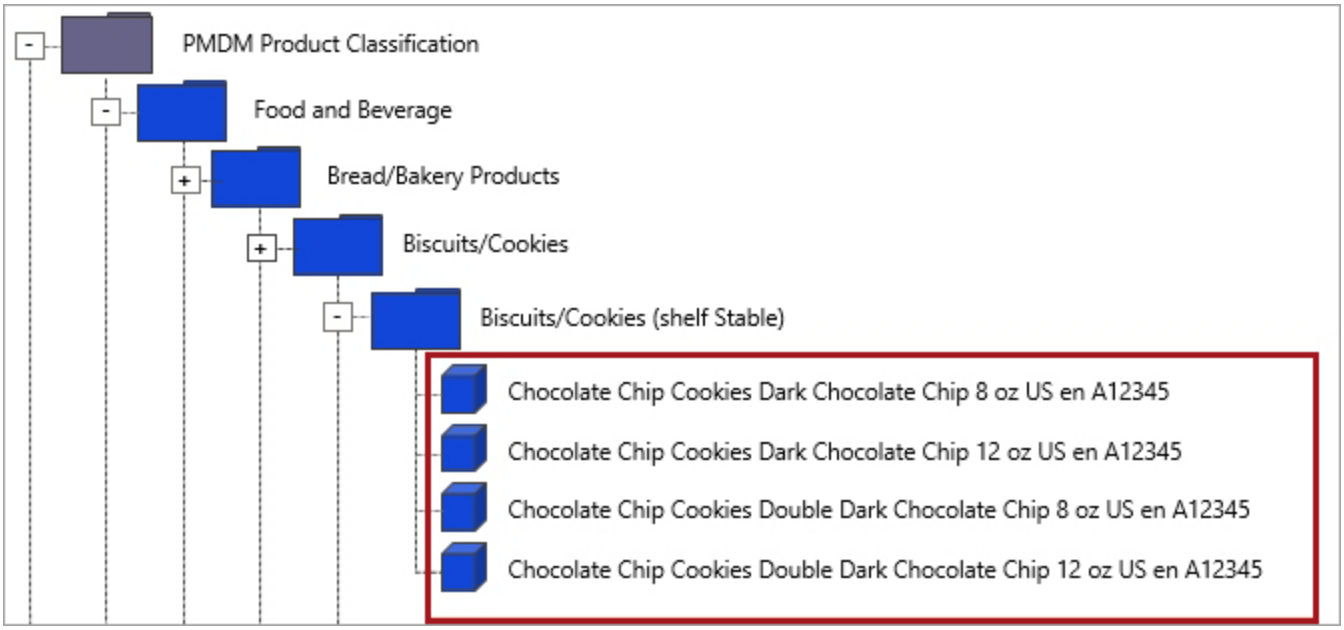


For suppliers other than Supplier A:

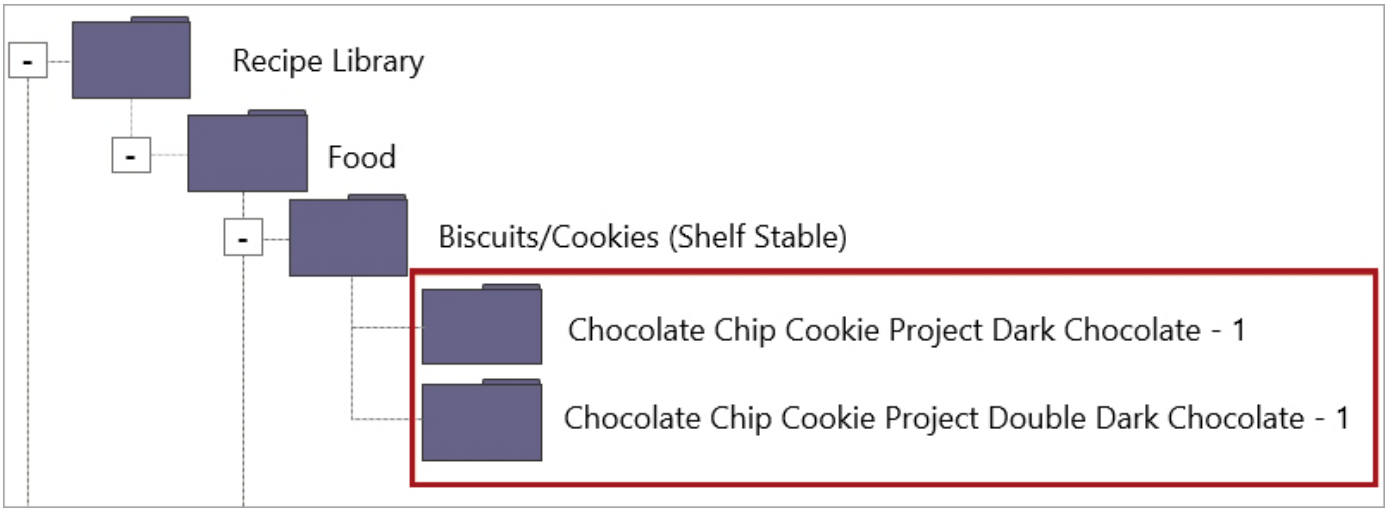
- None awarded Recipe Response are deleted
- None awarded Label Response are deleted
- None awarded Packaging Response are deleted

Note: When the Recipe Specifications, Label Specifications, and Packaging Specifications that were not awarded are deleted, all the related specified ingredients, supplier responses ingredients, and packaging elements are also deleted.

One PMDM product was created for each awarded label for Supplier A.



The awarded supplier recipe is stored in a library so that users can view the recipe. The library recipe is also linked to the PMDM product in case additional information about the recipe needs to be reviewed.



Multi-Reference Editor Conditional Settings Overview

The private label food solution uses a Multi-Reference Editor to improve the data review process.

In the PLM data model, most of the data is maintained on references, and a user works on creating one reference at the time. The user then adds metadata to the references and runs validations on the added data.

Suppliers are able to improve the completeness of their responses on a Multi-Reference Editor to specific information based on a conditional or conditionally mandatory attribute or flex attribute. With the more improved response, communication loops between the Product Developers and the suppliers are significantly reduced.

The following solution enablement documentation outlines how to use the conditional settings on the Multi-Reference Editor to improve supplier response efficiency.

Conditional Attribute

A conditional attribute is controlled by a specific value of a dependent attribute. Any attribute can be configured as a conditional attribute, but it must be made valid for either the 'Requirement' or 'Parameter' reference.

For out of the box PLM Private Label Food solution, the following attributes can configure to be conditional:

For Requirements	For Parameters
Requirement	Requirement
Requirement Description	Parameter Description
Meets Requirement?	Meets Requirement?
Response Detail	Response Detail
Additional Comments	Method
Help Text	Help Text

How to Configure a Conditional Attribute in the Multi-Reference Editor

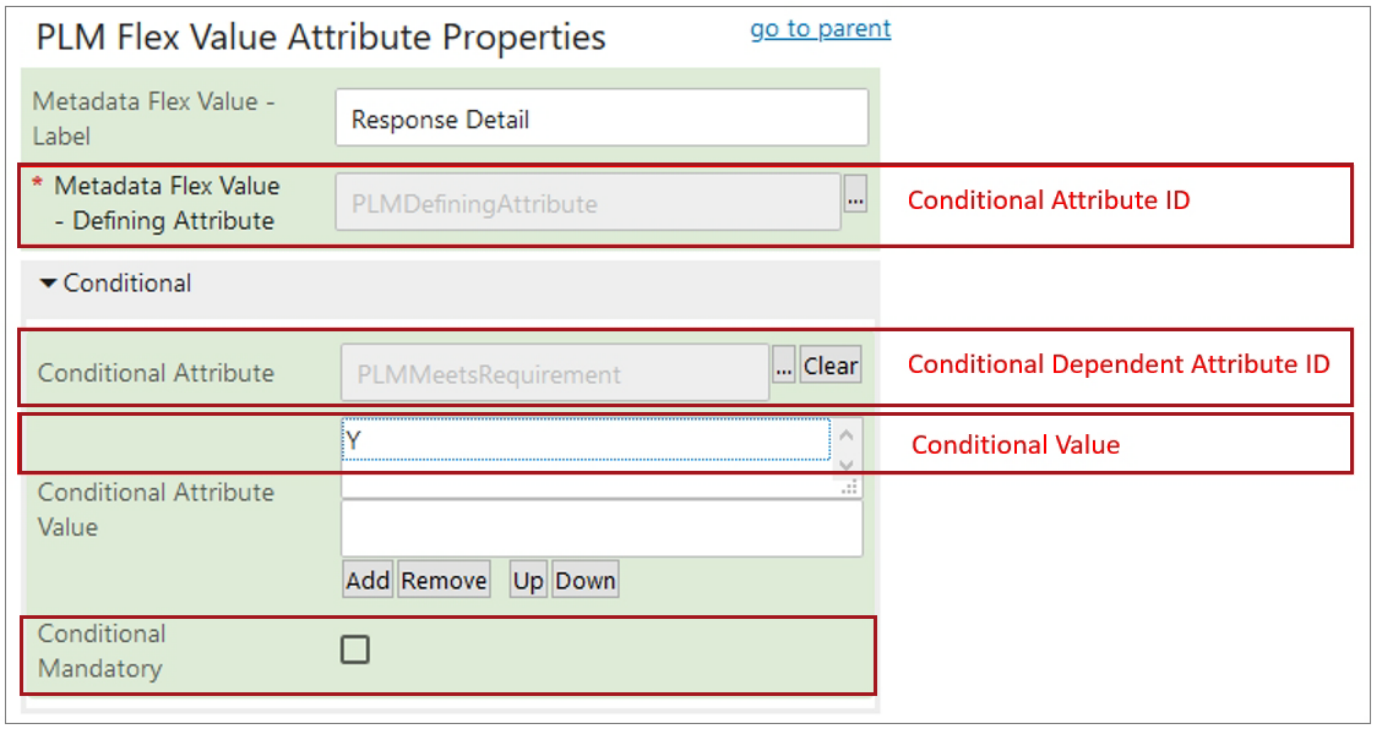
A conditional attribute in the Multi-Reference Editor can be configured in the Web UI designer on either the PLM Create Reference Action or PLM Edit Reference Action using either the PLM Attribute Value or PLM Flex Value Attribute child components.

Pre-requisites:

- Identify conditional attribute and attribute value
- Identify the conditional dependent attribute
- Business Function Conditional Rule – Optional

Conditional Attribute - PLM Flex Value Attribute

A conditional attribute is immediately shown after meeting the specified condition. There is no need to save the entered value into the conditional dependent attribute.



Note: If the conditional attribute is an LOV with IDs, then the conditional attribute value is the LOV ID not the value.

Use Case Conditional Attribute

A Quality Manager is responsible for preparing requirements and parameters for new products, which display in the Answer Requirements dialog that must be responded to by suppliers. The dialog can be enhanced to improve the completeness of supplier responses based on set conditions.

For example, to reduce the feedback loops of communication between the Quality Department and the supplier, and to guarantee that a supplier's responses are complete when submitted to the customers (buyer), the quality team has decided to implement the following conditional attributes.

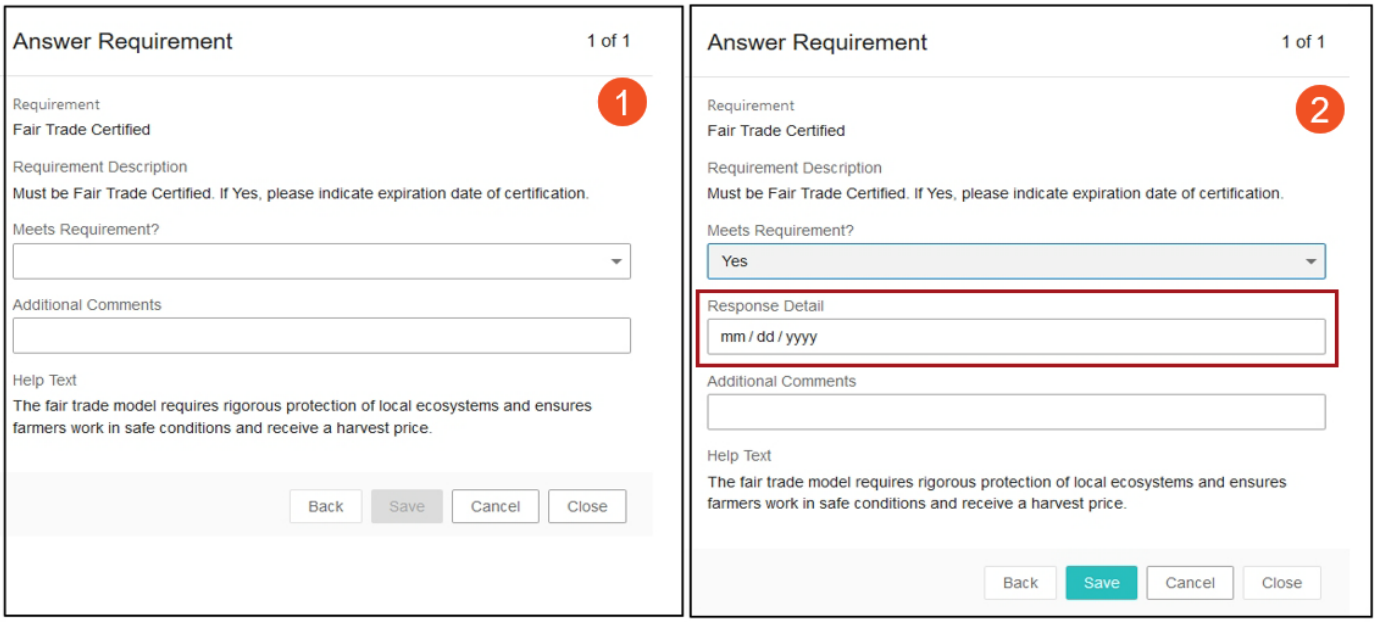
The 'Response Detail' attribute will be **conditional** based in the value of the 'Meets Requirement' attribute.

- If the 'Meets Requirement,' response value is **No**, then the 'Response Detail' attribute will not display in the Answer Requirement dialog, and Save button will be **enabled**. The supplier is able to continue and save the response.
- If the 'Meets Requirement,' response value is **Yes**, then the 'Response Detail' attribute will display in the Answer Requirement dialog. The supplier can choose to either complete or not complete the 'Response Detail' parameter. Either way, there is no limitation set to save the response, and the Save button will be **enabled**.

After the mandatory conditional configuration for the 'Meets Requirement' attribute has been implemented, Laura, from supplier A, receives an email notification that a new bid has been requested from the customer, CIBUS.

Laura accesses the Web UI for suppliers, opens the Chocolate Cookie Project Dark Chocolate Chip A12345 recipe response, and starts the process of completing the requested information for the recipe ingredients, requirements, and parameters.

Laura selects the 'Fair Trade' requirement and for the 'Meets Requirement' attribute responds with **Yes**. This affirmative response then triggers the conditional mandatory 'Response Detail' attribute to immediately show having met the set condition.



Conditional attributes in the Answer Requirement or Answer Parameter dialogs do not disable the Save action. A user can save the resposed even when the conditional attribute value is empty.

Conditional Mandatory on a PLM Edit Reference Action

An attribute can be configured as conditional mandatory when a dependent attribute has a specific value, and the Conditional Mandatory parameter is selected in the PLM Flex Value Attribute properties components.

Any attribute can be configured to be used as a conditional mandatory attribute, but it must be a valid attribute on the Requirement or Parameter reference.

In the PLM Private Label Food out of the box solution, the following attributes can be configured to be **conditional mandatory**:

For Requirements	For Parameters
Requirement	Requirement
Requirement Description	Parameter Description
Meets Requirement?	Meets Requirement?
Response Detail	Response Detail
Additional Comments	Method
Help Text	Help Text

Note: Conditional attribute and conditional dependent attribute must be a valid attribute in the Requirement or Parameter reference.

