

API Guide

Product Inventory

March 2018

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# List of Contributing Members

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

|  |  |
| --- | --- |
| AT&T | Orange |
| Cataworks | Telus |
| Colt |  |

Table 1 Contributing Member Companies

# Abstract

This API Guide is intended to help company to implement MEF Product Management API. The API swagger is available on MEF GitHub. In order to help API adoption this document provides:

* API Resource Model
* Resource Product lifecycle
* Resource Product full representation
* API Notifications
* Detailed description of all API Operations provided

# Scope

The scope of the project for the initial release is the ability for a Service Provider’s (Buyer) operational support system to retrieve from a Partner’s (Seller) Inventory management system a set of product instances based upon a filter of product inventory attributes, or a specific product instance based upon a product identifier.

Specifically, out of scope for this release are the following operations:

* Creation of a product instance in an inventory system
* Complete update of a product instance in an inventory system
* Partial modification of a product instance in an inventory system
* Deletion of a product instance from an inventory system

# Product Inventory Resource Model

The API product inventory resource model is the following:

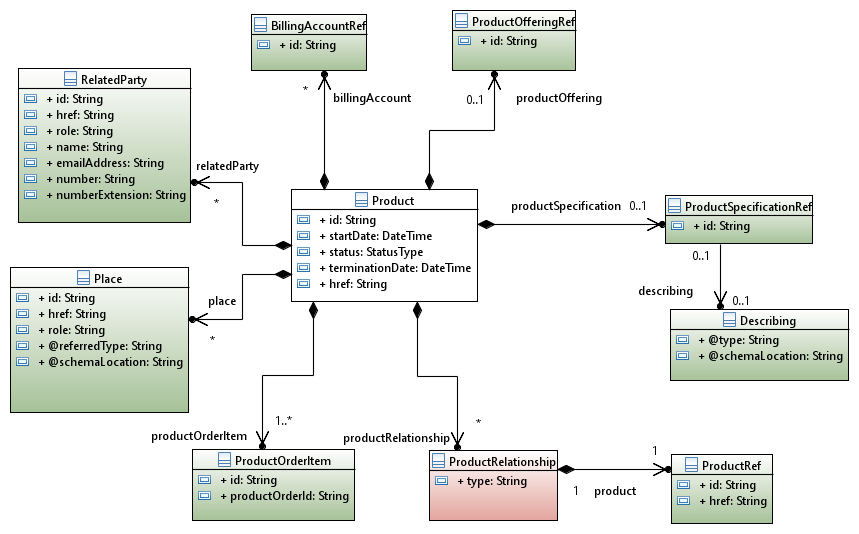


Figure 1 Product Inventory Resource Model

Color coding scheme:

* White box: API main resource
* Pink box: API sub resource(s)
* Green boxes : API related/referred resource(s)

Note: attributes are described directly in the swagger.

# State Diagrams

Here is the state machine diagram for a product:

Figure 2 Product Inventory State Machine

The following table provides additional information on product state:

|  |  |
| --- | --- |
| State | Description |
| ACTIVE | The product has been successfully installed. |
| PENDING\_CHANGE | The product was previously ACTIVE and a product order to change the product is in progress. |
| SUSPENDED | A product has been successfully suspended. |
| PENDING\_TERMINATE | The product is in the process of being terminated via a disconnect product order. |
| TERMINATED | The product has been successfully terminated via a disconnect product order. |

Table 2 – product state description

# Notifications

No notification is defined for this API

# Data mapping with IPS

Not necessary for this guide because straightforward attribute mapping with IPS.

# JSON representation sample

We provide below the JSON representation of an example of a 'Product' resource object.

