TM Forum Specification

Product Catalog Management API REST Specification

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INTRODUCTION

The catalog management API allows the management of the entire lifecycle of the catalog elements, the consultation of catalog elements during several processes such as ordering process, campaign management, sales management.

SAMPLE USE CASES

Lifecycle Management Use Case

The catalog management API allows the management of the entire lifecycle of the catalog elements.

UC1: A partner updates his catalog. He notifies his distributor the catalog change. The distributor requests a catalog export. Then, he retrieves the catalog at the provided URL.
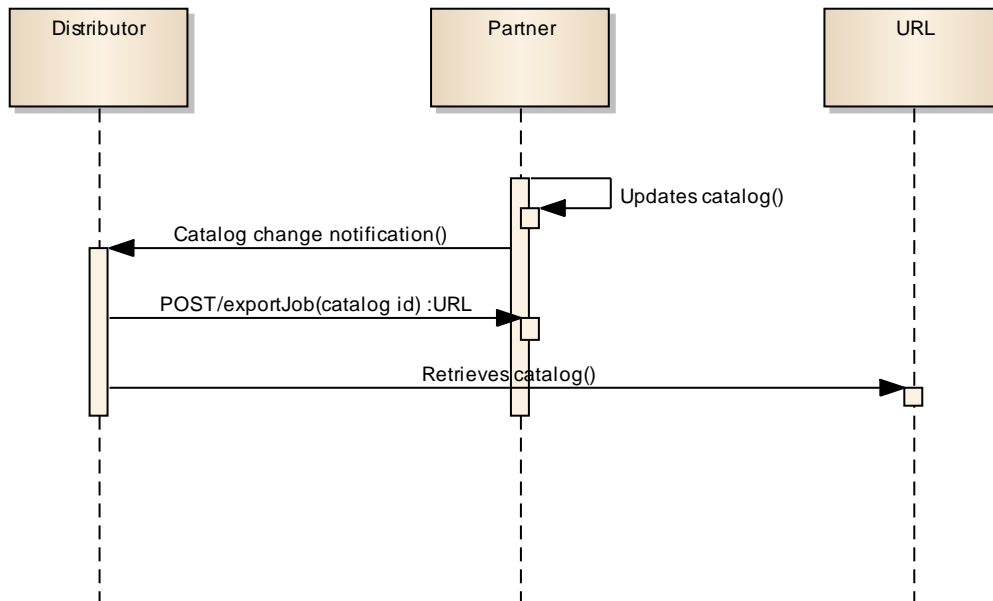
UC2: A partner updates his catalog. He notifies all catalog changes in detail to his distributor. This one updates his catalog copy.
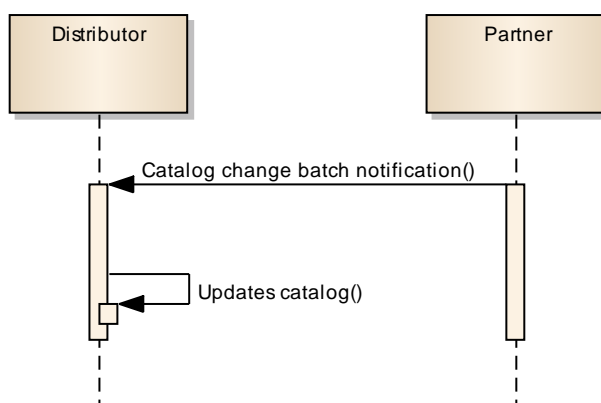
UC3: A catalog administrator wants to retrieve effective duration of a product offering based on product offering identifier or other search criteria (GET /productOffering/{ID}).

UC4: A catalog administrator wants to retrieve all the bundled product offerings included in a product offering bundle (GET/productOffering).

UC5: A catalog administrator wants to update the lifecycle status (from Launched to retired for example) of a product offering (PATCH/productOffering).

Order Management Use Case

The catalog management API allows the lookup of the catalog elements during order capture.

UC1: A distributor wants to browse product offerings during order capture and to retrieve product offerings belonging to a given category, for a given channel and a given place. He gets all details on product offerings, product offering prices, product specifications and its characteristics (GET/depth).

UC2: A distributor wants to retrieve the characteristics including prices of a given product offering (GET/productOffering).

UC3: A distributor wants to know if a product offering is available at customer's location (GET/productOffering).

UC4: A distributor wants to know which SLA applies on a given product offering (GET/productOffering).

UC5: A distributor wants to retrieve all product offerings belonging to a partner (GET/productOffering).

Entity Lifecycle States

Resource Lifecycle Management is responsible for managing the entire lifecycle of the catalog element and its underlying components. This include all the processes required to design, build, deploy, maintain and ultimately retire the catalog element.

tmforum
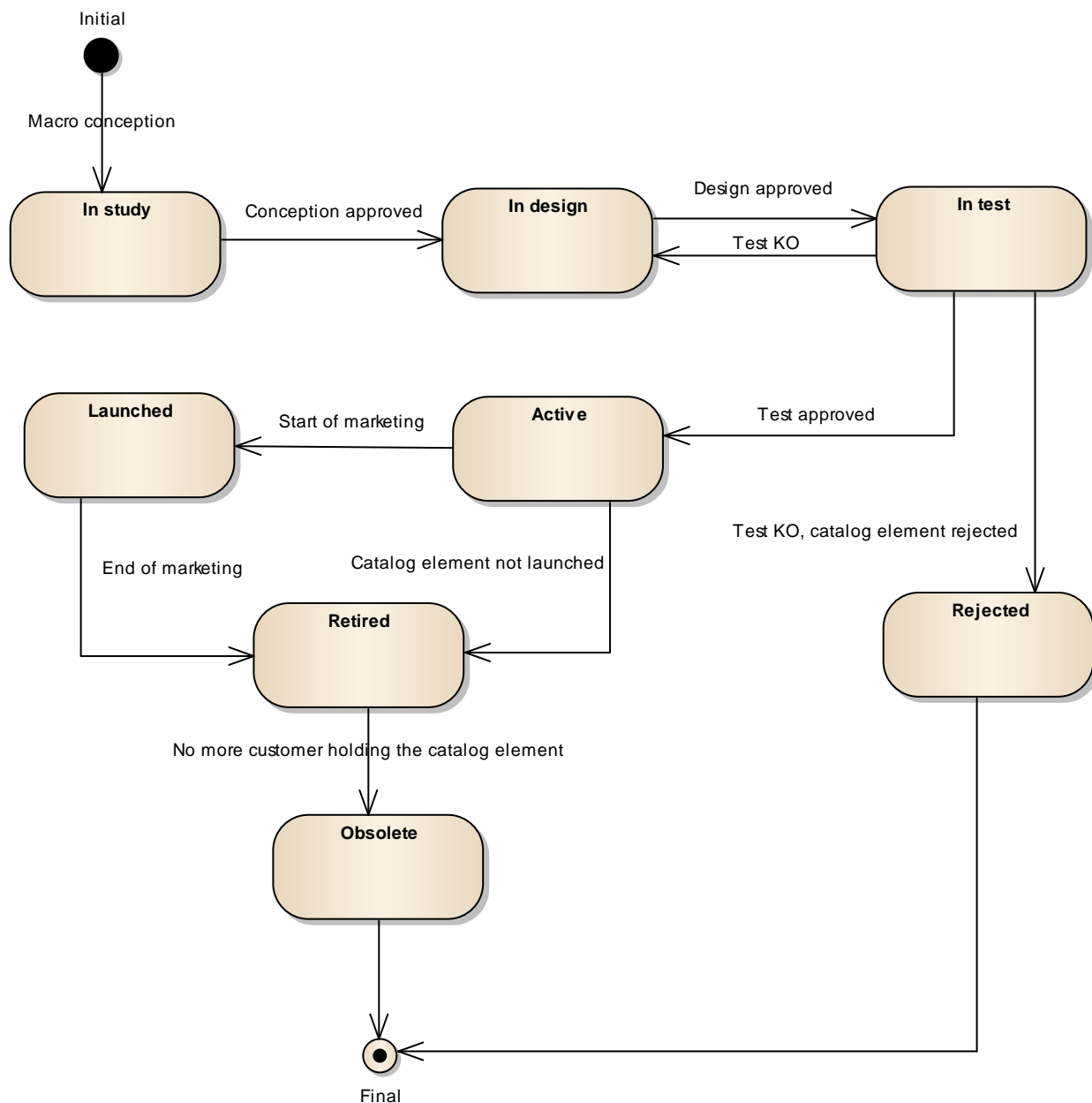
When the macro conception of a catalog element is started the first status of the later is "In Study".

When the conception of the catalog element is accepted, its status is changed to "In Design".

If the design is approved its status is changed to "In Test".

Then either the test is OK and then its status is changed to "Active" or the test is KO (failed) and its status is changed to "Rejected". The Rejected status is a final status.

When a catalog element is in a "Active" status it means, it has been validated and tested, but it is still not available for customers.

When the beginning of marketing is reached, its status is changed to "Launched". At this moment, customers can buy it.

If the catalog element is not launched, its status is changed to "Retired".

The same status is achieved when a catalog element reaches the end of marketing.

The "Retired" status means it cannot be sold to any new customers, but previous customers can still have it.

When no more customer holds the catalog element, its status is changed to "Obsolete" meaning it can be removed from the catalog.

SUPPORT OF POLYMORPHISM AND EXTENSION PATTERNS

Support of polymorphic collections and types and schema based extension is provided by means of a list of generic meta-attributes that we describe below. Polymorphism in collections occurs when entities inherit from base entities, for instance a TypeAProductSpecification and TypeBProductSpecification inheriting properties from the base ProductSpecification entity.

Generic support of polymorphism and pattern extensions is described in the TMF API Guidelines v3.0 Part 2 document.

The @type attribute provides a way to represent the actual class type of an entity. For example, within a list of ProductSpecification instances some may be instances of TypeAProductSpecification where other could be instances of TypeBProductSpecification. The @type gives this information. All resources and sub-resources of this API have a @type attributes that can be provided when this is useful.

The @referredType can be used within reference entities (like for instance an RelatedParty object) to explicitly denote the actual entity type of the referred class. Notice that in reference entities the @type, when used, denotes the class type of the reference itself, such as RelatedParty, and not the class type of the referred object. However since reference classes are rarely sub-classed, @type is generally not useful in reference objects.

The @schemaLocation property can be used in resources to allow specifying user-defined properties of an Entity or to specify the expected *characteristics* of an entity.

The @baseType attribute gives a way to provide explicitly the base of class of a given resource that has been extended.

RESOURCE MODEL

Managed Entity and Task Resource Models

Catalog resource

A collection of Product Offerings, intended for a specific DistributionChannel, enhanced with additional information such as SLA parameters, invoicing and shipping details.

