



**Mplify Standard**  
**Mplify 127.1**

**Product Catalog**  
**Business Requirements and Use Cases**

**November 2025**

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## 1 List of Contributing Members

The following members of Mplify participated in the development of this document and have requested to be included in this list.

- Amartus
- Cisco
- Lumen
- Proximus

## 2 Abstract

This document identifies the common Use Cases and attributes needed to support the Product Catalog at the LSO Sonata/Cantata Interface Reference Point.

It supports the requirements defined in the MEF Lifecycle Service Orchestration (LSO) Reference Architecture and Framework (MEF 55.1.1, “LSO RA”) requirements for the Product Catalog between business applications of the Service Provider (Seller) and Customer Domain (Buyer). Information contained within this document will be utilized by both the Seller and Buyer for the development of automated Product Catalog API systems.

### 3 Terminology and Abbreviations

This section defines the terms used in this document. In many cases, the normative definitions to terms are found in other documents. In these cases, the third column is used to provide the reference that is controlling, in other Mplify or external documents.

In addition, terms that are defined in MEF 10.4 [5], MEF 26.2 [6], MEF 50.1 [7], MEF 51.1 [8], and MEF 55.1.1 [9], MEF 57.2 [10], MEF 80 [11] are included in this document by reference and are not repeated in the table below.

<b>Term</b>	<b>Definition</b>	<b>Reference</b>
Bundle	In the context of this document, a Bundle is a Product Offering that groups multiple Product Offerings (for example, to provide a different price or simplified ordering process). A Bundle may not contain a Product Offering that is a Bundle.	This document
Business Function	In the context of this document, Business Function refers to Product Offering Qualification (POQ), Product Order, Quote and Inventory.	This document
DateTime	Date and time format.	ISO 8601 [4]
List Price	The standard published price, without any price reductions, deal references or discounts.	This document
Non-backwards Compatible Modification	Any modification to a Product Offering that results in a previously valid Product Offering Configuration to become invalid.	This document
Notification	A message sent from the Seller to the Buyer to inform about an event that has occurred regarding a specific instance of a Product Catalog Element.	This document
Product	The realization of a Product Offering to create a single instance for a specific Buyer.	MEF 55.1.1 [9]
Product Catalog	Describes the Product Specifications and Product Offerings made available by a Seller to potential Buyers.	MEF 55.1.1 [9]
Product Category	A grouping of Product Offerings in logical containers defined by the Seller. A Product Category may contain other (sub)Product Categories and/or Product Offerings.	This document
Product Catalog Element	In the context of this document, this is a generic term used to refer to any of the Product Catalog entities: Product Category, Product Offering and Product Specification.	This document



<b>Term</b>	<b>Definition</b>	<b>Reference</b>
Product Offering Contextual Target Schema	In the context of this document, a subschema of the Product Offering Specification Schema that defines additional constraints on the Product-Specific Attributes for the purpose of generating and validating the request for a given Business Function and Product Action. Each combination of Business Function and Product Action may result in a different contextual schema.	This document
Product Offering Specification Schema	In the context of this document, a subschema of the Product Specification defined by the Seller that restricts the possible values of the Product-Specific Attributes, relationships, and milestones to define the Product Offering.	This document
Product Schema	In the context of this document, a schema (i.e., JSON) that defines all the attributes of a Product and their possible values. This may be the Product Specification or a constraint subschema thereof.	This document
Product Specification	In the context of this document, a specification comprising the following, for use with MEF APIs: <ul style="list-style-type: none"> <li>• a set of schemas that define all of the attributes of a Product and their possible values</li> <li>• definition of relationships with other Products and/or locations</li> </ul>	This document
Product-Agnostic Attribute	An attribute defined by an LSO Cantata/Sonata API which is independent of a Product Offering.	MEF 55.1.1 [9]
Product-Specific Attribute	A Service Attribute or a parameter thereof defined within a Product Specification.	MEF 55.1.1 [9]

**Table 1 - Terminology**

## 4 Compliance Levels

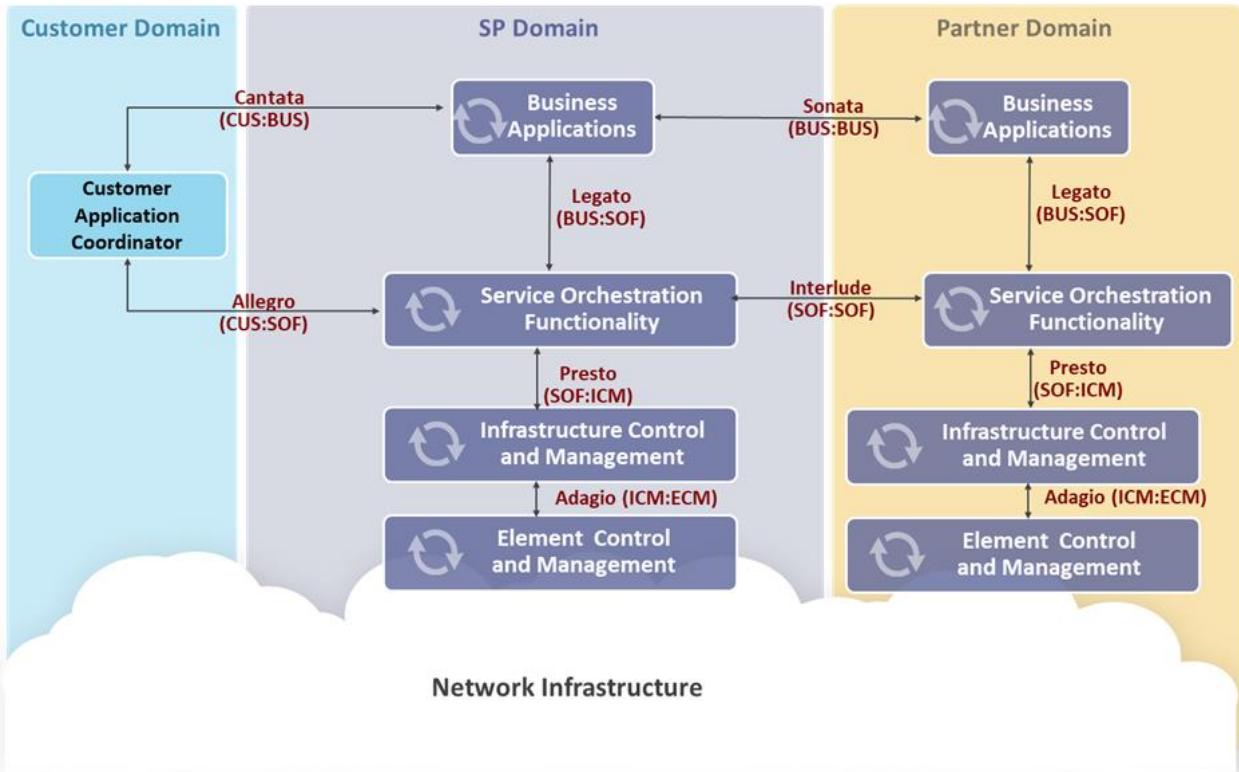
The key words "**MUST**", "**MUST NOT**", "**REQUIRED**", "**SHALL**", "**SHALL NOT**", "**SHOULD**", "**SHOULD NOT**", "**RECOMMENDED**", "**NOT RECOMMENDED**", "**MAY**", and "**OPTIONAL**" in this document are to be interpreted as described in BCP 14 (RFC 2119 [1], RFC 8174 [2]) when, and only when, they appear in all capitals, as shown here. All key words must be in bold text.

Items that are **REQUIRED** (contain the words **MUST** or **MUST NOT**) are labeled as [Rx] for required. Items that are **RECOMMENDED** (contain the words **SHOULD** or **SHOULD NOT**) are labeled as [Dx] for desirable. Items that are **OPTIONAL** (contain the words **MAY** or **OPTIONAL**) are labeled as [Ox] for optional.

A paragraph preceded by [CRa]< specifies a conditional mandatory requirement that **MUST** be followed if the condition(s) following the "<" have been met. For example, "[CR1]<[D38]" indicates that Conditional Mandatory Requirement 1 must be followed if Desirable Requirement 38 has been met. A paragraph preceded by [CDb]< specifies a Conditional Desirable Requirement that **SHOULD** be followed if the condition(s) following the "<" have been met. A paragraph preceded by [COc]< specifies a Conditional Optional Requirement that **MAY** be followed if the condition(s) following the "<" have been met.

## 5 Introduction

This document defines the business requirements and process-related guidelines for the Product Catalog over the Sonata/Cantata Interface Reference Point. The Sonata/Cantata Interface Reference Point is defined in MEF 55.1.1 [9] as the Management Interface Reference Point supporting the management and operations interactions (e.g., catalog, quoting, ordering, inventory, etc.) between the Service Provider (Seller) and Partner Domain/Customer Domain (Buyer). The scope of this document is limited to interactions between these parties; within this document, they are referred to as the “Seller” and the “Buyer”.



**Figure 1 - LSO Reference Architecture Diagram**

Figure 1 depicts the LSO Reference Architecture, per MEF 55.1.1 [9]. This document addresses the interactions between the business applications of the Buyer and Seller at the Sonata/Cantata Interface Reference Point required to support the Mplify Product Catalog.

The associated “patterns” to the interactivity between the Buyer and Seller are as follows:

1. Whenever the Buyer submits a Product Catalog request, the Seller responds immediately with the results of the request.
2. The Seller sends notifications to inform the Buyer of any Product Catalog Element related changes (e.g. internal “admin” operations within the Seller Domain). The Buyer may then retrieve all relevant Product Catalog Elements at any time to obtain the current status and details.

