TM Forum Specification

Product Ordering Management API REST Specification

TMF622
Release 17.5
January 2018

Latest Update: TM Forum Release 17.5.0	Member Evaluation
Version 4.0.2	IPR Mode: RAND

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INTRODUCTION

The following document is the specification of the REST API for Product Order Management. It includes the model definition as well as all available operations. Possible actions are creating, updating and retrieving Product Orders.

The Product Ordering API provides a standardized mechanism for placing a product order with all of the necessary order parameters. The API consists of a simple set of operations that interact with CRM/Order Negotiation systems in a consistent manner. A product order is created based on a product offer that is defined in a catalog. The product offer identifies the product or set of products that are available to a customer, and includes characteristics such as pricing, product options and market.

The product order references the product offer and identifies any specific requests made by the customer.

Product Ordering API manages product order resource:

- A Product Order is a type of order which can be used to place an order between a customer and a service provider or between a service provider and a partner and vice versa,
- Main Product Order attributes are its identifier, state, priority category (mass market, Enterprise, etc.) related dates (start, completion, etc.), related billing account, related parties and order items
- Main Order Items (aka order lines) attributes are the ordered offering and product characteristics with the related action to be performed (e.g. add or delete the products), state, location information for delivery.

Product ordering API performs the following operations on Product Order:

- Retrieval of a product order or a collection of product orders depending on filter criteria
- Partial update of a product order (including updating rules)
- Creation of a product order (including default values and creation rules)
- Deletion of product order (for administration purposes)
- Notification of events on product order
    o Order creation
    o Order removal
    o Order state change
    o Order value change used to notify that any data in an order has just changed
    o Order information required used to notify that some data in the order need to be filled / are missing

The following Assumptions were considered in the development of this document:

- The Order Management system has access to the commercial catalog system.

SAMPLE USE CASES

Two use case samples to illustrate the resource JSON representation in the following sections:

Use case 1 (UC1): Acquisition
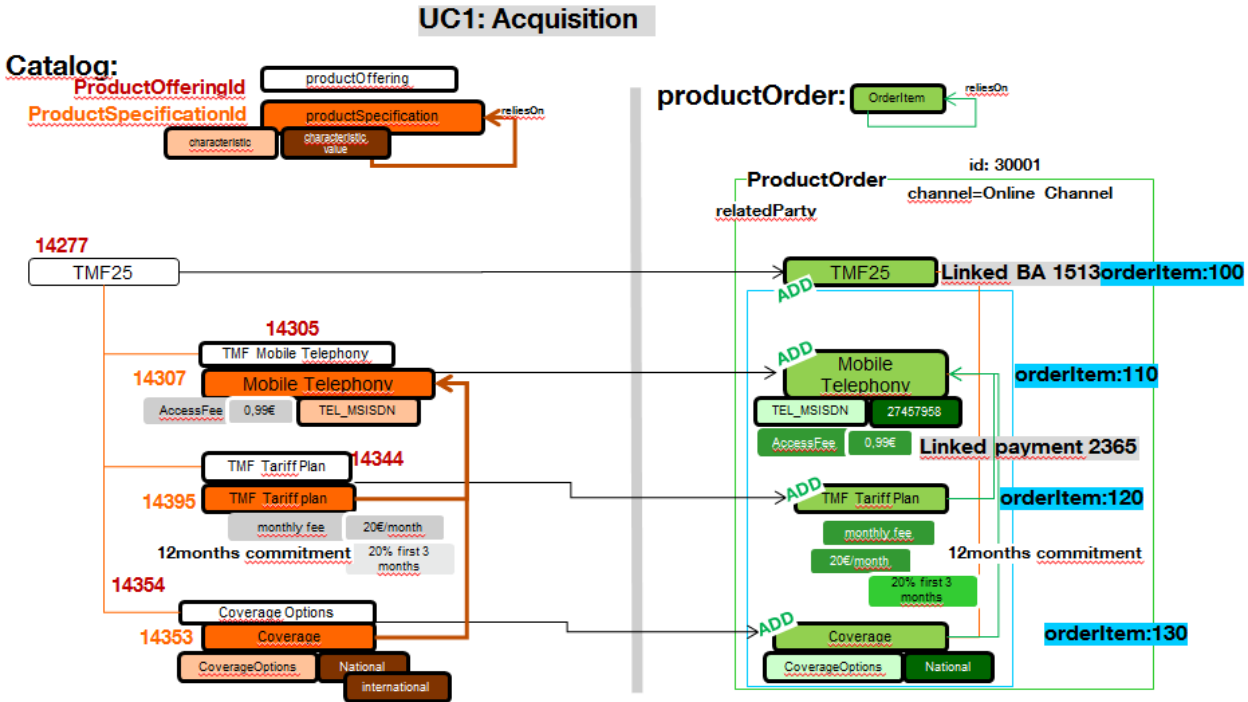
Use case 2 (UC2): Modification
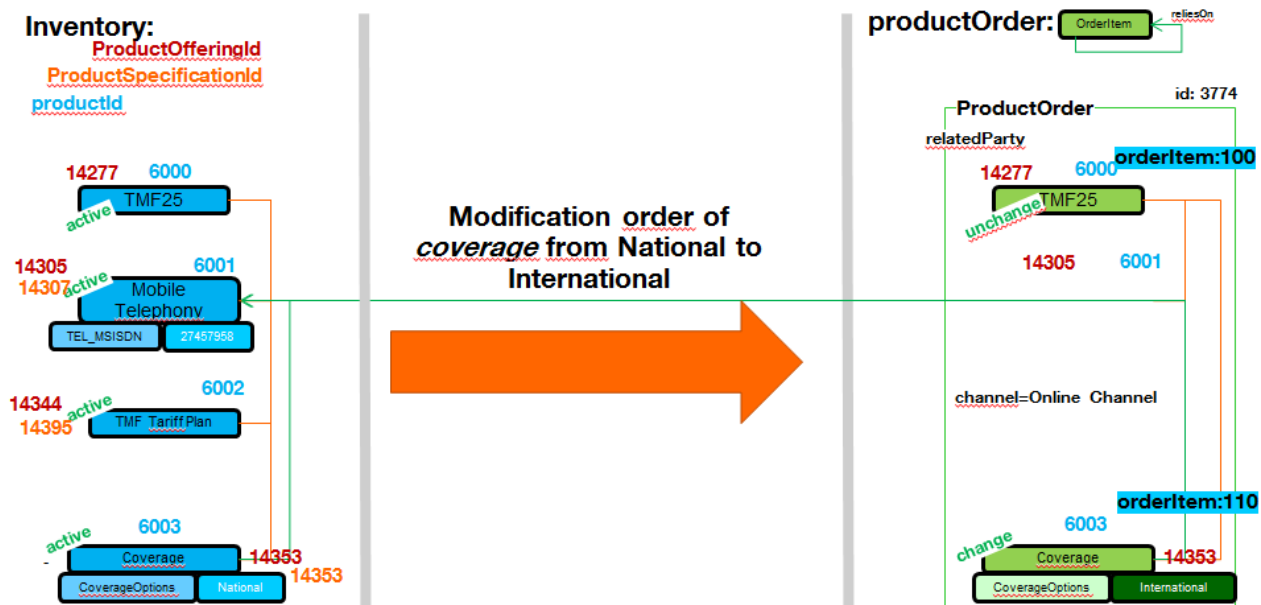
Additional examples, in particular to describe TMF polymorphism extension pattern are also described in this document.

RESOURCE MODEL

Managed Entity and Task Resource Models

PRODUCT ORDER RESOURCE

A Product Order is a type of order which can be used to place an order between a customer and a service provider or between a service provider and a partner and vice versa.