Resource model
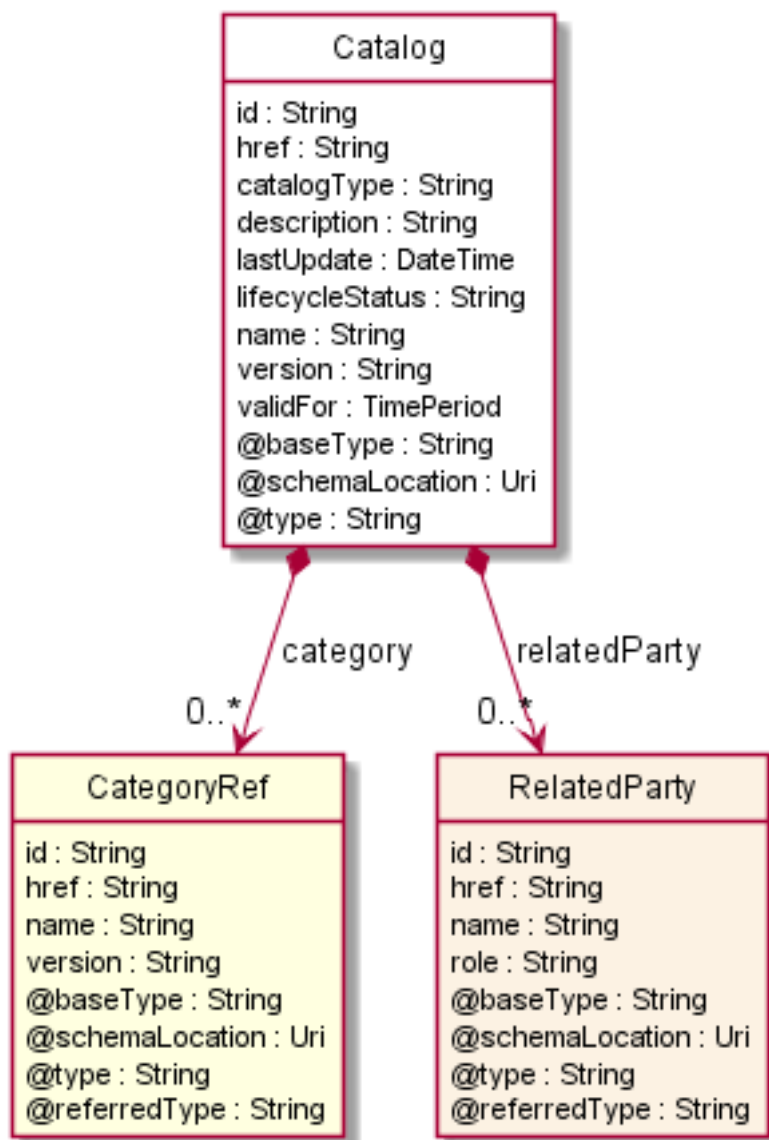
Field descriptions

Catalog fields

catalogType	A string. Indicates if the catalog is a product, service or resource catalog.
category	A list of category references (CategoryRef [*]). List of root categories contained in this catalog.
description	A string. Description of this catalog.
href	A string. Unique reference of the catalog.
id	A string. Unique identifier of the Catalog.
lastUpdate	A date time (DateTime). Date and time of the last update.
lifecycleStatus	A string. Used to indicate the current lifecycle status.
name	A string. Name of the catalog.
relatedParty	A list of related parties (RelatedParty [*]). List of parties involved in this catalog.
validFor	A time period. The period for which the catalog is valid.
version	A string. Catalog version.

RelatedParty sub-resource

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

@referredType	A string. The actual type of the target instance when needed for disambiguation.
href	A string. Reference of the related entity.
id	A string. Unique identifier of a related entity.
name	A string. Name of the related entity.
@referredType	A string. The actual type of the target instance when needed for disambiguation.
role	A string. Role played by the related party.

CategoryRef relationship

The category for grouping recommendations.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
href	A string. Reference of the related entity.
id	A string. Unique identifier of a related entity.
name	A string. Name of the related entity.
version	A string. Category version.

Json representation sample

We provide below the json representation of an example of a 'Catalog' resource object

```
{
    "id": "3830",
    "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/Catalog/3830",
    "name": "Catalog Wholesale Business",
    "description": "This catalog describes Product Offerings and technical specifications intended to address the wholesale
business segment.",
    "catalogType": "ProductCatalog",
    "version": "1.0",
    "validFor": {
        "startDateTime": "2017-08-29T00:00",
        "endDateTime": "2018-03-25T00:00"
    },
    "lastUpdate": "2017-08-27T00:00",
    "lifecycleStatus": "Active",
    "relatedParty": [
        {
            "href": "https://mycsp.com:8080/tmf-api/partyManagement/v4/organization/3426",
            "id": "3426",
            "name": "Broadly Broad Ltd",
            "role": "vendor"
        },
        {
            "href": "https://mycsp.com:8080/tmf-api/partyManagement/v4/individual/115566",
            "id": "115566",
            "name": "Roger Collins",
            "role": "Reviser"
        }
    ],
    "category": [
        {
            "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/category/7757",
            "id": "7757",
            "name": "business"
        }
    ],
    "@type": "Catalog"
}
```

Category resource

The category resource is used to group product offerings, service and resource candidates in logical containers.
Categories can contain other categories and/or product offerings, resource or service candidates.

Resource model
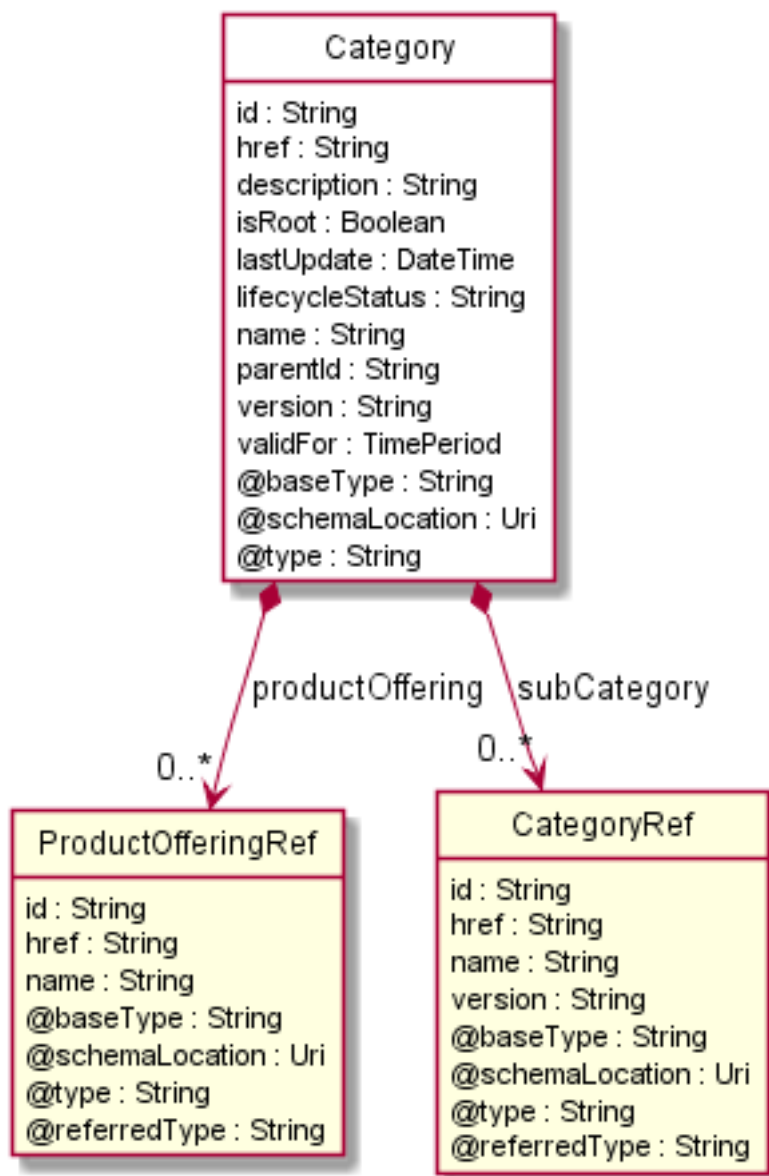
Field descriptions

Category fields

description	A string. Description of the category.
href	A string. Reference of the category.
id	A string. Unique identifier of the category.
isRoot	A boolean. If true, this Boolean indicates that the category is a root of categories.
lastUpdate	A date time (DateTime). Date and time of the last update.
lifecycleStatus	A string. Used to indicate the current lifecycle status.

name	A string. Name of the category.
parentId	A string. Unique identifier of the parent category.
productOffering	A list of product offering references (ProductOfferingRef [*]). A product offering represents entities that are orderable from the provider of the catalog, this resource includes pricing information.
subCategory	A list of category references (CategoryRef [*]). The category resource is used to group product offerings, service and resource candidates in logical containers. Categories can contain other (sub-)categories and/or product offerings.
validFor	A time period. The period for which the category is valid.
version	A string. Category version.

CategoryRef relationship

The category for grouping recommendations.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
href	A string. Reference of the related entity.
id	A string. Unique identifier of a related entity.
name	A string. Name of the related entity.
version	A string. Category version.

ProductOfferingRef relationship

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

|	
@referredType	A string. The actual type of the target instance when needed for disambiguation.
href	A string. Reference of the related entity.
id	A string. Unique identifier of a related entity.
name	A string. Name of the related entity.

Json representation sample

We provide below the json representation of an example of a 'Category' resource object

```
{
  "id": "1708",
  "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/Category/1708",
  "name": "Cloud Services",
  "description": "A category to hold all available cloud service offers",
```

```
  "version": "1.0",
  "validFor": {
    "startDateTime": "2017-08-24T00:00",
    "endDateTime": "2018-03-25T00:00"
  },
  "lifecycleStatus": "Active",
  "lastUpdate": "2017-08-27T00:00",
  "subCategory": [
    {
      "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/category/6086",
      "id": "6086",
      "name": "Cloud Storage"
    },
    {
      "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/category/6087",
      "id": "6087",
      "name": "Software as a Service"
    }
  ],
  "relatedParty": [
    {
      "href": "https://mycsp.com:8080/tmf-api/partyManagement/v4/organization/3426",
      "id": "3426",
      "name": "Broadly Broad Ltd",
      "role": "vendor"
    },
    {
      "href": "https://mycsp.com:8080/tmf-api/partyManagement/v4/individual/115566",
      "id": "115566",
      "role": "Reviser",
      "name": "Roger Collins"
    }
  ],
  "@type": "Category"
}
```

Product Offering resource

Represents entities that are orderable from the provider of the catalog, this resource includes pricing information.