To fully define the business interactions associated with the Product Catalog, this document is focused on the following key areas:

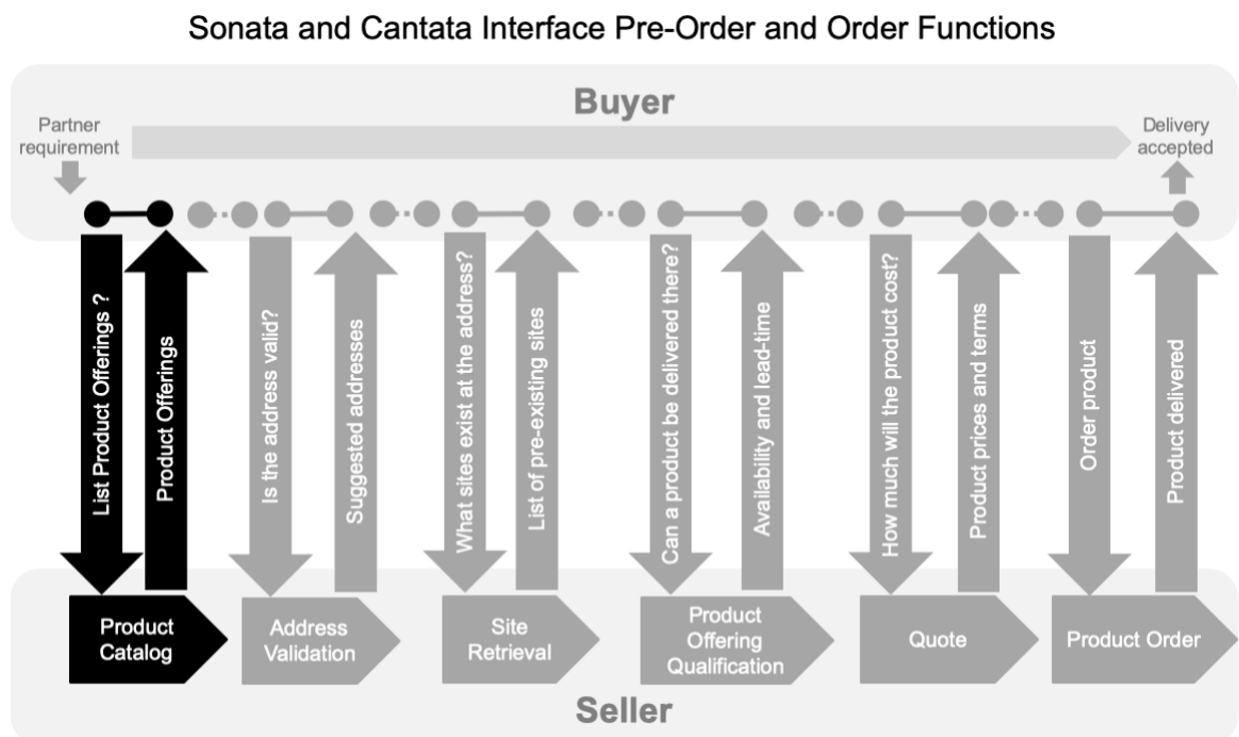
- Product Catalog Use Cases and Business Requirements
- Product Catalog Element Attributes supported in this document
- Notification of events that occur during the lifecycle of Product Catalog Elements
- Product Offering and Product Specification Lifecycle State Diagrams

## 6 Key Concepts

This section provides an overview, along with some key concepts for using a Product Catalog in the overall Product Ordering process defined in MEF 50.1 [7].

Prior arrangements for Buyer authentication, security verification, and system interface requirements are not addressed within these use cases. All onboarding requirements must be defined and negotiated between the Buyer and Seller prior to applying the Product Catalog Use Cases defined in this document.

The Product Catalog is part of a broader End-to-End Sonata/Cantata flow. Figure 2 below shows a high-level diagram to get an overview of the entire Product Ordering process and Product Catalog position within it.



**Figure 2 - Sonata and Cantata Interface Focus**

Sonata and Cantata Interface Overview:

- **Product Catalog:** Allows the Buyer to retrieve Product Categories and Product Offering information, including Product Specification details from a Seller's Product Catalog.
- **Address Validation:** Allows the Buyer to validate their address information for Places known to the Seller, including exact formats.
- **Site Retrieval:** Allows the Buyer to retrieve Service Site information including exact formats for Service Sites known to the Seller.

- **Product Offering Qualification:** Enables the Buyer to determine whether it is feasible for the Seller to deliver a particular Product with a given configuration to a particular Place.
- **Quote:** Allows the Buyer to find out how much the installation of an instance of a Product Offering, an update to an existing Product, or a disconnect of an existing Product will cost.
- **Product Order:** Allows the Buyer to request the Seller to initiate and complete the fulfilment process of an installation of a Product Offering, an update to an existing Product, or a disconnect of an existing Product at the Place defined by the Buyer.

The LSO Cantata/Sonata APIs consist of product-agnostic and product-specific parts, as shown in Figure 3 below. The product-agnostic part (which includes the Product-Agnostic Attributes) are defined in the POQ, Quote, Product Order, and Inventory API standards. The product-specific part (which includes the Product-Specific Attributes) are defined in the product specification standards of the corresponding products (e.g., Access E-Line, Subscriber Ethernet, etc.).



**Figure 3 - Sonata and Cantata API Structure**

Since the Product Schemas generally do not specify which set of Product-Specific Attributes are required and since the set of valid configurations and supported values may vary across Sellers, Business Functions and Product Action, an API mechanism is required for the Seller and Buyer to exchange this information in an automated manner.

The Product Catalog API allows the Buyer to discover what Product Offerings the Seller provides and which Product-Specific Attribute configurations are supported. This information is important for automation of the Mplify APIs during all the stages of Product Ordering process (POQ/Quote/Product Order/Inventory).

## 6.1 Product Catalog Elements

The Product Catalog's data model is comprised of the following key Product Catalog Elements:

- **Product Category:** A grouping of Product Offerings in logical containers defined by the Seller. A Product Category may contain other (sub)Product Categories and/or multiple Product Offerings.
- **Product Offering:** The commercial realization of a Product Specification achieved by defining Product Offering Terms and pricing, and specifying constraints on the possible values of the Product-Specific Attributes and relationships.
- **Product Specification:** A specification comprising the following, for use with Mplify APIs:
  - a set of schemas that define all of the Product-Specific Attributes of a Product and their possible values
  - definition of relationships with other Products and/or locations

In summary, a Product Specification is the detailed definition of a Product, a Product Offering is the commercial realization of a Product Specification by the Seller, while the Product Categories allows for better organization and management of Product Offerings.

## 6.2 Product-Specific Attribute Classification

To streamline the number of Product-Specific Attributes that are required to be included in the API request and responses for the different Use Cases and Business Functions at the Sonata/Cantata IRP, the Buyer and Seller agree to assign each Product-Specific Attribute included in the Product Specification into one of three classifications. The classification for each Product-Specific Attribute may be different across Business Function, Product Action and Product Offering:

- **Mandatory** - Product-Specific Attributes that must be provided by the Buyer in a POQ/Quote/Product Order request and must be returned by the Seller for an Inventory request as specified in section 6.2.1
- **Optional** - Product-Specific Attributes that may be provided by the Buyer in a POQ/Quote/Product Order request and may be returned by the Seller for an Inventory request as specified in section 6.2.2
- **Fixed** - Product-Specific Attributes that are hard coded and may be specified by the Buyer in a POQ/Quote/Product Order request (subject to agreement between the Buyer and Seller) and may be returned by the Seller for an Inventory request (subject to agreement between the Buyer and Seller) as specified in section 6.2.3

As noted above, the classification may depend on:

- Business Function - a given Product-Specific Attribute may, for example, be classified as Fixed for the Create POQ request; while it may be considered as Mandatory for the Create Product Order request.
- Product Action - a given Product-Specific Attribute may, for example, be classified as Mandatory for the Create POQ request for an INSTALL of a new Product, while it may be classified as Fixed for the Create POQ request for a CHANGE of an installed Product.
- Product Offering - a given Product-Specific Attribute may, for example, be classified as Mandatory for the Create POQ request for a Product Offering (e.g., Premium Service), while it may be classified as Fixed for the Create POQ request for a different Product Offering (e.g., Basic Service). Note: these two Product Offerings could be based on the same Product Specification or different Product Specifications.

The classification for each Product-Specific Attribute can be defined and negotiated during the onboarding process or defined in a Product Catalog.

- [R1]** The Seller and Buyer **MUST** agree, for each Product-Specific Attribute, whether the attribute is Mandatory, Optional or Fixed for each Business Function (POQ, Quote, Product Order) and Product Action (INSTALL, CHANGE) for a Product Offering.
- [R2]** The Seller and Buyer **MUST** agree, for each Product-Specific Attribute, whether the attribute is Mandatory, Optional or Fixed for Inventory for a Product Offering.
- [R3]** If, for a Product Offering, a Product-Specific Attribute is classified as Optional for any Business Function and, if applicable, Product Action, the Seller and Buyer **MUST** agree on a default value for the attribute.
- [R4]** The Seller **MUST** reject an API request if the value for a Product-Specific Attribute requested by the Buyer is not a supported value for the applicable Product Offering.

#### 6.2.1 Mandatory Product-Specific Attributes

- [R5]** If a Product-Specific Attribute is agreed to be Mandatory for a Business Function (POQ, Quote, Product Order), Product Action (INSTALL, CHANGE), and Product Offering, then the Buyer **MUST** include a value for the attribute in the corresponding API request.
- [R6]** If a Product-Specific Attribute is agreed to be Mandatory for Inventory for a Product Offering, then the Seller **MUST** include a value for the attribute in the corresponding API response.
- [R7]** When the Seller receives a POQ, Quote or Product Order request in which any of the Mandatory Product-Specific Attributes are not included, the request **MUST** be rejected by the Seller.



### 6.2.2 Optional Product-Specific Attributes

- [O1]** If a Product-Specific Attribute is agreed to be Optional for a Business Function (POQ, Quote, Product Order), Product Action (INSTALL, CHANGE), and Product Offering, then the Buyer **MAY** include a value for the attribute in the corresponding API request.
- [R8]** The Seller **MUST** apply the agreed default value for an Optional Product-Specific Attribute if a value is not included by the Buyer in the corresponding API request.

Note: If no default value is defined by the Seller, then the default value is considered to be NULL.

- [R9]** If a Product-Specific Attribute is agreed to be Optional for Inventory for a Product Offering, then the Seller **MUST** include a value for the attribute in the corresponding API response if the value is not the agreed default value.
- [O2]** If a Product-Specific Attribute is agreed to be Optional for Inventory for a Product Offering, then the Seller **MAY** include a value for the attribute in the corresponding API response if the value has the agreed default value.

### 6.2.3 Fixed Product-Specific Attributes

A Product-Specific Attribute may be classified as Fixed for a Business Function, Product Action, and Product Offering when only one value is applicable for the Seller. This can be the case for example if:

- the Seller supports only a single value, or
- the value is derived from the value of one or more other Product-Specific Attributes, or
- the Seller specifies a single value in the Product Catalog for a specific Product Offering, or
- the Seller defines the value for one or more Product-Specific Attributes during Product fulfillment (e.g., VLAN ID) and provides it to the Buyer during the Product Order
- the Buyer and the Seller agree on a single value during onboarding

Since these are Product-Specific Attributes, each value must still be agreed in some way between the Buyer and the Seller, which implies that even in the first two cases, the Seller must make the Buyer aware of what the value is or how it is derived, before the Buyer places an order. How this is done is outside the scope of this document.

The Seller applies the one applicable value for every request for which the Product-Specific Attribute is classified as Fixed.

- [R10]** The Buyer and Seller **MUST** agree on whether the Buyer can include Product-Specific Attributes that have been classified as Fixed in API requests for POQ, Quote and Product Order.