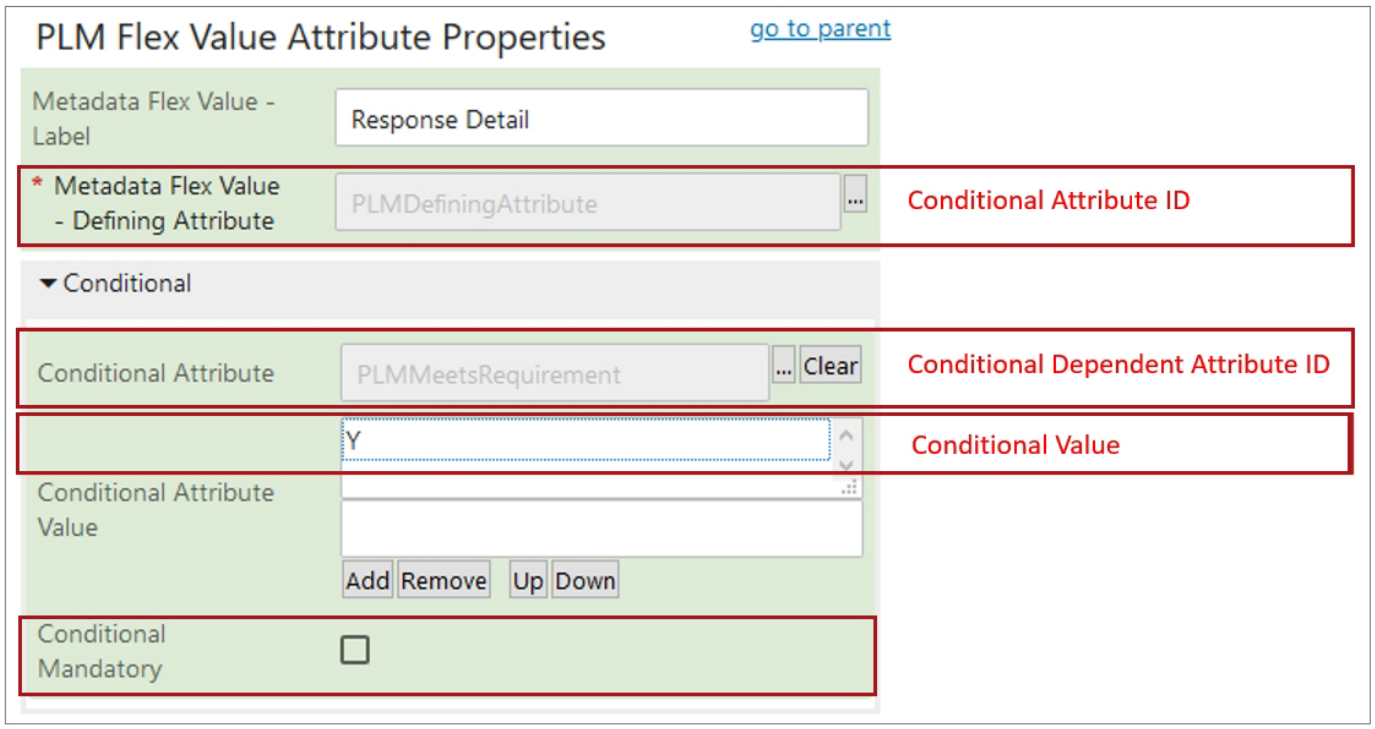
How to configure a Conditional Attribute - PLM Flex Attribute

A conditional attribute can be configured in the Web UI designer on either the PLM Create Reference Action or PLM Edit Reference Action using either the PLM Attribute Value or PLM Flex Value Attribute child components.

Pre-requisites:

- Identify conditional attribute and attribute value
- Identify the conditional dependent attribute
- Business Function Conditional Rule – Optional

Note: Conditional attribute and conditional dependent attribute must be a valid attribute for the Requirement or Parameter reference.


PLM Flex Value Attribute Properties
go to parent
Metadata Flex Value - Label
Response Detail
* Metadata Flex Value - Defining Attribute
PLMDefiningAttribute
Conditional Attribute ID
Conditional
Conditional Attribute
PLMMeetsRequirement
Clear
Conditional Dependent Attribute ID
Y
Conditional Value
Conditional Attribute Value
Add
Remove
Up
Down
Conditional Mandatory

Use Case Conditional Mandatory Attribute

A Quality Manager from CIBUS is reviewing the supplier responses they received for the Requirements and Parameters after the implementation of the conditional attribute functionality for 'Response Detail' attribute. The quality manager from CIBUS noticed that even when the conditional functionality has been implemented, suppliers tend to still not provide an answer for the 'Response Detail' parameter when the 'Meets Requirement' attribute value is set to **Yes**.

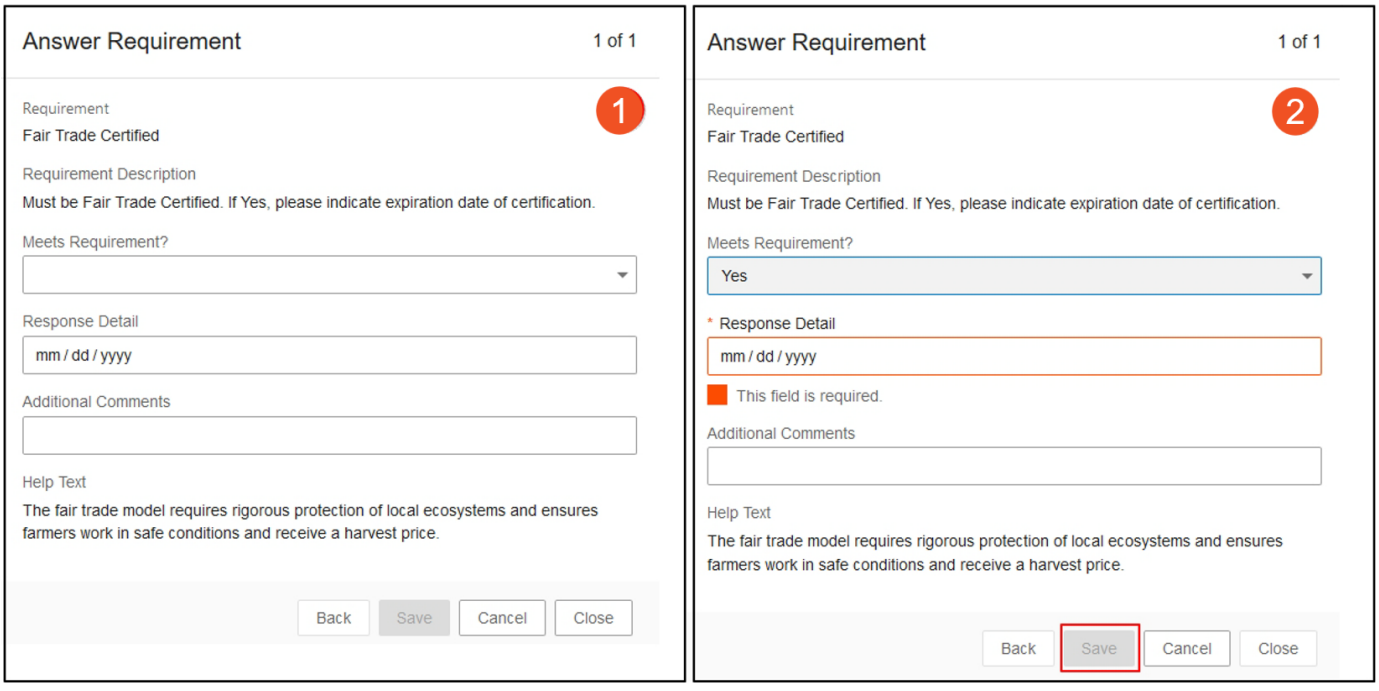
To ensure that the 'Response Detail' attribute must be complete by a supplier in their responses, the 'Response Detail' attribute needs to be conditional mandatory based in the value of the 'Meets Requirement' attribute.

- If the 'Meets Requirement' attribute response value is **No**, then the 'Response Detail' attribute will not be displayed in the Answer Requirement dialog, and Save button will be enabled. The supplier will continue and Save the response.
- If the 'Meets Requirement' attribute response value is **Yes**, then the 'Response Detail' attribute will be displayed in the Answer Requirement dialog. The Save button will be disabled. A supplier must complete the 'Response Detail' to continue and Save the response.

After the mandatory conditional configuration for Meets Requirement attribute has been implemented, Laura from supplier A receives an email notification that a new bid has been requested from the customer, CIBUS.

Laura accesses the Web UI for suppliers, opens the Chocolate Cookie Project Dark Chocolate Chip A12345 Recipe Response, and starts the process of completing the requested information for recipe ingredients, requirements, and parameters.

Laura selects the 'Fair Trade' Requirement and responds **Yes** to Meets Requirement. Immediately, the 'Response Detail' attribute is displayed as mandatory and highlighted. A message displays underneath the 'Response Detail' attribute further telling the supplier that the attribute is required to hold a value before the dialog can be Saved.



The conditional mandatory 'Response Detail' displays as a required field based on the dependent 'Meets Requirement?' attribute. If the value is **Yes**, then the Save button is disabled until the 'Response Detail' required field is populated.

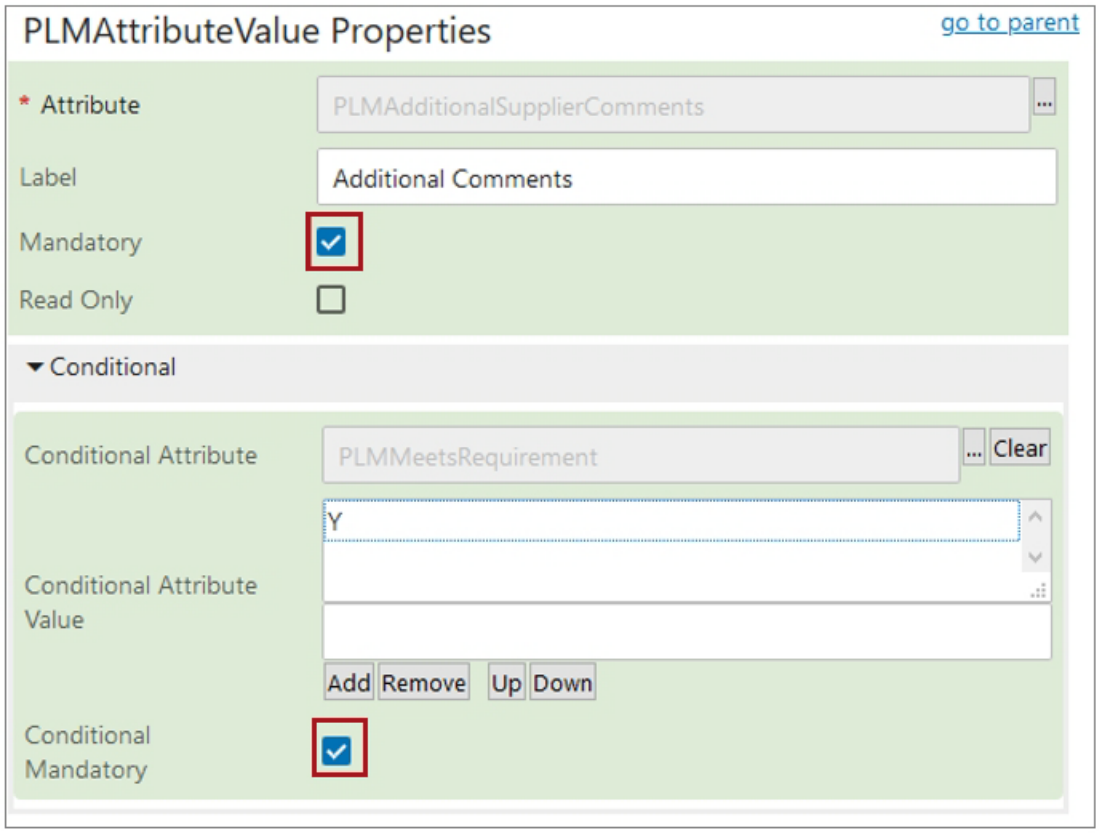
If the dependent attribute 'Meets Requirement?' has the value of **No**, then the conditional attribute 'Response Detail' displays but is not required.

Example 1: Conditional Mandatory Attribute, Mandatory

The conditional attribute 'Additional Comments' will always be shown as a mandatory attribute indicated by a red asterisk (*).

In this case, it is configured by entering the dependent attribute ID into the Conditional Attribute field, PLMAdditionalSupplierComments. The triggering value of **Y (LOV ID)** for PLMMeetsRequirement is entered into the Conditional Attribute Value field. Aditionally, the checkbox for making this mandatory is selected for the conditional attribute Additional Supplier Comments and Conditional Mandatory for dependent attribute PLMMeetsRequirement.

Both the Mandatory and conditional mandatory are selected, making the attribute 'Additional Comments' always shown as mandatory. The same result can be achieved by making the attribute 'Additional Comments' mandatory and not specify any of the conditional fields.



Note: This case is the same as indicating the 'Additional Comment' attribute to be mandatory with no conditional fields defined. Since the 'Additional Comments' attribute is mandatory, it will always be displayed as mandatory, independent of the conditional value. However, if instead the 'Additional Comment' attribute was set to mandatory and the conditional mandatory set to false, then the 'Additional Comment' attribute would only display if 'Meets Requirement' is answered as **Yes**. It would also display as mandatory.

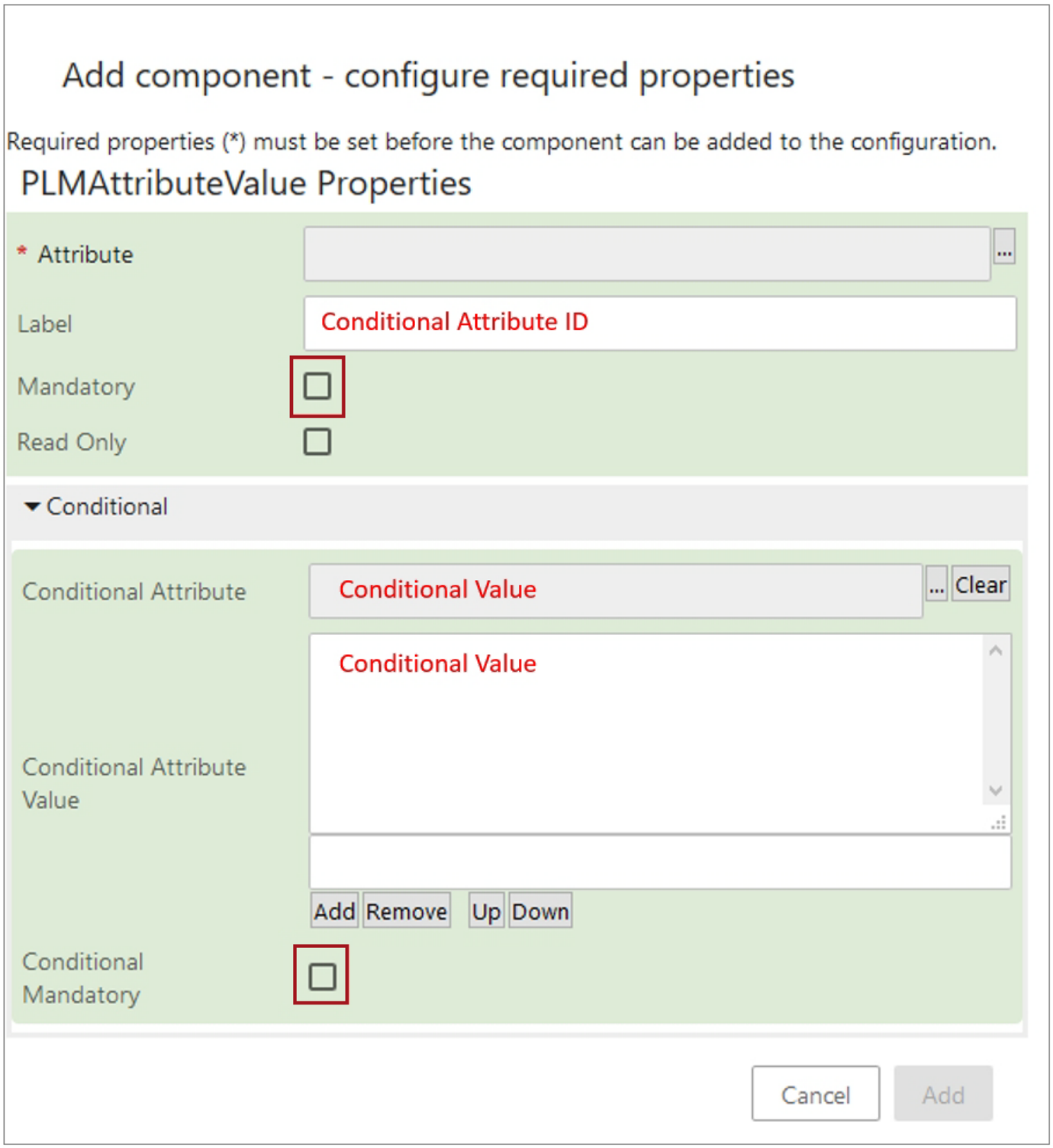
Conditional and Conditional Mandatory

Any attribute can be configured to be used as conditional and/or conditional mandatory, but it must be a valid attribute on the Requirement or Parameter reference.