Resource model
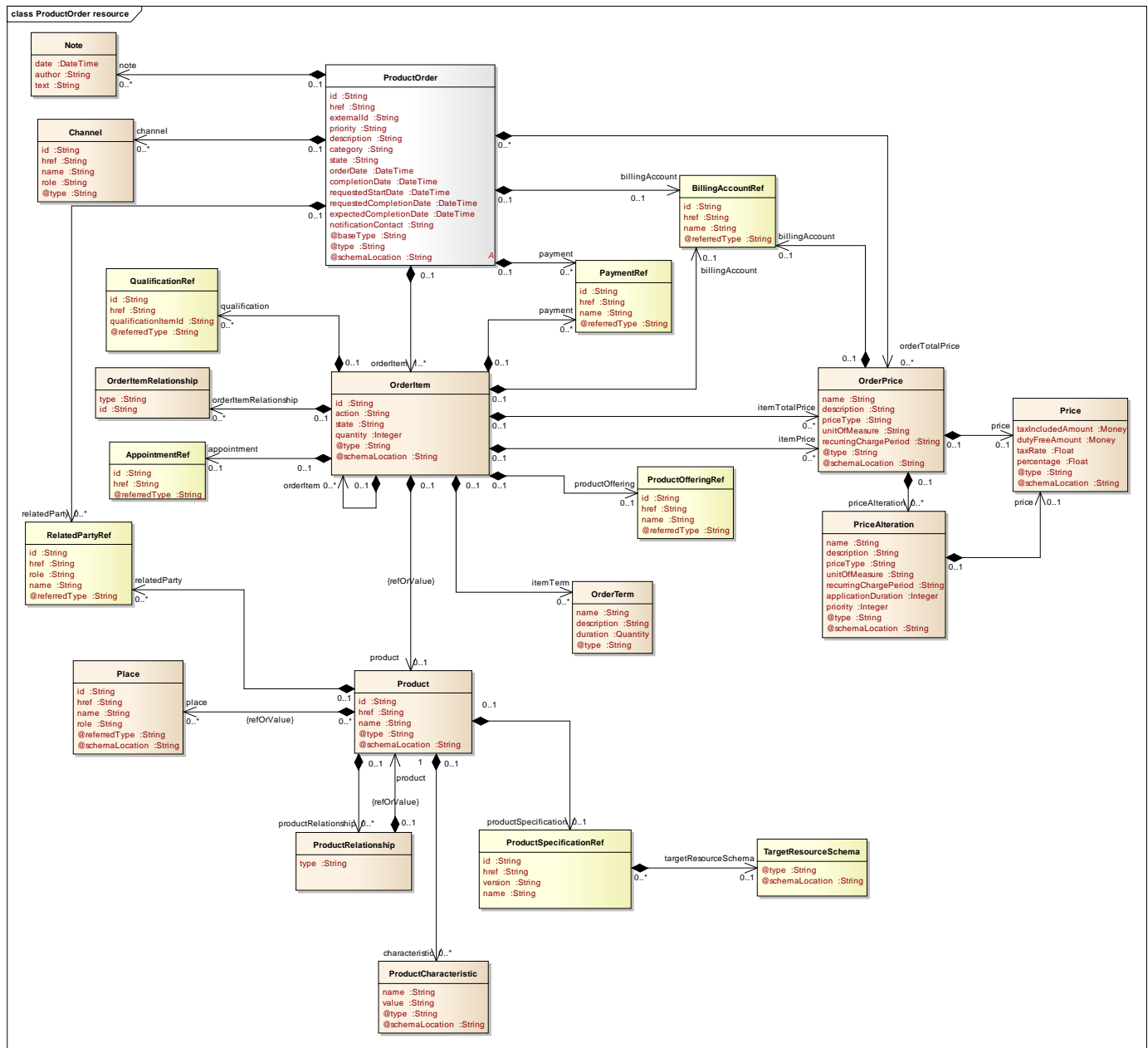
Lifecycle

The product order lifecycle is tracked by mean of the state field. Typical lifecycle values are: Rejected, Acknowledged, Pending, InProgress, Cancelled, Held, Partial, Completed and Failed.
Note that an implementation can enrich or remove or otherwise change the states. The diagram is not a normative part of the standards. The state machine specifying the typical state change transitions is provided below.

Order state machine:
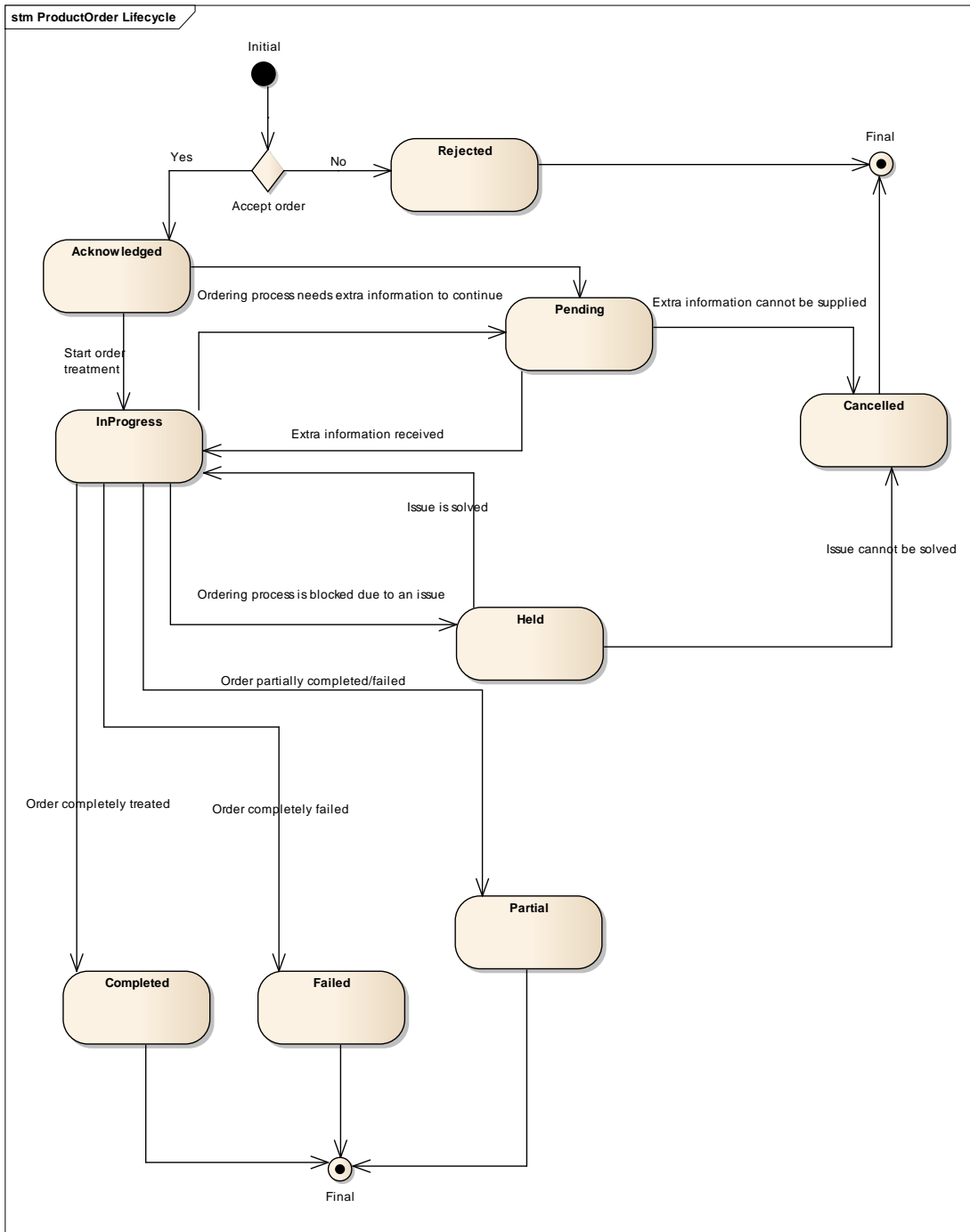
A product order item lifecycle is also described and in a same manner than product order lifecycle it may be enrich in implementation.