- [R11] If the Buyer and Seller agree that Product-Specific Attributes classified as Fixed cannot be included in API requests (see [R10]), the Buyer and Seller **MUST** agree on whether the Seller includes Product-Specific Attributes classified as Fixed in the corresponding API responses.
- [R12] If the Buyer and Seller agree that Product-Specific Attributes classified as Fixed cannot be included in an API request (see [R10]), the Seller **MUST** reject an API request from the Buyer if it includes a Product-Specific Attribute that has been classified as Fixed for the Business Function (POQ, Quote, Product Order), Product Action (INSTALL, CHANGE), and Product Offering.
- [R13] If the Buyer and Seller agree that Product-Specific Attributes classified as Fixed cannot be included in API requests (see [R10]), and if a Product-Specific Attribute is classified to be Fixed for Inventory for a Product Offering, then the Seller **MUST NOT** include a value for the Product-Specific Attribute in the Inventory API response.
- [R14] If the Buyer and Seller agree that Product-Specific Attributes classified as Fixed can be included in API requests (see [R10]), the Seller **MUST** reject an API request from the Buyer if it includes a Product-Specific Attribute that has been classified as Fixed for the Business Function (POQ, Quote, Product Order), Product Action (INSTALL, CHANGE), and Product Offering and includes a value that is different than the fixed value.
- [R15] If the Buyer and Seller agree that Product-Specific Attributes classified as Fixed can be included in API requests (see [R10]), and if a Product-Specific Attribute is agreed to be Fixed for Inventory for a Product Offering, then the Seller **MUST** include a value for the Product-Specific Attribute in the Inventory API responses.

### 6.3 Product Offering Schemas and Contextual Target Schemas

The Product Catalog defines the following schemas and subschemas to allow the Seller to define which Product-Specific Attributes are required or allowed to be included along with supported values in Buyer's API requests, and hence to allow the Buyer to automate the creation of the corresponding API requests for a given Seller.

- Source Product Specification Schema: The Product Schema as included in the Product Specification (e.g., MEF 125, *LSO Cantata and LSO Sonata Subscriber Ethernet Product Schemas and Developer Guide*)
- Product Offering Specification Schema: a subschema of the Source Product Specification Schema defined by the Seller that restricts the possible values of the Product-Specific Attributes, relationships, and milestones to define the Product Offering.
- Product Offering Contextual Target Schema: a subschema of the Product Offering Specification Schema that defines additional constraints on the Product-Specific Attributes

for the purpose of generating and validating the request for a given Business Function and Product Action.

Note: Each combination of Business Function and Product Action may result in a different contextual schema.

Note: The Product Offering Contextual Target Schemas are optional and are only required to be provided if the Business Functions and/or Product Actions need to be differentiated from the corresponding Product Offering Specification Schema.

The relationship between the Source Product Specification Schema, Product Offering Specification Schema and Product Offering Contextual Target Schema is shown in Figure 4 below.

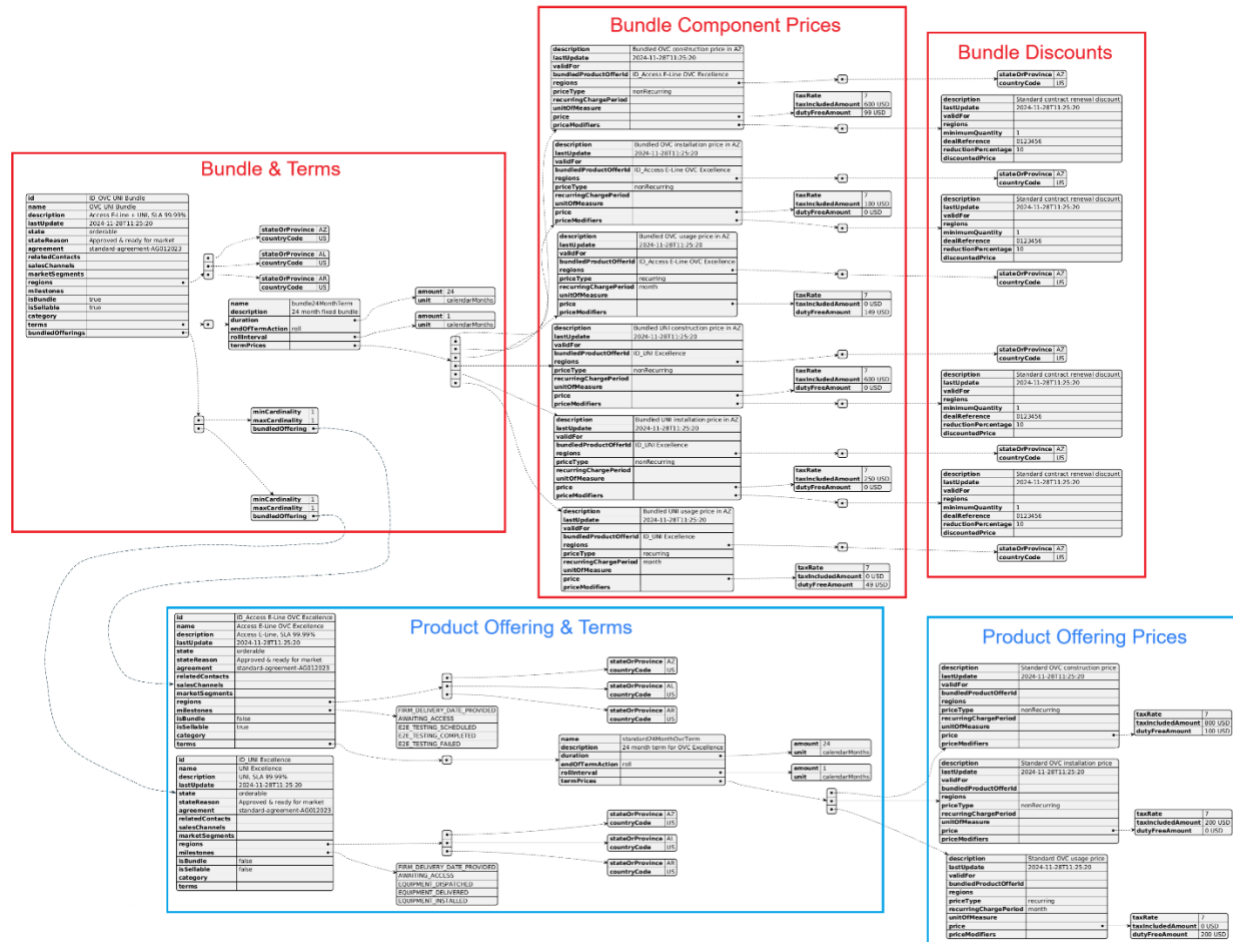


**Figure 4 - Product Catalog Schema Relationships**

## 6.4 Bundles

The LSO Cantata/Sonata APIs support Bundles which are comprised of multiple Product Offerings made available by the Seller. The benefits for a Buyer are for example, a preferential price or a simplified ordering process for a Bundle, versus ordering all the individual Product Offerings separately. A Bundle may not contain a Product Offering that is a Bundle.

A Bundle definition also includes a list of Product Offering Bundle Relation, which specifies the set of Product Offerings that comprise the Bundle, along with the ability for the Seller to constrain the minimum and maximum number of instances of each Product Offering supported for a given Bundle. Figure 5 below shows an example of this Bundle definition and Bundle Relation, with the “OVC UNI Bundle” comprised of exactly one “Access E-Line OVC Excellence” Product Offering and exactly one “UNI Excellence” Product Offering.



**Figure 5 - Product Offering and Bundle Example**

A given Product Offering may be sellable independently and be part of a Bundle at the same time. When this occurs, the Product Offering and the Bundle must each include a separate set of Product Offering Terms and Product Offering Prices. A Bundle with optional or variable number of Product Offerings must always include the Product Offering Terms and the Product Offering Prices that includes all the instances of Product Offerings included in the Bundle. An example of this can be seen in Figure 5 above, where the “Access E-Line OVC Excellence” Product Offering is sellable independently and as part of the Bundle. As such, the Product Offering Terms with Prices (e.g. “24 month term for OVC Excellence”) must be defined for the independently sellable Product Offering, along with a separate Product Offering Terms with Prices (e.g. “24 month fixed bundle”) that must be defined for the “OVC UNI Bundle” Product Offering with the “bundleProductOfferings” attribute pointing to the “Access E-Line OVC Excellence Product Offering”. Whereas the “UNI Excellence” Product Offering is not sellable independently and as such, its Product Offering Terms and Prices may only be defined within the Bundle. A Product Offering Term of a Product Offering that is a Bundle covers all Product Offerings that are contained within the Bundle.

In addition, every independently sellable Product Offering and Bundle may include a separate Price Modifiers (e.g. as a Reduction Percentage or Discounted Price). In the example above, the Bundle includes a 10% Reduction Percentage for all the non-recurring prices as part of the standard

contract renewal discount (e.g. as a Deal Reference promo code), while the “Access E-Line OVC Excellence” Product Offering does not currently offer any pricing discounts.

## 7 Use Cases

This section describes the use cases and business requirements that support the Product Catalog between the Buyer and Seller.

**[R16]** An implementation of Mplify Product Catalog API **MUST** support Use Cases 1 thru 6.

**[O3]** An implementation of Mplify Product Catalog API **MAY** support Use Cases 7 and 8.

Use Case #	Use Case Name	Use Case Description	Reference Section
1	Retrieve Product Category List	The Buyer requests a list of Product Categories from the Seller that meet a set of filter criteria. The Seller returns a summarized list of Product Categories.	Section 7.1.2
2	Retrieve Product Category by Product Category Identifier	The Buyer requests detailed information about a single Product Category based on a Product Category Identifier.	Section 7.1.3
3	Retrieve Product Offering List	The Buyer requests a list of Product Offerings from the Seller that meet a set of filter criteria. The Seller returns a summarized list of Product Offerings.	Section 7.2.9
4	Retrieve Product Offering by Product Offering Identifier	The Buyer requests detailed information about a single Product Offering based on a Product Offering Identifier.	Section 7.2.10
5	Retrieve Product Specification List	The Buyer requests a list of Product Specifications from the Seller that meet a set of filter criteria. The Seller returns a summarized list of Product Specifications.	Section 7.3.5
6	Retrieve Product Specification by Product Specification Identifier	The Buyer requests detailed information about a single Product Specification based on a Product Specification Identifier.	Section 7.3.6
7	Register for Product Catalog Notifications	The Buyer subscribes to Product Catalog notifications.	Section 7.5.1

Use Case #	Use Case Name	Use Case Description	Reference Section
8	Send Product Catalog Notification	The Seller sends a Product Catalog Notification to the Buyer provided Recipient Information when a Product Catalog Event has occurred.	Section 7.5.2

**Table 2 - Use Cases**

## 7.1 Product Category Use Cases

Details for the Product Category attributes and the following Use Cases are defined in this section:

- Retrieve Product Category List
- Retrieve Product Category by Product Category Identifier

### 7.1.1 Product Category Attributes

The Product Category is a grouping of Product Offerings in logical containers defined by the Seller. A Product Category may contain other (sub)Product Categories and/or Product Offerings.