In the PLM Private Label Food out of the box solution, the following attributes can be configured to be **conditional** or **conditional mandatory**.

For Requirements	For Parameters
Requirement	Requirement
Requirement Description	Parameter Description
Meets Requirement?	Meets Requirement?
Response Detail	Response Detail
Additional Comments	Method
Help Text	Help Text

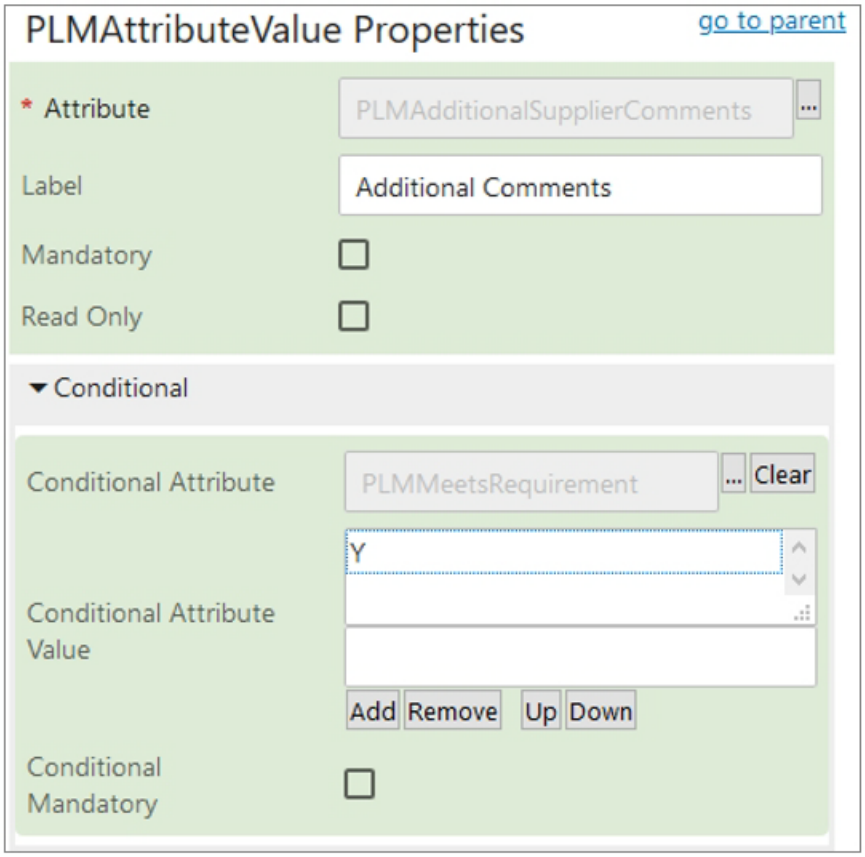
A Web UI admin will be able to configure conditional attributes and conditional mandatory attributes on the PLM Edit Reference Action.



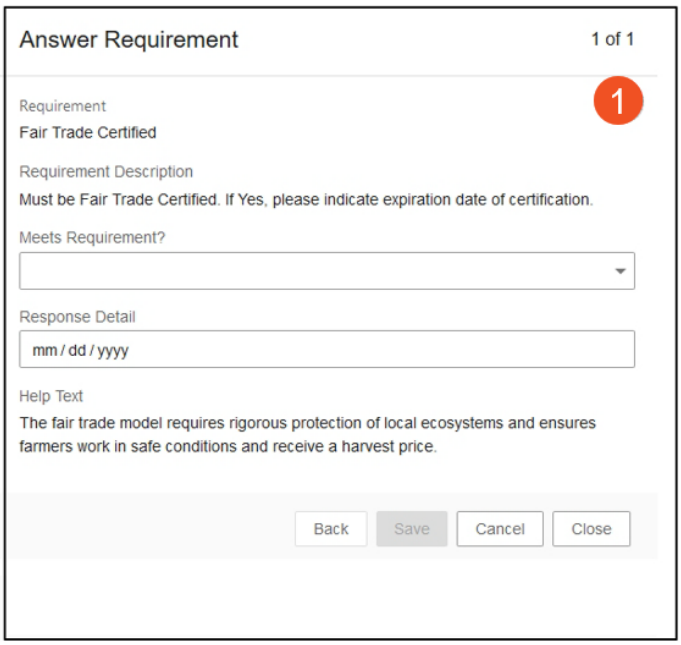
Example 1: Conditional Attribute

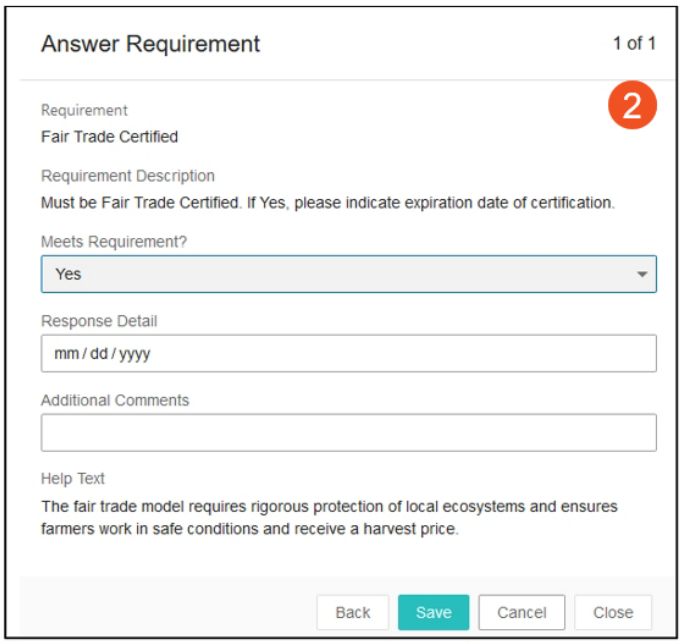
The conditional attribute 'Additional Supplier Comments' is shown to the user when the dependent attribute 'Meets Requirement' has a value equal to **Yes**.

This is configured by entering the dependent attribute ID into the Conditional Attribute field, PLMMeetsRequirement, and the triggering value, Y (LOV ID), for PLMMeetsRequirement into the Conditional Attribute Value field.



When supplier open the dialog to respond 'Meets Requirement?' the 'Additional Comments' attribute is not displaying. It will only display when the supplier responds with **Yes** to the 'Meets Requirement?' field. The Save action will be enabled.

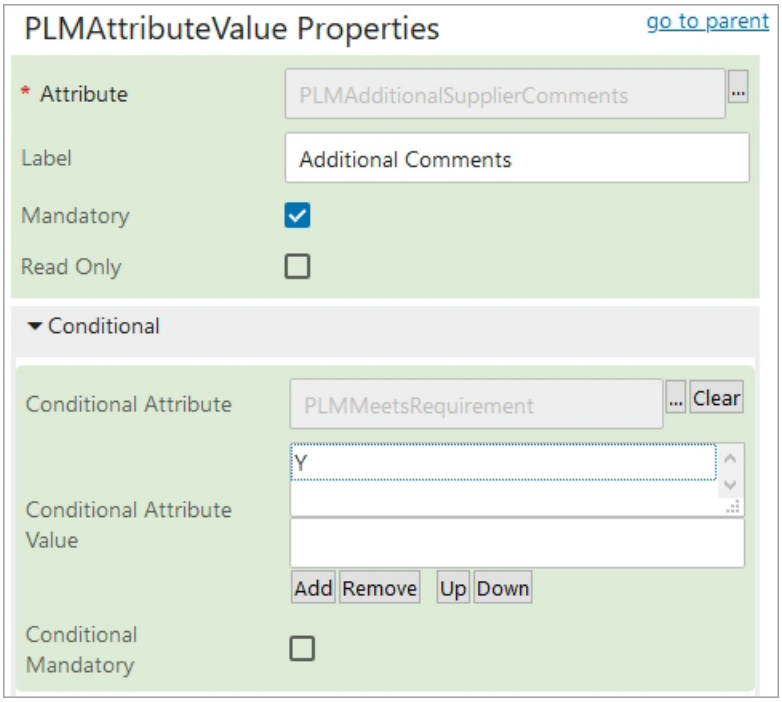




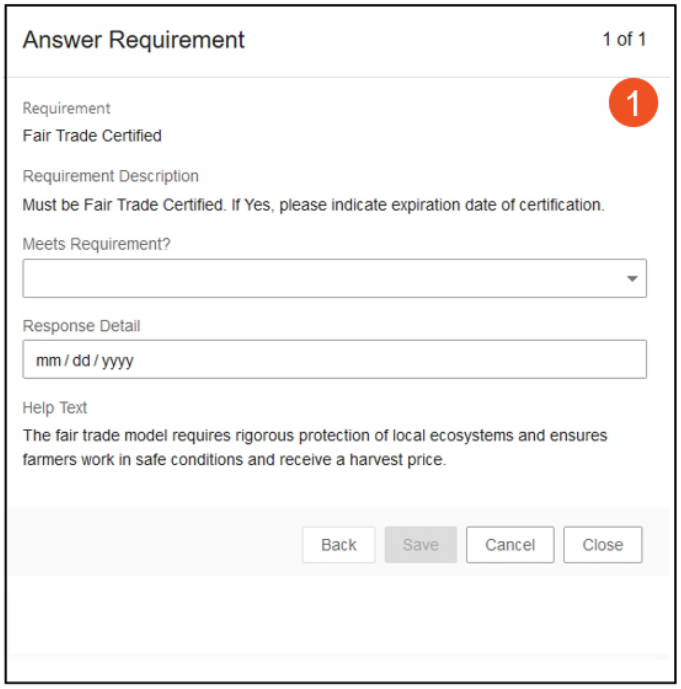
Example 2: Conditional Mandatory Attribute

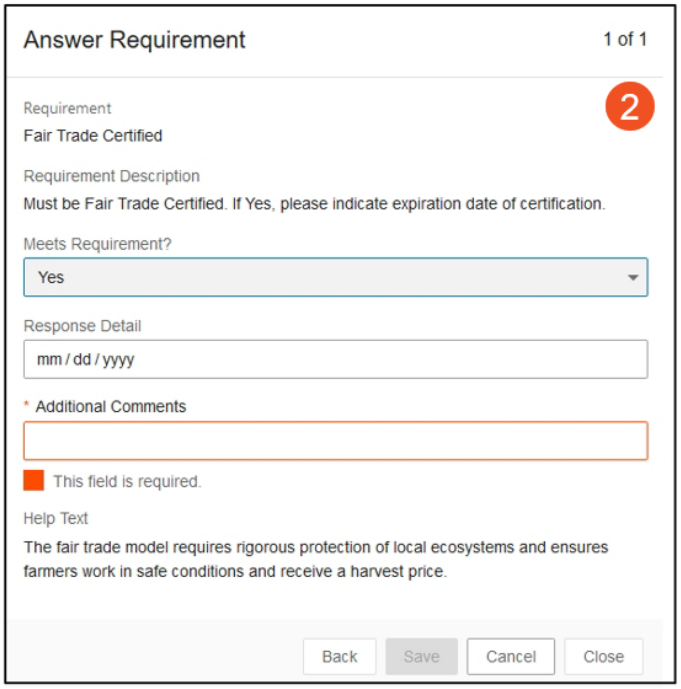
The conditional attribute 'Additional Supplier Comments' displays when the dependent attribute 'Meets Requirement' has a value equal to **Yes**.

This is configured by entering the dependent attribute ID into the Conditional Attribute field, PLMMeetsRequirement, and the triggering value, **Y (LOV ID)**, for PLMMeetsRequirement into the Conditional Attribute Value field. Select the Mandatory Parameter for Conditional attribute 'Additional Supplier Comments.'



When a supplier opens the dialog to respond to the 'Meets Requirement?' attribute, the 'Additional Comments' is not displaying. It will display when the supplier respond with **Yes** to the 'Meets Requirement?' field. The 'Additional Comments' attribute becomes a conditional mandatory field, and the Save action will be disabled until a value is entered into the **Additional Comments** field.



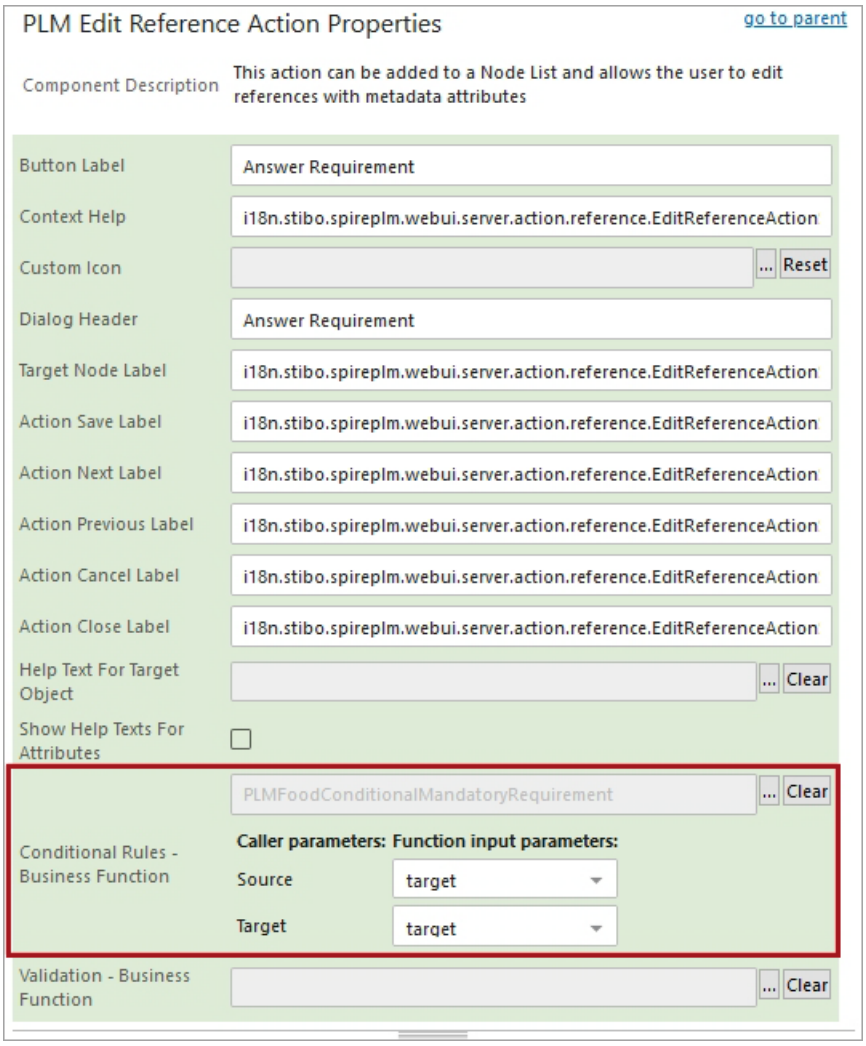


Conditional Rules - Business Functions

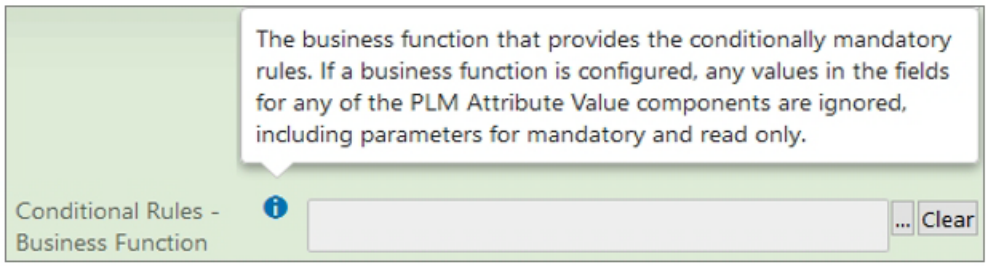
For more complex scenarios, a business function can control whether or not attributes are conditional, conditional mandatory, mandatory, or read only. An admin user will be able to specify a business function that will provide the conditional rules.

The Conditional Rules-Business Function will have two input parameters: an input parameters of the type Node for the source object and an input parameter of the type Node for the target object. It will have a return type of String.

The business function will be called every time a reference is being edited in the Multi-Reference Editor dialog, including going back and forth to edit multiple references.



If a Conditional Rules-Business Function is defined, any values in the fields for any of the PLM Attribute Value components are ignored. This includes properties for Mandatory and Read Only.