Order item state machine:
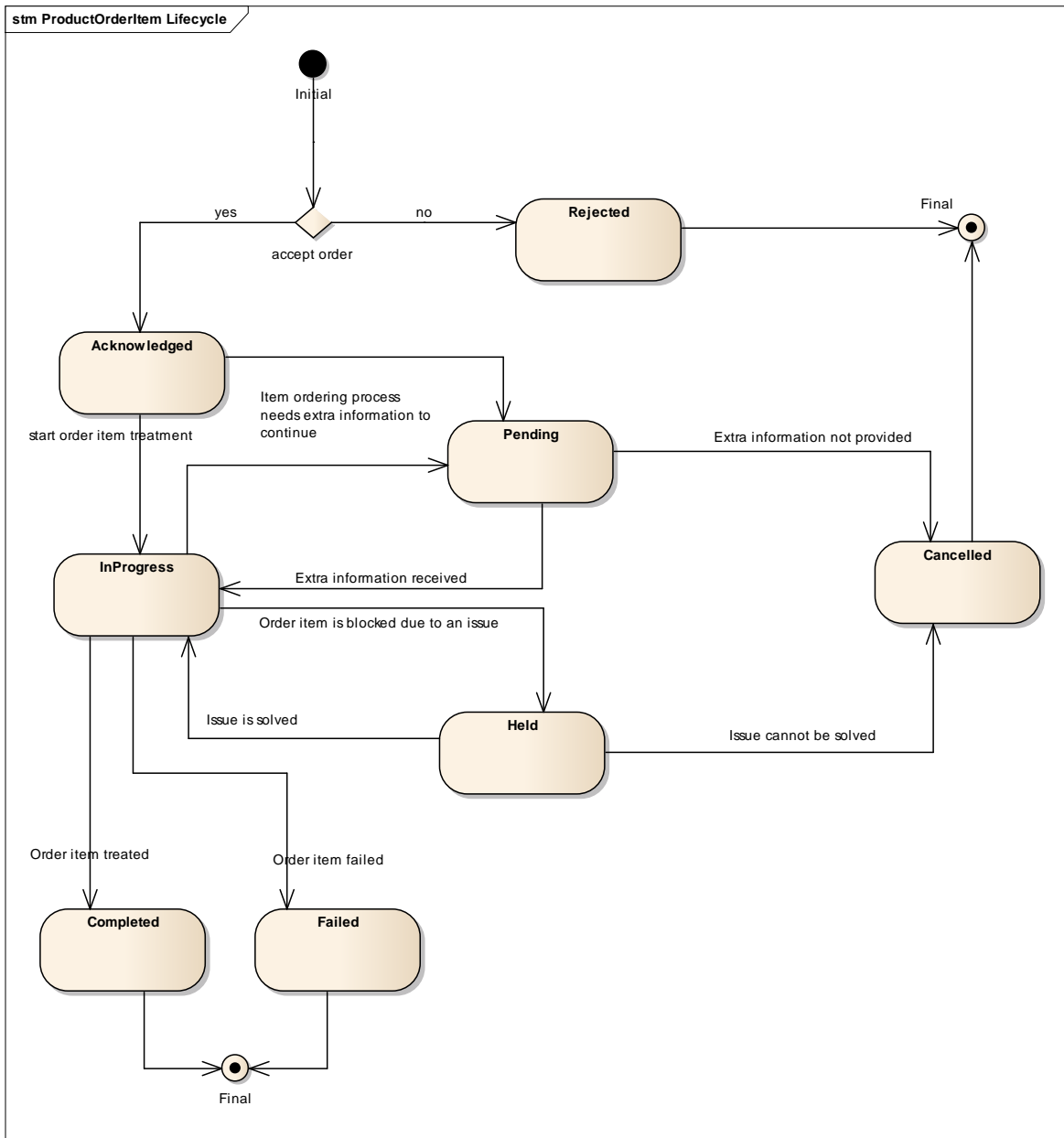
2 comments:

- The choice to accept order is done for the complete order and we cannot have a partial acceptance with some item in rejected and some other in Acknowledged.
- No 'Partial' final status for a product order tiem – the delivery process for an item must conclude to a success or a fail. A product order could finis in a Partail state if some items were completed and some others failed.

Field descriptions

ProductOrder fields

Field	Description
id	A string. ID created on repository side (OM system).
href	A string. Hyperlink to access the order.
externalId	A string. ID given by the consumer and only understandable by him (to facilitate his searches afterwards).
priority	A string. A way that can be used by consumers to prioritize orders in OM system (from 0 to 4 : 0 is the highest priority, and 4 the lowest). Implementation could enrich or use other set of values
description	A string. Description of the product order.
category	A string. Used to categorize the order from a business perspective that can be useful for the OM system (e.g. "enterprise", "residential", ...).
state	A string. Tracks the lifecycle status of the product order, such as Acknowledged, Rejected, InProgress, Pending and so on.
orderDate	A date time (DateTime). Date when the order was created.
completionDate	A date time (DateTime). Date when the order was completed.
requestedStartDate	A date time (DateTime). Order start date wished by the requestor.
requestedCompletionDate	A date time (DateTime). Requested delivery date from the requestor perspective.
expectedCompletionDate	A date time (DateTime). Expected delivery date amended by the provider.
notificationContact	A string. Contact attached to the order to send back information regarding this order.
@baseType	A string. Indicates the base type of the resource. Here can be 'ProductOrder'.
@type	A string. Indicates the type of resource. Here can be 'ProductOrder'.
@schemaLocation	A string. A link to the schema describing this REST resource.
note	A list of notes (Note [*]). Extra information about a given entity.
orderTotalPrice	A list of order prices (OrderPrice [*]). An amount, usually of money, that represents the actual price paid by the Customer for this item or this order.
orderItem	A list of order items (OrderItem [1..*]).
relatedParty	A list of related party references (RelatedPartyRef [*]). A related party defines party or party role linked to a specific entity.
payment	A list of payment references (PaymentRef [*]). If an immediate payment has been done at the product order submission, the payment information are captured and stored (as a reference) in the order.
billingAccount	A billing account reference (BillingAccountRef). A BillingAccount is a detailed description of a bill structure.
channel	A list of channel (Channel [*]). The channel defines the channel for selling product offerings.

Money sub-resource

A base / value business entity used to represent money.

Field	Description
value	A float. A positive floating point number.
unit	A string. Currency (ISO4217 norm uses 3 letters to define the currency).

Note sub-resource

Extra information about a given entity.

Field	Description
date	A date time (DateTime). Date of the note.
author	A string. Author of the note.
text	A string. Text of the note.

OrderItem sub-resource

An identified part of the order. A product order is decomposed into one or more order items.

Field	Description
id	A string. Identifier of the line item (generally it is a sequence number 01, 02, 03, ...).
action	A string. Can be "add" / "modify" / "no_change"/ "delete".
state	A string. State of the order item : described in the state machine diagram.
quantity	An integer. Quantity ordered.
@type	A string. Indicates the type of resource. Here it can be a type of productOrderItem.
@schemaLocation	A string. An URL to the schema describing this REST resource.
appointment	An appointment reference (AppointmentRef).
billingAccount	A billing account reference (BillingAccountRef). A BillingAccount is a detailed description of a bill structure.
itemPrice	A list of order prices (OrderPrice [*]). An amount, usually of money, that represents the actual price paid by the Customer for this item or this order.
orderItem	A list of order items (OrderItem [*]).
orderItemRelationship	A list of order item relationships (OrderItemRelationship [*]). Linked order items to the one instantiate.
itemTotalPrice	A list of order prices (OrderPrice [*]). An amount, usually of money, that represents the actual price paid by the Customer for this item or this order.
payment	A list of payment references (PaymentRef [*]). If an immediate payment has been done at the product order submission, the payment information are captured and stored (as a reference) in the order.
productOffering	A product offering reference (ProductOfferingRef). A product offering represents entities that are orderable from the provider of the catalog, this resource includes pricing information.
product	A product (Product). Product reference. Configure the product characteristics (only configurable characteristics and necessary only if a non default value is selected) and/or identify the product that needs to be modified/deleted.
qualification	A list of qualification references (QualificationRef [*]). It could be a serviceQualification or a productOfferingQualification that has been executed previously and captured in the productOrder to provide 'eligibility' information.
itemTerm	A list of order terms (OrderTerm [*]). Description of a productTerm linked to this orderItem. This reprsent a commitment with a duration.

OrderItemRelationship sub-resource

Linked order items to the one instantiate.

Field	Description
type	A string. Type of the order item relationship.
id	A string. The identifier of the related ordered item.

OrderPrice sub-resource

An amount, usually of money, that represents the actual price paid by the Customer for this item or this order.

Field	Description
name	A string. A short descriptive name such as "Subscription price".
description	A string. A narrative that explains in detail the semantics of this order item price.
priceType	A string. A category that describes the price, such as recurring, discount, allowance, penalty, and so forth.
unitOfMeasure	A string. Could be minutes, GB...
recurringChargePeriod	A string. Could be month, week...
@type	A string. Indicate the type of orderPrice.
@schemaLocation	A string. A link to the schema describing this orderPrice extension.
billingAccount	A billing account reference (BillingAccountRef). A BillingAccount is a detailed description of a bill structure.
price	A price (Price). Provides all amounts (tax included, duty free, tax rate), used currency and percentage to apply for Price Alteration.
priceAlteration	A list of price alterations (PriceAlteration [*]). Is an amount, usually of money, that modifies the price charged for an order item.