The Product Category attributes are defined in the table below. All attributes are set by the Seller.

Attribute	Description	Type	Comments
Product Category Identifier	Unique identifier (within the Seller domain) for the Product Category.	String	
Product Category Name	The name (unique within the Seller domain) of the Product Category.	String	
Product Category Description	Description of the Product Category.	String	
Product Category Last Update	The date and time the Product Category was created or most recently updated.	Date/Time	
Parent Category	Identifier referencing the parent Product Category of this Product Category.	Reference to Product Category	Note: This is empty for top-level Categories.
Sub Categories	A list of 0 to N Product Category Identifiers, to which this Product Category is a parent of.	List of Reference to Product Category (this table)	
Product Offerings	A list of Product Offering Identifiers grouped within this Product Category.	List of Reference to Product Offering (see Table 4)	

**Table 3 - Product Category Attributes**

- [R17] If a Product Category has a Parent Category, then its Product Category Identifier **MUST** be in the Sub Categories of the referenced Parent Category.
- [R18] If a Product Category has no Parent Category, then its Product Category Identifier **MUST NOT** be in the Sub Categories list for any Product Category.
- [R19] If a Product Category is specified in the Sub Categories of a Product Category A, then Product Category A **MUST** be the Parent Category of this Product Category.
- [R20] The Product Offerings attribute specified in Table 3 **MUST** include a list of references to all Product Offerings that are grouped in this Product Category.



- [R21] If any Product Category attribute listed in Table 3 has changed, then Product Category Last Update **MUST** be set to reflect the most recent date the modification occurred.
- [R22] After a Product Category has been created, the Product Category Identifier in Table 3 **MUST NOT** be modified.

### 7.1.2 Retrieve Product Category List Use Case

The Buyer requests a list of Product Categories from the Seller that meet a set of filter criteria.

#### 7.1.2.1 Use Case Process Steps

1. The Buyer sends the Retrieve Product Category List request to the Seller.

- [O4] The Buyer request **MAY** contain none or more of the following filter criteria defined in Table 3:

- Product Category Last Update (range of dates)
- Parent Category

2. The Seller receives the request and returns a summarized list of Product Categories.

- [R23] The Seller response **MUST** include the following attributes defined in Table 3 for each Product Category that matches the Buyer's filter criteria:

- Product Category Identifier
- Product Category Name
- Product Category Description
- Product Category Last Update

- [R24] The Seller response **MUST** include the following attributes defined in Table 3 for each Product Category for which they are set:

- Parent Category
- Sub Categories
- Product Offerings

- [R25] The Seller response **MUST NOT** include any attributes not defined in Table 3.

- [R26] If no Product Categories match the filter criteria provided by the Buyer, the Seller **MUST** return a positive response with an empty list.

### 7.1.3 Retrieve Product Category by Product Category Identifier Use Case

The Buyer requests detailed information about a single Product Category based on a Product Category Identifier.

#### 7.1.3.1 Use Case Process Steps

1. The Buyer sends the Retrieve Product Category by Product Category Identifier request to the Seller.

**[R27]** The Buyer request **MUST** include the following attribute defined in Table 3:

- Product Category Identifier

2. The Seller receives the request and returns details for the Product Category identified by the Product Category Identifier.

**[R28]** The Seller response **MUST** include the following attributes defined in Table 3:

- Product Category Identifier
- Product Category Name
- Product Category Description
- Product Category Last Update

**[R29]** The Seller response **MUST** include the following attributes defined in Table 3 if they are set:

- Parent Category
- Sub Categories
- Product Offerings

**[R30]** The Seller response **MUST NOT** include any attributes not defined in Table 3.

## 7.2 Product Offering Use Cases

Details for the Product Offering attributes and the following Use Cases are defined in this section:

- Retrieve Product Offering List
- Retrieve Product Offering by Product Offering Identifier

### 7.2.1 Product Offering Attributes

The Product Offering attributes are defined in the table below. All attributes are set by the Seller.

<b>Attribute</b>	<b>Description</b>	<b>Type</b>	<b>Comments</b>
Product Offering Identifier	Unique identifier (within the Seller domain) for the Product Offering.	String	Note: The Seller may choose to incorporate version information as part of the Offering Identifier.
Product Offering Name	The commercial name of the Product Offering.	String	
Product Offering Description	Description of the Product Offering.	String	
Product Offering Last Update	The date and time the Product Offering was created or most recently updated.	Date/Time	
Product Offering State	The current lifecycle status of the Product Offering.	One of (see Table 20): <ul style="list-style-type: none"> <li>• ANNOUNCED</li> <li>• END_OF_SALE</li> <li>• END_OF_SUPPORT</li> <li>• OBSOLETE</li> <li>• ON_HOLD</li> <li>• ORDERABLE</li> <li>• PILOT_BETA</li> <li>• REJECTED</li> </ul>	
Product Offering State Transitions	The list of Product Offering State transitions, including the date they are expected to occur or have occurred.	List of Product Offering State Transition (see Table 5)	
Product Offering State Reason	Provides complementary information on the reason why the Product Offering State is set to a particular value. For example, a reason of "Supply Constraint" as why a Product Offering is on ON_HOLD.	String	

<b>Attribute</b>	<b>Description</b>	<b>Type</b>	<b>Comments</b>
Standard Framework Agreement	The name of the Seller's standard offer arrangement (such as a framework agreement). The name is unique within the Seller domain.	String	This should be the name of the Seller's standard offer arrangement or framework agreement for this category of Product Offering (e.g., Commercial, Federal or Regulated) as used by the Seller in their official communication of the Product. This should only contain information specific for this Product Offering.
Attachments	Complements the Product Offering description with presentation, video, pictures, etc.	List of URL	Note: The Seller should include all documents describing the Standard Framework Agreement as an Attachment.
Related Contact	Defines the contact info for the related contact of a Product Offering.	Related Contact attribute as defined in MEF 113 [13] Section 8.1.5	This would typically be a Product Manager Contact.

<b>Attribute</b>	<b>Description</b>	<b>Type</b>	<b>Comments</b>
Sales Channels	A list of names defined by the Seller which identify the different methods by which the Product Offering is made available to the Buyer for ordering.	List of Strings	<p>The different Sales Channels should be specified in the Standard Framework Agreement or provided during the onboarding process.</p> <p>For example: Reseller, Distribution, Direct Sales.</p> <p>Note: If Sales Channels is an empty list, it implies that the Product Offering is available in all Seller supported Sales Channels.</p>
Market Segments	The names of the market segments for the Product Offering.	List of Strings	<p>The set of market segment names should be specified in the Standard Framework Agreement or provided during the onboarding process.</p> <p>For example: Wholesale, Federal, Financial.</p> <p>Note: If Market Segments is an empty list; it implies that the Product Offering is available in all Seller supported Market Segments</p>

<b>Attribute</b>	<b>Description</b>	<b>Type</b>	<b>Comments</b>
Regions	Areas where the products are offered by the Seller to potential Buyers.	List of Region (see Table 6)	Note: If Regions is an empty list, it implies that the Product Offering is available in all Seller supported Regions.
Product Offering Terms	Commitment durations under which a Product Offering is available to Buyers. For instance, a Product Offering can be made available with multiple commitment periods of 1, 2 or 3 year terms.	List of Product Offering Term (see Table 7)	Note: Product Offering Prices is included as part of the terms.
Product Offering Milestone Constraints	Allows constraining the Product Specification Milestones (see Table 12) for the Product Offering.	List of Product Milestone (see Table 15)	Note: This list must be a subset of the Product Specification Milestones and if defined, it will override the entire set of Product Specification Milestones.
Is Product Offering Bundle	Indicates if this Product Offering is a Bundle of other Product Offerings.	Boolean	If TRUE, this Product Offering is available as a Bundle of a set of Product Offerings that may be ordered together.
Is Sellable	Indicates that the Product Offering may be ordered independently.	Boolean	If FALSE, the Product Offering may only be ordered within a Bundle.
Product Offering Bundle Relations	Defines the set of Product Offerings that comprise the Product Offering Bundle, along with how they are related.	List of Product Offering Bundle Relation (see Table 8)	Note: This list may only be defined if 'Is Product Offering Bundle' attribute is TRUE.

<b>Attribute</b>	<b>Description</b>	<b>Type</b>	<b>Comments</b>
Product Offering Notes	A set of comments for additional information.	List of Note attribute as defined in MEF 57.2 [10] Section 8.14	
Product Offering Product Categories	A list of 0 or more Product Category Identifiers, with each referring to a Product Category in which this Product Offering is grouped together with other Product Offerings.	List of Reference to Product Category (see Table 3)	
Product Specification	A Product Specification Identifier referencing the Product Specification the Product Offering is based on.	Reference to Product Specification (see Table 12)	
Product Offering Specification Schema	A reference to or value of a subschema of the Source Product Specification Schema that restricts the possible values of the Product-Specific Attributes, relationships, and milestones to define the Product Offering.	Reference to or value of a Product Schema	
Product Offering Product Relationship Constraints	<p>Allows constraining the relationships between related Product Specifications.</p> <p>Note: only the relationships that need to be constraint should be included.</p>	List of Product Offering Product Relationship Constraint (see Table 9)	<p>As an example, an Access E-Line OVC references Operator UNI and ENNI Product Offerings.</p> <p>Note: this constrains the relationship between related Product Offerings (since the relationship is inherited from the Product Specification).</p>

<b>Attribute</b>	<b>Description</b>	<b>Type</b>	<b>Comments</b>
Product Offering Place Relationship Constraints	Allows constraining the Place relationships for the Product Offering.	List of Product Offering Place Relationship Constraint (see Table 10)	Note: only the Place relationships that need to be constraint should be included.
Product Offering Contextual Information	Defines additional constraints on the Product Offering Specification Schema for the Product-Specific Attributes of a Product Offering for each Business Function and Product Action.	List of Product Offering Contextual Info (see Table 11)	

**Table 4 - Product Offering Attributes**

- [R31]** If any Product Offering attribute listed in Table 4 has changed, then Product Offering Last Update **MUST** be set to reflect the most recent date the modification occurred.
- [R32]** If the Product Offering Contextual Information includes an entry for one Business Function or Product Action, then the Seller **MUST** provide a Product Offering Contextual Information entry in this list for every combination of Business Function and Product Action (as defined in Table 11) for the Product Offering.
- [R33]** The Product Offering Terms attribute **MUST NOT** be defined if the Is Sellable attribute is FALSE.
- [R34]** If the Is Product Offering Bundle attribute is TRUE, then the Is Sellable attribute **MUST** be TRUE.
- [R35]** The Product Offering Bundle Relations attribute **MUST** only be defined if the Is Product Offering Bundle attribute is TRUE.
- [R36]** If any of the attributes defined in Table 4 are changed in a Non-backwards Compatible Modification, the Seller **MUST** create a new Product Offering with a different Product Offering Identifier.
- [R37]** After a Product Offering has been created, the following attributes listed in Table 4 **MUST NOT** be modified:
  - Product Offering Identifier
  - Product Specification



### 7.2.2 Product Offering State Transition Attributes

The Product Offering State Transition attributes are defined in the table below.