Resource model

ProductOffering

- id : String
- href : String
- description : String
- isBundle : Boolean
- isSellable : Boolean
- lastUpdate : DateTime
- lifecycleStatus : String
- name : String
- statusReason : String
- version : String
- validFor : TimePeriod
- @baseType : String
- @schemaLocation : Uri
- @type : String

AttachmentRefOrValue
- id : String
- href : String
- attachmentType : String
- content : String
- description : String
- mimeType : String
- name : String
- url : String
- size : Quantity
- validFor : TimePeriod
- @baseType : String
- @schemaLocation : Uri
- @type : String
- @referredType : String

CategoryRef
- id : String
- href : String
- name : String
- version : String
- @baseType : String
- @schemaLocation : Uri
- @type : String
- @referredType : String

ChannelRef
- id : String
- href : String
- name : String
- @baseType : String
- @schemaLocation : Uri
- @type : String
- @referredType : String

MarketSegmentRef
- id : String
- href : String
- name : String
- @baseType : String
- @schemaLocation : Uri
- @type : String
- @referredType : String

PlaceRef
- id : String
- href : String
- name : String
- @baseType : String
- @schemaLocation : Uri
- @type : String
- @referredType : String

ProductOfferingPriceRef
- id : String
- href : String
- name : String
- @baseType : String
- @schemaLocation : Uri
- @type : String
- @referredType : String

AgreementRef
- id : String
- href : String
- name : String
- @baseType : String
- @schemaLocation : Uri
- @type : String
- @referredType : String

ProductSpecificationCharacteristicValueUse
- description : String
- maxCardinality : Integer
- minCardinality : Integer
- name : String
- valueType : String
- validFor : TimePeriod
- @baseType : String
- @schemaLocation : Uri
- @type : String

ProductSpecificationCharacteristicValue
- isDefault : Boolean
- rangeInterval : String
- regex : String
- unitOfMeasure : String
- valueFrom : String
- valueTo : String
- valueType : String
- validFor : TimePeriod
- value : Any
- @baseType : String
- @schemaLocation : Uri
- @type : String

SLARef
- id : String
- href : String
- name : String
- @baseType : String
- @schemaLocation : Uri
- @type : String
- @referredType : String

ServiceCandidateRef
- id : String
- href : String
- name : String
- version : String
- @baseType : String
- @schemaLocation : Uri
- @type : String
- @referredType : String

ResourceCandidateRef
- id : String
- href : String
- name : String
- version : String
- @baseType : String
- @schemaLocation : Uri
- @type : String
- @referredType : String

ProductOfferingTerm
- description : String
- name : String
- duration : Quantity
- validFor : TimePeriod
- @baseType : String
- @schemaLocation : Uri
- @type : String

BundledProductOffering
- id : String
- href : String
- lifecycleStatus : String
- name : String
- @baseType : String
- @schemaLocation : Uri
- @type : String

ProductSpecificationRef
- id : String
- href : String
- name : String
- version : String
- @baseType : String
- @schemaLocation : Uri
- @type : String
- @referredType : String

BundledProductOfferingOption
- numberRelOfferDefault : Integer
- numberRelOfferLowerLimit : Integer
- numberRelOfferUpperLimit : Integer
- @baseType : String
- @schemaLocation : Uri
- @type : String

TargetProductSchema
- @baseType : String
- @schemaLocation : String
- @type : String

Relationships
- attachment 0..*
- category 0..*
- channel 0..*
- marketSegment 0..*
- place 0..*
- productOfferingPrice 0..*
- agreement 0..*
- prodSpecCharValueUse 0..*
- productSpecCharacteristicValue 0..*
- serviceLevelAgreement 0..1
- serviceCandidate 0..1
- resourceCandidate 0..1
- productOfferingTerm 0..*
- bundledProductOffering 0..*
- productSpecification 0..1
- productSpecification 0..1
- bundledProductOfferingOption 0..1
- targetProductSchema 0..1

Field descriptions

ProductOffering fields

agreement	A list of agreement references (AgreementRef [*]). An agreement represents a contract or arrangement, either written or verbal and sometimes enforceable by law, such as a service level agreement or a customer price agreement. An agreement involves a number of other business entities, such as products, services, and resources and/or their specifications.
attachment	A list of attachment ref or values (AttachmentRefOrValue [*]). Complements the description of an element (for instance a product) through video, pictures...
bundledProductOffering	A list of bundled product offerings (BundledProductOffering [*]). A type of ProductOffering that belongs to a grouping of ProductOfferings made available to the market. It inherits of all attributes of ProductOffering.
category	A list of category references (CategoryRef [*]). The category resource is used to group product offerings, service and resource candidates in logical containers. Categories can contain other categories and/or product offerings, resource or service candidates.
channel	A list of channel references (ChannelRef [*]). The channel defines the channel for selling product offerings.
description	A string. Description of the productOffering.
href	A string. Reference of the ProductOffering.
id	A string. Unique identifier of the productOffering.
isBundle	A boolean. isBundle determines whether a productOffering represents a single productOffering (false), or a bundle of productOfferings (true).
isSellable	A boolean. A flag indicating if this product offer can be sold stand-alone for sale or not. If this flag is false it indicates that the offer can only be sold within a bundle.
lastUpdate	A date time (DateTime). Date and time of the last update.
lifecycleStatus	A string. Used to indicate the current lifecycle status.
marketSegment	A list of market segment references (MarketSegmentRef [*]). provides references to the corresponding market segment as target of product offerings. A market segment is grouping of Parties, GeographicAreas, SalesChannels, and so forth.
name	A string. Name of the productOffering.
place	A list of place references (PlaceRef [*]). Place defines the places where the products are sold or delivered.
prodSpecCharValueUse	A list of product specification characteristic value uses (ProductSpecificationCharacteristicValueUse [*]). A use of the

	ProductSpecificationCharacteristicValue by a ProductOffering to which additional properties (attributes) apply or override the properties of similar properties contained in ProductSpecificationCharacteristicValue. It should be noted that characteristics which their value(s) addressed by this object must exist in corresponding product specification. The available characteristic values for a ProductSpecificationCharacteristic in a Product specification can be modified at the ProductOffering level. For example, a characteristic 'Color' might have values White, Blue, Green, and Red. But, the list of values can be restricted to e.g. White and Blue in an associated product offering. It should be noted that the list of values in 'ProductSpecificationCharacteristicValueUse' is a strict subset of the list of values as defined in the corresponding product specification characteristics.
productOfferingPrice	A list of product offering price references (ProductOfferingPriceRef [*]). An amount, usually of money, that is asked for or allowed when a ProductOffering is bought, rented, or leased. The price is valid for a defined period of time and may not represent the actual price paid by a customer.
productOfferingTerm	A list of product offering terms (ProductOfferingTerm [*]). A condition under which a ProductOffering is made available to Customers. For instance, a productOffering can be offered with multiple commitment periods.
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.
resourceCandidate	A resource candidate reference (ResourceCandidateRef). A resource candidate is an entity that makes a ResourceSpecification available to a catalog.
serviceCandidate	A service candidate reference (ServiceCandidateRef). ServiceCandidate is an entity that makes a ServiceSpecification available to a catalog.
serviceLevelAgreement	A s l a reference (SLARef). A service level agreement (SLA) is a type of agreement that represents a formal negotiated agreement between two parties designed to create a common understanding about products, services, priorities, responsibilities, and so forth. The SLA is a set of appropriate procedures and targets formally or informally agreed between parties in order to achieve and maintain specified Quality of Service.
statusReason	A string. A string providing a complementary information on the value of the lifecycle status attribute.
validFor	A time period. The period for which the productOffering is valid.
version	A string. ProductOffering version.

AttachmentRefOrValue sub-resource

An attachment by value or by reference. For AttachmentRefOrValue, the attribute type,schemaLocation and referredType are related to the contained entity and not to AttchmentRefOrValue itself.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
description	A string. A narrative text describing the content of the attachment.
href	A string. URI for this Attachment.
id	A string. Unique identifier for this particular attachment.
url	A string. Uniform Resource Locator, is a web page address (a subset of URI).
@referredType	A string. The actual type of the target instance when needed for disambiguation.
href	A string. URI for this Attachment.
id	A string. Unique identifier for this particular attachment.
name	A string. The name of the attachment.
attachmentType	A string. Attachment type such as video, picture.
content	A string. The actual contents of the attachment object, if embedded, encoded as base64.
description	A string. A narrative text describing the content of the attachment.
href	A string. URI for this Attachment.
id	A string. Unique identifier for this particular attachment.
mimeType	A string. Attachment mime type such as extension file for video, picture and document.
name	A string. The name of the attachment.
url	A string. Uniform Resource Locator, is a web page address (a subset of URI).
size	A quantity (Quantity). The size of the attachment.
validFor	A time period. The period of time for which the attachment is valid.

BundledProductOffering sub-resource

A type of ProductOffering that belongs to a grouping of ProductOfferings made available to the market. It inherits of all attributes of ProductOffering.

bundledProductOfferingOption	A bundled product offering option (BundledProductOfferingOption). A set of numbers that specifies the lower and upper limits for a ProductOffering that can be procured as part of the related BundledProductOffering. Values can range from 0 to unbounded.
href	A string. Unique reference of the BundledProductOffering.

id	A string. Unique identifier of the BundledProductOffering.
lifecycleStatus	A string. Used to indicate the current lifecycle status.
name	A string. Name of the BundledProductOffering.

BundledProductOfferingOption sub-resource

A set of numbers that specifies the lower and upper limits for a ProductOffering that can be procured as part of the related BundledProductOffering. Values can range from 0 to unbounded.

numberRelOfferDefault	An integer. Default number of produc offereings that should be procured as part of the related BundledProductOffering.
numberRelOfferLowerLimit	An integer. lower limit for a product offering that can be procured as part of the related BundledProductOffering.
numberRelOfferUpperLimit	An integer. upper limit for a product offering that can be procured as part of the related BundledProductOffering.

ProductOfferingTerm sub-resource

A condition under which a ProductOffering is made available to Customers. For instance, a productOffering can be offered with multiple commitment periods.

description	A string. Description of the productOfferingTerm.
duration	A quantity (Quantity). Duration of the productOfferingTerm.
name	A string. Name of the productOfferingTerm.
validFor	A time period. The period for which the productOfferingTerm is valid.

ProductSpecificationCharacteristicValue sub-resource

A ProductSpecificationCharacteristicValue object is used to define a set of attributes, each of which can be assigned to a corresponding set of attributes in a ProductSpecificationCharacteristic object. The values of the attributes in the ProductSpecificationCharacteristicValue object describe the values of the attributes that a corresponding ProductSpecificationCharacteristic object can take on.

isDefault	A boolean. Indicates if the value is the default value for a characteristic.
rangeInterval	A string. An indicator that specifies the inclusion or exclusion of the valueFrom and valueTo attributes. If applicable, possible values are "open", "closed", "closedBottom" and "closedTop".
regex	A string. Regular expression to define constraint on the allowed value.
unitOfMeasure	A string. A length, surface, volume, dry measure, liquid measure, money, weight, time, and the like. In general, a determinate quantity or magnitude of the kind

designated, taken as a standard of comparison for others of the same kind, in assigning to them numerical values, as 1 foot, 1 yard, 1 mile, 1 square foot.

validFor	A time period. The period of time for which a value is applicable.
value	An any (Any). A discrete value that the characteristic can take on, or the actual value of the characteristic.
valueFrom	A string. The low range value that a characteristic can take on.
valueTo	A string. The upper range value that a characteristic can take on.
valueType	A string. A kind of value that the characteristic can take on, such as numeric, text, and so forth.