OrderTerm sub-resource

Description of a productTerm linked to this orderItem. This represent a commitment with a duration.

Field	Description
name	A string. Name of the productOrderTerm.
description	A string. Description of the productOrderTerm.
duration	A quantity (Quantity). Duration of the productOrderTerm.
@type	A string. Type of Term.

Place sub-resource

Place reference. Place defines the places where the products are sold or delivered.

Field	Description
id	A string. Unique identifier of the place.
href	A string. Unique reference of the place.
name	A string. A user-friendly name for the place, such as "Paris Store", "London Store", "Main Home".
role	A string. Role of the place (for instance: 'home delivery', 'shop retrieval').
@referredType	A string. Type of Place.
@schemaLocation	A string. Link to the schema describing this REST resource.

Price sub-resource

Provides all amounts (tax included, duty free, tax rate), used currency and percentage to apply for Price Alteration.

Field	Description
taxIncludedAmount	A money (Money). All taxes included amount (expressed in the given currency).
dutyFreeAmount	A money (Money). All taxes excluded amount (expressed in the given currency).
taxRate	A float. Tax rate.
percentage	A float. Percentage to apply for ProdOfferPriceAlteration.
@type	A string. Indicates the (class) type of the price.
@schemaLocation	A string. Link to the schema describing this REST resource.

PriceAlteration sub-resource

Is an amount, usually of money, that modifies the price charged for an order item.

Field	Description
name	A string. A short descriptive name such as "Monthly discount".
description	A string. A narrative that explains in detail the semantics of this order item price alteration.
priceType	A string. A category that describes the price such as recurring, one time and usage.
unitOfMeasure	A string. Could be minutes, GB...
recurringChargePeriod	A string. Could be month, week...
applicationDuration	An integer. Duration during which the alteration applies on the order item price (for instance 2 months free of charge for the recurring charge).
priority	An integer. Priority level for applying this alteration among all the defined alterations on the order item price.
@type	A string. Indicates the (class) type of the price alteration.
@schemaLocation	A string. Link to the schema describing this REST resource.
price	A price (Price). Provides all amounts (tax included, duty free, tax rate), used currency and percentage to apply for Price Alteration.

Product sub-resource

Product reference. Configure the product relationships & characteristics (only configurable characteristics and necessary only if a non default value is selected) and/or identify the product that needs to be modified/deleted.

Field	Description
id	A string. Unique identifier of the product.
href	A string. Reference of the product.
name	A string. Name of the product.
place	A list of places (Place [*]). Place reference. Place defines the places where the products are sold or delivered.
@type	A string. Type of product
@schemaLocation	A string. Link to the schema describing this REST resource.

productRelationship	A list of product relationships (ProductRelationship [*]). Represents a relationship between products - which potentially holds an entire product object or a product reference (with partial content).
productRelationship	A list of product relationships (ProductRelationship [*]). Represents a relationship between products - which potentially holds an entire product object or a product reference (with partial content).
place	A list of places (Place [*]). Place reference. Place defines the places where the products are sold or delivered.
characteristic	A list of product characteristics (ProductCharacteristic [*]). Characteristics of the product to instantiate or to modify.
relatedParty	A list of related party references (RelatedPartyRef [*]). A related party defines party or party role linked to a specific entity.
place	A list of places (Place [*]). Place reference. Place defines the places where the products are sold or delivered.
productSpecification	A product specification reference (ProductSpecificationRef). A ProductSpecification is a detailed description of a tangible or intangible object made available externally in the form of a ProductOffering to customers or other parties playing a party role.

TargetResourceSchema sub-resource

Target to the schema describing the product spec resource (and type)

Field	Description
@type	A string. Indicates the (class) type of resource.
@schemaLocation	A string. This field provided a link to the schema describing this REST resource.

ProductCharacteristic sub-resource

Characteristics of the product to instantiate or to modify.

Field	Description
name	A string. Name of the characteristic.
value	A string. Value of the characteristic.
@type	A string. Indicates the (class) type of resource.
@schemaLocation	A string. This field provided a link to the schema describing this REST resource.

ProductRelationship sub-resource

Represents a relationship between products - which potentially holds an entire product object or a product reference (with partial content).

Field	Description
type	A string. Type of the product relationship. It can be : - "bundled" if the product is a bundle and you want to describe the "bundled" products inside this bundle - "reliesOn" if the product needs another already owned product to rely on (e.g. an option on an already owned mobile access product)

	"targets" or "isTargeted" (depending on the way of expressing the link) for any other kind of links that may be useful.
product	A product (Product). Product reference. Configure the product characteristics (only configurable characteristics and necessary only if a non default value is selected) and/or identify the product that needs to be modified/deleted.

AppointmentRef relationship

Appointment reference. If the product order item requires an appointment between the service provider and the customer.

Field	Description
href	A string. Hyperlink to access the appointment.
id	A string. Identifier of the appointment (generally it is a sequence number 01, 02, 03, ...).
@referredType	A string. Indicates the (class) type of resource.

BillingAccountRef relationship

BillingAccount reference. A BillingAccount is a detailed description of a bill structure.

Field	Description
id	A string. Unique identifier of the billing account.
href	A string. Reference of the billing account.
name	A string. Name of the billing account.
@referredType	A string. Indicates the (class) type of the billing account.

Channel relationship

Channel. The channel defines the sale channel for selling product offerings.

Field	Description
id	A string. Unique identifier of the channel.
href	A string. Reference of the channel.
name	A string. Name of the channel.
role	A string. Role of the channel - could be 'initChannel', 'submitChannel' for example.
@type	A string. Indicates the (class) type of chanel.

PaymentRef relationship

If an immediate payment has been done at the product order submission, the payment information are captured and stored (as a reference) in the order.

Field	Description
id	A string. Identifier of a payment.
href	A string. Hyperlink to access to a payment.
name	A string. Name of a payment.

Field	Description
@referredType	A string. Indicates the type of resource. Here can be 'cash', 'BankCard', 'Check', etc...

ProductOfferingRef relationship

ProductOffering reference. A product offering represents entities that are orderable from the provider of the catalog, this resource includes pricing information.

Field	Description
id	A string. Unique identifier of the product offering.
href	A string. Reference of the product offering.
name	A string. Name of the product offering.
@referredType	A string. Indicate the class (type) of product offering.

ProductSpecificationRef relationship

Product specification reference: A ProductSpecification is a detailed description of a tangible or intangible object made available externally in the form of a ProductOffering to customers or other parties playing a party role.

Field	Description
id	A string. Unique identifier of the product specification.
href	A string. Reference of the product specification.
version	A string. Version of the product specification.
name	A string. Name of the product specification.
@referredType	A string. Indicates the (class) type of resource (here product specification).
@schemaLocation	A string. URL to get to the schema description file.

QualificationRef relationship

It could be a serviceQualification or a productOfferingQualification that has been executed previously and captured in the productOrder to provide 'eligibility' information.

Field	Description
id	A string. Identifier of a pre-existing qualification.
href	A string. href of the qualification.
qualificationItemId	A string. Id of an item of a qualification.
@referredType	A string. Indicates the type of resource. Here it can be a type of qualification. (could a service qualification or a product offering qualification).

RelatedPartyRef relationship

A related party defines party or party role linked to a specific entity.

Field	Description
id	A string. Unique identifier of a related party.
href	A string. Reference of the related party, could be a party reference or a party role reference.
role	A string. Role of the related party.

name	A string. Name of the related party.
@referredType	A string. Indicates the base (class) type of the party.

Json representation sample

We provide below the json representation of an example of a 'ProductOrder' resource object based on UC1 described above.