Attribute	Description	Type	Comments
Transition Date	The Date and Time that the Transition Product Offering State is planned to occur or has occurred.	DateTime	
Transition Product Offering State	The lifecycle status of the Product Offering on the Transition Date.	One of (see Table 20): <ul style="list-style-type: none"> <li>• ANNOUNCED</li> <li>• END_OF_SALE</li> <li>• END_OF_SUPPORT</li> <li>• OBSOLETE</li> <li>• ON_HOLD</li> <li>• ORDERABLE</li> <li>• PILOT_BETA</li> <li>• REJECTED</li> </ul>	
Transition State Reason	Provides complementary information on the reason why the Product Offering State is planned to occur or was set to a particular value. For example, a description of "Supply Constraint" as why a Product Offering was put on ON_HOLD.	String	

**Table 5 - Product Offering State Transition Attributes**

**[R38]** A Product Offering State Transition **MUST** contain the following attributes defined in Table 5:

- Transition Date
- Transition Product Offering State

### 7.2.3 Region Attributes

The Regions attributes are defined in the table below. All attributes are set by the Seller.

Attribute	Description	Type	Comments
Locality	An area of defined or undefined present boundaries within a local authority or other legislatively defined area, usually rural or semi-rural in nature.	String	Note: Should only be specified by a Seller for a Product Offering that is not available Country wide.
City	City in which the Address is located.	String	Note: Should only be specified by a Seller for a Product Offering that is not available Country wide.
State Or Province	The State or Province the region is located.	String	Note: Should only be specified by a Seller for a Product Offering that is not available Country wide.
Country Code	The Country the region is located. Country Code is defined using two characters as defined in ISO 3166 [3].	String	

**Table 6 - Region Attributes**

**[R39]** When specifying a Region, the Seller **MUST** specify the Country Code attribute defined in Table 6, using the ISO 3166 [3] two letter codes.

**[R40]** When specifying a Region, the Seller **MUST NOT** include any attributes not defined in Table 6.

### 7.2.4 Product Offering Term Attributes

A Product Offering Term is the commitment duration under which a Product Offering is available to Buyers. A Product Offering can have multiple Product Offering Terms, each with a different commitment period, for instance with a 1, 2 or 3 year duration.

The attributes are defined in the table below. All attributes are set by the Seller.

Attribute	Description	Type	Comments
Name	Unique name (within the Seller domain) of the Product Offering Term.	String	
Description	Description of the Product Offering Term.	String	
Duration	The commitment period of the Product Offering.	Duration attribute defined in MEF W110 [12] Section 10.3	
End of Term Action	The action the Seller will take once the term expires.	One of: <ul style="list-style-type: none"> <li>• ROLL</li> <li>• AUTO_DISCONNECT</li> <li>• AUTO_RENEW</li> </ul>	<p>ROLL: The term will continue on a rolling basis for the duration of the Roll Interval at the end of the term.</p> <p>AUTO_DISCONNECT: The Product will be disconnected at the end of the term.</p> <p>AUTO_RENEW: The Product's term will be automatically renewed for the Duration at the end of the term.</p>
Roll Interval	The recurring renewal period after the original term has expired.	Duration attribute defined in MEF W110 [12] Section 10.3	
Product Offering Prices	A list of prices for which a Product Offering is available for the Term Duration.	List of Product Offering Price (see Table 16)	

**Table 7 - Product Offering Term Attributes**

**[R41]** A Product Offering Term **MUST** contain the following attributes defined in Table 7:

- Name
- Duration
- End of Term Action

- [R42]** A Product Offering Term **MUST** contain the Roll Interval defined in Table 7, if the End of Term Action is ROLL.

### 7.2.5 Product Offering Bundle Relation Attributes

The Product Offering Bundle Relation defines the set of Product Offerings that comprise a Product Offering Bundle, along with the ability to specify the minimum and maximum number of instances of a Product Offering (e.g. fixed, optional or variable component) that are supported for the Bundle.

Note: The Product Offering Bundle Relation may only be specified within a Product Offering Bundle.

The attributes are defined in the table below. All attributes are set by the Seller.

Attribute	Description	Type	Comments
Bundled Product Offering Identifier	Identifier of the Product Offering being grouped in this Product Offering Bundle Relation.	Reference to Product Offering (see Table 4)	
Bundle Relation Is Modifiable	Indicates if the Product Bundle Relation can be added, modified or deleted after the Product Bundle has been activated.	Boolean	If TRUE, a Buyer can add/modify/delete the Product Bundle Relation on an active Product Bundle.
Min Cardinality	The minimum number of instances of the Bundled Product Offering that are required for the associated Product Offering Bundle.	Integer	If 0, the Bundled Product Offering is an optional component of the Product Offering Bundle.
Max Cardinality	The maximum number of instances of the Bundled Product Offering that are allowed for the associated Product Offering Bundle.	Integer	Note: A predefined value will be used to indicate that there is no limit.

**Table 8 - Product Offering Bundle Relation Attributes**

**[R43]** A Product Offering Bundle Relation **MUST** contain the following attributes defined in Table 8:

- Bundled Product Offering Identifier
- Bundle Relation Is Modifiable
- Min Cardinality
- Max Cardinality

- [R44] If Max Cardinality is not unlimited, then the Max Cardinality **MUST** be greater than or equal to the Min Cardinality.
- [R45] The Bundled Product Offering Identifier **MUST NOT** reference a Product Offering with the attribute Is Product Offering Bundle set to TRUE.

## 7.2.6 Product Offering Product Relationship Constraint Attributes

The Product Offering Product Relationship Constraint allows constraining the relationship between related Product Offerings. Note: this will override the number of supported instances specified in the Product Specification Product Relationship attribute of any related Product Offerings based on the related Product Specification.

The attributes are defined in the table below. All attributes are set by the Seller.

Attribute	Description	Type	Comments
Related Product Specification Identifier	The Identifier of the associated Product Specification.	Reference to Product Specification (see Table 12)	Note: the constraint is on the Product Specification level, which gets inherited by all related Product Offerings.
Relationship Type	Specifies the nature of the relationship between any related Product Offerings that are based on the related Product Specification.	String	This must be one of the relationship types as defined in the related Product Specification.
Product Relationship Is Modifiable	Indicates if the Product Relationship can be modified on an active Product.	Boolean	If TRUE, the Product Relationship may be modified on an active Product.
Min Cardinality	The minimum number of supported instances of any related Product Offering based on the related Product Specification.	Integer	If 0, the Relationship Type is optional.
Max Cardinality	The maximum number of supported instances of any related Product Offering based on the related Product Specification.	Integer	Note: A predefined value will be used to indicate that there is no limit.

**Table 9 - Product Offering Product Relationship Constraint Attributes**

**[R46]** A Product Offering Product Relationship Constraint **MUST** contain the following attributes defined in Table 9:

- Related Product Specification Identifier
- Relationship Type
- Product Relationship Is Modifiable

- Min Cardinality
- Max Cardinality

- [R47] The Min Cardinality **MUST** be greater than or equal to the Min Cardinality of the Product Specification Product Relationship of the Product Offering's Specification for the specified Related Product Specification Identifier and Relationship Type.
- [R48] If Max Cardinality is not unlimited, then the Max Cardinality **MUST** be greater than or equal to the Min Cardinality.
- [R49] The Max Cardinality **MUST** be less than or equal to the Max Cardinality of the Product Specification Product Relationship of the Product Offering's Specification for the specified Related Product Specification Identifier and Relationship Type.



### 7.2.7 Product Offering Place Relationship Constraint Attributes

The Product Offering Place Relationship Constraint allows constraining the Place relationship for the Product Offering. Note: this will override the number of supported Places for the related Product Specification Place Relationship attribute of the Product Specification that the Product Offering is based on.

The attributes are defined in the table below. All attributes are set by the Seller.

Attribute	Description	Type	Comments
Place Relationship Role	Specifies the nature of the relationship between the Product Offering and Place (as specified in the corresponding Product Specification).	String	For example, INSTALL_LOCATION.
Place Relationship Is Modifiable	Indicates if the Place Relationship can be modified on an active Product.	Boolean	If TRUE, the Place Relationship can be modified on an active Product.
Min Cardinality	The minimum number of Places that must be included for the Product Offering for the given Place Relationship Role and Product Action.	Integer	If 0, the Place Relationship Role is optional.
Max Cardinality	The maximum number of Places supported for the Product Offering for the given Place Relationship Role and Product Action.	Integer	Note: A predefined value will be used to indicate that there is no limit.

**Table 10 - Product Offering Place Relationship Constraint Attributes**

**[R50]** A Product Offering Place Relationship Constraint **MUST** contain the following attributes defined in Table 10:

- Place Relationship Role
- Place Relationship Is Modifiable
- Min Cardinality
- Max Cardinality

**[R51]** The Min Cardinality **MUST** be greater than or equal to the Min Cardinality of the Product Specification Place Relationship of the Product Offering's Specification for the specified Place Relationship Role.

**[R52]** If Max Cardinality is not unlimited, then the Max Cardinality **MUST** be greater than or equal to the Min Cardinality.

**[R53]** The Max Cardinality **MUST** be less than or equal to the Max Cardinality of the Product Specification Place Relationship of the Product Offering's Specification for the specified Place Relationship Role.

### 7.2.8 Product Offering Contextual Info Attributes

The Product Offering Contextual Info defines the behavior of the Product-Specific Attributes for a Product for each Business Function and Product Action for a given Product Offering (see section 6.2). The Product Offering Contextual Target Schemas are optional and are only required to be provided if the Business Functions and/or Product Actions need to be differentiated from the corresponding Product Offering Specification Schema.

The attributes are defined in the table below. All attributes are set by the Seller.