ProductSpecificationCharacteristicValueUse sub-resource

A use of the ProductSpecificationCharacteristicValue by a ProductOffering to which additional properties (attributes) apply or override the properties of similar properties contained in ProductSpecificationCharacteristicValue. It should be noted that characteristics which their value(s) addressed by this object must exist in corresponding product specification. The available characteristic values for a ProductSpecificationCharacteristic in a Product specification can be modified at the ProductOffering level. For example, a characteristic 'Color' might have values White, Blue, Green, and Red. But, the list of values can be restricted to e.g. White and Blue in an associated product offering. It should be noted that the list of values in 'ProductSpecificationCharacteristicValueUse' is a strict subset of the list of values as defined in the corresponding product specification characteristics.

description	A string. A narrative that explains in detail what the productSpecificationCharacteristic is.
maxCardinality	An integer. The maximum number of instances a CharacteristicValue can take on. For example, zero to five phone numbers in a group calling plan, where five is the value for the maxCardinality.
minCardinality	An integer. The minimum number of instances a CharacteristicValue can take on. For example, zero to five phone numbers in a group calling plan, where zero is the value for the minCardinality.
name	A string. Name of the associated productSpecificationCharacteristic.
productSpecCharacteristicValue	A list of product specification characteristic values (ProductSpecificationCharacteristicValue [*]). A number or text that can be assigned to a ProductSpecificationCharacteristic.
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.

validFor	A time period. The period for which the productSpecificationCharacteristic is valid.
valueType	A string. A kind of value that the characteristic can take on, such as numeric, text and so forth.

Quantity sub-resource

An amount in a given unit.

amount	A float. Numeric value in a given unit.
units	A string. Unit.

TargetProductSchema sub-resource

The reference object to the schema and type of target product which is described by product specification.

@schemaLocation	A string. This field provides a link to the schema describing the target product.
@type	A string. Class type of the target product.

AgreementRef relationship

Agreement reference. An agreement represents a contract or arrangement, either written or verbal and sometimes enforceable by law, such as a service level agreement or a customer price agreement. An agreement involves a number of other business entities, such as products, services, and resources and/or their specifications.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
href	A string. Reference of the related entity.
id	A string. Unique identifier of a related entity.
name	A string. Name of the agreement.
name	A string. Name of the agreement.

CategoryRef relationship

The category for grouping recommendations.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
href	A string. Reference of the related entity.
id	A string. Unique identifier of a related entity.
name	A string. Name of the related entity.
version	A string. Category version.

ChannelRef relationship

The channel to which the resource reference to. e.g. channel for selling product offerings, channel for opening a trouble ticket etc..

@referredType	A string. The actual type of the target instance when needed for disambiguation.
href	A string. Reference of the related entity.
id	A string. Unique identifier of a related entity.
name	A string. Name of the related entity.

MarketSegmentRef relationship

provides references to the corresponding market segment as target of product offerings. A market segment is grouping of Parties, GeographicAreas, SalesChannels, and so forth.

@referredType	A string. (Class) type of the referred market segment.
href	A string. Reference of the market segment.
id	A string. Unique identifier of the market segment.
name	A string. Name of the market segment.

PlaceRef relationship

Place reference. PlaceRef defines the placeRefs where the products are sold or delivered.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
href	A string. Reference of the related entity.
id	A string. Unique identifier of a related entity.
name	A string. Name of the related entity.

ProductOfferingPriceRef relationship

ProductPriceOffering reference. An amount, usually of money, that is asked for or allowed when a ProductOffering is bought, rented, or leased.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
href	A string. Reference of the related entity.
id	A string. Unique identifier of a related entity.
name	A string. Name of the related entity.

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.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
href	A string. Reference of the related entity.
id	A string. Unique identifier of a related entity.
name	A string. Name of the related entity.
targetProductSchema	A target product schema (TargetProductSchema). A target product schema reference. The reference object to the schema and type of target product which is described by product specification.
version	A string. Version of the product specification.

ResourceCandidateRef relationship

ResourceCandidate reference: A resource candidate is an entity that makes a ResourceSpecification available to a catalog.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
href	A string. Reference of the resource candidate.
id	A string. Unique identifier of the resource candidate.
name	A string. Name of the resource candidate.
version	A string. Version of the resource candidate.

SLARef relationship

ServiceLevelAgreement reference: A service level agreement (SLA) is a type of agreement that represents a formal negotiated agreement between two parties designed to create a common understanding about products, services, priorities, responsibilities, and so forth. The SLA is a set of appropriate procedures and targets formally or informally agreed between parties in order to achieve and maintain specified Quality of Service.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
href	A string. Reference of the service level agreement.
id	A string. Unique identifier of service level agreement.
name	A string. Name of the service level agreement.

ServiceCandidateRef relationship

ServiceCandidate reference. ServiceCandidate is an entity that makes a ServiceSpecification available to a catalog.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
href	A string. Unique reference of the service candidate.
id	A string. Unique identifier of the service candidate.
name	A string. Name of the service candidate.
version	A string. Version of the service candidate.

Json representation sample

We provide below the json representation of an example of a 'ProductOffering' resource object

```
{
    "id": "7655",
    "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productOffering/7655",
    "name": "Basic Firewall for Business",
    "description": "This product offering suggests a firewall service that can be deployed in business customer premise.",
    "version": "2.1",
    "validFor": {
        "startDateTime": "2017-08-23T00:00",
        "endDateTime": "2018-03-25T00:00"
    },
    "lastUpdate": "2017-08-27T00:00",
    "lifecycleStatus": "Active",
    "isBundle": false,
    "isSellable": true,
    "statusReason": "Released for sale",
    "place": [
        {
            "id": "9979",
            "href": "https://mycsp.com:8080/tmf-api/geographicAddressManagement/v4/geographicAddress/9979",
            "name": "San Francisco Bay Area",
            "@referredType": "GeographicAddress"
        }
    ],
    "serviceLevelAgreement": {
        "id": "8082",
        "href": "https://mycsp.com:8080/tmf-api/slaManagement/v4/sla/8082",
        "name": "Gold SLA for Business",
        "@referredType": "BusinessSLA"
    },
    "productSpecification": {
        "id": "9881",
        "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/9881",
        "version": "1.1",
        "name": "Robotics999",
        "@referredType": "DeviceSpecification"
    },
    "channel": [
        {
            "id": "4406",
            "href": "https://mycsp.com:8080/tmf-api/salesChannelManagement/v4/channel/4406",
            "name": "Online Channel"
```

```
          }
        ],
        "serviceCandidate": {
          "id": "8167",
          "href": "https://mycsp.com:8080/tmf-api/serviceCatalogManagement/v4/serviceCandidate/8167",
          "version": "1.1",
          "name": "Mega Max"
        },
        "category": [
          {
            "id": "2646",
            "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/category/2646",
            "version": "2.1",
            "name": "Cloud"
          }
        ],
        "resourceCandidate": {
          "id": "8937",
          "href": "https://mycsp.com:8080/tmf-api/resourceCatalogManagement/v4/resourceCandidate/8937",
          "name": "Mega Band"
        },
        "productOfferingTerm": [
          {
            "name": "New Client Condition",
            "description": "This product offering term is for new client at fix duration of less than a year",
            "duration": {
              "amount": 3,
              "units": "Month"
            },
            "validFor": {
              "startDateTime": "2017-06-15T00:00",
              "endDateTime": "2018-01-13T00:00"
            }
          }
        ],
        "productOfferingPrice": [
          {
            "id": "1747",
            "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productOfferingPrice/1747",
            "name": "Recurring Monthly Price for Business Firewall"
          }
        ],
        "attachment": [
          {
            "description": "This attachment gives a block diagram of the firewall.",
            "mimeType": "image/jpeg",
            "url": "https://mycsp.com:7070/docloader?docnum=3534536"
          }
        ],
        "marketSegment": [
          {
            "id": "1266",
            "href": "https://mycsp.com:8080/tmf-api/productOfferingReferences/v4/marketSegmentRef/1266",
            "name": "North Region"
          }
        ],
```

```
      "prodSpecCharValueUse": [
        {
          "name": "Number of Ports",
          "description": "The total Number of Ports for this product",
          "valueType": "number",
          "minCardinality": 1,
          "maxCardinality": 1,
          "validFor": {
            "startDateTime": "2017-06-17T00:00",
            "endDateTime": "2018-01-13T00:00"
          },
          "productSpecCharacteristicValue": [
            {
              "isDefault": true,
              "valueType": "number",
              "validFor": {
                "startDateTime": "2017-06-16T00:00",
                "endDateTime": "2018-01-13T00:00"
              },
              "value": 8
            },
            {
              "isDefault": false,
              "valueType": "number",
              "validFor": {
                "startDateTime": "2017-06-16T00:00",
                "endDateTime": "2018-01-13T00:00"
              },
              "value": 16
            }
          ],
          "productSpecification": {
            "id": "9881",
            "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/9881",
            "version": "1.1"
          }
        }
      ],
    "@type": "ProductOffering"
  }
```

Product Offering Price resource

Is based on both the basic cost to develop and produce products and the enterprises policy on revenue targets. This price may be further revised through discounting (productOfferPriceAlteration). The price, applied for a productOffering may also be influenced by the productOfferingTerm, the customer selected, eg: a productOffering can be offered with multiple terms, like commitment periods for the contract. The price may be influenced by this productOfferingTerm. A productOffering may be cheaper with a 24 month commitment than with a 12 month commitment.

Resource model

Field descriptions

ProductOfferingPrice fields

@baseType	A string. the immediate base class type of this product offering.
@schemaLocation	A string. hyperlink reference to the schema describing this resource.
@type	A string. The class type of this Product offering.
bundledPopRelationship	A list of bundled product offering price relationships (BundledProductOfferingPriceRelationship [*]). this object represents a bundle relationship from a bundle product offering price (parent) to a simple product offering price (child). A simple product offering price may participate in more than one bundle relationship.
constraint	A list of constraint references (ConstraintRef [*]). The Constraint resource represents a policy/rule applied to ProductOfferingPrice.
description	A string. Description of the productOfferingPrice.
href	A string. Reference of the ProductOfferingPrice.
id	A string. unique id of this resource.
isBundle	A boolean. A flag indicating if this ProductOfferingPrice is composite (bundle) or not.
lastUpdate	A date time (DateTime). the last update time of this ProductOfferingPrice.
lifecycleStatus	A string. the lifecycle status of this ProductOfferingPrice.
name	A string. Name of the productOfferingPrice.
percentage	A float. Percentage to apply for ProductOfferPriceAlteration (Discount).
place	A list of place references (PlaceRef [*]). Place defines the places where the products are sold or delivered.
popRelationship	A list of product offering price relationships (ProductOfferingPriceRelationship [*]). Product Offering Prices related to this Product Offering Price, for example a price alteration such as allowance or discount.
price	A money (Money). The amount of money that characterizes the price.
priceType	A string. A category that describes the price, such as recurring, discount, allowance, penalty, and so forth.
pricingLogicAlgorithm	A list of pricing logic algorithms (PricingLogicAlgorithm [*]). The PricingLogicAlgorithm entity represents an instantiation of an interface specification to external rating function (without a modeled behavior in SID).