This example illustrates an UNI product – To illustrate we assume that the UNI was created in a first order and then sometime later was modified by another order.

|  |
| --- |
| {  "id":"1546-45f6-7sqs-45th",  "status":"ACTIVE",  "startDate":"2018-02-02T08:52:15.705Z",  "href": "…/productInventory/product/1546-45f6-7sqs-45th",  "buyerProductId":”buyProd012jk364",  "place":[  {  "id":"12df-zz56-hjy5-rr56",  "role":"UNI Site",  "@referredType":"site"  }  ],  "productOffering":{  "id":"OrangeUNI"  },  "productSpecification":{  "id":"UNISpec",  "describing":{  "@type":"UNIspec",  "@schemaLocation":"https://github.com/MEF-GIT/MEF-LSO-Sonata-SDK/blob/master/experimental/api/ProductSpecDescription/Ordering/UNISpec.json"  }  },  *<< This is where productspec characteristics would be given value>>*  },  "billingAccount":[  {  "id":"7891-23654-dfre-ty55"  }  ],  "relatedParty":[  {  "role":"Technical Contact",  "name":"Jean Pontus",  "number":"689741456",  "numberExtension":"401",  "emailAddress":"jean@orange.com"  },  {  "role":"Implementation Contact",  "name":"Jean Pontus",  "number":"689741456",  "numberExtension":"401",  "emailAddress":"jean@orange.com"  },  {  "role":"Site Contact",  "name":"Jean Pontus",  "number":"689741456",  "numberExtension":"401",  "emailAddress":"jean@orange.com"  }  ],  "productOrderItem":[  {  "id":"1236-tred-ty56-78uu",  "href":"https...",  "productOrderItem":"1"  },  {  "id":"1aaz6-gfff-sd56-sf22",  "href":"https...",  "productOrderItem":"3"  }  ],  "@type":"MEFproduct"  } |

# API Operations

In the following table, the use cases and operations defined in the IPS are mapped to the API operations:

(Only white filled lines will be documented in this document version)

|  |  |  |  |
| --- | --- | --- | --- |
| Use Case | Operation | Uniform API Operation | Description |
| [UC\_SONATA\_INVENTORY\_0001](#UC_SONATA_ORDER_0002) | productFind | GET operation with filtering criteria provided | GET must be used to retrieve a representation of a resource. |
| [[UC\_SONATA\_INVENTORY\_0002](#UC_SONATA_ORDER_0002)](#UC_SONATA_ORDER_0001) | productGet | GET operation with id provided | POST must be used to create a new resource |

Table 3 – mapping UC – API operation

The product interaction model is described below:

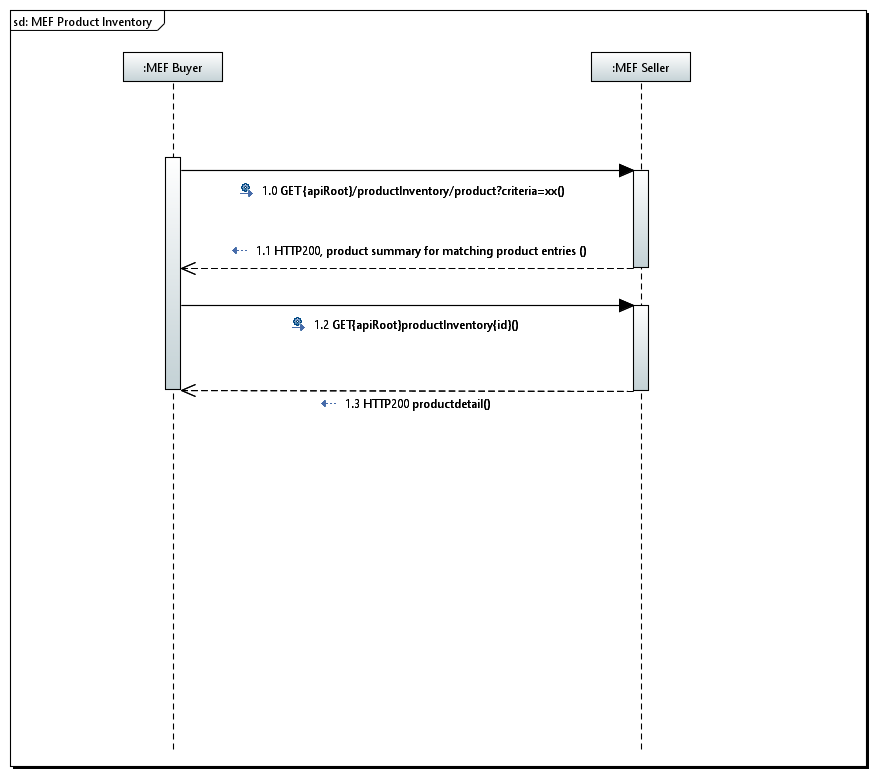


Table 3 – product API interaction model

## productFind

GET /product?{filtering}

Description

This operation is used to retrieve product (s) corresponding to search criteria(s)

The response will be a product summary.