Attribute	Description	Type	Comments
Business Function	The Business Function for which the categorization applies.	One of: <ul style="list-style-type: none"> <li>• POQ</li> <li>• QUOTE</li> <li>• PRODUCT_ORDER</li> <li>• PRODUCT_INVENTORY</li> <li>• ALL</li> </ul>	ALL: Applies for all supported Business Functions for a given Product Offering.
Product Action	The Product Action for which the categorization applies.	One of: <ul style="list-style-type: none"> <li>• INSTALL</li> <li>• CHANGE</li> <li>• ALL</li> </ul>	<p>ALL: Applies for all supported Product Action for a given Product Offering.</p> <p>Note: The Product Action attribute does not apply for Business Function PRODUCT_INVENTORY.</p> <p>DISCONNECT does not apply here, since this Product Action only includes a Product Identifier.</p>

Attribute	Description	Type	Comments
Product Offering Contextual Target Schema	A subschema of the Product Offering Specification Schema that defines additional constraints on the Product-Specific Attributes for the purpose of generating and validating the request for a given Business Function and Product Action.	Reference to or value of a Product Schema	

**Table 11 - Product Offering Contextual Info Attributes**

**[R54]** A Product Offering Contextual Info **MUST** contain the following attributes defined in Table 11:

- Business Function
- Product Offering Contextual Target Schema

**[R55]** A Product Offering Contextual Info **MUST** contain the Product Action if the Business Function is not **PRODUCT\_INVENTORY**.

## 7.2.9 Retrieve Product Offering List Use Case

The Buyer requests a list of Product Offerings from the Seller that meet a set of filter criteria.

### 7.2.9.1 Use Case Process Steps

1. The Buyer sends the Retrieve Product Offering List request to the Seller.

**[O5]** The Buyer request **MAY** contain none or more of the following filter criteria defined in Table 4:

- Product Offering Name
- Product Offering Last Update (range of dates)
- Product Offering State
- Standard Framework Agreement
- Sales Channel
- Market Segment
- Country Code (attribute of a Region)
- Is Product Offering Bundle
- Is Sellable
- Product Offering Product Category
- Product Specification

2. The Seller receives this request and returns a summarized list of Product Offerings.

**[R56]** The Seller response **MUST** include the following attributes defined in Table 4 for each Product Offering that matches the Buyer's filter criteria:

- Product Offering Identifier
- Product Offering Name
- Product Offering Last Update
- Product Offering State
- Standard Framework Agreement
- Sales Channels

- Market Segments
  - Regions
  - Is Product Offering Bundle
  - Is Sellable
  - Product Offering Product Categories
  - Product Specification
- [R57] When the Product Offering's Sales Channel filter criteria is used, the Seller response **MUST** include every Product Offering that has at least one matching Sales Channel.
- [R58] A Product Offering with no Sales Channels **MUST** be considered as matching any Product Offering's Sales Channel filter criteria.
- [R59] When the Product Offering's Market Segment filter criteria is used, the Seller response **MUST** include every Product Offering that has at least one matching Market Segment.
- [R60] A Product Offering with no Market Segments **MUST** be considered as matching any Product Offering's Market Segment filter criteria.
- [R61] When the Product Offering's Country Code filter criteria is used, the Seller response **MUST** include every Product Offering that has at least one matching Country Code within the Regions attribute.
- [R62] A Product Offering with no Regions **MUST** be considered as matching any Product Offering's Country Code filter criteria.
- [R63] The Seller response **MUST** include every Product Offering where the Product Offering Product Category filter criteria matches one of the Product Offering Product Categories of a Product Offering or one of the Sub Categories of the Product Offering Categories.
- [R64] The Seller response **MUST NOT** include any attributes not defined in Table 4.
- [R65] If no Product Offerings match the filter criteria provided by the Buyer, the Seller **MUST** return a positive response with an empty list.

## 7.2.10 Retrieve Product Offering by Product Offering Identifier Use Case

The Buyer requests detailed information about a single Product Offering based on a Product Offering Identifier.

### 7.2.10.1 Use Case Process Steps

1. The Buyer sends the Retrieve Product Offering by Product Offering Identifier request to the Seller.

**[R66]** The Buyer request **MUST** include the following attribute defined in Table 4:

- Product Offering Identifier

2. The Seller receives the request and returns details for the Product Offering with the Product Offering Identifier.

**[R67]** The Seller response **MUST** include the following attributes defined in Table 4:

- Product Offering Identifier
- Product Offering Name
- Product Offering Description
- Product Offering Last Update
- Product Offering State
- Is Product Offering Bundle
- Is Sellable
- Product Specification

**[R68]** The Seller response **MUST** include the following optional attributes defined in Table 4, if they are set:

- Product Offering State Transitions
- Product Offering State Reason
- Standard Framework Agreement
- Attachments
- Related Contact
- Sales Channels

- Market Segments
- Regions
- Product Offering Terms
- Product Offering Milestone Constraints
- Product Offering Bundle Relations
- Product Offering Notes
- Product Offering Product Categories
- Product Offering Specification Schema
- Product Offering Product Relationship Constraints
- Product Offering Place Relationship Constraints
- Product Offering Contextual Information

**[R69]** The Seller response **MUST NOT** include any attributes not defined in Table 4.

## 7.3 Product Specification Use Cases

Details for the Product Specification attributes and the following Use Cases are defined in this section:

- Retrieve Product Specification List
- Retrieve Product Specification by Product Specification Identifier

### 7.3.1 Product Specification Attributes

The Product Specification attributes are defined in the table below. All attributes are set by the Seller.

Attribute	Description	Type	Comments
Product Specification Identifier	Unique identifier for the Product Specification.	String	For Mplify standardized products, this should be the Mplify assigned URN.
Product Specification Name	The name of the Product Specification.	String	
Product Specification Description	Description of the Product Specification.	String	
Product Specification Last Update	The date and time an attribute within this Product Specification was created or most recently updated.	Date/Time	
Product Specification State	The current lifecycle status of the Product Specification.	One of (see Table 21): • PUBLISHED • OBSOLETE	



<b>Attribute</b>	<b>Description</b>	<b>Type</b>	<b>Comments</b>
Standard Framework Agreement	The name of the Seller's standard offer arrangement (such as a framework agreement). The name is unique within the Seller domain.	String	This should be the name of the Seller's standard offer arrangement or framework agreement for the Product Specification. This should include all common information that is identical across all Product Offerings within the same Product Specification.
Product Specification Attachments	Complements the Product Specification Description (datasheets, manuals, pictures, videos, etc.).	List of URL	Note: The Seller should include all documents describing the Standard Framework Agreement as an Attachment.
Product Specification Product Relationships	Specifies the relationships towards Products described by the related Product Specifications.	List of Product Specification Product Relationship (see Table 13)	As an example, an Access E-Line OVC references an Operator UNI and an ENNI Product Specification.
Product Specification Place Relationships	Specifies the relationship between Products described by this Product Specification and Place(s).	List of Product Specification Place Relationship (see Table 14)	
Product Specification Milestones	Specifies the different milestones during the fulfillment process.	List of Product Milestone (see Table 15)	
Product Specification Notes	A set of comments for additional information.	List of Note as defined in MEF 57.2 [10] Section 8.14	

<b>Attribute</b>	<b>Description</b>	<b>Type</b>	<b>Comments</b>
Source Product Specification Schema	A reference to or value of the Product Schema as included in the Product Specification.	Reference to or value of a Product Schema	

**Table 12 - Product Specification Attributes**

- [R70]** If any Product Specification attribute listed in Table 12 has changed, then Product Specification Last Update **MUST** be set to reflect the most recent date the modification occurred.
- [R71]** After a Product Specification has been created, the following attributes listed in Table 12 **MUST NOT** be modified:
- Product Specification Identifier
  - Product Specification Product Relationships
  - Product Specification Place Relationships
  - Source Product Specification Schema

### 7.3.2 Product Specification Product Relationship Attributes

The Product Specification Product Relationship allows specifying the nature of the relationships and cardinality between related Product Specifications.

The attributes are defined in the table below. All attributes are set by the Seller.

Attribute	Description	Type	Comments
Related Product Specification Identifier	The Identifier of the associated Product Specification.	Reference to Product Specification (see Table 12)	
Relationship Type	Specifies the nature of the relationship between the Product Specifications.	String	
Product Relationship Is Modifiable	Indicates if the Product Relationship can be modified on an active Product based on this Product Specification.	Boolean	If TRUE, the Product Relationship may be modified on an active Product.
Min Cardinality	The minimum number of supported instances of Product Offerings based on the related Product Specification.	Integer	For example, as specified in the 'Relationship Between Entities' Section of MEF 106.  If 0, the Relationship Type is optional.
Max Cardinality	The maximum number of supported instances of Product Offerings based on the related Product Specification.	Integer	Note: A predefined value will be used to indicate that there is no limit.

**Table 13 - Product Specification Product Relationship Attributes**

**[R72]** A Product Specification Product Relationship **MUST** contain the following attributes defined in Table 13:

- Related Product Specification Identifier
- Relationship Type
- Product Relationship Is Modifiable
- Min Cardinality

- Max Cardinality

**[R73]** If Max Cardinality is not unlimited, then the Max Cardinality **MUST** be greater than or equal to the Min Cardinality.

### 7.3.3 Product Specification Place Relationship Attributes

The Product Specification Place Relationship allows specifying the nature of the Place relationship and cardinality of supported Places for the Product Specification.

The attributes are defined in the table below. All attributes are set by the Seller.

Attribute	Description	Type	Comments
Place Relationship Role	Specifies the nature of the relationship between the Product Specification and Places.	String	For example, <code>INSTALL_LOCATION</code> .
Place Relationship Is Modifiable	Indicates if the Place Relationship can be modified on an active Product based on this Product Specification.	Boolean	
Min Cardinality	The minimum number of Places that must be included for the given Place Relationship Role.	Integer	If 0, the Place Relationship Role is optional.
Max Cardinality	The maximum number of Places supported for the given Place Relationship Role.	Integer	Note: A predefined value will be used to indicate that there is no limit.

**Table 14 - Product Specification Place Relationship Attributes**

**[R74]** A Product Specification Place Relationship **MUST** contain the following attributes defined in Table 14:

- Place Relationship Role
- Place Relationship Is Modifiable
- Min Cardinality
- Max Cardinality

**[R75]** If Max Cardinality is not unlimited, then the Max Cardinality **MUST** be greater than or equal to the Min Cardinality.

### 7.3.4 Product Milestone Attributes

The Product Milestone allows specifying the different stages of the Product provisioning process.

The attributes are defined in the table below. All attributes are set by the Seller.

Attribute	Description	Type	Comments
Milestone Name	The unique identifier of the milestone (as specified in the corresponding Product Specification).	String	For example, Awaiting_Access, Construction_Started
Milestone Description	The explanation of what the milestone represents and when it occurs.	String	

**Table 15 - Product Milestone Attributes**

**[R76]** A Product Milestone **MUST** contain the following attributes defined in Table 15:

- Milestone Name
- Milestone Description

### 7.3.5 Retrieve Product Specification List Use Case

The Buyer requests a list of Product Specifications from the Seller that meet a set of filter criteria.