	Some of the parameters of the interface definition may be already set (such as price per unit) and some may be gathered during the rating process from the event (such as call duration) or from ProductCharacteristicValues (such as assigned bandwidth).
prodSpecCharValueUse	A list of product specification characteristic value uses (ProductSpecificationCharacteristicValueUse [*]). A use of the ProductSpecificationCharacteristicValue by a ProductOfferingPrice to which additional properties (attributes) apply or override the properties of similar properties contained in ProductSpecificationCharacteristicValue. It should be noted that characteristics which their value(s) addressed by this object must exist in corresponding product specification. The available characteristic values for a ProductSpecificationCharacteristic in a Product specification can be modified at the ProductOffering and ProductOfferingPrice level. The list of values in ProductSpecificationCharacteristicValueUse is a strict subset of the list of values as defined in the corresponding product specification characteristics.
productOfferingTerm	A list of product offering terms (ProductOfferingTerm [*]). A list of conditions under which a ProductOfferingPrice is made available to Customers. For instance, a Product Offering Price can be offered with multiple commitment periods.
recurringChargePeriodLength	An integer. the period of the recurring charge: 1, 2, ...It sets to zero if it is not applicable.
recurringChargePeriodType	A string. The period to repeat the application of the price Could be month, week...
tax	A list of tax items (TaxItem [*]). An amount of money levied on the price of a Product by a legislative body.
unitOfMeasure	A quantity (Quantity). A number and unit representing how many (for instance 1 dozen) of an ProductOffering is available at the offered price. Its meaning depends on the priceType. It could be a price, a rate, or a discount.
validFor	A time period. The period for which the productOfferingPrice is valid.
version	A string. ProductOffering version.

BundledProductOfferingPriceRelationship sub-resource

This represents a bundling pricing relationship, allowing a price to be composed of multiple other prices (e.g. a recurring charge and a onetime charge).

href	A string. hyperlink reference of the bundled product offering price.
id	A string. Unique identifier of the bundled product offering price.

| name | A string. Name of the bundled product offering price. |

Money sub-resource

A base / value business entity used to represent money.

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

PricingLogicAlgorithm sub-resource

The PricingLogicAlgorithm entity represents an instantiation of an interface specification to external rating function (without a modeled bahavior in SID). Some of the parameters of the interface definiition may be already set (such as price per unit) and some may be gathered during the rating process from the event (such as call duration) or from ProductCharacteristicValues (such as assigned bandwidth).

description	A string. Description of the PricingLogicAlgorithm.
href	A string. hyperlink reference of this PricingLogicAlgorithm.
id	A string. unique id of the PricingLogicAlgorithm.
name	A string. Name given to the PricingLogicAlgorithm.
plaSpecId	A string. id of corresponding PricingLogicAlgorithm specification.
validFor	A time period. The period for which the PricingLogicAlgorithm is valid.

ProductOfferingPriceRelationship sub-resource

Describes a non-composite relationship between product offering prices. For example one price might be an discount alteration for another price.

href	A string. hyperlink reference of the associated product offering price.
id	A string. Unique identifier of the associated product offering price.
name	A string. Name of the associated product offering price.
relationshipType	A string. type of the relationship, for example override, discount, etc.

ProductOfferingTerm sub-resource

A condition under which a ProductOffering is made available to Customers. For instance, a productOffering can be offered with multiple commitment periods.

| description | A string. Description of the productOfferingTerm. |
| duration | A quantity (Quantity). Duration of the productOfferingTerm. |

name   A string. Name of the productOfferingTerm.

validFor   A time period. The period for which the productOfferingTerm is valid.

ProductSpecificationCharacteristicValue sub-resource

A ProductSpecificationCharacteristicValue object is used to define a set of attributes, each of which can be assigned to a corresponding set of attributes in a ProductSpecificationCharacteristic object. The values of the attributes in the ProductSpecificationCharacteristicValue object describe the values of the attributes that a corresponding ProductSpecificationCharacteristic object can take on.

isDefault   A boolean. Indicates if the value is the default value for a characteristic.

rangeInterval   A string. An indicator that specifies the inclusion or exclusion of the valueFrom and valueTo attributes. If applicable, possible values are "open", "closed", "closedBottom" and "closedTop".

regex   A string. Regular expression to define constraint on the allowed value.

unitOfMeasure   A string. A length, surface, volume, dry measure, liquid measure, money, weight, time, and the like. In general, a determinate quantity or magnitude of the kind designated, taken as a standard of comparison for others of the same kind, in assigning to them numerical values, as 1 foot, 1 yard, 1 mile, 1 square foot.

validFor   A time period. The period of time for which a value is applicable.

value   An any (Any). A discrete value that the characteristic can take on, or the actual value of the characteristic.

valueFrom   A string. The low range value that a characteristic can take on.

valueTo   A string. The upper range value that a characteristic can take on.

valueType   A string. A kind of value that the characteristic can take on, such as numeric, text, and so forth.

ProductSpecificationCharacteristicValueUse sub-resource

A use of the ProductSpecificationCharacteristicValue by a ProductOffering to which additional properties (attributes) apply or override the properties of similar properties contained in ProductSpecificationCharacteristicValue. It should be noted that characteristics which their value(s) addressed by this object must exist in corresponding product specification. The available characteristic values for a ProductSpecificationCharacteristic in a Product specification can be modified at the ProductOffering level. For example, a characteristic 'Color' might have values White, Blue, Green, and Red. But, the list of values can be restricted to e.g. White and Blue in an associated product offering. It should be noted that the list of values in 'ProductSpecificationCharacteristicValueUse' is a strict subset of the list of values as defined in the corresponding product specification characteristics.

description	A string. A narrative that explains in detail what the productSpecificationCharacteristic is.
maxCardinality	An integer. The maximum number of instances a CharacteristicValue can take on. For example, zero to five phone numbers in a group calling plan, where five is the value for the maxCardinality.
minCardinality	An integer. The minimum number of instances a CharacteristicValue can take on. For example, zero to five phone numbers in a group calling plan, where zero is the value for the minCardinality.
name	A string. Name of the associated productSpecificationCharacteristic.
productSpecCharacteristicValue	A list of product specification characteristic values (ProductSpecificationCharacteristicValue [*]). A number or text that can be assigned to a ProductSpecificationCharacteristic.
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.
validFor	A time period. The period for which the productSpecificationCharacteristic is valid.
valueType	A string. A kind of value that the characteristic can take on, such as numeric, text and so forth.

Quantity sub-resource

An amount in a given unit.

amount	A float. Numeric value in a given unit.
units	A string. Unit.

TargetProductSchema sub-resource

The reference object to the schema and type of target product which is described by product specification.

@schemaLocation	A string. This field provides a link to the schema describing the target product.
@type	A string. Class type of the target product.

TaxItem sub-resource

A tax item is created for each tax rate and tax type used in the bill.

taxAmount	A money (Money). Amount of tax expressed in the given currency.

taxCategory	A string. Tax category.
taxRate	A float. Applied rate of the tax.

ConstraintRef relationship

Constraint reference. The Constraint resource represents a policy/rule applied to an entity or entity spec.

@referredType	A string. The (class) type of the referred constraint.
href	A string. Hyperlink reference to the target constraint.
id	A string. reference id to the target constraint.
name	A string. Name given to the constraint.
version	A string. constraint version.

PlaceRef relationship

Place reference. PlaceRef defines the placeRefs where the products are sold or delivered.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
href	A string. Reference of the related entity.
id	A string. Unique identifier of a related entity.
name	A string. Name of the related entity.

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.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
href	A string. Reference of the related entity.
id	A string. Unique identifier of a related entity.
name	A string. Name of the related entity.
targetProductSchema	A target product schema (TargetProductSchema). A target product schema reference. The reference object to the schema and type of target product which is described by product specification.
version	A string. Version of the product specification.

Json representation sample

We provide below the json representation of an example of a 'ProductOfferingPrice' resource object

```
{
   "id": "7655",
   "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productOfferingPrice/7655",
   "name": "Recurring Charge for Business Firewall",
   "description": "This pricing describes the recurring charge for a firewall service that can be deployed in business
customer premise.",
   "version": "2.1",
   "validFor": {
      "startDateTime": "2017-08-23T00:00",
      "endDateTime": "2018-03-25T00:00"
   },
   "priceType": "recurring",
   "recurringChargePeriodType": "monthly",
   "recurringChargePeriodLength": 1,
   "lastUpdate": "2017-08-27T00:00",
   "isBundle": false,
   "lifecycleStatus": "Active",
   "price": {
      "unit": "EUR",
      "amount": 50
   },
   "percentage": 0.0,
   "productOfferingTerm": [
      {
         "name": "12 Month",
         "description": "12 month contract",
         "duration": {
            "amount": 12,
            "units": "Month"
         },
         "validFor": {
            "startDateTime": "2017-04-19T16:42:23.0Z",
            "endDateTime": "2017-06-19T00:00:00.0Z"
         }
      }
   ],
   "place": [
      {
         "id": "9979",
         "href": "https://mycsp.com:8080/tmf-api/geographicAddressManagement/v4/geographicAddress/9979",
         "name": "San Francisco Bay Area",
         "@referredType": "GeographicAddress"
      }
   ],
   "constraint": [
      {
         "@referredType": "PriceConstraint",
         "name": "PriceRuleNo1",
         "id": "525",
         "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/constraint/525"
      }
   ],
   "pricingLogicAlgorithm": {
      "id": "533",
      "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/PricingLogicAlgorithm/533",
      "@type": "RecurringRatingPLA",
```

```
      "@baseType": "PricingLogicAlgorithm",
      "@schemaLocation": "https://mycsp.com:8080/tmf-api/schema/Product/RecurringRatingPLA.schema.json",
      "name": "PLA_rec",
      "description": "Algorithm that rates Recurring event",
      "plaSpecId": "525",
      "validFor": {
        "startDateTime": "2017-04-19T16:42:23.0Z",
        "endDateTime": "2018-06-19T00:00:00.0Z"
      }
    },
    "tax": [
      {
        "taxAmount": {
          "unit": "EUR",
          "value": 10
        },
        "taxCategory": "VAT",
        "taxRate": 20.0
      }
    ],
    "@type": "ProductOfferingPrice"
  }
```

Product Specification resource

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.