Only following attributes could be used as search criteria

* status,
* productSpecification.id,
* productOffering.id,
* relatedPartyId,
* relatedPartyRole,
* buyerProductId
* placeId, +placeType

Only following attributes will be retrieved in summary view:

* id
* href
* status
* startDate
* productOffering.id
* productspecification.id
* buyerProductId

Behavior

* Returns HTTP/1.1 status code 200 if the request was successful
* To be noted that if not product match the request criteria, an empty list is retrieved (no error code)

Otherwise:

|  |  |
| --- | --- |
| 400 | Bad Request |
| 401 | Unauthorized |
| 403 | Forbidden |
| 422 | Unprocessable entity |
| 503 | Service Unavailable |

Usage Samples

Request

|  |
| --- |
| GET /productInventory/product ?status=ACTIVE Accept: application/json |

Response

|  |
| --- |
| 200  [  {  "id": "1546-45f6-7sqs-45th",  "status": "ACTIVE",  "startDate": "2018-02-02T16:09:36.032Z",  "href": "…/productInventory/product/1546-45f6-7sqs-45th",  "productOffering": {  "id": "OrangeUNI"  },  "productSpecification": {  "id": "UNISpec"  },  "buyerProductId":”buyProd012jk364"  },  {  "id": "sd22-aa45-98ty-2236",  "status": "ACTIVE",  "startDate": "2018-02-02T16:09:37.089Z",  "href": "…/productInventory/product/sd22-aa45-98ty-2236",  "productOffering": {  "id": "OrangeELine"  },  "productSpecification": {  "id": "eLineSpec"  }  },  …  ] |

## productGet

GET /product/{productId}

Description

This operation is used to retrieve one product representation

The response will be product resource representations with all attributes

Behavior

* Returns HTTP/1.1 status code 200 if the request was successful

Otherwise:

|  |  |
| --- | --- |
| 400 | Bad Request |
| 401 | Unauthorized |
| 403 | Forbidden |
| **404** | **Not Found** |
| 503 | Service Unavailable |

Usage Samples

Request

|  |
| --- |
| GET /productInventory/product/1546-45f6-7sqs-45th Accept: application/json |

Response

|  |
| --- |
| 200  {  "id":"1546-45f6-7sqs-45th",  "status":"ACTIVE",  "startDate":"2018-02-02T08:52:15.705Z",  "href": "…/productInventory/product/1546-45f6-7sqs-45th",  "buyerProductId":”buyProd012jk364",  "place":[  {  "id":"12df-zz56-hjy5-rr56",  "role":"UNI Site",  "@referredType":"site"  }  ],  "productOffering":{  "id":"OrangeUNI"  },  "productSpecification":{  "id":"UNISpec",  "describing":{  "@type":"UNIspec",  "@schemaLocation":"https://github.com/MEF-GIT/MEF-LSO-Sonata-SDK/blob/master/experimental/api/ProductSpecDescription/Ordering/UNISpec.json"  }  },  *<< This is where productspec characteristics would be given value>>*  "billingAccount":[  {  "id":"7891-23654-dfre-ty55"  }  ],  "relatedParty":[  {  "role":"Technical Contact",  "name":"Jean Pontus",  "number":"689741456",  "numberExtension":"401",  "emailAddress":"jean@orange.com"  },  {  "role":"Implementation Contact",  "name":"Jean Pontus",  "number":"689741456",  "numberExtension":"401",  "emailAddress":"jean@orange.com"  },  {  "role":"Site Contact",  "name":"Jean Pontus",  "number":"689741456",  "numberExtension":"401",  "emailAddress":"jean@orange.com"  }  ],  "productOrderItem":[  {  "id":"1236-tred-ty56-78uu",  "href":"https...",  "productOrderItem":"1"  },  {  "id":"1aaz6-gfff-sd56-sf22",  "href":"https...",  "productOrderItem":"3"  }  ],  "@type":"MEFproduct"  } |

# Appendix A - Relationship to Product Ordering API

## Product Order(s) & Product Inventory sync

One golden rule: The product inventory is built and updated only through productOrder processing. Updated covers product characteristics change but also suspension, reactivation or termination.