#### 7.3.5.1 Use Case Process Steps

1. The Buyer sends the Retrieve Product Specification List request to the Seller.
  - [O6] The Buyer request **MAY** contain none or more of the following filter criteria defined in Table 12:
    - Product Specification Name
    - Product Specification Last Update (range of dates)
    - Product Specification State
    - Standard Framework Agreement
2. The Seller receives this request and returns a summarized list of Product Specifications.
  - [R77] The Seller response **MUST** include the following attributes defined in Table 12 for each Product Specification that matches the Buyer's filter criteria:
    - Product Specification Identifier
    - Product Specification Name
    - Product Specification Last Update
    - Product Specification State
    - Standard Framework Agreement
  - [R78] The Seller response **MUST NOT** include any attributes not defined in Table 12.
  - [R79] If no Product Specifications match the filter criteria provided by the Buyer, the Seller **MUST** return a positive response with an empty list.

### 7.3.6 Retrieve Product Specification by Product Specification Identifier Use Case

The Buyer requests detailed information about a single Product Specification based on a Product Specification Identifier.

#### 7.3.6.1 Use Case Process Steps

1. The Buyer sends the Retrieve Product Specification by Product Specification Identifier request to the Seller.

**[R80]** The Buyer request **MUST** include the following attribute defined in Table 12:

- Product Specification Identifier

2. The Seller receives the request and returns details for the Product Specification with the Product Specification Identifier.

**[R81]** The Seller response **MUST** include the following attributes defined in Table 12:

- Product Specification Identifier
- Product Specification Name
- Product Specification Description
- Product Specification Last Update
- Product Specification State
- Source Product Specification Schema

**[R82]** The Seller response **MUST** include the following optional attributes defined in Table 12, if they are set:

- Product Specification Attachments
- Standard Framework Agreement
- Product Specification Product Relationships
- Product Specification Place Relationships
- Product Specification Milestones
- Product Specification Notes

**[R83]** The Seller response **MUST NOT** include any attributes not defined in Table 12.

## 7.4 Product Offering Price Attributes

Details for the Product Offering Price attributes are defined in this section.

### 7.4.1 Product Offering Price Attributes

The Product Offering Price attributes are defined in the table below. All attributes are set by the Seller.

Attribute	Description	Type	Comments
Product Offering Price Description	Description of the Product Offering Price.	String	
Product Offering Price Last Update	The date and time the Product Offering Price was created or most recently updated.	String	
Valid For	The date range that the Product Offering Price is applicable.	Valid For: <ul style="list-style-type: none"> <li>Start DateTime</li> <li>End DateTime</li> </ul>	Note: End DateTime may be blank if open ended.
Bundled Product Offering Identifier	The identifier of a Product Offering within the Bundle to which this Product Offering Price applies.	Reference to Product Offering (see Table 4)	Note: The Product Offering Price Amount is the unit price for one instance of the Bundled Product Offering.
Product Offering Price Regions	The areas where the Product Offering Price is applicable.	List of Region (see Table 6)	Note: Only Regions that need to be constraint may be included. If Product Offering Price Regions is an empty list, then this list is inherited from the Product Offering or Product Offering Bundle this is contained in.
Product Offering Price Notes	A set of comments for additional information.	List of Note attribute as defined in MEF 57.2 [10] Section 8.14	



<b>Attribute</b>	<b>Description</b>	<b>Type</b>	<b>Comments</b>
Product Offering Price Type	Indicates if the price is for recurring, non-recurring, or usage-based charges.	One of: <ul style="list-style-type: none"> <li>• RECURRING</li> <li>• NON_RECURRING</li> <li>• USAGE_BASED</li> </ul>	
Product Offering Price Recurring Charge Period	Used for a recurring charge to indicate period.	Duration attribute defined in MEF W110 [12] Section 10.3	Note: Only applicable if Product Offering Price Type is RECURRING.
Product Offering Price Unit of Measure	Unit of Measure (Gb, SMS volume, etc.) if Quote Item Price Type = USAGE_BASED	String	Note: Only applicable if Product Offering Price Type is USAGE_BASED.
Product Offering Price Amount	The associated price.	Reference to Price attribute as defined in MEF 80 [11] Section 8.1.13	The List Price for the Product Offering.
Product Offering Price Modifiers	The related price discounts.	List of Price Modifier (see Table 17)	

**Table 16 - Product Offering Price Attributes**

**[R84]** A Product Offering Price **MUST** contain the following attributes defined in Table 16:

- Product Offering Price Description
- Product Offering Price Last Update
- Valid For (Start DateTime)
- Product Offering Price Type
- Product Offering Price Amount

**[R85]** The Product Offering Price Recurring Charge Period **MUST** only be set if the Product Offering Price Type is RECURRING.

**[R86]** The Product Offering Price Unit of Measure **MUST** only be set if the Product Offering Price Type is USAGE\_BASED.

**[R87]** The Bundled Product Offering Identifier **MUST NOT** be set for a Product Offering that is not a Bundle.

- [R88]** The Bundled Product Offering Identifier **MUST** only refer to Product Offerings that are contained within the Bundle.
- [R89]** The Bundled Product Offering Identifier **MUST** be set for every Product Offering, for which the price of the Bundle is dependent on the number of instances of the Product Offering.

### 7.4.2 Price Modifier Attributes

The Price Modifier allows specifying promotional (via Price Modifier Deal Reference) and/or volume based pricing discounts. For example, if only Minimum Quantity is specified, then the Price Modifier is a volume based discount, and if only Price Modifier Deal Reference is set then the Price Modifier is a form of promo code, and if both are set then the Price Modifier is a form of promo code with a minimum purchase requirement.

The Price Modifier attributes are defined in the table below. All attributes are set by the Seller.

Attribute	Description	Type	Comments
Price Modifier Description	Description of the Price Modifier.	String	
Price Modifier Last Update	The date and time the Price Modifier was created or most recently updated.	String	
Valid For	The date range that the Price Modifier is applicable.	Valid For: <ul style="list-style-type: none"> <li>Start DateTime</li> <li>End DateTime</li> </ul>	Note: End DateTime may be blank if open ended.
Price Modifier Region Constraints	Allows constraining the Regions where the Price Modifier is applicable.	List of Region (see Table 6)	Note: only the Regions that need to be constraint may be included (since this is inherited from the Product Offering Price).
Minimum Quantity	The minimum quantity of the associated Product Offering required to receive the price reduction.	Integer	Must be 1 or more, if specified.
Price Modifier Deal Reference	A pre-agreed pricing modifier reference that the Seller is offering which may impact the pricing (for example, a Promo Code).	String	This Price Modifier is applicable when the fulfillment of the associated Product Offering satisfies this pre-agreed Deal Reference.
Reduction Percentage	The amount of price discount, expressed as a percentage.	Number	For example, a value of 5 represents a 5% price reduction.
Discounted Price	The associated discounted price.	Reference to Price attribute as defined in MEF 80 [11] Section 8.1.13	Note: This attribute may only be set if the Reduction Percentage is not set.

**Table 17 - Price Modifier Attributes**

- [R90]** A Price Modifier **MUST** contain the following attributes defined in Table 17:
- Price Modifier Description
  - Price Modifier Last Update
  - Valid For (Start DateTime)
- [R91]** A Price Modifier **MUST** contain either the Reduction Percentage or the Discounted Price, but not both.

## 7.5 Product Catalog Notifications Use Cases

Details for Product Catalog Notifications attributes and the following Use Cases are defined in this section:

- Register for Product Catalog Notifications
- Send Product Catalog Notification

### 7.5.1 Register for Product Catalog Notifications Use Case

The Buyer requests to subscribe to or unsubscribe from Product Catalog notifications.

#### 7.5.1.1 Use Case Process Steps

1. The Buyer sends the Register for Product Catalog Notifications request to the Seller.

**[R92]** The Buyer request **MUST** contain the following:

Attribute	Value	Description
Notification Action	START	Start receiving Notifications.
	STOP	Stop receiving Notifications.
Notification Type	List of one or more of: PRODUCT_CATEGORY_CREATE PRODUCT_CATEGORY_UPDATE PRODUCT_OFFERING_CREATE PRODUCT_OFFERING_UPDATE PRODUCT_OFFERING_STATE_CHANGE PRODUCT_SPECIFICATION_CREATE PRODUCT_SPECIFICATION_UPDATE PRODUCT_SPECIFICATION_STATE_CHANGE	The Notification Types the Buyer wishes to receive.
Recipient Information	Target Address	The API callback target.

**Table 18 - Buyer Register for Product Catalog Notifications Attributes**

2. The Seller responds to the Buyer's request with an acknowledgment.

**[CR1]<[O3]**If the Seller supports the Register for Product Catalog Notifications Use Case, the Seller **MUST** support all Notification Types.

**[R93]** The Seller **MUST** respond to the Buyer's request to indicate that the request was accepted or rejected.

**[R94]** If the Seller does not support notifications, they **MUST** return an error message to the Buyer indicating that notifications are not supported.

## 7.5.2 Send Product Catalog Notifications Use Case

The Seller sends a Product Catalog Notification to the Buyer provided Target Address when the Buyer has registered for Product Catalog Notifications and a Product Catalog Event has occurred.

### 7.5.2.1 Use Case Process Steps

1. The Seller generates and sends Product Catalog Notifications to subscribed Buyers.

**[R95]** The Seller **MUST** send Product Catalog Notifications to Buyers only for Notification Types for which the Buyer has registered.

**[R96]** The Seller notification **MUST** include the following attributes:

Attribute	Value	Comments
Notification Type	One of the following: PRODUCT_CATEGORY_CREATE PRODUCT_CATEGORY_UPDATE PRODUCT_OFFERING_CREATE PRODUCT_OFFERING_UPDATE PRODUCT_OFFERING_STATE_CHANGE PRODUCT_SPECIFICATION_CREATE PRODUCT_SPECIFICATION_UPDATE PRODUCT_SPECIFICATION_STATE_CHANGE	Set by the Seller
Product Catalog Element Identifier	String	Set by the Seller
Product Catalog Element State	The new state of the Product Catalog Element.	Set by the Seller

**Table 19 - Seller Notification Attributes**

**[CR2]<[O3]** If the Seller supports Product Catalog Notifications, the Seller **MUST** send a PRODUCT\_xxx\_CREATE Notification whenever a new corresponding Product Catalog Element has been created.

**[CR3]<[O3]** If the Seller supports Product Catalog Notifications, the Seller **MUST** send a PRODUCT\_xxx\_UPDATE Notification whenever the Seller has updated a corresponding Product Catalog Element.

**[CR4]<[O3]** If the Seller supports Product Catalog Notifications, the Seller **MUST** send a PRODUCT\_xxx\_STATE\_CHANGE Notification whenever a state change has occurred for a corresponding Product Catalog Element.

**[R97]** When sending the PRODUCT\_xxx\_STATE\_CHANGE Notification, the Seller **MUST** include the Product Catalog Element State attribute defined in Table 19.