Resource model
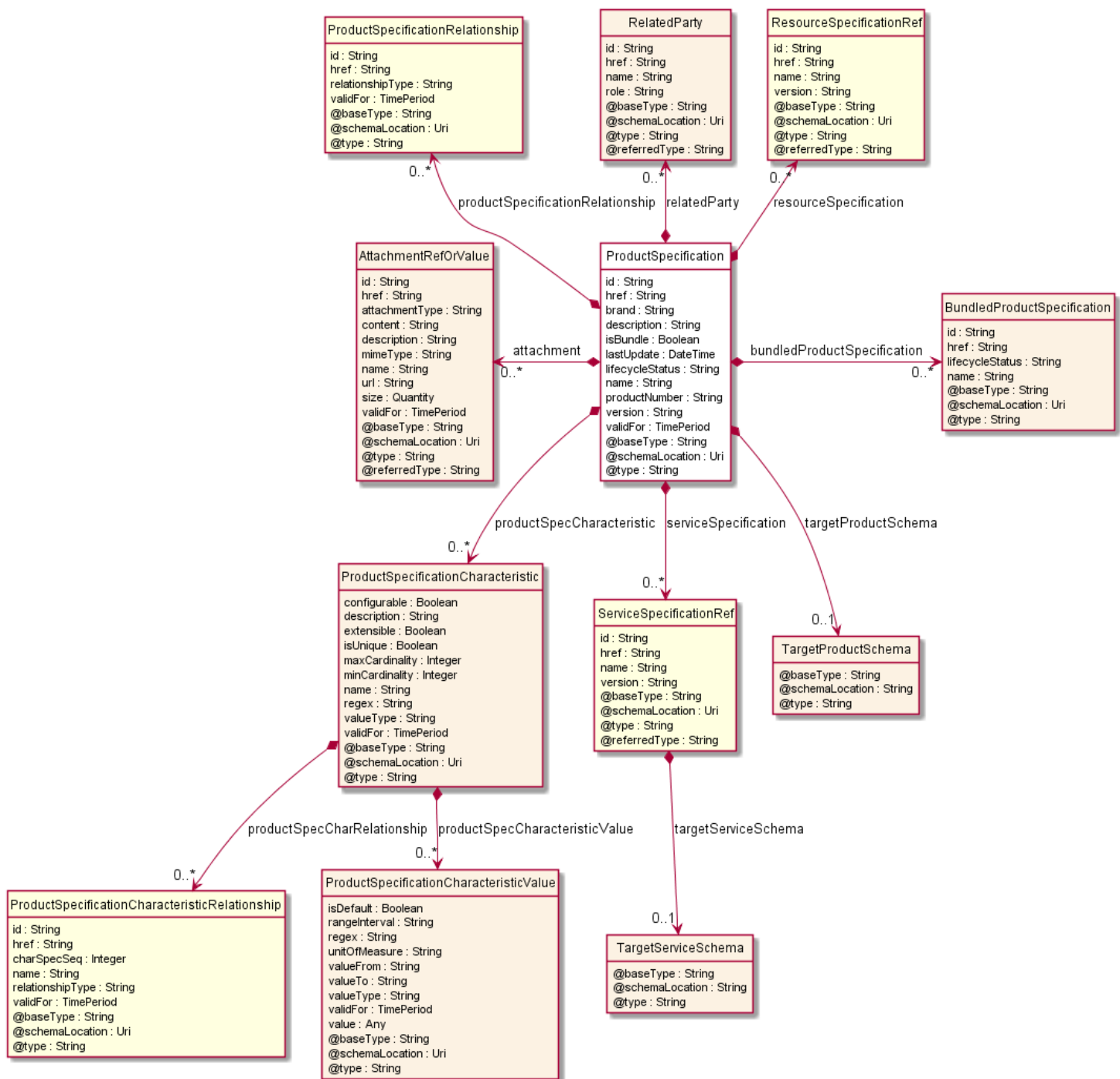
Field descriptions

ProductSpecification fields

attachment
A list of attachment ref or values (AttachmentRefOrValue [*]). Complements the description of an element (for instance a product) through video, pictures...

brand
A string. The manufacturer or trademark of the specification.

bundledProductSpecification	A list of bundled product specifications (BundledProductSpecification [*]). A type of ProductSpecification that belongs to a grouping of ProductSpecifications made available to the market. It inherits of all attributes of ProductSpecification.
description	A string. A narrative that explains in detail what the product specification is.
href	A string. Reference of the product specification.
id	A string. Unique identifier of the product specification.
isBundle	A boolean. isBundle determines whether a productSpecification represents a single productSpecification (false), or a bundle of productSpecification (true).
lastUpdate	A date time (DateTime). Date and time of the last update.
lifecycleStatus	A string. Used to indicate the current lifecycle status.
name	A string. Name of the product specification.
productNumber	A string. An identification number assigned to uniquely identity the specification.
productSpecCharacteristic	A list of product specification characteristics (ProductSpecificationCharacteristic [*]). A characteristic quality or distinctive feature of a ProductSpecification. The characteristic can be take on a discrete value, such as color, can take on a range of values, (for example, sensitivity of 100-240 mV), or can be derived from a formula (for example, usage time (hrs) = 30 - talk time *3). Certain characteristics, such as color, may be configured during the ordering or some other process.
productSpecificationRelationship	A list of product specification relationships (ProductSpecificationRelationship [*]). A migration, substitution, dependency or exclusivity relationship between/among product specifications.
relatedParty	A list of related parties (RelatedParty [*]). A related party defines party or party role linked to a specific entity.
resourceSpecification	A list of resource specification references (ResourceSpecificationRef [*]). The ResourceSpecification is required to realize a ProductSpecification.
serviceSpecification	A list of service specification references (ServiceSpecificationRef [*]). ServiceSpecification(s) required to realize a ProductSpecification.
targetProductSchema	A target product schema (TargetProductSchema). A target product schema reference. The reference object to the schema and type of target product which is described by product specification.

| validFor | A time period. The period for which the product specification is valid. |
| version | A string. Product specification version. |

AttachmentRefOrValue sub-resource

An attachment by value or by reference. For AttachmentRefOrValue, the attribute type,schemaLocation and referredType are related to the contained entity and not to AttchmentRefOrValue itself.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
description	A string. A narrative text describing the content of the attachment.
href	A string. URI for this Attachment.
id	A string. Unique identifier for this particular attachment.
url	A string. Uniform Resource Locator, is a web page address (a subset of URI).
@referredType	A string. The actual type of the target instance when needed for disambiguation.
href	A string. URI for this Attachment.
id	A string. Unique identifier for this particular attachment.
name	A string. The name of the attachment.
attachmentType	A string. Attachment type such as video, picture.
content	A string. The actual contents of the attachment object, if embedded, encoded as base64.
description	A string. A narrative text describing the content of the attachment.
href	A string. URI for this Attachment.
id	A string. Unique identifier for this particular attachment.
mimeType	A string. Attachment mime type such as extension file for video, picture and document.
name	A string. The name of the attachment.
url	A string. Uniform Resource Locator, is a web page address (a subset of URI).
size	A quantity (Quantity). The size of the attachment.
validFor	A time period. The period of time for which the attachment is valid.

BundledProductSpecification sub-resource

A type of ProductSpecification that belongs to a grouping of ProductSpecifications made available to the market. It inherits of all attributes of ProductSpecification.

href	A string. Reference of the product specification.
id	A string. Unique identifier of the product specification.
lifecycleStatus	A string. Used to indicate the current lifecycle status.
name	A string. Name of the product specification.

ProductSpecificationCharacteristic sub-resource

A characteristic quality or distinctive feature of a ProductSpecification. The characteristic can be take on a discrete value, such as color, can take on a range of values, (for example, sensitivity of 100-240 mV), or can be derived from a formula (for example, usage time (hrs) = 30 - talk time *3). Certain characteristics, such as color, may be configured during the ordering or some other process.

configurable	A boolean. If true, the Boolean indicates that the ProductSpecificationCharacteristic is configurable.
description	A string. A narrative that explains in detail what the ProductSpecificationCharacteristic is.
extensible	A boolean. An indicator that specifies that the values for the characteristic can be extended by adding new values when instantiating a characteristic for a product.
isUnique	A boolean. An indicator that specifies if a value is unique for the specification. Possible values are; "unique while value is in effect" and "unique whether value is in effect or not".
maxCardinality	An integer. The maximum number of instances a CharacteristicValue can take on. For example, zero to five phone numbers in a group calling plan, where five is the value for the maxCardinality.
minCardinality	An integer. The minimum number of instances a CharacteristicValue can take on. For example, zero to five phone numbers in a group calling plan, where zero is the value for the minCardinality.
name	A string. Name of the ProductSpecificationCharacteristic.
productSpecCharRelationship	A list of product specification characteristic relationships (ProductSpecificationCharacteristicRelationship [*]). An aggregation, migration, substitution, dependency or exclusivity relationship between/among Specification Characteristics.
productSpecCharacteristicValue	A list of product specification characteristic values (ProductSpecificationCharacteristicValue [*]). A

	ProductSpecificationCharacteristicValue object is used to define a set of attributes, each of which can be assigned to a corresponding set of attributes in a ProductSpecificationCharacteristic object. The values of the attributes in the ProductSpecificationCharacteristicValue object describe the values of the attributes that a corresponding ProductSpecificationCharacteristic object can take on.
regex	A string. A rule or principle represented in regular expression used to derive the value of a characteristic value.
validFor	A time period. The period for which the ProductSpecificationCharacteristic is valid.
valueType	A string. A kind of value that the characteristic can take on, such as numeric, text and so forth.

ProductSpecificationCharacteristicRelationship sub-resource

An aggregation, migration, substitution, dependency or exclusivity relationship between/among productSpecificationCharacteristics.

charSpecSeq	An integer. The order in which a CharacteristicSpecification appears within another CharacteristicSpecification that defines a grouping of CharacteristicSpecifications. For example, a grouping may represent the name of an individual. The given name is first, the middle name is second, and the last name is third.
href	A string. Hyperlink reference to the target product specification.
id	A string. the identifier of the associated product specification.
name	A string. Name of the target product specification characteristic.
relationshipType	A string. Type of relationship such as aggregation, migration, substitution, dependency, exclusivity.
validFor	A time period. The period for which the productSpecificationCharacteristicRelationship is valid.

ProductSpecificationCharacteristicValue sub-resource

A ProductSpecificationCharacteristicValue object is used to define a set of attributes, each of which can be assigned to a corresponding set of attributes in a ProductSpecificationCharacteristic object. The values of the attributes in the ProductSpecificationCharacteristicValue object describe the values of the attributes that a corresponding ProductSpecificationCharacteristic object can take on.

isDefault	A boolean. Indicates if the value is the default value for a characteristic.

rangeInterval	A string. An indicator that specifies the inclusion or exclusion of the valueFrom and valueTo attributes. If applicable, possible values are "open", "closed", "closedBottom" and "closedTop".
regex	A string. Regular expression to define constraint on the allowed value.
unitOfMeasure	A string. A length, surface, volume, dry measure, liquid measure, money, weight, time, and the like. In general, a determinate quantity or magnitude of the kind designated, taken as a standard of comparison for others of the same kind, in assigning to them numerical values, as 1 foot, 1 yard, 1 mile, 1 square foot.
validFor	A time period. The period of time for which a value is applicable.
value	An any (Any). A discrete value that the characteristic can take on, or the actual value of the characteristic.
valueFrom	A string. The low range value that a characteristic can take on.
valueTo	A string. The upper range value that a characteristic can take on.
valueType	A string. A kind of value that the characteristic can take on, such as numeric, text, and so forth.