The business function that provides the conditionally mandatory rules. If a business function is configured, any values in the fields for any of the PLM Attribute Value components are ignored, including parameters for mandatory and read only.
Conditional Rules - Business Function
...
Clear

JSON Schema

The JSON schema has the following structure:

Element	Possible Value	

mandatory: Specify if the attribute is mandatory or not.
Default value if no value has been specified is no.
	false or true	var text = {
		"PLMDefiningAttribute": {
		"mandatory": false,
		"readonly": false,
		"conditionalMandatory": true,
		"flexAttribute" : true,
		"rules": [
		{
		"attribute": "attributeID",
		"values": [
		{
		"context": "Context1",
		"value": "Y"
		}
		]
		}
		]
		};
		return JSON.stringify(text);

readonly: specifying if the attribute is mandatory or not. Default value if no value has been specified is no.	false or true	
conditionalMandatory: Indicating if the attribute is conditional mandatory, if is it set to yes, the conditional attribute will always be displayed in the dialog and becomes mandatory if any of the depended attribute value matches the defined rules. Default value if no value has been specified is no.	false or true	
flexattribute:	false or true	
rule: Specifying the attribute id of the depended attribute and the value rules and contexts. **attribute**: the STEP ID of the dependent attribute **values**: containing the list of value and context pairs **value**: the value(s) of the dependent attribute for when the rule is evaluated to true. **context**: specify the STEP context ID that the entered value should be evaluated for. If no context is defined, then values are to be evaluated in all contexts.		

JSAON Schema in table above:

```
var text = {
"PLMDefiningAttribute": {
"mandatory": false,
"readonly": false,
"conditionalMandatory": true,
"flexAttribute" : true,
"rules": [
{
"attribute": "attributeID",
"values": [
{
"context": "Context1",
"value": "Y"
}
]
}
]
}
```

```
]
};
return JSON.stringify(text);
```

Any number of rules can be defined for an attribute. The rules will be evaluated from the top down, and stop evaluating when a rule is evaluated to true, displaying the conditional attribute in the MRE dialog.

If any of the attributes for a rule have not been added as a PLM Attribute Value child component to the PLM Edit Reference Action, the rule will be ignored and skipped, and a warning will be logged to the system log file.

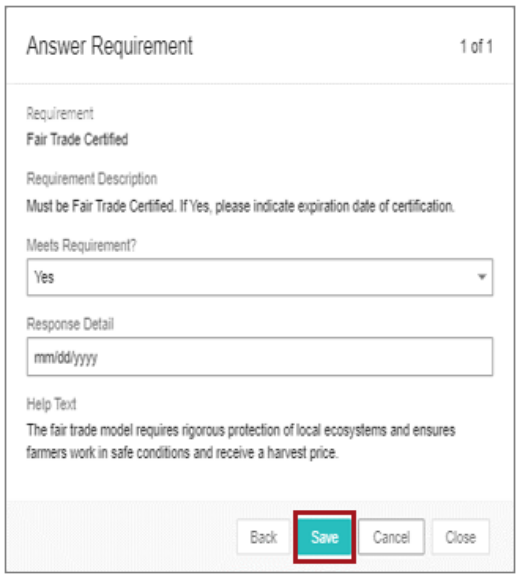
Example 1: Condition Rules – Business Function

In this example, the 'Additional Comments' attribute is shown in the 'Answer Requirement' dialog when the dependent attribute 'Meets Requirements?' has a value equal to **No**.

The 'Additional Comments' attribute has been configured as a Conditional Mandatory attribute.

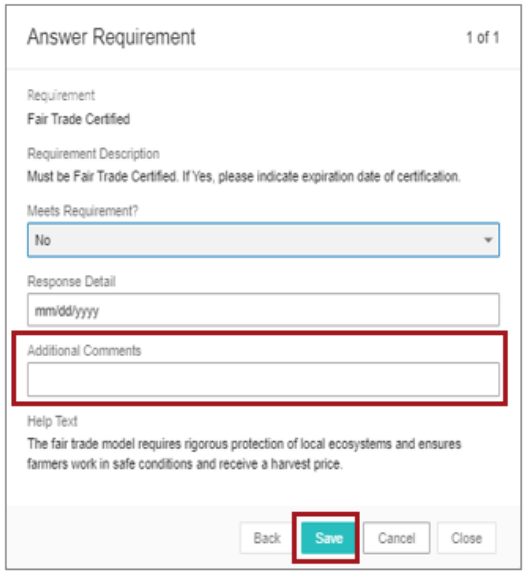
<table>
<tr><th>Business Function</th><th>Conditional Dependent Attribute</th><th>Conditional Attribute</th></tr>
<tr>
<td>

```
var text = {
 "PLMDefiningAttribute": {
  "mandatory": false,
  "readonly": false,
  "conditionalMandatory": true,
  "flexAttribute" : true,
  "rules": [
   {
    "attribute":
"PLMMeetsRequirement",
     "values": [
      {
       "context": "Context1",
       "value": "Y"
      }
     ]
   }
  ]
 },

"PLMAdditionalSupplierComments"
: {
  "mandatory": false,
  "readonly": false,
  "conditionalMandatory": false,
  "rules": [
   {
    "attribute":
"PLMMeetsRequirement",
     "values": [
      {
       "context": "Context1",
       "value": "N"
      }
     ]
   }
  ]
 },
 "PLMRequirementDescription": {
  "mandatory": false,
  "readonly": true,
  "conditionalMandatory": false
 },
 "PLMHelpText": {
  "mandatory": false,
  "readonly": true,
  "conditionalMandatory": false
 }
};

return JSON.stringify(text);
```

</td>
<td>


Results:

Attribute Additional Comments is not displayed.
Save button is enabled. After Meets Requirement? Yes value is selected.

</td>
<td>


Results:

Attribute Additional Comments is displayed.
Save button is enabled.

</td>
</tr>
</table>

Business function in table above:

```
var text = {
"PLMDefiningAttribute": {
"mandatory": false,
"readonly": false,
"conditionalMandatory": true,
"flexAttribute" : true,
"rules": [
{
"attribute": "PLMMeetsRequirement",
```

```
"values": [
{
"context": "Context1",
"value": "Y"
}
]
}
]
},
"PLMAdditionalSupplierComments": {
"mandatory": false,
"readonly": false,
"conditionalMandatory": false,
"rules": [
{
"attribute": "PLMMeetsRequirement",
"values": [
{
"context": "Context1",
"value": "N"
}
]
}
]
},
"PLMRequirementDescription": {
"mandatory": false,
"readonly": true,
"conditionalMandatory": false
},
"PLMHelpText": {
"mandatory": false,
"readonly": true,
"conditionalMandatory": false
}
```

```
};
return JSON.stringify(text);
```

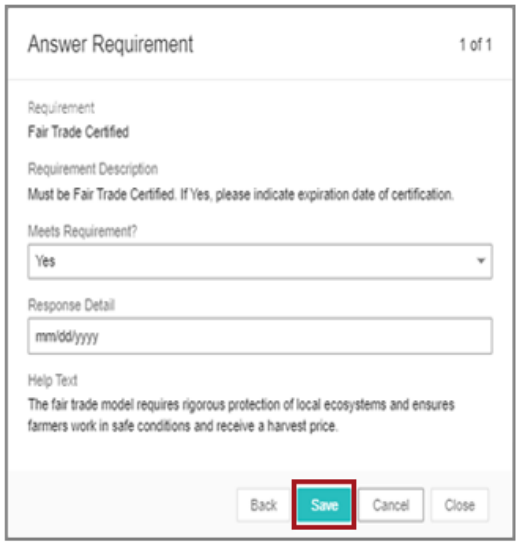
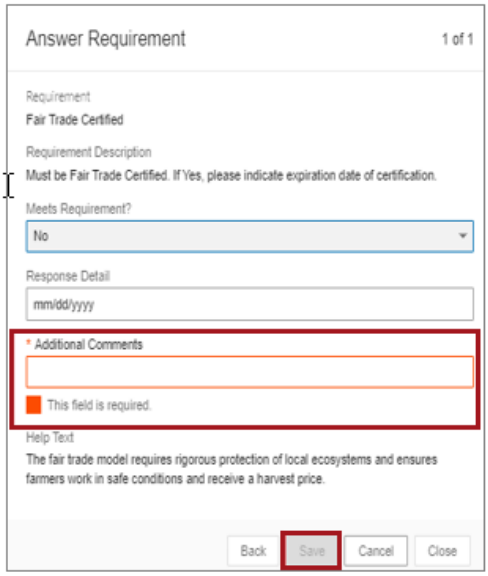
Example 2: Condition Rules – Business Function

In this example, the 'Additional Comments' attribute is shown in the Answer Requirement dialog when the dependent attribute 'Meets Requirements?' has a value equal to **No**.

The 'Additional Comments' attribute has been configured as a Conditional Mandatory attribute. The Save button will not be enable until the 'Additional Comments' attribute is populated.

<table>
<tr><th>Business Function</th><th>Conditional Dependent Attribute</th><th>Conditional Attribute</th></tr>
<tr>
<td rowspan="2">
<pre>
var text = {
 "PLMDefiningAttribute": {
  "mandatory": false,
  "readonly": false,
  "conditionalMandatory": true,
  "flexAttribute" : true,
  "rules": [
   {
    "attribute":
"PLMMeetsRequirement",
    "values": [
     {
      "context": "Context1",
      "value": "Y"
     }
    ]
   }
  ]
 },

 "PLMAdditionalSupplierComments":
{
  "mandatory": true,
  "readonly": false,
  "conditionalMandatory": false,
  "rules": [
   {
    "attribute":
"PLMMeetsRequirement",
    "values": [
     {
      "context": "Context1",
      "value": "N"
     }
    ]
   }
  ]
 },
 "PLMRequirementDescription": {
  "mandatory": false,
  "readonly": true,
  "conditionalMandatory": false
 },
 "PLMHelpText": {
  "mandatory": false,
  "readonly": true,
  "conditionalMandatory": false
 }
};

return JSON.stringify(text);
</pre>
</td>
<td> 
</td>
<td> 
</td>
</tr>
<tr>
<td>Results:
▪ Attribute Additional Comments is not displayed.
▪ Save button is enabled. After Meets Requirement? Yes value is selected.</td>
<td>Results:
▪ Attribute Additional Comments is displayed. Including a note “This field is required”.
▪ Save button is disabled. It will be enabled until a value is entered into Additional Comments.</td>
</tr>
</table>

Business function in table above:

```
var text = {
"PLMDefiningAttribute": {
```

```
"mandatory": false,
"readonly": false,
"conditionalMandatory": true,
"flexAttribute" : true,
"rules": [
{
"attribute": "PLMMeetsRequirement",
"values": [
{
"context": "Context1",
"value": "Y"
}
]
}
]
},
"PLMAdditionalSupplierComments": {
"mandatory": true,
"readonly": false,
"conditionalMandatory": false,
"rules": [
{
"attribute": "PLMMeetsRequirement",
"values": [
{
"context": "Context1",
"value": "N"
}
]
}
]
},
"PLMRequirementDescription": {
"mandatory": false,
"readonly": true,
```

```
"conditionalMandatory": false
},
"PLMHelpText": {
"mandatory": false,
"readonly": true,
"conditionalMandatory": false
}
};
return JSON.stringify(text);
```

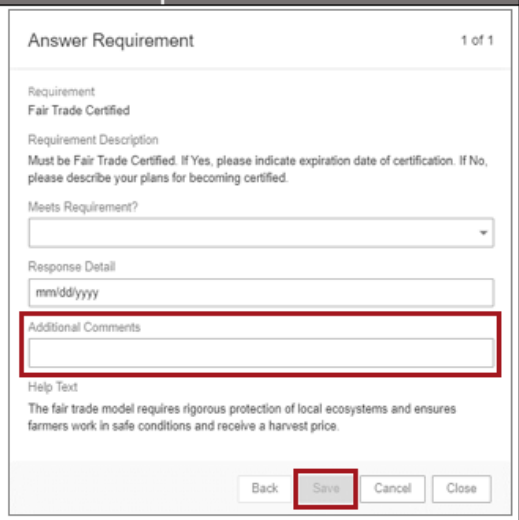
Example 3: Condition Rules – Business Function

In this example, the 'Additional Comments' attribute is shown always in the Answer Requirement dialog when the dependent attribute 'Meets Requirements?' has a value equal to **No**.

The 'Additional Comments' attribute become a Mandatory attribute, and the Save button will not be enabled until 'Additional Comments' field is populated.

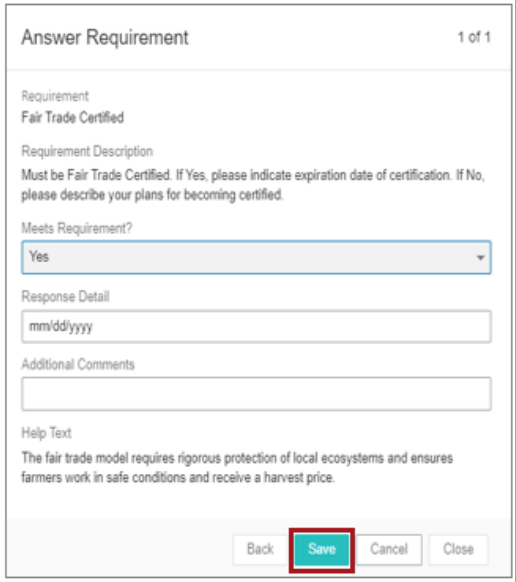
<table>
<tr><th>Business Function</th><th>Conditional Dependent Attribute</th><th>Conditional Attribute</th></tr>
<tr>
<td>

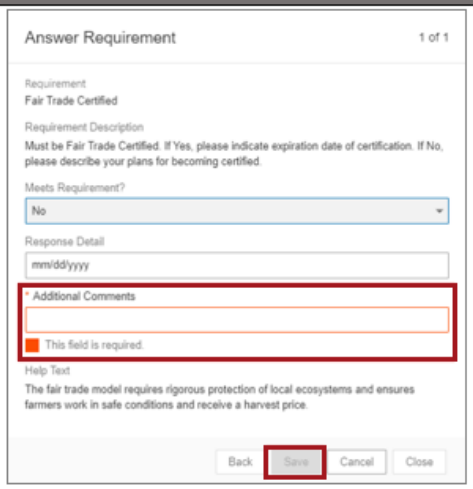
```
var text = {
 "PLMDefiningAttribute": {
  "mandatory": false,
  "readonly": false,
  "conditionalMandatory": true,
  "flexAttribute" : true,
  "rules": [    {
    "attribute":
"PLMMeetsRequirement",
    "values": [
     {
      "context": "Context1",
      "value": "Y"
     }
    ]
   }
  ]
 },

"PLMAdditionalSupplierComments
": {
  "mandatory": false,
  "readonly": false,
  "conditionalMandatory": true,
  "rules": [
   {
    "attribute":
"PLMMeetsRequirement",
    "values": [
     {
      "context": "Context1",
      "value": "N"
     }
    ]
   }
  ]
 },
 "PLMRequirementDescription": {
  "mandatory": false,
  "readonly": true,
  "conditionalMandatory": false
 },
 "PLMHelpText": {
  "mandatory": false,
  "readonly": true,
  "conditionalMandatory": false
 }
};

return JSON.stringify(text);
```

</td>
<td>


Results:

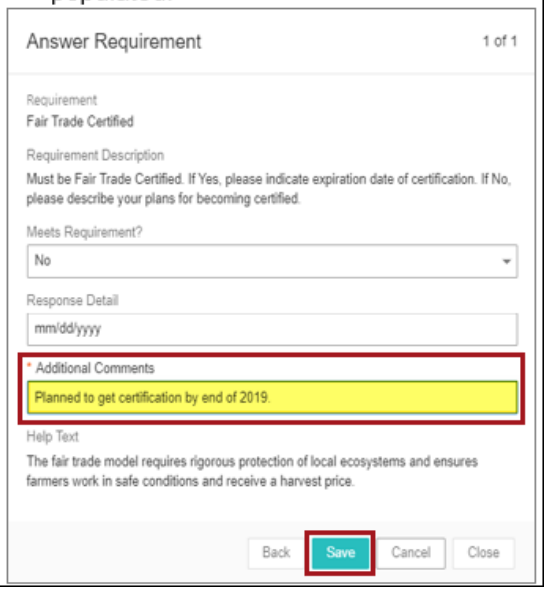
- Attribute Additional Comments is not displayed.
- Save button is enabled after Meets Requirement? Yes value is selected.



</td>
<td>


Results:

- Attribute Additional Comments is displayed. Including a note “This field is required”.
- Save button is disabled. And will be enable until Additional Comments field is populated.



</td>
</tr>
</table>

Note: Only attributes that are valid on the Requirement reference and/or Parameter reference should be configured in the component list. If they are not valid, they will not be displayed and will not have any values.