This means that a product is the result of a succession of order/order item that have created it and then modified it.

* A productOrder is a transaction that describes actions on product(s). An order Item describes one action on one product (or future one for ‘INSTALL’ order item action). Once fulfilled a productOrder has not any impact on the product.
* A product is a persistent object in SP seller database.
* Buyer must be able to retrieve ‘his’ product in seller database to use them in productOrder to describe expected modification

Remark: only for admin reason (coming from seller) the product inventory could be directly updated. These specific UC as inventory correction – are not part of this document (this is internal seller processes).

The following table provides an example to clarify this synchronization:

|  |  |  |  |
| --- | --- | --- | --- |
| **Date** | **Event** | **ProductOrder** | **ProductInventory** |
| Before |  |  | An UNI is existing (Id: 14789)– status Active  An ENNI is existing (id: 9963) – status active |
| 09/07/2017 | SP1 wants a new E-Line between UNI1 and ENNI |  | He uses GET product to retrieving product Id |
|  |  | SP1 post an order for this E-Line between UNI14789 and ENNI9963 |  |
|  |  | SP2 receives the order. This is the order #1  Order #1 in Acknowledged status |  |
|  |  | SP2 begin delivery  Order #1 in ‘InProgress’ status | A E-Line product is created in the inventory in status pendingActive.  E-Line Product has the id 55664 |
|  | E-Line is build! | Order #1 in ‘Completed’ status | The E-Line product 55664 is active status |
| 11/8/2017 | SP1 want to change E-Line bandwidth speed |  | He uses GET product to retrieving product Id (55664) |
|  |  | SP1 post an order to modify E-Line 55664 |  |
|  |  | SP2 receives the order. This is the order #9  Order #9 in Acknowledged status  **Note that order #9 has not any link with order #1 !!** |  |
|  |  | SP2 begin delivery  Order #9 in ‘InProgress’ status | The E-Line product #55664  in the inventory stays in Active  (*Sometime we use a pendingModification status – not in TMF state engine*) |
|  | E-Line speed is modified | Order #9 in ‘Completed’ status | The E-Line product 55664 is active status with new attribute updated |
| 5/7/2018 | SP1 wants to suspend his E-Line |  | He uses GET product to retrieving product Id (ß 55664) |
|  |  | SP1 post an order to suspend E-Line55664 |  |
|  |  | SP2 receives the order. This is the order #48  Order #48 in Acknowledged status  Note that order #48 has not any link with orders  #1 or #9 |  |
|  |  | SP2 begin delivery  Order #48 in ‘InProgress’ status | The  E-Line product #55664  in the inventory stays in Active  (*Sometime we use a pendingsuspension status – not in TMF state engine*) |
|  | E-Line is suspended | Order #48 in ‘Completed’ status | The E-Line product 55664 is in suspended status |
| 5/13/2018 | SP1 wants to reactivate his E-Line |  | He uses GET product to retrieving product Id (ß 55664) |
|  |  | SP1 post an order to reactivate E-Line 55664 |  |
|  |  | SP2 receives the order. This is the order #52  Order #52 in Acknowledged status |  |
|  |  | SP2 begin delivery  Order #52 in ‘InProgress’ status | The  E-Line product #55664  in the inventory stays in suspended status |
|  | E-Line is active | Order #52 in ‘Completed’ status | The E-Line product 55664 is in active status |
| ….. |  |  |  |