ProductSpecificationRelationship sub-resource

A migration, substitution, dependency or exclusivity relationship between/among product specifications.

href	A string. Reference of the productSpecification.
id	A string. Unique identifier of the productSpecification.
relationshipType	A string. Type of relationship such as migration, substitution, dependency, exclusivity.
validFor	A time period. The period for which the productSpecificationRelationship is valid.

Quantity sub-resource

An amount in a given unit.

amount	A float. Numeric value in a given unit.
units	A string. Unit.

RelatedParty sub-resource

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

@referredType	A string. The actual type of the target instance when needed for disambiguation.
href	A string. Reference of the related entity.

id	A string. Unique identifier of a related entity.
name	A string. Name of the related entity.
@referredType	A string. The actual type of the target instance when needed for disambiguation.
role	A string. Role played by the related party.

TargetProductSchema sub-resource

The reference object to the schema and type of target product which is described by product specification.

@schemaLocation	A string. This field provides a link to the schema describing the target product.
@type	A string. Class type of the target product.

TargetServiceSchema sub-resource

The reference object to the schema and type of target service which is described by service specification.

@schemaLocation	A string. This field provides a link to the schema describing the target service.
@type	A string. Class type of the target service.

ResourceSpecificationRef relationship

Resource Specification reference: The ResourceSpecification is required to realize a ProductSpecification.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
href	A string. Reference of the resource specification.
id	A string. Unique identifier of the resource specification.
name	A string. Name of the requiredResourceSpecification.
version	A string. Resource specification version.

ServiceSpecificationRef relationship

Service specification reference: ServiceSpecification(s) required to realize a ProductSpecification.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
href	A string. Reference of the serviceSpecification.
id	A string. Unique identifier of the service specification.
name	A string. Name of the requiredServiceSpecification.

targetServiceSchema   A target service schema (TargetServiceSchema). A target service schema reference (TargetServiceSchemaRef). The reference object to the schema and type of target service which is described by service specification.

version   A string. Service specification version.

Json representation sample

We provide below the json representation of an example of a 'ProductSpecification' resource object

```
{
    "id": "7655",
    "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/7655",
    "name": "Cisco Firepower NGFW",
    "brand": "Cisco",
    "productNumber": "CSC-340-NGFW",
    "description": "Powerful product that integrates with a firewall, including intrusion prevention, advanced malware
protection, cloud-based sandboxing, URL filtering, endpoint protection, web gateway, email security, network traffic
analysis, network access control and CASB.",
    "isBundle": true,
    "lastUpdate": "2017-04-19T16:42:23.0Z",
    "lifecycleStatus": "Active",
    "validFor": {
        "startDateTime": "2017-06-19T00:00:00.0Z",
        "endDateTime": "2018-04-19T16:42:23.0Z"
    },
    "version": "2.1",
    "relatedParty": [
        {
            "id": "1234",
            "href": "https://mycsp.com:8080/tmf-api/partyManagement/v4/partyRole/1234",
            "role": "Owner",
            "name": "Gustave Flaubert",
            "validFor": {
                "startDateTime": "2017-03-19T16:42:23-04:00"
            }
        }
    ],
    "attachment": [
        {
            "name": "Product Picture",
            "mimeType": "image/jpeg",
            "url": "https://mycsp.com:7070/docloader?docnum=774451234"
        },
        {
            "name": "Product Manual",
            "mimeType": "application/pdf",
            "url": "https://mycsp.com:7070/docloader?docnum=774454321"
        }
    ],
    "bundledProductSpecification": [
        {
            "id": "15",
            "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/15",
            "name": "URL Filter"
```

```
      },
      {
        "id": "64",
        "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/64",
        "name": "Malware Protector"
      }
    ],
    "targetProductSchema": {
      "@type": "Firewall",
      "@schemaLocation": "https://mycsp.com:8080/tmf-api/schema/Product/Firewall.schema.json"
    },
    "productSpecificationRelationship": [
      {
        "id": "23",
        "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/23",
        "relationshipType": "Dependency",
        "validFor": {
          "startDateTime": "2017-04-19T16:42:23.0Z"
        }
      }
    ],
    "serviceSpecification": [
      {
        "id": "22",
        "href": "https://mycsp.com:8080/tmf-api/serviceCatalogManagement/v4/serviceSpecification/22",
        "name": "Firewall",
        "version": "1.0"
      }
    ],
    "resourceSpecification": [
      {
        "id": "63",
        "href": "https://mycsp.com:8080/tmf-api/resourceCatalogManagement/v4/resourceSpecification/63",
        "name": "Firewall Port",
        "version": "1.0"
      }
    ],
    "productSpecCharacteristic": [
      {
        "name": "Number of Ports",
        "description": "The total Number of Ports for this product",
        "valueType": "number",
        "configurable": true,
        "minCardinality": 1,
        "maxCardinality": 1,
        "isUnique": true,
        "productSpecCharRelationship": [
          {
            "id": "43",
            "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/43",
            "relationshipType": "Dependency",
            "name": "Bandwidth",
            "validFor": {
              "startDateTime": "2017-04-19T16:42:23-04:00"
            }
          }
```

```
            ],
            "productSpecCharacteristicValue": [
                {
                    "isDefault": true,
                    "valueType": "number",
                    "validFor": {
                        "startDateTime": "2017-06-16T00:00",
                        "endDateTime": "2018-01-13T00:00"
                    },
                    "value": 8
                },
                {
                    "isDefault": false,
                    "valueType": "number",
                    "validFor": {
                        "startDateTime": "2017-06-16T00:00",
                        "endDateTime": "2018-01-13T00:00"
                    },
                    "value": 16
                },
                {
                    "isDefault": false,
                    "valueType": "number",
                    "validFor": {
                        "startDateTime": "2017-06-16T00:00",
                        "endDateTime": "2018-01-13T00:00"
                    },
                    "value": 24
                }
            ],
            "validFor": {
                "startDateTime": "2017-04-19T16:42:23.0Z"
            }
        },
        {
            "name": "Color",
            "description": "Color of the Firewall housing",
            "valueType": "string",
            "configurable": true,
            "minCardinality": 1,
            "maxCardinality": 1,
            "extensible": true,
            "isUnique": true,
            "productSpecCharacteristicValue": [
                {
                    "isDefault": true,
                    "valueType": " string",
                    "value": "Black"
                },
                {
                    "isDefault": false,
                    "valueType": " string",
                    "value": "White"
                }
            ],
            "validFor": {
```

```
      "startDateTime": "2017-04-19T16:42:23.0Z"
    }
  }
 ],
 "@type": "ProductSpecification"
}
```

Import Job resource

Represents a task used to import resources from a file.

Resource model
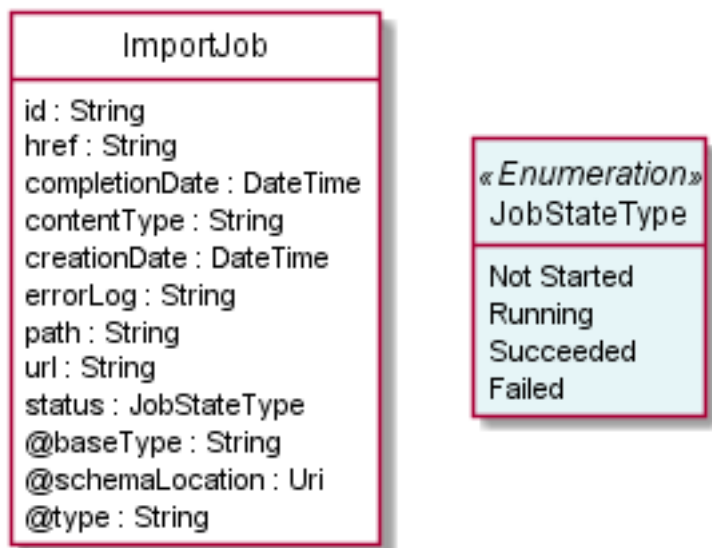
Field descriptions

ImportJob fields

completionDate	A date time (DateTime). Date at which the job was completed.
contentType	A string. Indicates the format of the imported data.
creationDate	A date time (DateTime). Date at which the job was created.
errorLog	A string. Reason for failure if status is failed.
href	A string. Reference of the import job.
id	A string. Identifier of the import job.
path	A string. URL of the root resource where the content of the file specified by the import job must be applied.
status	A job state type (JobStateType). Status of the import job (not started, running, succeeded, failed).

| url | A string. URL of the file containing the data to be imported. |

Json representation sample

We provide below the json representation of an example of a 'ImportJob' resource object

```
{
    "id": "2341",
    "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/importJob/2341",
    "contentType": "application/json",
    "creationDate": "2018-08-27T00:00",
    "completionDate": "2018-08-27T00:05",
    "path": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/Catalog/3830",
    "status": "running",
    "url": "https://my-platform/daily/job/NHCFD6",
    "errorLog": "http://my-platform/logging/errors.log",
    "@type": "ImportJob"
}
```

Export Job resource

Represents a task used to export resources to a file.

Resource model
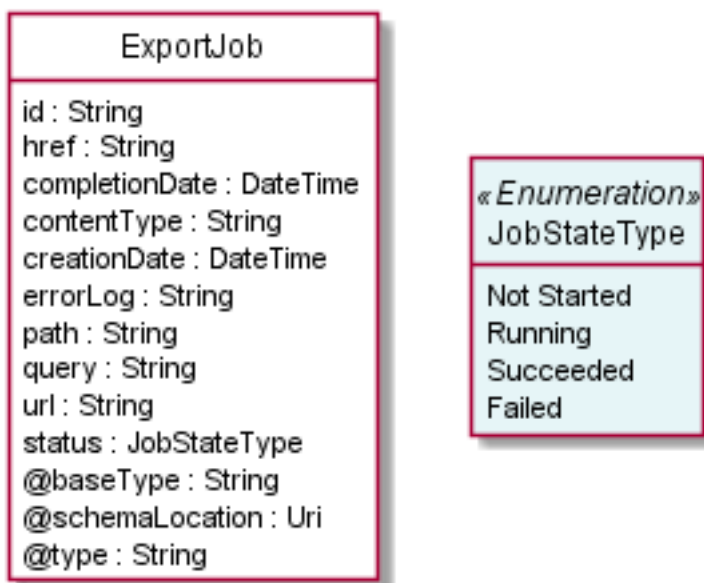
Field descriptions

ExportJob fields

completionDate	A date time (DateTime). Data at which the job was completed.
contentType	A string. The format of the exported data.
creationDate	A date time (DateTime). Date at which the job was created.

errorLog	A string. Reason for failure.
href	A string. Reference of the export job.
id	A string. Identifier of the export job.
path	A string. URL of the root resource acting as the source for streaming content to the file specified by the export job.
query	A string. Used to scope the exported data.
status	A job state type (JobStateType). Status of the export job (not started, running, succeeded, failed).
url	A string. URL of the file containing the data to be exported.