**[R98]** The Seller **MUST** send Product Catalog Notifications for PILOT\_BETA or REJECTED states only to Buyers that have been included in beta testing or

during the pilot of a Product Offering based on prior agreement between the Buyer and Seller.

2. The Buyer acknowledges the Notification received from the Seller.

**[07]** If the Seller fails to receive an acknowledgement from the Buyer repeatedly, they Seller **MAY** mark the Target Address as bad and stop sending notifications.

## 8 Product Catalog State Machines

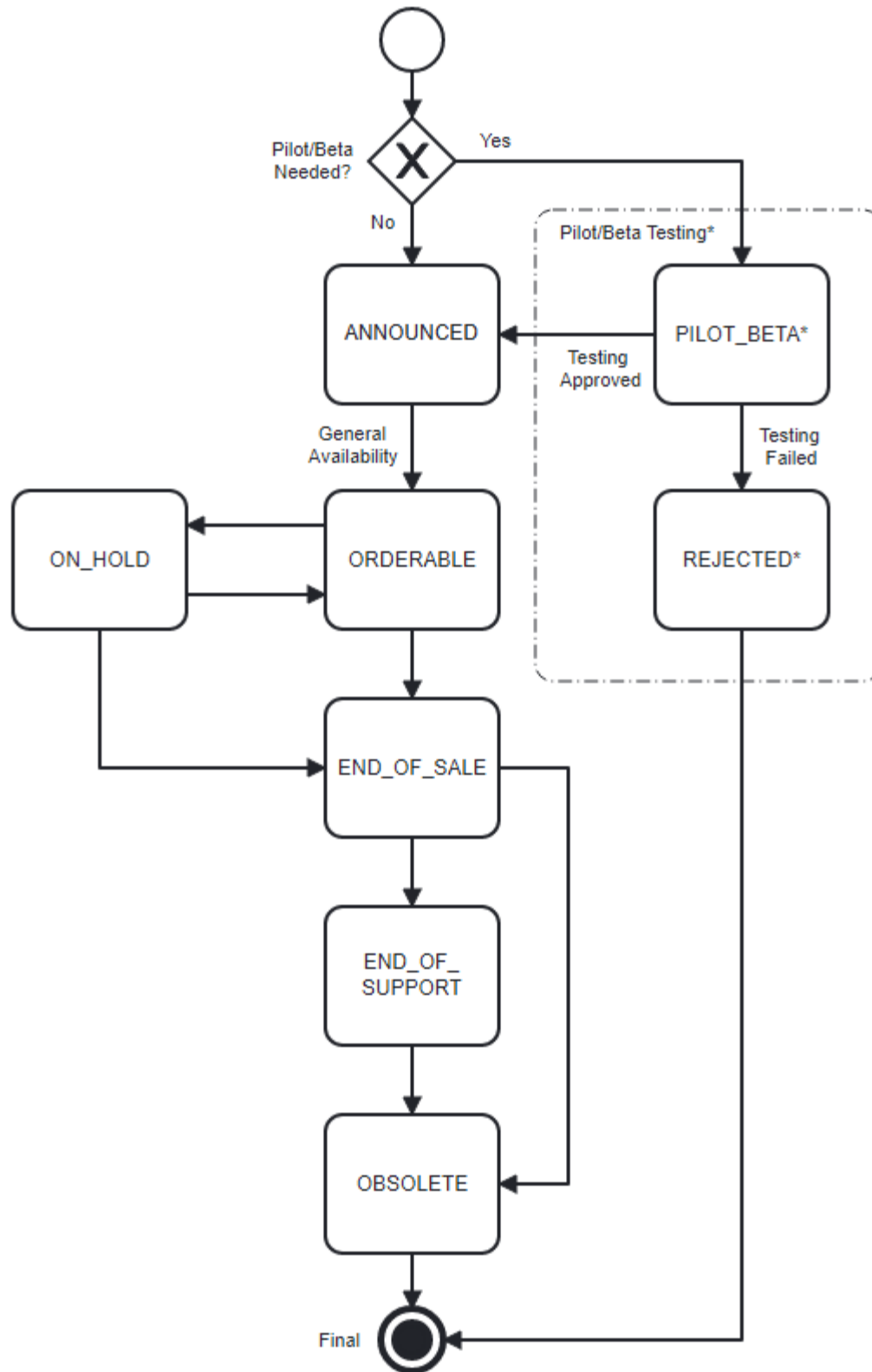
This section of the document defines the states within the Product Offering and Product Specification State Machines.

### 8.1 Product Offering State Machine

The Product Offering State Machine is shown in Figure 6 below. The diagram and state definitions are adapted and aligned with TMF620 [14] (Product Catalog Management API REST Specification) and captures the states that a Product Offering goes through in its lifecycle. The specific states are managed by the Seller.

- [R99]** The Seller **MUST** support all Product Offering States and the associated state transitions shown in Figure 6 and Table 20.





**Figure 6 - Product Offering State Machine**

The Product Offering States are defined in the table below.

<b>State</b>	<b>Description</b>
ANNOUNCED	A Product Offering has been defined in the Product Catalog for marketing purposes, but is not yet available for ordering.
END_OF_SALE	A new Product based on the Product Offering cannot be ordered by any Buyers, but Products may still be in use and may be changed or disconnected, and receive support.
END_OF_SUPPORT	When a Product Offering is in the END_OF_SUPPORT state, it is no longer possible to Install new, nor Change any existing Products based on the Product Offering. The Buyer can still use Products based on the Product Offering as is without any support from the Seller (the only allowed action is DISCONNECT).
OBSOLETE	The Product Offering is only available in the Product Catalog for historical documentation reasons. No actions are allowed on Products based on these Product Offering. A Product Offering that is OBSOLETE may be removed at the Seller's discretion from the Product Catalog. This is a final state.
ON_HOLD	<p>A Product Offering is ON_HOLD when the Seller decides to stop Buyers from ordering new Products based on the Product Offering (for example, due to supply constraints, product recall, legal reasons, etc.).</p> <p>The Product Offering can transition to either ORDERABLE when the constraints are lifted and the Buyer can order new Products again, or to END_OF_SALE, if the Seller decides to stop offering Products based on the Product Offering.</p> <p>The State ON_HOLD is an intermediate temporary state.</p>
ORDERABLE	When a Product Offering is in the ORDERABLE state, a Buyer can Install new Products, and change or disconnect any active Products based on the Product Offering.
PILOT_BETA*	A Product Offering in the PILOT_BETA state can only be used by a Buyer during a limited period of time for beta testing or during the pilot of a Product Offering. Normally, only a limited set of Buyers will be given access to a Product Offering in this state.
REJECTED*	When the pilot testing period is ended by the Seller, they may decide whether the Product Offering becomes available for ordering; otherwise, the Product Offering transitions to the REJECTED state. This is a final state.

**Table 20 - Product Offering States**

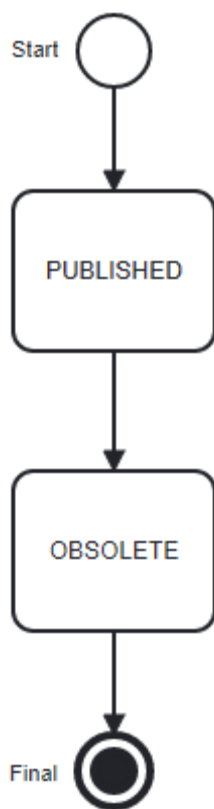
\*Note: Only applicable for select Buyers involved with pilot/beta testing.

- [D1] The Seller **SHOULD** add a Product Offering State Reason describing the reasons for the condition when a Product Offering transitions to the ON\_HOLD state.
- [R100] The Seller **MUST NOT** remove a Product Offering from the Product Catalog unless the state is REJECTED or OBSOLETE.

## 8.2 Product Specification State Machine

The Product Specification State Machine is shown in Figure 7 below. The diagram and state definitions are adapted and aligned with TMF620 [14] (Product Catalog Management API REST Specification) and captures the states that a Product Specification goes through in its lifecycle. The specific states are managed by the Seller.

- [R101] The Seller **MUST** support all Product Specification States and the associated state transitions shown in Figure 7 and Table 21.



**Figure 7 - Product Specification State Machine**

The Product Specification States are defined in the table below.

<b>State</b>	<b>Description</b>
PUBLISHED	A Product Specification has been defined in the Product Catalog. Product Offerings based on the Product Specification may be available for ordering.
OBSOLETE	The Product Specification is only available in the Product Catalog for historical documentation reasons. There are no active Products on the Seller's Network based on the Product Specification. A Product Specification that is OBSOLETE may be removed at the Seller's discretion from the Product Catalog. This is a final state.

**Table 21 - Product Specification States**

- [R102]** A Product Specification **MUST NOT** be set to the OBSOLETE state unless all associated Product Offerings are in the OBSOLETE or REJECTED state.
- [R103]** The Seller **MUST NOT** remove a Product Specification from the Product Catalog unless the state is OBSOLETE.
- [R104]** When the Seller removes an OBSOLETE Product Specification, the Seller **MUST** also remove all related Product Offerings referencing the OBSOLETE Product Specification.

## 9 References

- [1] IETF RFC 2119, *Key words for use in RFCs to Indicate Requirement Levels*, March 1997
- [2] IETF RFC 8174, *Ambiguity of Uppercase vs Lowercase in RFC 2119 Key Words*, May 2017
- [3] ISO 3166, *Codes for the representation of names of countries and their subdivisions - Part 1: Country code*, 2020
- [4] ISO 8601, *Data elements and interchange formats – Information interchange -- Representation of dates and times*, 2004
- [5] MEF 10.4, *Subscriber Ethernet Service Attributes*, December 2018
- [6] MEF 26.2, *External Network Network Interfaces (ENNI) and Operator Services Attributes*, August 2016
- [7] MEF 50.1, *MEF Services Lifecycle Process Flows*, August 2017
- [8] MEF 51.1, *Operator Services Definitions*, December 2018
- [9] MEF 55.1.1, *LSO Reference Architecture and Framework*, December 2023
- [10] MEF 57.2, *Product Order Management Requirements and Use Cases*, August 2022
- [11] MEF 80, *Quote Management Requirements and Use Cases*, July 2021
- [12] MEF W110, *Product Offering Availability and Pricing Discovery Business Requirements and Use Cases*, August 2024
- [13] MEF 113, *Trouble Ticketing Requirements and Use Cases*, October 2022
- [14] TMF620 TM Forum, *TMF620 Product Catalog Management API REST Specification R19.0.0*, July 2019.

## Appendix A      Acknowledgements

The following individuals participated in the development of this document and have requested to be included in this list.

- Manfred **ARNDT**
- David **BALL**
- Tomasz **CHMAL**
- Michał **ŁĄCZYŃSKI**
- Jack **PUGACZEWSKI**
- Patrick **ROOSEN**