Business function in table above:

```
var text = {
"PLMDefiningAttribute": {
```

```
"mandatory": false,
"readonly": false,
"conditionalMandatory": true,
"flexAttribute" : true,
"rules": [      {
"attribute": "PLMMeetsRequirement",
"values": [
{
"context": "Context1",
"value": "Y"
}
]
}
]
},
"PLMAdditionalSupplierComments": {
"mandatory": false,
"readonly": false,
"conditionalMandatory": true,
"rules": [
{
"attribute": "PLMMeetsRequirement",
"values": [
{
"context": "Context1",
"value": "N"
}
]
}
]
},
"PLMRequirementDescription": {
"mandatory": false,
"readonly": true,
"conditionalMandatory": false
```

```
},
"PLMHelpText": {
"mandatory": false,
"readonly": true,
"conditionalMandatory": false
}
};
return JSON.stringify(text);
```

Multi-Reference Editor Overview

In the PLM data model, the majority of the data is on references and not on objects. The users work on creating one reference at a time, adding metadata, then running validations on the added data. The 'PLM Edit Reference Action' allows users to configure metadata to append to the dialog menu, limiting what values on an object's references can be changed.

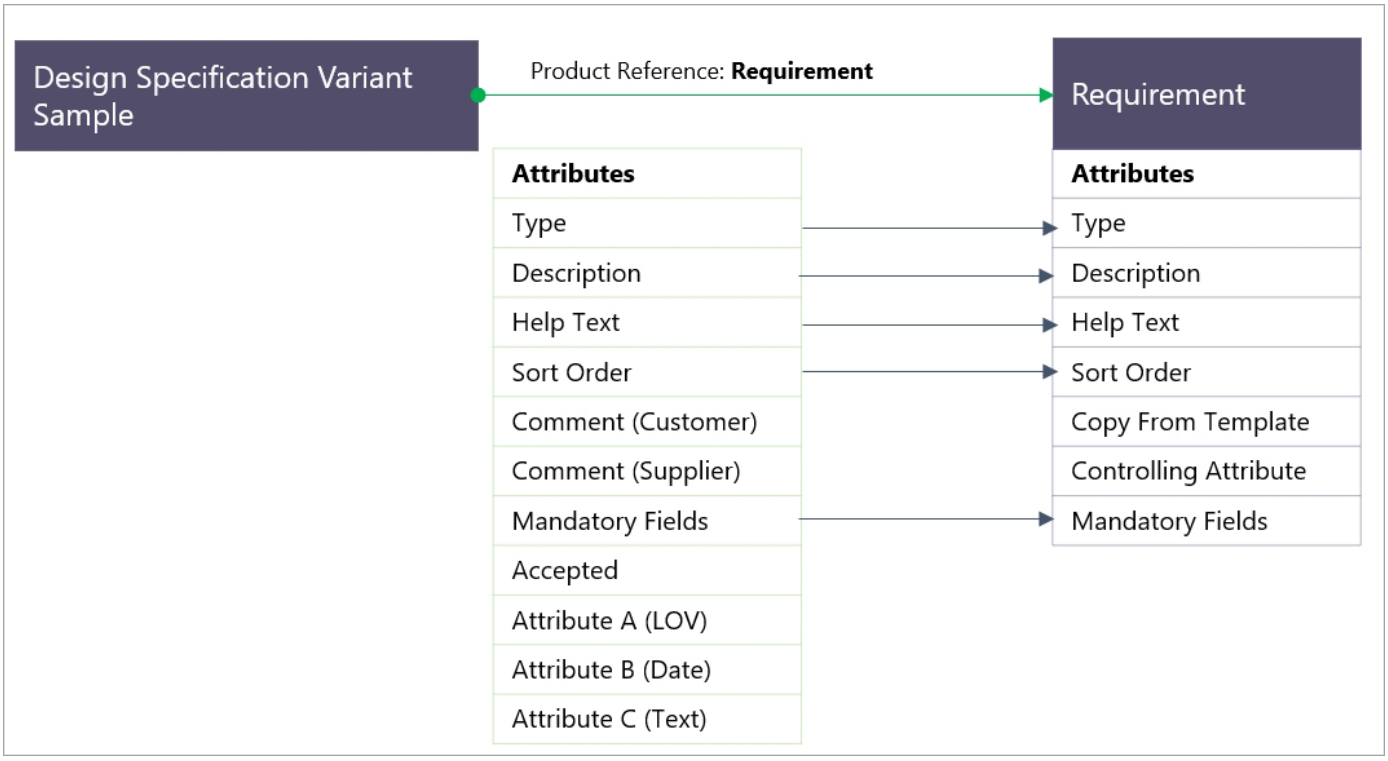
In the private label food solution, the Multi-Reference Editor component in Web UI supplies two specific functionalities for the PLM food solution.

- PLM Create References Action
- PLM Edit Reference Action

Multi-Reference Editor Data Model

The data model for Multi-Reference Editor is based in Product-to-Product references.

In this model example, there are two source objects (Design Specification Variant and Sample) and one target object (Requirement). Both source and target objects are products. The reference connecting the objects is a Product Reference Type. An example of attributes valid on the reference and the target objects listed below the reference / object is pictured below.



PLM Create Reference Action

The PLM Create Reference is a configurable action for the PLM private label food solution. It allows users to configure a toolbar action that adds references to an object when used with the Multi-Reference Editor. The PLM Create Reference Action can be configured to specify business rules for consistent creation, object nodes to restrict applicable references, and validation methods to ensure that the created reference is allowed. Once the PLM Create Reference Action component is added, it opens a configurable dialog box.

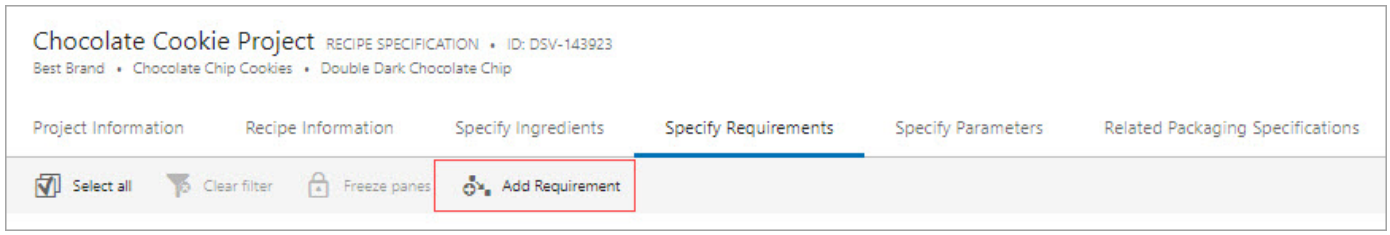
For more on how to configure the Create Reference Action in the Multi-Reference Editor, see the **Multi-Reference Editor in PLM** topic in the **PLM for Admins** section of the **Product Lifecycle Management** documentation.

Multi-Reference Editor Use Case

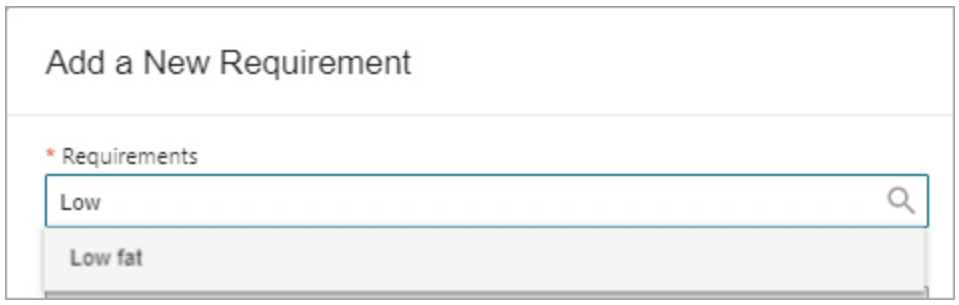
The quality manager user is responsible for reviewing the requirement and parameter references for each Recipe Specification, Label Specification, and Packaging Specification. They may need to add a requirement and/or a parameter references to the product in addition to what was added automatically by the system.

The quality manager user must access the Specify Details state of the Private Label Product Specification list in the Web UI, and select the Specification (Recipe Specification, Label Specification or Packaging Specification) to be maintained.

They can select the Specify Requirements tab to add requirements, or they can select the Specify Parameters tab to add parameters. The quality manager user then selects the **Add Requirement** or **Add Parameter** action in the toolbar.



Once the Add Requirement or Add Parameter action is executed, it opens a dialog box.



The quality manager user can do one or more of the following actions:

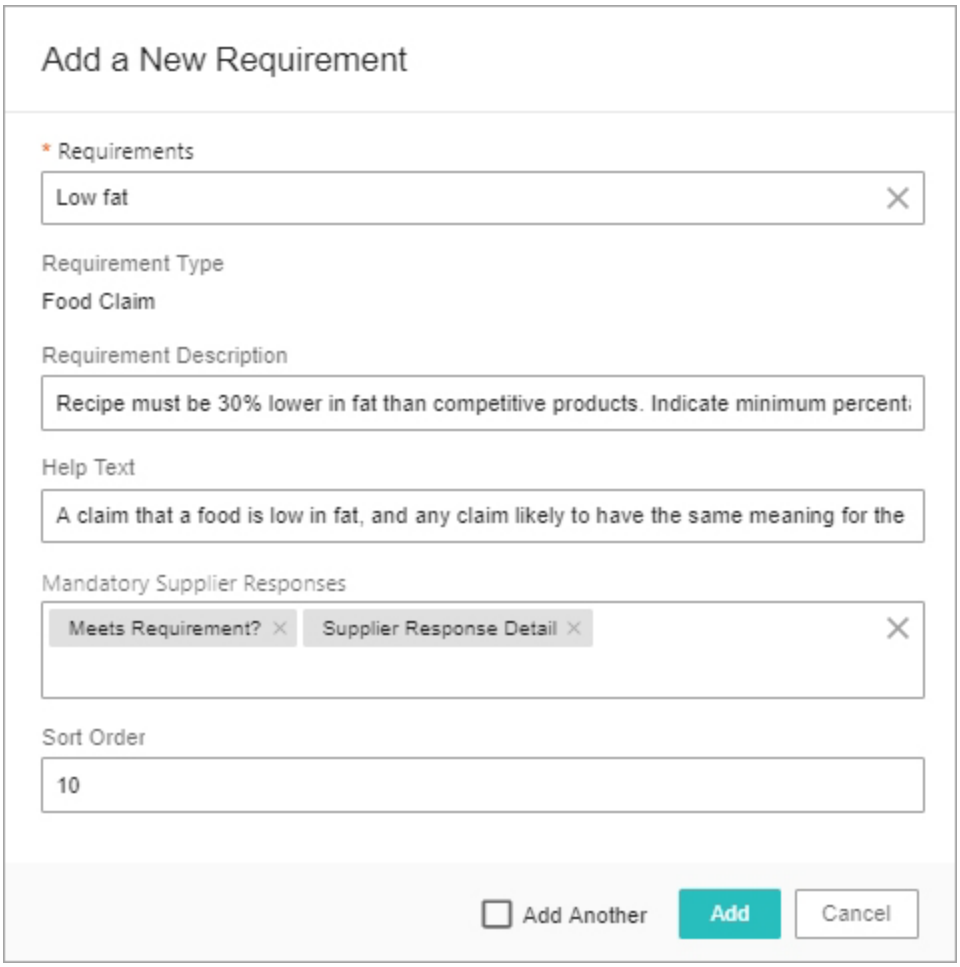
- They can search for a requirement or parameter (typeahead search capability embedded in the Add Reference component). The search is performed below the specified node. The quality manager user then selects the requirement or parameter to be added. If the requirement or parameter is already referenced, it will not be enabled for selection.

When the requirement or parameter is selected, the following actions take place:

1. Business function **PLM Food Get Requirement or Parameter Reference** Type is executed and returns the reference type ID to use.
2. The requirement or parameter reference is created.
3. Business action **PLM Food Copy Requirement or Parameter Template** is executed to copy default values from the requirement or parameter to populate attribute value(s) displayed in the dialog box.

The quality manager user can now change values for the configured attributes to be displayed in the dialog box.

Note: The created reference is deleted after the data is displayed in the dialog including copied values. The reference is then recreated and committed when the user clicks the Add button.



- If **Add Another** box is selected, the **Add a New Requirement** or **Add a New Parameter** dialog box will be refreshed after the reference is added, so that an additional requirement or parameter can be created and

added to the Recipe Specification.

- When the **Add** button is clicked the reference will be created, values in the dialog box are saved to the reference and committed, and any validation of the data needed will be executed. A business action for copying default values in other contexts will be executed. If the validation fails, an error is shown in the dialog box and the dialog box stays open.
- Select **Cancel** to cancel the **Add Requirement** or **Add Parameter** action.

PLM Edit Reference Action

The **Edit Reference** action is used for editing an existing reference. It allows users to edit references with metadata attributes.

The purpose of the PLM Edit Reference action is to edit attributes on a reference in a dialog and also be able to run validation on the entered data.

A user can select more than one reference from the list view and select the PLM Edit Reference (Labeled as Answer Requirement or Answer Parameter) action in the toolbar.

In the private label food solution, the references for requirements and parameters have two phases, called scenarios in this guide, in the product specification process:

- The customer quality manager user reviews and customizes the requirements and parameters for each specification.
- The supplier user must complete the information needed for requirements and parameters in each specification. This is where the PLM Edit Reference Action can be used for a Supplier to respond to multiple Requirements or Parameters.

Additionally, the **PLM Edit Reference** action has **Flex Valued Header** capabilities to show and edit flexible values from different metadata attributes on a reference in one column for the Multi Edit Display Mode. It also shows attribute values from different attributes in one column in the Table Display Mode.

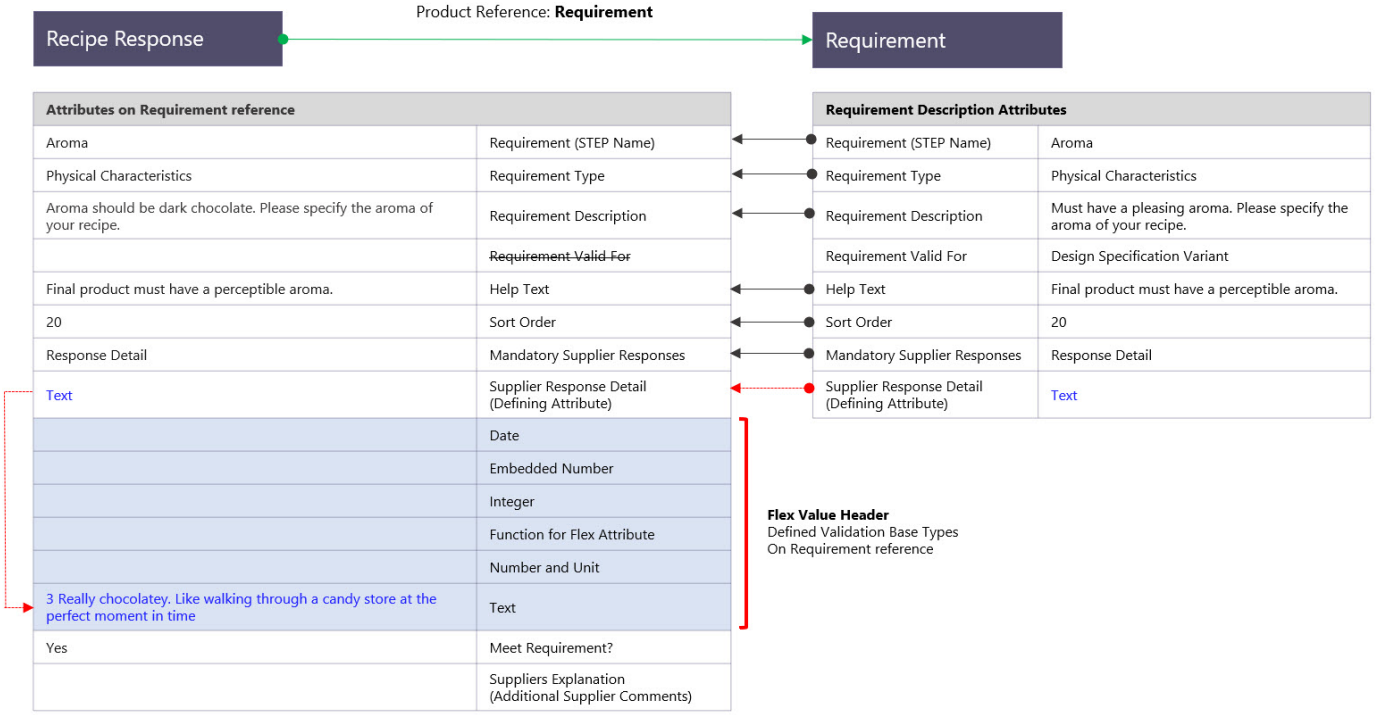
For more on how to configure the Edit Reference Action, see the **Multi-Reference Editor in PLM** topic in the **PLM for Admins** section of the **Product Lifecycle Management** documentation.