Assumptions:

- Order items 110, 120 and 130 are embedded in order item 100.

```json
{
    "id":"11",
    "href":"tmfAPI/productOrdering/productOrder/11.org",
    "externalId":"Telco01",
    "priority":"1",
    "description":"Order illustration UC1",
    "category":"Residential",
    "state":"Completed",
    "orderDate":"2017-11-03T08:46:47.945Z",
    "completionDate":"2017-11-03T08:46:47.945Z",
    "requestedStartDate":"2017-11-03T08:46:47.945Z",
    "requestedCompletionDate":"2017-11-03T08:46:47.945Z",
    "expectedCompletionDate":"2017-11-03T08:46:47.945Z",
    "notificationContact":"jean.pontus@tmforum.com",
    "@baseType":"productOrder",
    "@type":"productOrder",
    "ChannelRef":{
      "id":"1",
      "name":"store",
      "role":"submitChannel",
      "@type":"store"
    },
    "note":{
      "text":"Order to illustrate UC1",
      "date":"2017-11-03T08:46:47.945Z",
      "author":"Jean-Lyuc Tymen"
    },
    "relatedParty":[
      {
        "id":"11",
        "href":"tmfAPI/customer/11.org",
        "name":"Joe Doe",
        "role":"customer",
        "@referredType":"individualParty"
      },
      {
        "id":"12",
        "href":"tmfAPI/customer/12.org",
        "name":"Arthur Pence",
        "role":"Seller",
        "@referredType":"individualParty"
```

```
        }
      ],
      "billingAccount":{
        "id":"BA1513",
        "href":"tmfAPI/billingAccount/BA1513.org",
        "name":"BA01",
        "@referredType":"billingAccount"
      },
      "orderItem":[
        {
          "id":"100",
          "action":"add",
          "state":"Completedompleted",
          "quantity":1,
          "productOffering":{
            "id":"14277",
            "href":"tmfAPI/productOffering/14277.org",
            "name":"TMF25"
          },
          "orderItem":[
            {
              "id":"110",
              "action":"add",
              "state":"Completed",
              "quantity":1,
              "itemPrice":[
                {
                  "name":"AccessFee",
                  "description":"Access Fee",
                  "priceType":"oneTime",
                  "price":{
                    "taxIncludedAmount":{
                      "value":0.99,
                      "unit":"Euros"
                    }
                  }
                }
              ],
              "productOffering":{
                "id":"14305",
                "href":"tmfAPI/productOffering/14305.org",
                "name":"TMF Mobile Telephony"
              },
              "product":{
                "characteristic":[
                  {
                    "name":"TEL_MSISDN",
                    "value":"27457958"
                  }
                ],
                "relatedParty":[
                  {
                    "id":"11",
                    "href":"tmfAPI/customer/11.org",
                    "name":"Joe Doe",
                    "role":"user",
```

```
                "@referredTtype":"individualParty"
               }
             ],
             "productSpecification":{
               "id":"14307",
               "href":"tmfAPI/productSpecification/14307.org",
               "version":"1",
               "name":"Mobile Telephony"
             }
           },
           "payment":[
             {
               "id":"2365",
               "href":"tmfAPI/payment/2365.org",
               "name":"shop payment cash #2365",
               "@referredType":"cash"
             }
           ]
         },
         {
           "id":"120",
           "action":"add",
           "state":"Completed",
           "quantity":1,
           "itemPrice":[
             {
               "name":"monthly price",
               "description":"TMF Tariff Plan monthly fee",
               "priceType":"recuring",
               "recurringChargePeriod":"monthly",
               "price":{
                 "taxIncludedAmount":{
                   "value":20,
                   "unit":"Euros"
                 },
                 "taxRate":18.6
               },
               "priceAlteration":[
                 {
                   "name":"20Discount3Months",
                   "description":"discount 20% for 3 months",
                   "priceType":"recuring",
                   "recurringChargePeriod":"monthly",
                   "applicationDuration":"3",
                   "priority":1,
                   "price":{
                     "percentage":20
                   }
                 }
               ]
             }
           ],
           "productOffering":{
             "id":"14344",
             "href":"tmfAPI/productOffering/14344.org",
             "name":"TMF TariffPlan"
```

```
        },
        "product":{
          "productSpecification":{
            "id":"14395",
            "href":"tmfAPI/productSpec/14395.org",
            "name":"TMF TariffPlan"
          }
        },
        "orderItemRelationship":[
          {
            "id":"110",
            "type":"reliesOn"
          }
        ],
        "itemTerm":[
          {
            "name":"12MonthsCommitment",
            "description":"12 Months commitment",
            "duration":{
              "value":12,
              "unit":"string"
            }
          }
        ]
      },
      {
        "id":"130",
        "action":"add",
        "state":"Completed",
        "quantity":1,
        "productOffering":{
          "id":"14354",
          "href":"tmfAPI/productOffering/14354.org",
          "name":"CoverageOptions"
        },
        "product":{
          "characteristic":[
            {
              "name":"CoverageOption",
              "value":"National"
            }
          ],
          "productSpecification":{
            "id":"14353",
            "href":"tmfAPI/productSpec/14353.org",
            "name":"coverage"
          }
        },
        "orderItemRelationship":[
          {
            "id":"110",
            "type":"reliesOn"
          }
        ]
      }
    ]
```

```
        }
      ]
    }
```

Notification Resource Models

4 notifications are defined for this API
Notifications related to ProductOrder:

- ProductOrderCreationNotification
- ProductOrderAttributeValueChangeNotification
- ProductOrderStateChangeNotification
- ProductOrderRemoveNotification

The notification structure for all notifications in this API follow the pattern depicted by the figure below.
A notification resource (depicted by "SpecificNotification" placeholder) is a sub class of a generic
Notification structure containing an id of the event occurence (eventId), an event timestamp (eventTime),
and the name of the notification resource (eventType).

This notification structure owns an event structure ("SpecificEvent" placeholder) linked to the resource
concerned by the notification using the resource name as access field ("resourceName" placeholder).
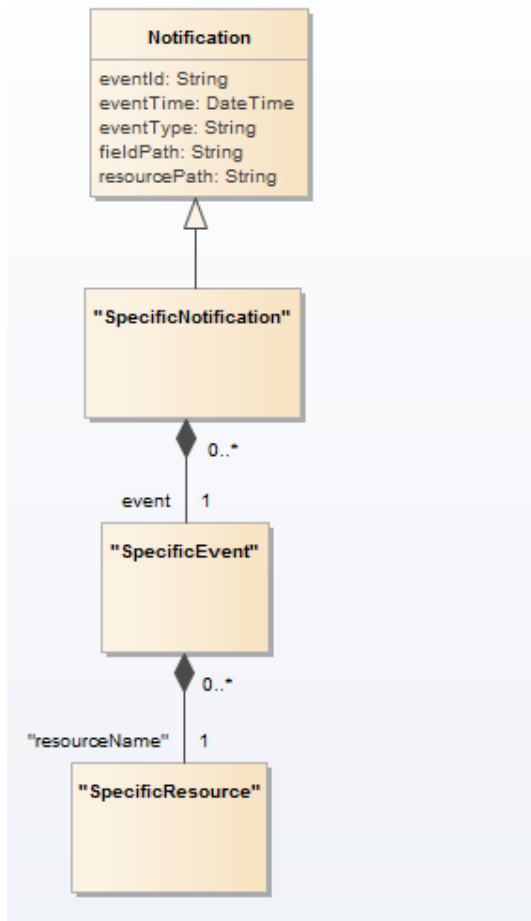
PRODUCT ORDER CREATION NOTIFICATION

Notification sent when a new ProductOrder resource is created.

Json representation sample

We provide below the json representation of an example of a 'ProductOrderCreationNotification' notification object

```
{
   "eventId":"00001",
   "eventTime":"2015-11-16T16:42:25-04:00",
   "eventType":"ProductOrderCreationNotification",
    "event": {
      "productOrder" :
         {-- SEE ProductOrder RESOURCE SAMPLE --}
   }
}
```

PRODUCT ORDER ATTRIBUTE VALUE CHANGE NOTIFICATION

Notification sent when changing an attribute of a ProductOrder resource.

Json representation sample

We provide below the json representation of an example of a 'ProductOrderAttributeValueChangeNotification' notification object

```
{
   "eventId":"00001",
   "eventTime":"2015-11-16T16:42:25-04:00",
   "eventType":"ProductOrderAttributeValueChangeNotification",
    "event": {
      "productOrder" :
         {-- SEE ProductOrder RESOURCE SAMPLE --}
   }
}
```

PRODUCT ORDER STATE CHANGE NOTIFICATION

Notification sent when changing the state of a ProductOrder resource.

Json representation sample

We provide below the json representation of an example of a 'ProductOrderStateChangeNotification' notification object

```
{
   "eventId":"00001",
   "eventTime":"2015-11-16T16:42:25-04:00",
   "eventType":"ProductOrderStateChangeNotification",
    "event": {
```

```
      "productOrder" :
         {-- SEE ProductOrder RESOURCE SAMPLE --}
   }
}
```

PRODUCT ORDER REMOVE NOTIFICATION

Notification sent when removing a ProductOrder resource.