Table 3 – Product Order Example

## Relationship Between Order Item Status and Product Status

There is a relationship between the “OrderItem” status and the “Product” status when the “orderItemAction” on a product order is “INSTALL”, as described in the table below:

|  |  |  |
| --- | --- | --- |
| Order Item Status | Product Status | Comment |
| Acknowledged | NA | No product available through the API |
| Rejected | NA | No product available through the API |
| Pending | NA | No product available through the API |
| AssessingCancellation | NA | No product available through the API |
| PendingCancellation | NA | No product available through the API |
| Cancelled | NA | No product available through the API |
| InProgress | NA | No product available through the API |
| Configured | NA | No product available through the API |
| Held | NA | No product available through the API |
| Failed | NA | No product available through the API |
| Completed | Active |  |

Table 4 – Install Product Order Relationship

The following table represents the relationship between the “OrderItem” status and the “Product” status when the “orderItemAction” on a product order is “SUSPEND”. It is assumed the “Product” status is in an “Active” state when the order to suspend the product is received.

|  |  |  |
| --- | --- | --- |
| Order Item Status | Product Status | Comment |
| Acknowledged | Active | Product already active |
| Rejected | Active | Rejection of product order item doesn’t change product status. |
| Pending | Active |  |
| AssessingCancellation | Active |  |
| PendingCancellation | Active |  |
| Cancelled | Active |  |
| InProgress | Active |  |
| Configured | Active |  |
| Held | Active |  |
| Failed | Active | The product order has failed so the product remains in an active status. |
| Completed | Suspended | Product is successfully suspended. |

Table 5 – Suspend Product Order Relationship

The following table represents the relationship between the “OrderItem” status and the “Product” status when the “orderItemAction” on a product order is “REACTIVATE”. It is assumed the “Product” status is in a “Suspended” state when the order to suspend the product is received.

|  |  |  |
| --- | --- | --- |
| Order Item Status | Product Status | Comment |
| Acknowledged | Suspended | Product already suspended |
| Rejected | Suspended | Rejection of product order item doesn’t change product status. |
| Pending | Suspended |  |
| AssessingCancellation | Suspended |  |
| PendingCancellation | Suspended |  |
| Cancelled | Suspended |  |
| InProgress | Suspended |  |
| Configured | Suspended |  |
| Held | Suspended |  |
| Failed | Suspended | The product order item has failed so the product remains in Suspended status. |
| Completed | Active | Request to reactivate a previously suspended product is successful. |

Table 6 – Reactivate Product Order Relationship

The following table represents the relationship between the “OrderItem” status and the “Product” status when the “orderItemAction” is “DISCONNECT”. It is assumed the “Product” status is in an “Active” state when the order to disconnect the product is received.

|  |  |  |
| --- | --- | --- |
| Order Item Status | Product Status | Comment |
| Acknowledged | Active | Product already active |
| Rejected | Active | Rejection of product order item doesn’t change product status. |
| Pending | PendingTerminate |  |
| AssessingCancellation | PendingTerminate |  |
| PendingCancellation | PendingTerminate |  |
| Cancelled | Active |  |
| InProgress | PendingTerminate |  |
| Configured | PendingTerminate |  |
| Held | PendingTerminate |  |
| Failed | Active | As the disconnect has failed, the product status remains Active |
| Completed | Terminated | Disconnect is successful. |

Table 7 – Disconnect Product Order Relationship

The following table represents the relationship between the “OrderItem” status and the “Product” status when the “orderItemAction” is “CHANGE”. It is assumed the “Product” status is in an “Active” state when the order to change the product is received.

|  |  |  |
| --- | --- | --- |
| Order Item Status | Product Status | Comment |
| Acknowledged | Active | Product already active |
| Rejected | Active | Rejection of product order item doesn’t change product status. |
| Pending | PendingChange |  |
| AssessingCancellation | PendingChange |  |
| PendingCancellation | PendingChange |  |
| Cancelled | Active |  |
| InProgress | PendingChange |  |
| Configured | PendingChange |  |
| Held | PendingChange |  |
| Failed | Active | As the change has failed, the product status transitions from PendingChange to its previous status of Active and the change does not go into effect.  Note: because the order item failed, the buyer received a notification of failure |
| Completed | Active | The product status transitions from PendingChange to Active and the change goes into effect.  Note: because the order item was successful , the buyer received a notification of success |

Table 8 – Change Product Order Relationship