Flex Valued Header

The **Flex Valued Header** is a highly configurable component that enables the ability to enter more than one validation base type for a metadata attribute. The validation base types supported are:

- Date
- Embedded Number
- Function for flex attributes
- Integer
- Number and Unit
- Text

The image below describes the metadata attributes on a Requirement reference using the Reference Metadata Flex Value Header.



For more information on configuring the Flex Valued Header, see the **Reference Metadata Flex Value Header Component** topic in the **PLM for Admins** section of the **Product Lifecycle Management** documentation.

Note: The PLMDefiningAttribute must be a single value LOV. This is the attribute that defines the ID specific of the Validation Base Type to be allowed. Additionally, defining the Attribute LOV is a LOV with ID. The ID will be the attribute ID / business function ID used as the flex attribute.

Defining Attribute LOVE

ID	Name	Description
PLMDate	Date	One of the required specific attributes. The attribute is a date.
PLMEmbeddedNumber	Embedded Number	One of the required specific attributes. The attribute is an Embedded Number
PLMFunctionForFlexAttribute	Function for Flex Attribute	A business function that will return the attribute ID to be used.

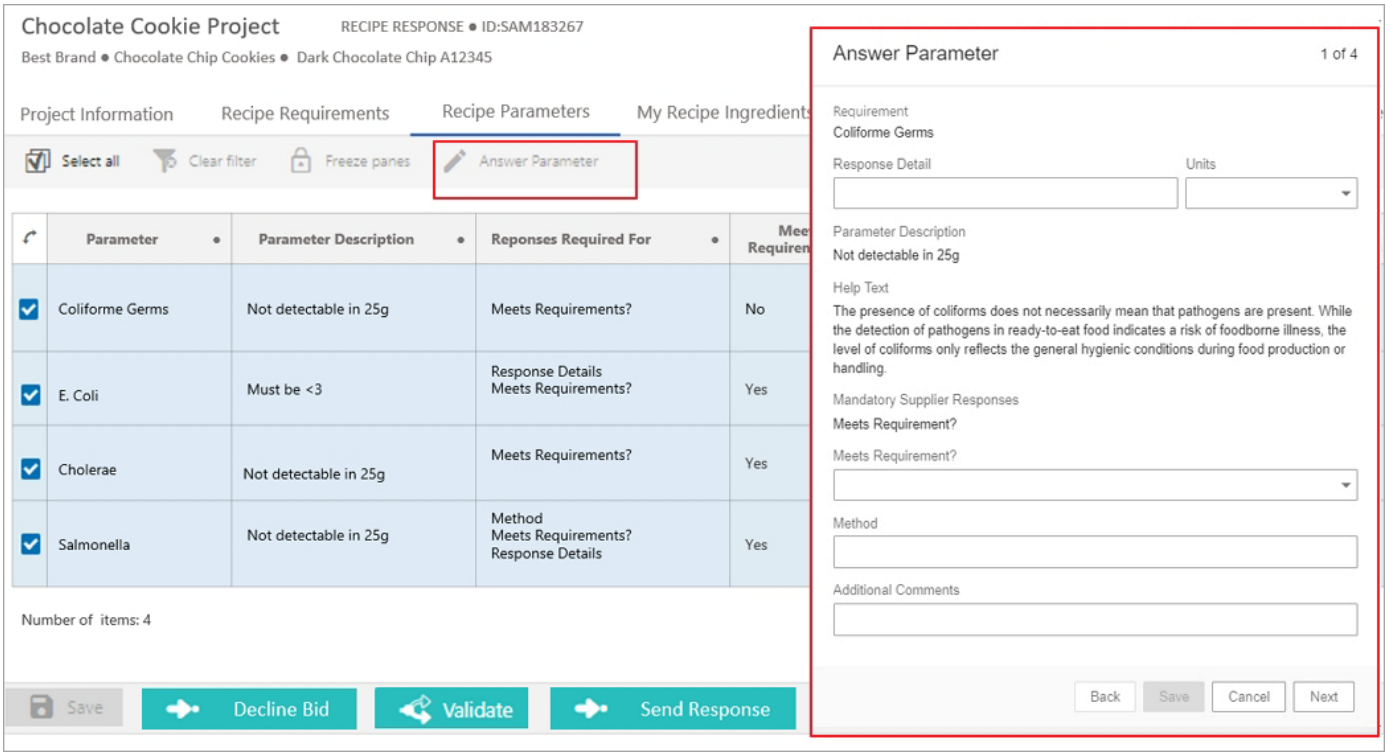
ID	Name	Description
PLMInteger	Integer	One of the required specific attributes. The attribute is an Integer.
PLMNumberAndUnit	Number and Unit	One of the required specific attributes. The attribute is a Number and has units.
PLMText	Text	One of the required specific attributes. The attribute is a text.
PLMISODate	ISO Date	One of the required specific attributes. The attribute is an ISO date.
PLMProductLOV	Product Dating	One of the required specific attributes. The attribute has an LOV.

Note: The **defining attribute** is used to identify the attribute defined to control the allowed attribute validations

Supplier Responding to Requirements and Parameters Use Case

The supplier user is responsible for answering the requirements and parameters specified by the customer for each Recipe Response, Label Response, and Packaging Response.

1. The supplier user accesses the Initial Response state of the Private Label Food Supplier Response list in the Web UI, selects the response (Recipe Response, Label Response, or Packaging Response) that needs to be answered, and navigates to the Recipe Requirements and/or Parameters tab.
2. The supplier user then selects requirements or parameter to answer from the list view. If more than one requirement or parameter has been selected, the requirements / parameter will be displayed in the Answer Requirement / Answer Parameter dialog box in the sequential order that they were selected.
3. To edit each of the selected requirements / parameters, the supplier user must select the Answer Requirement / Answer Parameters action from the toolbar and the Answer Requirement / Answer Parameters dialog box will be displayed.



4. A supplier can do one or more of the following actions in the Answer Requirement / Parameters dialog box:
   - Views requirement / parameters information, such as attribute values on the reference.
   - Views help texts for the requirement / parameters and for the attributes shown in the dialog.
   - Views and answers the requirement / parameter specific attribute defined by the customer quality manager user.
   - View alerts from validations performed by a business function.

   Note: The solution associated with this documentation does not include function validations. A customer may add their own validation business functions as needed.

   - Save the answer on the reference.
5. The Answer Requirement / Answer Parameter dialog box will have buttons to move back and forward to view the previous or next requirement of all selected requirements / parameters.
6. Clicking the **Save** button will save any supplier user changes.
7. Clicking the **Cancel** button will cancel any user changes. An **Unsaved Changes** warning message will display. The user can click **OK** to confirm that changes will not be saved, or they can click **Cancel** to go back to the dialog box and **Save** the changes.
8. Additionally, the Answer Requirements action has the Flex Valued Header capability to show and edit values from different attributes in one column for the Multi Edit Display Mode or to show attributes values from different attributes in one column for the Table Display Mode.

Multi-Reference Editor Business Rules

For the Multi-Reference Editor (MRE), several business rules can be configured. Each of the business rules will be described in detail in this section.

Get Reference Type – Business Function

This business function is used by the **PLM Create Reference Action** component to get the reference type ID that will be used to create the new reference.

It has two input parameters:

- Source object of the type Node which is the owner of the reference that will be created
- Target object of the type Node which is the target object of the reference that will be created

The return type of the business function is in the format of a string, containing the STEP reference type ID.

Below is an example of a business function that is used in the private label food solution to get the reference type ID when adding a requirement or a parameter to a variant.

JavaScript Function

Binds:

Variable name	Binds to
manager	STEP Manager

Messages:

Variable name	Message	Translations

Input Parameters:

Parameter name	Type	Description
source	Node	
target	Node	

Return Type:

Return Type
String

JavaScript:

```
var otID = target.getObjectType().getID();

if (otID.equals("PLMParameter")){
     if (!isValidFor(target, source, "PLMParameterValidFor", logger)){
          throw "Parameter [" + target.getName() + "] is not valid for [" + source.getName() + "]";
     }

     return new java.lang.String("PLMParameter");
} else if (otID.equals("PLMRequirement")){
     if (!isValidFor(target, source, "PLMRequirementValidFor", logger)){
          throw "Requirement [" + target.getName() + "] is not valid for [" + source.getName() + "]";
     }

     var nodeOTID = source.getObjectType().getID();
     if (nodeOTID.equals("PLMDesignSpecificationVariant")){
          return new java.lang.String("PLMRequirement");
     } else if (nodeOTID.equals("PLMDesignSpecificationPackagingVariant")){
          return new java.lang.String("PLMPackagingRequirement");
     } else if (nodeOTID.equals("PLMDesignSpecificationLabelVariant")){
          return new java.lang.String("PLMLabelRequirement");
     }
} else {
     throw "Not a Parameter or Requirement";
}



function isValidFor(req, source, attrID, logger){

     var objectTypeID = source.getObjectType().getID();

     var validFor = req.getValue(attrID).getValues();
     for (var i = 0; i < validFor.size(); i++){
          var validForID = validFor.get(i).getID();
          if (validForID.equals(objectTypeID)){
               return true;
          }
     }
```

Edit externally

Copy From Template- Business Action

This business action is used by the **PLM Create Reference Action** component for getting default values to display in the Multi-Reference Editor (MRE).

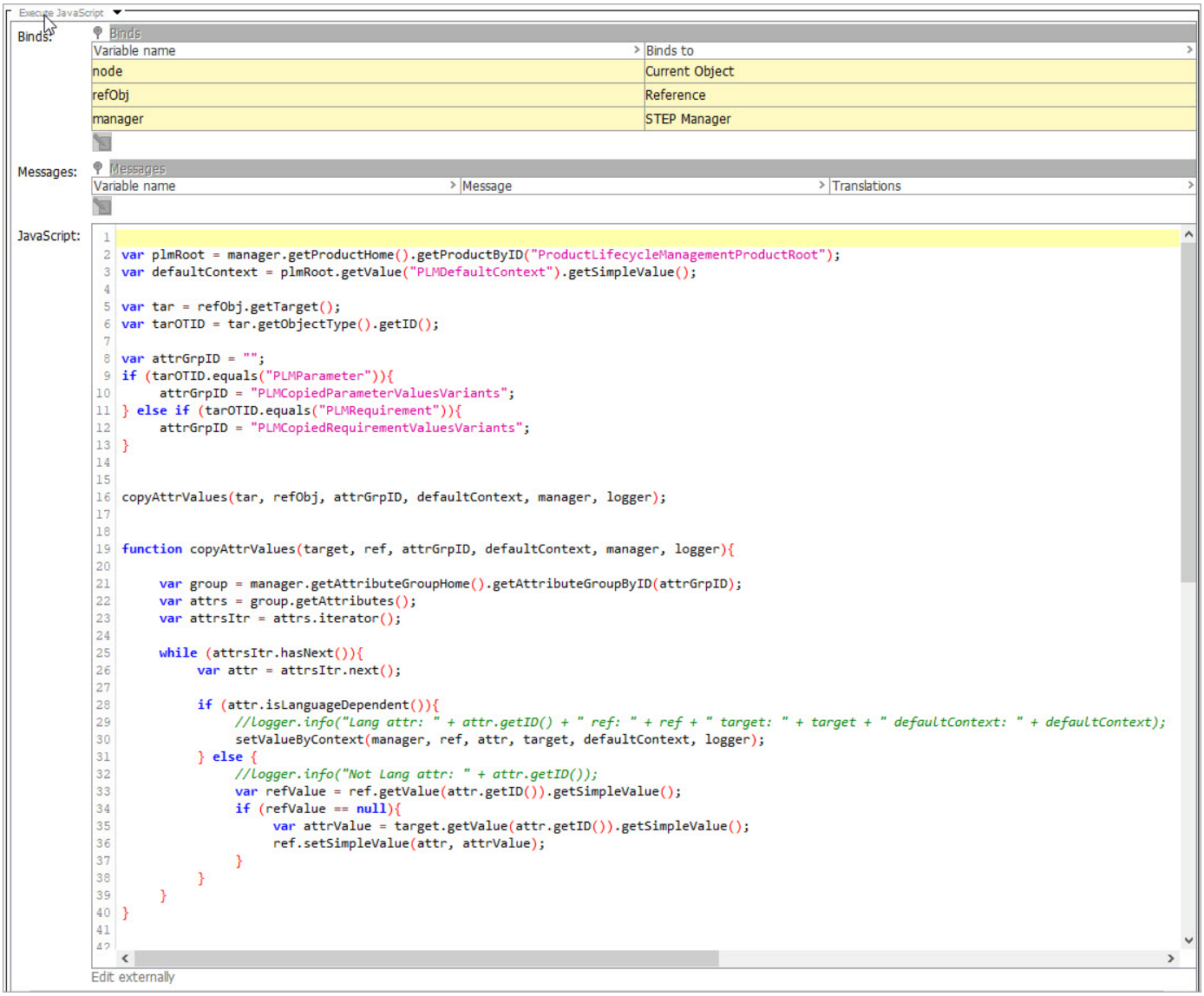
The low-level processing flow to display default values in the MRE dialog is:

1. Start a transaction.
2. Create a reference between the source and target object using the reference type ID returned by the 'get reference type – business function'.
3. Execute the defined 'copy from template – business action'. This will populate values on the created reference in step 2.
4. The MRE dialog reads the defined attribute values from the reference that was created in step 2 and has default values populated in step 3.
5. MRE dialog is shown.
6. The transaction is rolled back.

Important: Any values that are copied to the created reference that are not displayed in the MRE dialog will be deleted when the reference is deleted (rolled back). The values in the MRE dialog will be saved to a new reference when the user clicks the save button in the MRE dialog.

This business action has a bind that is an instance of the reference object that was created in step 2 above.

Below is an example for a business action that is used in the private label food solution to copy default values based on attributes in an attribute group when adding a requirement or parameter.



Validation – Business Function

This business function is used by the **PLM Create Reference Action** and the **PLM Edit Reference Action** components to validate the entered data in the Multi- Reference Editor (MRE) dialog.

It has two input parameters:

- Source object of the type Node which is the owner of the reference that was created
- Target object of the type Node which is the target object of the reference that was created

The return type of the business function is in the format of a list<String>, which is a list of strings containing pairs of values where the first value is the attribute name and the second value is the validation error message. The validation error message can contain html tags including links (a href)

Below is an example of a validation – business function. This example is not used in the private label food solution.