Json representation sample

We provide below the json representation of an example of a 'ProductOrderRemoveNotification' notification object

```
{
   "eventId":"00001",
   "eventTime":"2015-11-16T16:42:25-04:00",
   "eventType":"ProductOrderRemoveNotification",
    "event": {
      "productOrder" :
         {-- SEE ProductOrder RESOURCE SAMPLE --}
   }
}
```

API OPERATIONS

Remember the following Uniform Contract:

Operation on Entities	Uniform API Operation	Description
Query Entities	GET Resource	GET must be used to retrieve a representation of a resource.
Create Entity	POST Resource	POST must be used to create a new resource
Partial Update of an Entity	PATCH Resource	PATCH must be used to partially update a resource
Complete Update of an Entity	PUT Resource	PUT must be used to completely update a resource identified by its resource URI
Remove an Entity	DELETE Resource	DELETE must be used to remove a resource
Execute an Action on an Entity	POST on TASK Resource	POST must be used to execute Task Resources
Other Request Methods	POST on TASK Resource	GET and POST must not be used to tunnel other request methods.

Filtering and attribute selection rules are described in the TMF REST Design Guidelines.

Notifications are also described in a subsequent section.

OPERATIONS ON PRODUCT ORDER

LIST PRODUCT ORDERS

`GET /productOrder?fields=...&{filtering}`

Description

This operation list product order entities.
Attribute selection is enabled for all first level attributes.
Filtering may be available depending on the compliance level supported by an implementation.

Providing filtering criteria is mandatory to avoid too many answers retrieved. See example below:

- externalId
- description
- orderDate
- state + orderDate interval (orderDate > 11/4/2018 & orderDate > 11/9/2017)
- relatedParty id and role + orderDate interval
- priority + orderDate interval
- billingAccount + orderDate interval
- category + orderDate interval

Usage Samples

Here's an example of a request for retrieving ProductOrder resources.

Searching product orders started on January 1st 2015. The result items are shrinked to show only the ids (fields=id)

Request
GET /productOrderingManagement/productOrder?fields=id&orderDate="2015-01-01" Accept: application/json

Response

200
 	
[
  {
    "id": "986781"
  },
  {
    "id": "986782"
  },
  {
    "id": "986783"
  }
]

RETRIEVE PRODUCT ORDER

GET /productOrder/{id}?fields=...&{filtering}

Description

This operation retrieves a product order entity.
Attribute selection is enabled for all first level attributes.
Filtering on sub-resources may be available depending on the compliance level supported by an implementation.

Usage Samples

Sample #1

Here's an example of a request for retrieving a ProductOrder resource based on UC1.

Request
GET /productOrderingManagement/productOrder/11 Accept: application/json
Response

200
 	
{
  "id":"11",
  "href":"tmfAPI/productOrdering/productOrder/11.org",
  "externalId":"Telco01",
  "priority":"1",
  "description":"Order illustration UC1",
  "category":"Residential",
  "state":"Completed",
  "orderDate":"2017-11-03T08:46:47.945Z",
  "completionDate":"2017-11-03T08:46:47.945Z",
  "requestedStartDate":"2017-11-03T08:46:47.945Z",
  "requestedCompletionDate":"2017-11-03T08:46:47.945Z",
  "expectedCompletionDate":"2017-11-03T08:46:47.945Z",
  "notificationContact":"jean.pontus@tmforum.com",
  "@type":"productOrder",
  "Channel":{
    "id":"1",
    "name":"store",
    "role":"submitChannel",
    "@type":"store"
  },
  "note":{
    "text":"Order to illustrate UC1",
    "date":"2017-11-03T08:46:47.945Z",
    "author":"Jean-Lyuc Tymen"
  },

```
"relatedParty":[
  {
    "id":"11",
    "href":"tmfAPI/customer/11.org",
    "name":"Joe Doe",
    "role":"customer",
    "@referredType":"individualParty"
  },
  {
    "id":"12",
    "href":"tmfAPI/customer/12.org",
    "name":"Arthur Pence",
    "role":"Seller",
    "@referredType":"individualParty"
  }
],
"billingAccount":{
  "id":"BA1513",
  "href":"tmfAPI/billingAccount/BA1513.org",
  "name":"BA01",
  "@referredType":"billingAccount"
},
"orderItem":[
  {
    "id":"100",
    "action":"add",
    "state":"Completedompleted",
    "quantity":1,
    "productOffering":{
      "id":"14277",
      "href":"…/14277",
      "name":"TMF25"
    },
    "orderItem":[
      {
        "id":"110",
        "action":"add",
        "state":"Completed",
        "quantity":1,
        "itemPrice":[
          {
            "name":"AccessFee",
            "description":"Access Fee",
            "priceType":"oneTime",
            "price":{
              "taxIncludedAmount":{
                "value":0.99,
                "unit":"Euros"
              }
            }
          }
        ],
        "productOffering":{
          "id":"14305",
          "href":"…/14305",
          "name":"TMF Mobile Telephony"
```

```
        },
        "product":{
          "characteristic":[
            {
              "name":"TEL_MSISDN",
              "value":"27457958"
            }
          ],
          "relatedParty":[
            {
              "id":"11",
              "href":"tmfAPI/customer/11.org",
              "name":"Joe Doe",
              "role":"user",
              "@referredType":"individualParty"
            }
          ],
          "productSpecification":{
            "id":"14307",
            "href":"tmfAPI/productSpecification/14307.org",
            "version":"1",
            "name":"Mobile Telephony"
          }
        },
        "payment":[
          {
            "id":"2365",
            "name":"shop payment cash #2365",
            "href":".../2365",
            "@referredType":"cash"
          }
        ]
      },
      {
        "id":"120",
        "action":"add",
        "state":"Completed",
        "quantity":1,
        "itemPrice":[
          {
            "name":"monthly price",
            "description":"TMF Tariff Plan monthly fee",
            "priceType":"recuring",
            "recurringChargePeriod":"monthly",
            "price":{
              "taxIncludedAmount":{
                "value":20,
                "unit":"Euros"
              },
              "taxRate":18.6
            },
            "priceAlteration":[
              {
                "name":"20Discount3Months",
                "description":"discount 20% for 3 months",
                "priceType":"recuring",
```

```json
          "recurringChargePeriod":"monthly",
          "applicationDuration":"3",
          "priority":1,
          "price":{
            "percentage":20
          }
        }
      ]
    }
  ],
  "productOffering":{
    "id":"14344",
    "name":"TMF TariffPlan"
  },
  "product":{
    "productSpecification":{
      "id":"14395",
      "name":"TMF TariffPlan"
    }
  },
  "orderItemRelationship":[
    {
      "id":"110",
      "type":"reliesOn"
    }
  ],
  "itemTerm":[
    {
      "name":"12MonthsCommitment",
      "description":"12 Months commitment",
      "duration":{
        "value":12,
        "unit":"string"
      }
    }
  ]
},
{
  "id":"130",
  "action":"add",
  "state":"Completed",
  "quantity":1,
  "productOffering":{
    "id":"14354",
    "name":"CoverageOptions"
  },
  "product":{
    "characteristic":[
      {
        "name":"CoverageOption",
        "value":"National"
      }
    ],
    "productSpecification":{
      "id":"14353",
      "name":"coverage"
```

```
          }
        },
        "orderItemRelationship":[
          {
            "id":"110",
            "type":"reliesOn"
          }
        ]
      }
    ]
  }
]
}
```

Sample #2

Here's an example of a request for retrieving a ProductOrder resource based on MEF ordering.

Request
GET /productOrder/?externalId=SivaOrder001 Accept: application/json

Response

200
 	
``
{
  "id":"58f5d726-1c8a-4fa8-abe9-e0d2d858bed2",
  "href":"/productOrder/58f5d726-1c8a-4fa8-abe9-e0d2d858bed2",
  "externalId":" SivaOrder001",
  "orderDate":"2017-08-29T11:38:21.501Z",
  "state":"acknowledged",
  "requestedCompletionDate":"2017-08-29T11:38:21.501Z",
  "requestedStartDate":"2017-08-29T11:38:21.501Z",
  "completionDate":"",
  "note": null,
  "relatedParty":[
    {
      "id":"100",
      "name":"AT&T",
      "role":"Buyer"
    }
  ],
  "orderItem":[
    {
      "id":"1",
      "action":"add",
      "state":"acknowledged",
      "productOffering":{
        "id":"UNI_Offering"
      },
``

```
   "product":{
       "@type":" UNISpec",
       "@schemaLocation":"https://github.com/MEF-GIT/MEF-LSO-Sonata-
SDK/blob/master/experimental/api/ProductSpecDescription/Ordering/UNISpec.json",
       "productSpecification":{
         "id":"UNISpec"
       },
       "buyerId":"AT&T UNI id",
       "physicalLayer":"100BASE-TX ",
       "numberOfLinks":1,
       "maxAggBw":{
         "amount":10,
         "unit":"Mbps"
       },
       "relatedParty":[
         {
           "id":"101",
           "name":"Joe Smith",
           "role":"UNI Site contact ",
           "number":"0645897425"
         }
       ],
       "place":[
         {
           "id":"1",
           "role":"UNI Site"
         }
       ]
     },
     "qualification":[
       {
         "id":"xx",
         "qualificationItem":"1"
       }
     ]
   },
   {
     "id":"2",
     "action":"add",
     "state":"acknowledged",
     "productOffering":{
       "id":"ELINE_Offering"
     },
     "product":{
       "@type":" eLineSpec ",
       "@schemaLocation":"https://github.com/MEF-GIT/MEF-LSO-Sonata-
SDK/blob/master/experimental/api/ProductSpecDescription/Ordering/ELineSpec.json",
       "productSpecification":{
         "id":"eLineSpec"
       },
       "buyerId":"AT&T ELine id",
                 "mtuSize": 1350,
       "relatedParty":[
         {
           "id":"102",
           "name":"Paul Douglas",
```

```json
                    "role":"Technical Contact"
                }
            ]
        }
    },
    {
      "id":"3",
      "action":"add",
      "state":"acknowledged",
      "productOffering":{
        "id":"ELINE_EP_UNI_Offering"
      },
      "product":{
          "@type":"UNICEEndPointSpec",
          "@schemaLocation":"https://github.com/MEF-GIT/MEF-LSO-Sonata-
SDK/blob/master/experimental/api/ProductSpecDescription/Ordering/UNICEEndPointSpec.json",
          "productSpecification":{
            "id":"UNICEEndPointSpec"
          },
        "cvlanId": [
                    20
                    ],
        "ingressBWProfile":[
          {
            "cosId":"Gold",
            "cir":{
              "amount":10,
              "unit":"Mbps"
            }
          }
        ]
      },
      "orderItemRelationship":[
        {
          "type":"reliesOn",
          "id":"1"
        },
        {
          "type":"reliesOn",
          "id":"2"
        }
      ]
    },
    {
      "id":"4",
      "action":"add",
      "state":"acknowledged",
      "productOffering":{
        "id":"ELINE_EP_ENNI_Offering"
      },
      "product":{
          "@type":"ENNICEEndPointSpec",
          "@schemaLocation":"https://github.com/MEF-GIT/MEF-LSO-Sonata-
SDK/blob/master/experimental/api/ProductSpecDescription/Ordering/ENNICEEndPointSpec.json",
          "productSpecification":{
            "id":"ENNICEEndPointSpec"
```

```
        },
        "svlanId": [
          100
                ],
        "ingressBWProfile":[
        {
          "cosId":"Gold",
          "cir":{
            "amount":10,
            "unit":"Mbps"
          }
        }
      ],
      "productRelationship":[
        {
          "type":"reliesOn",
          "product":{
            "id":"ENN123654789I"
          }
        }
      ]
    },
    "orderItemRelationship":[
      {
        "type":"reliesOn",
        "id":"2"
      }
    ]
  }
 ]
}
```

CREATE PRODUCT ORDER

POST /productOrder

Description

This operation creates a product order entity.

Mandatory and Non Mandatory Attributes

The following tables provides the list of mandatory and non mandatory attributes when creating a ProductOrder, including any possible rule conditions and applicable default values. Notice that it is up to an implementer to add additional mandatory attributes.

Mandatory Attributes	Rule
relatedParty	At least one related party must be provided
orderItem	At least one order item must be provided

Non Mandatory Attributes	Default Value	Rule
externalId		
priority	4 (lowest)	
description		
category	Uncategorized	
state	N/A	Must be not provided in the POST request
orderDate	N/A	Must be not provided in the POST request
completionDate	N/A	Must be not provided in the POST request
requestedStartDate		
requestedCompletionDate		
expectedCompletionDate	N/A	Must be not provided in the POST request
notificationContact		
@baseType		
@type		
@schemaLocation		
note		
orderTotalPrice		
payment		
billingAccount		
channel		If channel provided, an id must be filled. Channel role by default is 'submitChannel'

Additional Rules

The following table provides additional rules indicating mandatory fields in sub-resources or relationships when creating a ProductOrder resource.

Context	Mandatory Sub-Attributes
orderItem	id, action, at least a product or a productOffering must be present
billingAccount	id, href
payment	id, href
note	text
relatedParty	role, id, href
channel	id
orderItem.qualification	id, href
orderItem.appointment	id, href
orderItem.product.place	role
orderItem.productOffering	id, href
orderItem.itemTerm	name OR duration
orderItem.orderItemRelationship	type, id
orderItem.product	id, href if action==modify or action==delete
orderItem.product.productSpecification	id, href
orderItem.product.productSpecification.describing	@type, @schemaLocation
orderItem.product.place	If id provided, href must be provided if href provided, id must be provided

The following pre-conditions apply for this operation.

Pre-conditions
PATCH allowed if order not completed

Default Values Summary

When creating the resource, the following table summarizes the default values applicable to optional attributes of the resource (or sub-resources).

Attributes	Default Value
state	Acknowledged
priority	4 (lowest)
category	Uncategorized
orderItem.state	Acknowledged

Usage Samples

Here's an example of a request for creating a ProductOrder resource. In this example the request only passes mandatory attributes.

Request

POST /productOrderingManagement/productOrder
Content-Type: application/json

```
{
  "externalId":"Telco01",
  "priority":"1",
  "description":"Order illustration UC1",
  "category":"Residential",
  "notificationContact":"jean.pontus@tmforum.com",
  "@baseType":"productOrder",
  "@type":"productOrder",
  "Channel":{
    "id":"1",
    "name":"store",
    "role":"submitChannel",
    "@type":"store"
  },
  "note":{
    "text":"Order to illustrate UC1",
    "date":"2017-11-03T08:46:47.945Z",
    "author":"Jean-Lyuc Tymen"
  },
  "relatedParty":[
    {
      "id":"11",
      "href":"tmfAPI/customer/11.org",
      "name":"Joe Doe",
      "role":"customer",
      "@referredType":"individualParty"
    },
    {
      "id":"12",
      "href":"tmfAPI/customer/12.org",
```

```json
      "name":"Arthur Pence",
      "role":"Seller",
      "@referredType":"individualParty"
    }
  ],
  "billingAccount":{
    "id":"BA1513",
    "href":"tmfAPI/billingAccount/BA1513.org",
    "name":"BA01",
    "@referredType":"billingAccount"
  },
  "orderItem":[
    {
      "id":"100",
      "action":"add",
      "quantity":1,
      "productOffering":{
        "id":"14277",
        "name":"TMF25"
      },
      "orderItem":[
        {
          "id":"110",
          "action":"add",
          "quantity":1,
          "itemPrice":[
            {
              "name":"AccessFee",
              "description":"Access Fee",
              "priceType":"oneTime",
              "price":{
                "taxIncludedAmount":{
                  "value":0.99,
                  "unit":"Euros"
                }
              }
            }
          ],
          "productOffering":{
            "id":"14305",
            "name":"TMF Mobile Telephony"
          },
          "product":{
            "characteristic":[
              {
                "name":"TEL_MSISDN",
                "value":"27457958"
              }
            ],
            "relatedParty":[
              {
                "id":"11",
                "href":"tmfAPI/customer/11.org",
                "name":"Joe Doe",
                "role":"user",
                "@referredType":"individualParty"
```

```
          }
        ],
        "productSpecification":{
          "id":"14307",
          "href":"tmfAPI/productSpecification/14307.org",
          "version":"1",
          "name":"Mobile Telephony"
        }
      },
      "payment":[
        {
          "id":"2365",
          "name":"shop payment cash #2365",
          "@referredType":"cash"
        }
      ]
    },
    {
      "id":"120",
      "action":"add",
      "quantity":1,
      "itemPrice":[
        {
          "name":"monthly price",
          "description":"TMF Tariff Plan monthly fee",
          "priceType":"recuring",
          "recurringChargePeriod":"monthly",
          "price":{
            "taxIncludedAmount":{
              "value":20,
              "unit":"Euros"
            },
            "taxRate":18.6
          },
          "priceAlteration":[
            {
              "name":"20Discount3Months",
              "description":"discount 20% for 3 months",
              "priceType":"recuring",
              "recurringChargePeriod":"monthly",
              "applicationDuration":"3",
              "priority":1,
              "price":{
                "percentage":20
              }
            }
          ]
        }
      ],
      "productOffering":{
        "id":"14344",
        "name":"TMF TariffPlan"
      },
      "product":{
        "productSpecification":{
          "id":"14395",
```

```
            "name":"TMF TariffPlan"
          }
        },
        "orderItemRelationship":[
          {
            "id":"110",
            "type":"reliesOn"
          }
        ],
        "itemTerm":[
          {
            "name":"12MonthsCommitment",
            "description":"12 Months commitment",
            "duration":{
              "value":12,
              "unit":"string"
            }
          }
        ]
      },
      {
        "id":"130",
        "action":"add",
        "quantity":1,
        "productOffering":{
          "id":"14354",
          "name":"CoverageOptions"
        },
        "product":{
          "characteristic":[
            {
              "name":"CoverageOption",
              "value":"National"
            }
          ],
          "productSpecification":{
            "id":"14353",
            "name":"coverage"
          }
        },
        "orderItemRelationship":[
          {
            "id":"110",
            "type":"reliesOn"
          }
        ]
      }
    ]
  }
 ]
}
```