JavaScript Function

Binds:

Variable name	Binds to
manager	STEP Manager

Messages:

Variable name	Message	Translations

Input Parameters:

Parameter name	Type	Description
source	Node	
target	Node	

Return Type:

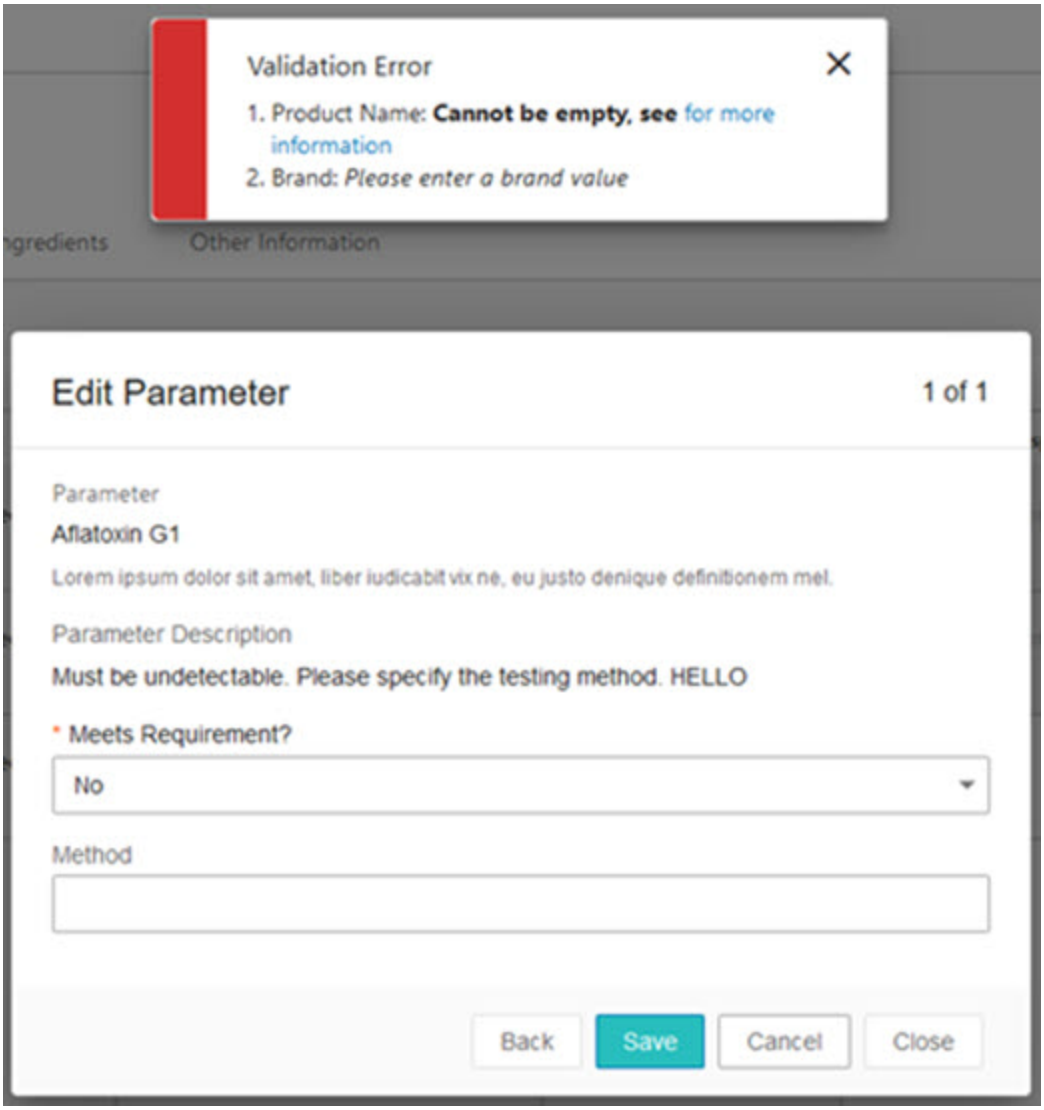
Return Type
List<String>

JavaScript:

```
var refObj = getReference(manager, source, target, "PLMParameter");

logger.info("source: " + source);
logger.info("target: " + target);

var retVal = new java.util.ArrayList();


if (refObj != null && refObj.getValue("PLMMeetsRequirement").getSimpleValue() != null &&
     refObj.getValue("PLMMeetsRequirement").getSimpleValue().equals("No")){
     retVal.add("PLMProductName");
     retVal.add("<b>Dav med <a href='www.google.com'>dig</a></b>");
     retVal.add("PLMBrand");
     retVal.add("<i>Another one</i>");
}

logger.info("retVal: " + retVal);

return retVal;


function getReference(manager, source, target, refTypeID){

     var refType = manager.getReferenceTypeHome().getReferenceTypeByID(refTypeID);

     var refs = source.getReferences(refType);
     var refsItr = refs.iterator();
     while (refsItr.hasNext()){
          ref = refsItr.next();

          if (ref.getTarget().getID().equals(target.getID())){
               return ref;
          }
     }

     return null;
}
```

Edit externally

The validation errors are shown to the user in a dialog as shown below:



Copy From Template (Context) – Business Action

This business action is used by the **PLM Create Reference Action** component for copying additional values to the created reference, including values in other contexts than the current context. An example of copying values in other contexts could be that when working in the US English context, and adding a new parameter to a variant, we need to populate the default help text in Spanish and potential other contexts as well.

This business action has a bind which an instance of the reference object.

Below is an example for a business action that is used in the private label food solution to copy default values based on attributes in an attribute group when adding a requirement or parameter. This is the same business action used in the 'copy from template – business action'. The business action is copying attribute values for all of the system-defined contexts.

Execute JavaScript

Binds:

Binds

Variable name	Binds to
node	Current Object
refObj	Reference
manager	STEP Manager

Messages:

Messages

Variable name	Message	Translations

JavaScript:

```
42
43 function getValueByContext(manager, ref, attr, contextID){
44      var  contextValues = manager.executeInContext(contextID, function(aManager) {
45           return aManager.getObjectFromOtherManager(ref).getValue(attr.getID()).getSimpleValue();
46      });
47
48      return contextValues;
49 }
50
51
52 function setValueByContext(manager, ref, attr, target, defaultContext, logger){
53      //logger.info("target: " + target.getID());
54      var contexts = manager.getContextHome().getContexts();
55      var contextsItr = contexts.iterator();
56      while (contextsItr.hasNext()){
57           var context = contextsItr.next();
58           var contextID = context.getID();
59
60           var curValue = getValueByContext(manager, ref, attr, contextID);
61           //logger.info("curValue: " + curValue);
62           if (curValue == null){
63                var ctxValue = getValueByContext(manager, ref, attr, contextID);
64                     //logger.info("curValue 1: " + ctxValue);
65                if (ctxValue == null){
66                     ctxValue = getValueByContext(manager, target, attr, contextID);
67                }
68                     //logger.info("curValue 2: " + ctxValue);
69                if (ctxValue == null){
70                     ctxValue = getValueByContext(manager, ref, attr, defaultContext);
71                }
72                     //logger.info("curValue 3: " + ctxValue);
73                if (ctxValue == null){
74                     ctxValue = getValueByContext(manager, target, attr, defaultContext);;
75                }
76                     //logger.info("curValue 4: " + ctxValue);
77                //logger.info("ctxValue: " + ctxValue + " attrID: " + attr.getID() + " target: " + target.getID());
78
79                manager.executeInContext(contextID, function(aManager) {
80                     aManager.getObjectFromOtherManager(ref).setSimpleValue(attr, ctxValue);
81                });
82           }
83      }
84 }
```

Edit externally

References, Limitations, and Performance

This topic details how to remove references as well as any limitations or performance considerations when working with the Multi-Reference Editor.

Remove Reference

This functionality will remove the selected reference to Requirements or Parameters.

In the private label food solution, some requirements are used in 90% of projects. Once the user has started the revision process, some references to requirements or parameters must be deleted.

Limitations

The only attribute validation base type(s) that are supported in the current React components are:

- Number
- Text
- ISO Date
- LOV (single and multi-valued)

Note: Only the edit mode is supported.

Performance Considerations

A lot of business actions / functions are executed in the new 'Create Reference' and 'Edit Reference' dialogs. The performance will depend on how the business actions / functions are configured.

Solution Outline for Multi-Reference Editor

Below is a table that outlines the setup and configurations needed for Multi-Reference Editor to work.

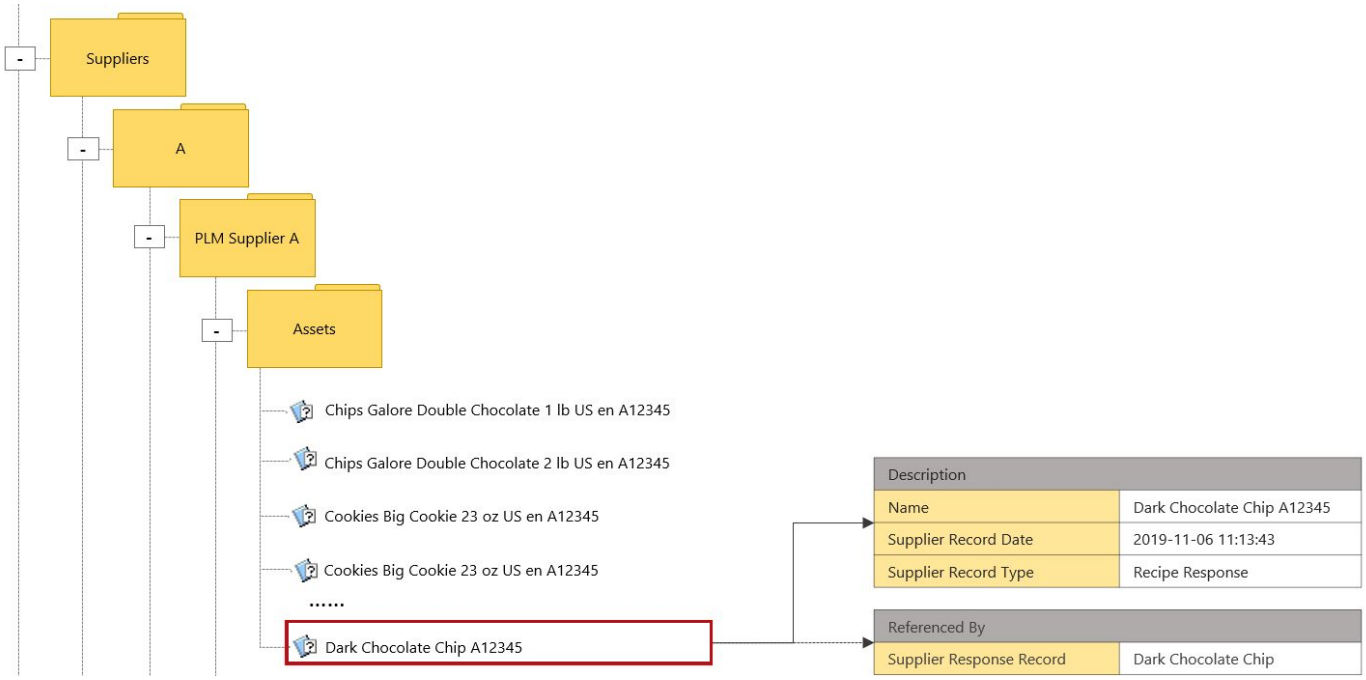
Setup and Configurations	
Licensing	A Multi-Reference Editor will require a PLM license and an additional Flex Table Header license. Consult your implementation team for details.
Business Actions	No special privileges are required.
Add-on Component	Spire-plm

For more information about Multi-Reference Editor for the PLM food solution, see the **Multi-Reference Editor in PLM** topic of the **Product Lifecycle Management** documentation.

Supplier Records Overview

When suppliers respond to a bid to supply a new private label product, they enter information about requirements, parameters, ingredients, and specifications. This information becomes a contract between the customer and the supplier. The supplier needs their own record of what was entered as part of their bid.

When a supplier submits their bid for either a recipe, packaging, or label deal, the supplier receives an email with a record of what was submitted. An asset with the submitted record is created and linked to the submitted bid. If a supplier desires, it is possible in Web UI to include a list of submitted bid records and also include the ability to print the records.



Supplier Record Setup

For the Private Label Food Supplier Record functionality, a Supplier Record needs the following configurations to be enabled:

- A required data model for storing information for Supplier Record
- A business library for creating a record of the submitted bid as an HTML document
- A business rule to send an email to the supplier with the submitted bid
- A business rule for creating an asset with the submitted bid record
- Changes to Private Label Food Supplier Response workflow
- Changes to Private Label Food Web UI for suppliers

The Supplier Record functionality use standard STEP platform capabilities, and does not need additional Web UI components. Business Rules are used to create a HTML record of the supplier bid.

- An InDesign server is not required since this solution does not use InDesign.
- Implemented business rules can be extended by a customer to include additional information or to do format changes.

Supplier Record Data Model

The following object types are needed for the supplier record data model.

Attribute Groups

The following attribute groups are used by the PLM Food Supplier Record Library to determine which attributes to include in the supplier bid record, and in which order they should display.

Attribute Group ID	Attribute Group Name	Description
PLMSupplierResponseRecordInformation	Supplier Response Record Information	The root attribute group

Attribute Group ID	Attribute Group Name	Description
PLMSupplierRecordAsset	Supplier Record Asset	Attributes valid for the supplier response record asset
PLMSupplierRecordHeader	Supplier Record Header	Attributes to include in the header section
PLMSupplierRecordIngredient	Supplier Record Ingredient	Attributes to include in the ingredient section of recipes
PLMSupplierRecordLabelDetails	Supplier Record Label Details	Attributes to include in the label details section of labels
PLMSupplierRecordLabelRequirement	Supplier Record Label Requirement	Attributes to include for label requirements
PLMSupplierRecordNutrition	Supplier Record Nutrition	Attributes to include in the nutrition section
PLMSupplierRecordNutritionDV	Supplier Record Nutrition DV	Attributes to include in the nutrition daily values section
PLMSupplierRecordOtherInformation	Supplier Record Other Information	Attributes to include in the other information section of recipes
PLMSupplierRecordPackagingElement	Supplier Record Packaging Element	Attributes to include in the packaging

Attribute Group ID	Attribute Group Name	Description
		element section of packaging
PLMSupplierRecordPackagingRequirement	Supplier Record Packaging Requirement	Attributes to include for packaging requirements
PLMSupplierRecordParameter	Supplier Record Parameter	Attributes to include in the parameter section
PLMSupplierRecordProjectInformationLabel	Supplier Record Project Information Label	Attributes to include in the project information section of labels
PLMSupplierRecordProjectInformationPack	Supplier Record Project Information Packaging	Attributes to include in the project information section of packaging
PLMSupplierRecordProjectInformationRecipe	Supplier Record Project Information Recipe	Attributes to include in the project information section of recipe
PLMSupplierRecordRequirement	Supplier Record Requirement	Attributes to include in the recipe requirement section

Supplier Response Attributes

Attribute Group ID	Attribute Group Name	Description
PLMSupplierRecordDate	Supplier Record Date	Storing the date and timestamp when the record is created
PLMSupplierRecordType	Supplier Record Type	Storing the sample type, recipe, label, or packaging

Supplier Response Asset

Attribute Group ID	Attribute Group Name	Description
SupplierResponseRecord	Supplier Response Record	An asset object type for storing the HTML document for a supplier's bid record.

Supplier Response Record Image and Document Reference

Attribute Group ID	Attribute Group Name	Description
PLMSupplierResponseRecord	Supplier Response Record	Reference from the sample to the supplier response record.

Business Rules for Supplier Records

The following business rules are necessary for the Supplier Records data model.

Business Library for Creating HTML Document

The business library PLM Food Supplier Record Library constructs an HTML document and returns it as String.

The main flow of the business library is to call the function getSupplierResponseRecord() which takes threearguments:

Argument 1: Node - the object the HTML document will be created for. The function expects the object to be one of the following object types, otherwise an empty HTML document is returned.

- PLM Sample
- PLM Packaging Variant Sample
- PLM Label Variant Sample

Argument 2: Indicates if the generated HTML is to be emailed or not. If the HTML is to be emailed (true) then the print link is not included. If the HTML is not emailed (false) then the print link is included in the generated HTML.

Argument 3: STEP Manager

Business Rule for Sending Email

The business action 'PLM Food Email Supplier Record' creates a supplier bid record for the current object and sends an email to the supplier.

It is valid for Sample, Packaging Variant Sample, and Label Variant Sample object types, and it has three binds:

- Node for the current object
- Mailer for the mailer home object
- Manager for the STEP manager

The business action has a dependency to 'PLM Food Supplier Record Library' with the alias PLMFoodSupplierRecordLibrary.

The main flow of the business action is:

- Get the email address from the attribute PLM Supplier Notification Email.
- Generate a supplier bid response HTML using the PLMFoodSupplierRecordLibrary library.
- Use the mailer home to send the email where the body of the email is the HTML document.

Business Rule for Creating Supplier Record Asset

'PLM Food Create Supplier Record' business action creates an asset for the supplier bid record and links it to the Supplier Response (Recipe Response, Label Response, or Packaging Response).

It is valid for the Sample, Packaging Variant Sample, and Label Variant Sample object types, and it has two binds:

- Node for the current object
- Manager for the STEP manager

The business action has a dependency to 'PLM Food Supplier Record Library' with the alias PLMFoodSupplierRecordLibrary.

The main flow of the business action is:

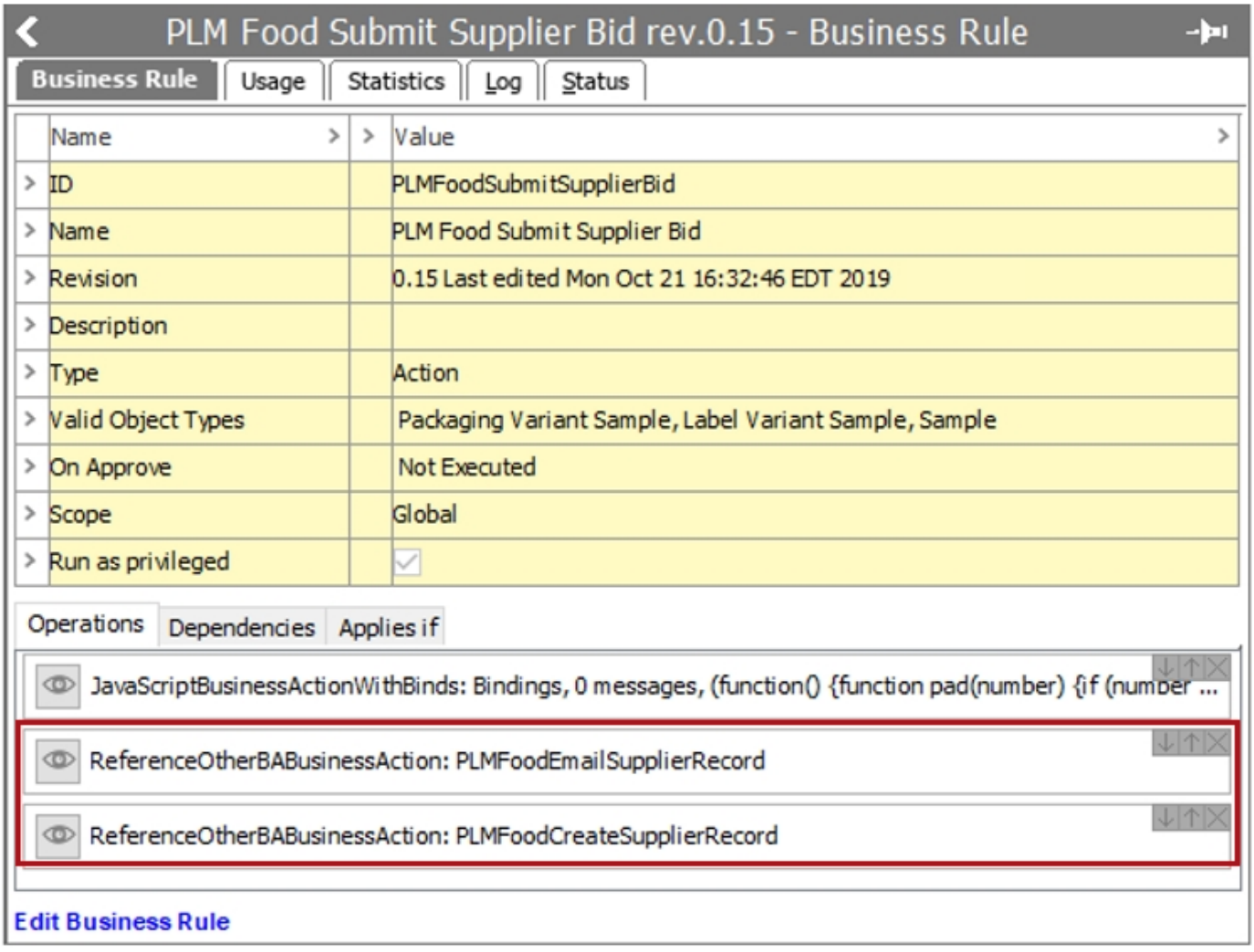
- Get the suppliers asset folder, object ID (SuppliersAssets).
- Create an asset in the supplier asset folder with the object type Supplier Response Record.
- Create a reference from the current object to the asset with the reference type Supplier Response Record.
- Generate a supplier bid response HTML using the PLM Food Supplier Record Library.
- Upload the HTML document to the created asset.

Workflow for Supplier Response

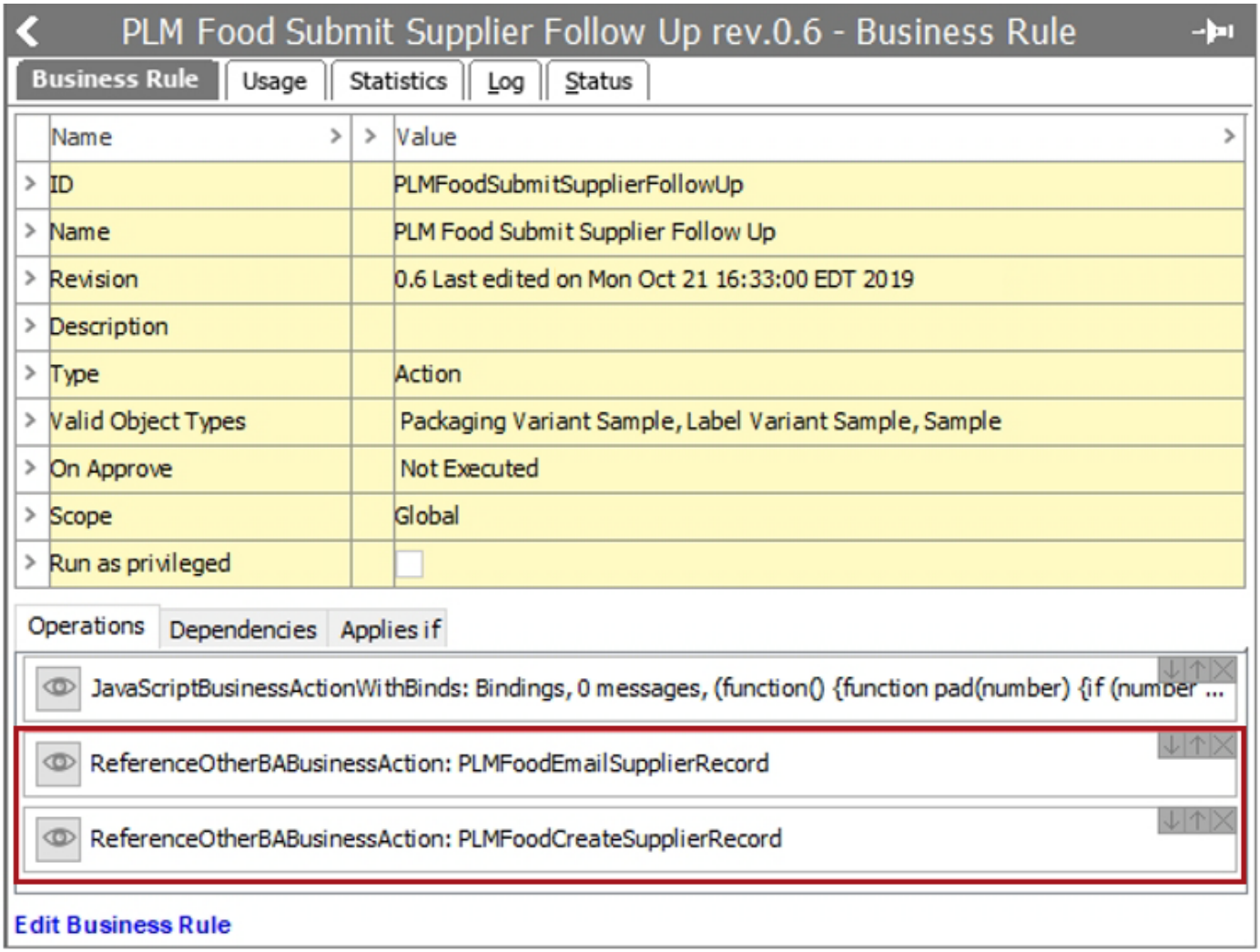
In the existing private label food solution, the business actions 'PLM Food Submit Supplier Bid' and 'PLM Food Submit Supplier Follow Up' include the business actions described in the **Business Rules for Supplier Records** topic in this documentation.

Both the business actions are used in the PLM Private Label Food Supplier Response workflow.

PLM Food Submit Supplier Bid setup



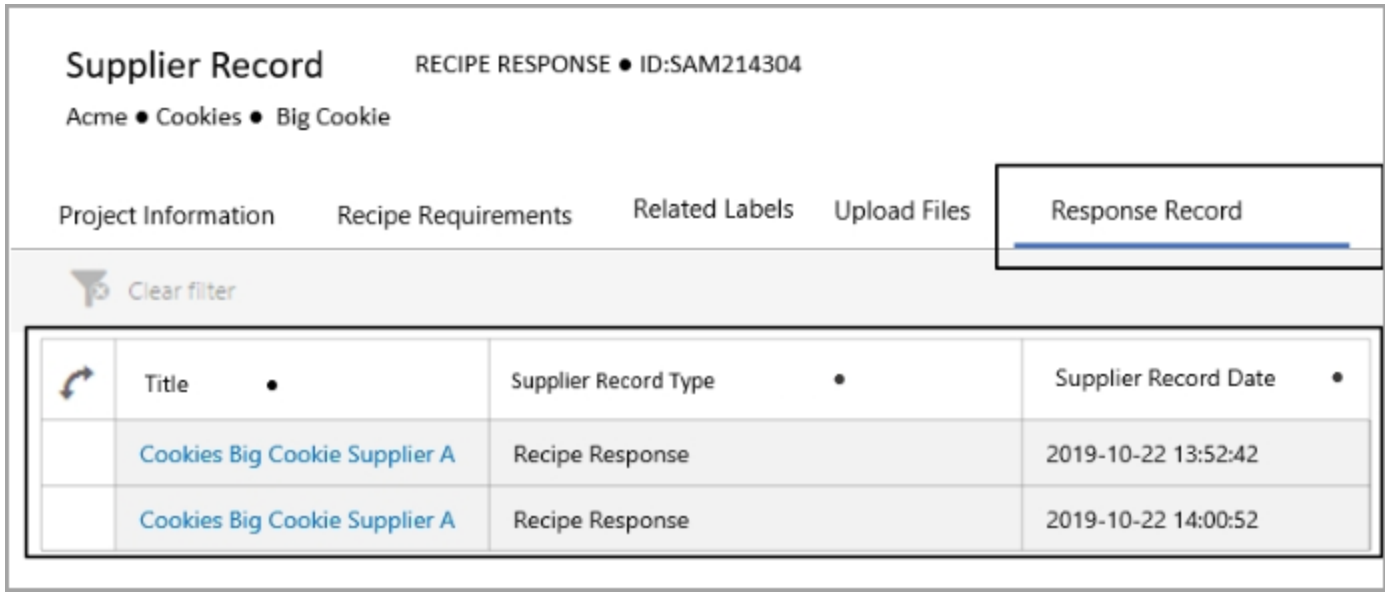
PLM Food Submit Supplier Follow Up setup



Web UI Private Label Food Supplier

The Private Label Food Web UI for suppliers includes a list of the supplier response assets for a Sample, Packaging Variant Sample, or Label Variant Sample.

The Response Record tab displays the supplier bid records.



Clicking on the Title link (for example, 'Cookies Big Cookie Supplier A' above) will display the Supplier Record.

Note: The supplier record can be accessed from the email received when a bid is submitted or from any of the Private Label Food Supplier Bid Status states.

Use Case for Supplier Record

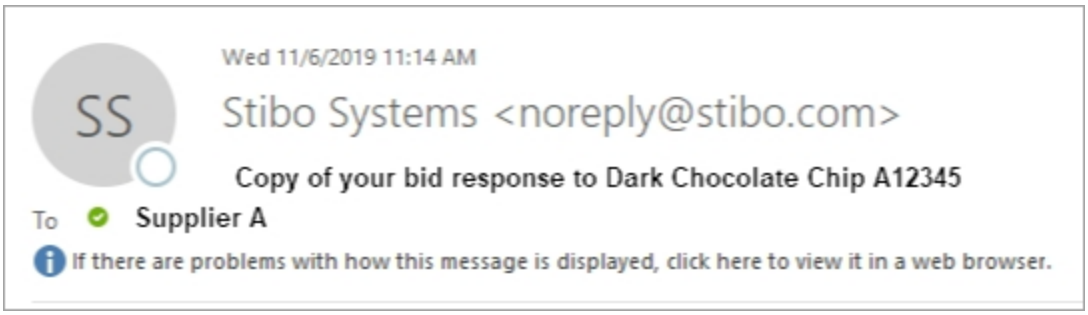
Laura, from the Supplier A team, is responsible for answering the Recipe Response requests received from the customer, CIBUS (Buyer). Laura accesses the Web UI for suppliers, opens the Chocolate Cookie Project Dark Chocolate Chip A12345 (Recipe Response), and starts the process of completing the requested information for the recipe ingredients, requirements, and parameters.

Note: For more information on the use case for the supplier user response, see the **Use Cases for the Supplier User Response** topic in the **PLM Change Reports Summary** segment of the **Product Lifecycle Management** section of the **Solution Enablement** documentation.

Laura completes the Dark Chocolate Chip A12345 (Recipe Response) and clicks 'Send Response' to send the bid to the customer, CIBUS (Buyer).

On transition out of the Initial Response state, named 'Supplier', the Dark Chocolate Chip A12345 (Recipe Response) is removed from Supplier Response workflow. The Dark Chocolate Chip A12345 (Recipe Response) is then initiated in the Supplier Bid Status workflow where suppliers can continue to monitor the status of their open bids.

Immediately, the supplier user who submitted the Dark Chocolate Chip A12345 (Recipe Response) receives an email with a copy of the bid response, as shown below.



Supplier Response Record

Supplier's Name	Supplier A
Supplier's ID Number	A12345
Response Record for	Dark Chocolate Chip A12345 ID:
Time	November 6, 2019 11:13:43 AM EST

Project Information

Project Name	Chocolate Chip Cookie Project
Product Name	Chocolate Chip Cookies
Specification Name	Chocolate Chip Cookies Dark Chocolate Chip
Flavor	Dark Chocolate Chip
Type	Recipe Response
Brand	Best Brand
Need By Date	11/29/2019
Project Start Date	11/01/2019
Version Number	1
Planned Flavor Variations	8 oz 12 oz
Description	A classic chocolate chip cookie, loaded with chocolate chips and baked to soft, warm perfection.
PLM Product Category	Biscuits/Cookies/(Shelf Stable)
Label Country and Languages	United States en

Requirements

Requirement	Requirement Description	Meets Requirement?	Response Detail	Additional Supplier Comments
Fair Trade Certified	Must be Fair Trade Certified. If Yes, please indicate expiration date of certification.	Yes	2018-12-07	
Calories from saturated fat	Please Specify	Yes		
No Genetically Modified Ingredients	Use of non-GMO ingredients is required	Yes		Now I can get non-GMO ingredients
Sugar by weight	Please Specify	Yes	25%	>20 but <25 for sure

Parameters

Parameter	Parameter Description	Meets Requirement?	Response Detail	Method	Additional Supplier Comments
Coliforme Germs	Not detectable in 25g	No	27 g	B	
E. Coli	Must be <3	Yes	1.8 g	C	
Cholerae	Not detectable in 25g	Yes	25 g	C	
Salmonella	Not detectable in 25g	Yes	28 g	A	

Recipe

Ingredient	Ingredient Quantity (%)	Country Of Origin
Brown Sugar	15	Guatemala
Butter	14.0	United States
Dark Chocolate	10.0	Brazil
Enriched Wheat Flour	25.0	United States

Nutrition

Nutrient Declaration Per	100 g
Serving Size (Imperial)	
Serving Size (Metric)	
Calories	250
Calories from Fat	180
Total Fat	45 g
Saturated Fat	2 g
Cholesterol	10 mg
Sodium	150 mg
Total Carbohydrate	11 g
Dietary Fiber	1 g
Sugars	7 g
Protein	1 g
Vitamin A	
Vitamin C	
Calcium	
Iron	
Potassium	
Vitamin D	
Vitamin E	
Vitamin K	
Thiamin	
Riboflavin	
Niacin	
Vitamin B(6)	
Folate	
Vitamin B(12)	
Biotin	
Phosphorus	
Iodine	
Magnesium	
Zinc	
Selenium	

Nutrition % Daily Value

Nutrient Basis (%)	58
Total Fat (%)	10
Saturated Fat (%)	3
Cholesterol (%)	7
Sodium (%)	4
Total Carbohydrate (%)	4
Dietary Fiber (%)	14
Added Sugars (%)	2
Protein (%)	0
Vitamin A (%)	0
Vitamin C (%)	0
Calcium (%)	0
Iron (%)	0
Potassium (%)	0
Vitamin D (%)	0
Vitamin E (%)	0
Vitamin K (%)	0
Thiamin (%)	0
Riboflavin (%)	0
Niacin (%)	0
Vitamin B(6) (%)	0
Folate (%)	0
Vitamin B(12) (%)	0
Biotin (%)	0
Phosphorus (%)	0
Iodine (%)	0
Magnesium (%)	0
Zinc (%)	0
Selenium (%)	0

Other Information

Recipe Number	R-233619
Preparation Instructions	Open and enjoy!
Handling Statements	Store in a cool, dry place
Suitable For Diet Type	With nut allergy
Certified Organic	Yes
No Genetically Modified Ingredients?	Yes
Non-GMO Certifying Agency	U.S Department of Agriculture
Organic Certifying Agency	Quality assurance International

Related Packaging

Specification Name	Chocolate Cookies 12 oz C12345
Specification Name	Chocolate Cookies 8 oz C12345

Related Labels

Specification Name	Chocolate Chip Cookies Dark Chocolate Chip 12 oz US en C12345
Specification Name	Chocolate Chip Cookies Dark Chocolate Chip 8 oz US en C12345