Response

```
201

{
  "id": "11",
  "href": https://host:port/productOrder/productOrder/11
}
```

PATCH PRODUCT ORDER

PATCH /productOrder/{id}

Description

This operation allows partial updates of a product order entity.

Support of json/merge (https://tools.ietf.org/html/rfc7386) is mandatory, support of json/patch (http://tools.ietf.org/html/rfc5789) is optional.

Note: If the update operation yields to the creation of sub-resources or relationships, the same rules concerning mandatory sub-resource attributes and default value settings in the POST operation applies to the PATCH operation. Hence these tables are not repeated here.

Patchable and Non Patchable Attributes

The tables below provide the list of patchable and non patchable attributes, including constraint rules on their usage.

Patchable Attributes	Rule
priority	Rule may be enforced depending on order state.
externalId	
description	
category	
requestedStartDate	Rule may be enforced depending on order state.
requestedCompletionDate	Rule may be enforced depending on order state.
notificationContact	
@baseType	
@type	
@schemaLocation	
note	
orderTotalPrice	Rule may be enforced depending on order state.
orderItem	Rule may be enforced depending on order state.
relatedParty	Rule may be enforced depending on order state.
payment	Rule may be enforced depending on payment state.
billingAccount	
channel	
orderItem.product.place	Rule may be enforced depending on order item state but also place role (shipped address could be updated…. More complicated for an install address)
orderItem.appointment	Rule may be enforced depending on appointment state

Non Patchable Attributes	Rule
id	
href	
orderDate	
completionDate	
expectedCompletionDate	
state	
orderItem.id	
orderItem.action	
orderItem.state	
orderItem.product.id	
orderItem.product.href	
orderItem.itemTerm	
orderItem.productOffering	

Additional Rules

The following pre-conditions apply for this operation.

Pre-conditions
PATCH allowed if order not completed

Usage Samples

Here's an example of a request for patching a ProductOrder resource.

Changing the priority of the order (using json-merge)

Request

PATCH /productOrderingManagement/productOrder/42
Content-Type: application/merge-patch+json
 	
{
  "priority": 1
}

Response
201 { Similar JSON as in GET response with priority changed }

DELETE PRODUCT ORDER

```
DELETE /productOrder/{id}
```

Note: this operation is available only to ADMIN API users

Description

This operation deletes a product order entity.

Usage Samples

Here's an example of a request for deleting a ProductOrder resource.

Request
DELETE /productOrderingManagement/productOrder/42
Response
204

API NOTIFICATIONS

For every single of operation on the entities use the following templates and provide sample REST notification POST calls.

It is assumed that the Pub/Sub uses the Register and UnRegister mechanisms described in the REST Guidelines reproduced below.

REGISTER LISTENER

POST /hub

Description

Sets the communication endpoint address the service instance must use to deliver information about its health state, execution state, failures and metrics. Subsequent POST calls will be rejected by the service if it does not support multiple listeners. In this case DELETE /api/hub/{id} must be called before an endpoint can be created again.

Behavior

Returns HTTP/1.1 status code 204 if the request was successful.

Returns HTTP/1.1 status code 409 if request is not successful.

Usage Samples

Here's an example of a request for registering a listener.

Request
POST /api/hub Accept: application/json {"callback": "http://in.listener.com"}
Response
201 Content-Type: application/json Location: /api/hub/42 {"id":"42","callback":"http://in.listener.com","query":null}

UNREGISTER LISTENER

DELETE /hub/{id}

Description

Clears the communication endpoint address that was set by creating the Hub.

Behavior

Returns HTTP/1.1 status code 204 if the request was successful.

Returns HTTP/1.1 status code 404 if the resource is not found.

Usage Samples

Here's an example of a request for un-registering a listener.

Request
DELETE /api/hub/42 Accept: application/json
Response
204

PUBLISH EVENT TO LISTENER

POST /client/listener

Description

Clears the communication endpoint address that was set by creating the Hub.

Provides to a registered listener the description of the event that was raised. The /client/listener url is the callback url passed when registering the listener.

Behavior

Returns HTTP/1.1 status code 201 if the service is able to set the configuration.

Usage Samples

Here's an example of a notification received by the listener. In this example "EVENT TYPE" should be replaced by one of the notification types supported by this API (see Notification resources Models section) and EVENT BODY refers to the data structure of the given notification type.

Request

POST /client/listener
Accept: application/json
 	
{
  "event": {
      EVENT BODY
    },
  "eventType": "EVENT_TYPE"
}

Response
201

For detailed examples on the general TM Forum notification mechanism, see the TMF REST Design Guidelines.

tmførum

ACKNOWLEDGEMENTS

RELEASE HISTORY

Release Number	Date	Release led by:	Description
Release 1.0	04/15/2013	Pierre Gauthier TM Forum pgauthier@tmforum.org	First Release of Draft Version of the Document.
Release 1.1			Updated for use in the Paris Spec Jam – and rebranded.
Release 2.0	04/15/2016	Pierre Gauthier TM Forum pgauthier@tmforum.org Mariano Belaunde Orange mariano.belaunde@orange.com	Regenerated from the API Data Model – and rebranded.
Release 3.0	10/07/2016	Ludovic Robert Orange ludovic.robert@orange.com Mariano Belaunde Orange mariano.belaunde@orange.com	Add price and price alteration on order item Regenerated from the API Data Model
Release 4.0	11/8/2017	Pierre Gauthier TM Forum pgauthier@tmforum.org Mariano Belaunde Orange mariano.belaunde@orange.com Ludovic Robert Orange ludovic.robert@orange.com	AP-974 The productOrder API have been updated: • with the guideline 3.0 • with request coming from the community (AP954 & AP 432 for example) • with change requests coming from the MEF To list modifications taken into account: • Change OrderItemPrice class name to OrderPrice name

Release Number	Date	Release led by:	Description
			• Add BA-ProductOrder relationship • Modify BA-OrderItem cardinality (0..* --> 0..1) • Add BA-OrderPrice relationship • Change PlaceRef with Place • Change relationship name between Product-Place to placeReforValue name • Add geographicalAddress, geographicalsubAddress, geoLocation, GeoPoint • Add @baseType,@type and @schemaLocation attributes on all concerned classes (Aligned with guideline) • Add QualificationRef class and link from productOrderItem • Add OrderTerm and link from productOrderItem • Add PaymentRef and link from productOrderItem & productOrder • Add 'describing' pattern to allow schema extension usage to describe product spec characteristic (same as in API entity Catalog) • Adopt reforValue patern (based on annotation)
4.0.1	06/12/2017	P. Gauthier / L.Robert	Added attributes @type and @schemaLocation in Product class. Add a 'targetResourceSchema' attribute featuring @type and @schemaLocation attributes to TargetResourceSchema
Release 17.5.0 v4.0.2	18-Jan-2018	Adrienne Walcott	Formatting/style edits prior to publishing