Json representation sample

We provide below the json representation of an example of a 'ExportJob' resource object

```
{
    "id": "5435",
    "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/exportJob/5435",
    "contentType": "application/json",
    "creationDate": "2018-08-27T00:00",
    "path": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/Catalog/3830",
    "query": "category.id=7757",
    "status": "running",
    "url": "https://my-platform/daily/job/EHCFD6",
    "errorLog": "http://my-platform/logging/errors.log",
    "@type": "ExportJob"
}
```

Notification Resource Models

15 notifications are defined for this API

Notifications related to Catalog:
  - CatalogCreateEvent
  - CatalogDeleteEvent
  - CatalogBatchEvent

Notifications related to Category:
  - CategoryCreateEvent
  - CategoryDeleteEvent

Notifications related to ProductOffering:
  - ProductOfferingCreateEvent
  - ProductOfferingAttributeValueChangeEvent

- ProductOfferingStateChangeEvent
- ProductOfferingDeleteEvent

Notifications related to ProductOfferingPrice:
- ProductOfferingPriceCreateEvent
- ProductOfferingPriceAttributeValueChangeEvent
- ProductOfferingPriceStateChangeEvent
- ProductOfferingPriceDeleteEvent

Notifications related to ProductSpecification:
- ProductSpecificationCreateEvent
- ProductSpecificationDeleteEvent

The notification structure for all notifications in this API follow the pattern depicted by the figure below.
A notification event resource (depicted by "SpecificEvent" placeholder) is a sub class of a generic Event structure containing at least an id of the event occurrence (eventId), an event timestamp (eventTime), and the name of the resource (eventType).
This notification structure owns an event payload structure ("SpecificEventPayload" placeholder) linked to the resource concerned by the notification using the resource name as access field ("resourceName" placeholder).
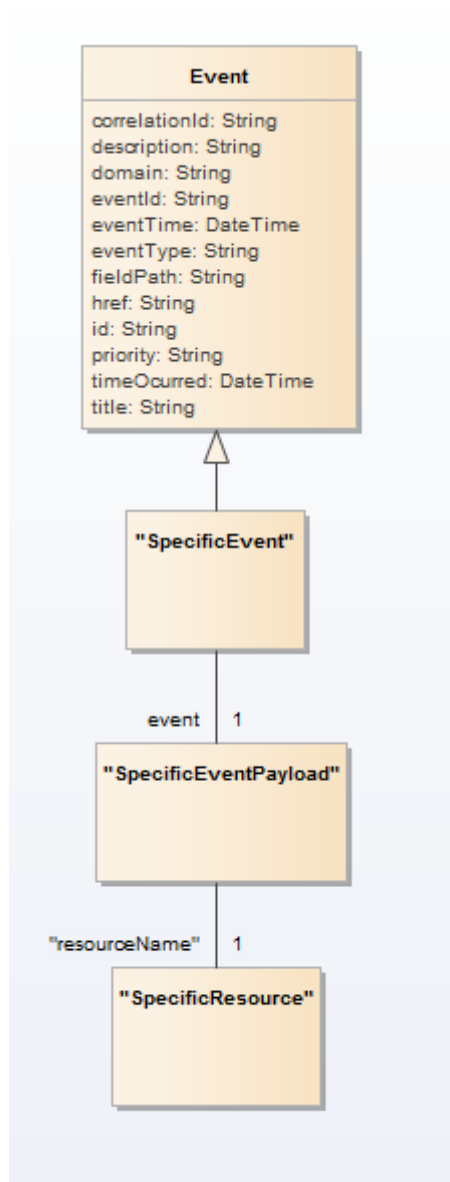
Catalog Create Event

Notification CatalogCreateEvent case for resource Catalog

Json representation sample

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

```
{
   "eventId":"00001",
   "eventTime":"2015-11-16T16:42:25-04:00",
   "eventType":"CatalogCreateEvent",
    "event": {
      "catalog" :
         {-- SEE Catalog RESOURCE SAMPLE --}
   }
}
```

Catalog Delete Event

Notification CatalogDeleteEvent case for resource Catalog

Json representation sample

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

```
{
    "eventId":"00001",
    "eventTime":"2015-11-16T16:42:25-04:00",
    "eventType":"CatalogDeleteEvent",
    "event": {
        "catalog" :
            {-- SEE Catalog RESOURCE SAMPLE --}
    }
}
```

Catalog Batch Event

Notification CatalogBatchEvent case for resource Catalog

Json representation sample

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

```
{
    "eventId":"00001",
    "eventTime":"2015-11-16T16:42:25-04:00",
    "eventType":"CatalogBatchEvent",
    "event": {
        "catalog" :
            {-- SEE Catalog RESOURCE SAMPLE --}
    }
}
```

Category Create Event

Notification CategoryCreateEvent case for resource Category

Json representation sample

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

```
{
    "eventId":"00001",
    "eventTime":"2015-11-16T16:42:25-04:00",
    "eventType":"CategoryCreateEvent",
    "event": {
        "category" :
            {-- SEE Category RESOURCE SAMPLE --}
    }
```

```
    }
```

Category Delete Event

Notification CategoryDeleteEvent case for resource Category

Json representation sample

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

```
{
    "eventId":"00001",
    "eventTime":"2015-11-16T16:42:25-04:00",
    "eventType":"CategoryDeleteEvent",
    "event": {
      "category" :
          {-- SEE Category RESOURCE SAMPLE --}
    }
}
```

Product Offering Create Event

Notification ProductOfferingCreateEvent case for resource ProductOffering

Json representation sample

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

```
{
    "eventId":"00001",
    "eventTime":"2015-11-16T16:42:25-04:00",
    "eventType":"ProductOfferingCreateEvent",
    "event": {
      "productOffering" :
          {-- SEE ProductOffering RESOURCE SAMPLE --}
    }
}
```

Product Offering Attribute Value Change Event

Notification ProductOfferingAttributeValueChangeEvent case for resource ProductOffering

Json representation sample

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

```
{
    "eventId":"00001",
```

```
   "eventTime":"2015-11-16T16:42:25-04:00",
   "eventType":"ProductOfferingAttributeValueChangeEvent",
    "event": {
      "productOffering" :
          {-- SEE ProductOffering RESOURCE SAMPLE --}
    }
}
```

Product Offering State Change Event

Notification ProductOfferingStateChangeEvent case for resource ProductOffering

Json representation sample

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

```
{
   "eventId":"00001",
   "eventTime":"2015-11-16T16:42:25-04:00",
   "eventType":"ProductOfferingStateChangeEvent",
    "event": {
      "productOffering" :
          {-- SEE ProductOffering RESOURCE SAMPLE --}
    }
}
```

Product Offering Delete Event

Notification ProductOfferingDeleteEvent case for resource ProductOffering

Json representation sample

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

```
{
   "eventId":"00001",
   "eventTime":"2015-11-16T16:42:25-04:00",
   "eventType":"ProductOfferingDeleteEvent",
    "event": {
      "productOffering" :
          {-- SEE ProductOffering RESOURCE SAMPLE --}
    }
}
```

Product Offering Price Create Event

Notification ProductOfferingPriceCreateEvent case for resource ProductOfferingPrice

Json representation sample

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

```
{
   "eventId":"00001",
   "eventTime":"2015-11-16T16:42:25-04:00",
   "eventType":"ProductOfferingPriceCreateEvent",
    "event": {
      "productOfferingPrice" :
         {-- SEE ProductOfferingPrice RESOURCE SAMPLE --}
   }
}
```

Product Offering Price Attribute Value Change Event

Notification ProductOfferingPriceAttributeValueChangeEvent case for resource ProductOfferingPrice

Json representation sample

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

```
{
   "eventId":"00001",
   "eventTime":"2015-11-16T16:42:25-04:00",
   "eventType":"ProductOfferingPriceAttributeValueChangeEvent",
    "event": {
      "productOfferingPrice" :
         {-- SEE ProductOfferingPrice RESOURCE SAMPLE --}
   }
}
```

Product Offering Price State Change Event

Notification ProductOfferingPriceStateChangeEvent case for resource ProductOfferingPrice

Json representation sample

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

```
{
   "eventId":"00001",
   "eventTime":"2015-11-16T16:42:25-04:00",
   "eventType":"ProductOfferingPriceStateChangeEvent",
    "event": {
      "productOfferingPrice" :
         {-- SEE ProductOfferingPrice RESOURCE SAMPLE --}
   }
```

```
    }
```

Product Offering Price Delete Event

Notification ProductOfferingPriceDeleteEvent case for resource ProductOfferingPrice

Json representation sample

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

```
{
    "eventId":"00001",
    "eventTime":"2015-11-16T16:42:25-04:00",
    "eventType":"ProductOfferingPriceDeleteEvent",
     "event": {
       "productOfferingPrice" :
          {-- SEE ProductOfferingPrice RESOURCE SAMPLE --}
    }
}
```

Product Specification Create Event

Notification ProductSpecificationCreateEvent case for resource ProductSpecification

Json representation sample

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

```
{
    "eventId":"00001",
    "eventTime":"2015-11-16T16:42:25-04:00",
    "eventType":"ProductSpecificationCreateEvent",
     "event": {
       "productSpecification" :
          {-- SEE ProductSpecification RESOURCE SAMPLE --}
    }
}
```

Product Specification Delete Event

Notification ProductSpecificationDeleteEvent case for resource ProductSpecification

Json representation sample

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

```
{
   "eventId":"00001",
   "eventTime":"2015-11-16T16:42:25-04:00",
   "eventType":"ProductSpecificationDeleteEvent",
    "event": {
      "productSpecification" :
         {-- SEE ProductSpecification 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
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 Part 1 document.

Notifications are also described in a subsequent section.

OPERATIONS ON CATALOG

List catalogs

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

Description

This operation list catalog entities.

Attribute selection is enabled for all first level attributes.

Filtering may be available depending on the compliance level supported by an implementation.

Usage Samples

Here's an example of a request for retrieving multiple catalogs.

Request
GET {apiRoot}/catalog?category.id=7757 Accept: application/json
Response

200
 	
[
  {
    "id": "2355",
    "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/Catalog/2355",
    "name": "IoT Product Catalog",
    "description": "This catalog describes Product Offerings and technical specifications intended to address the IoT products.",
    "catalogType": "ProductCatalog",
    "version": "1.0",
    "validFor": {
      "startDateTime": "2017-08-29T00:00",
      "endDateTime": "2018-03-25T00:00"
    },
    "lastUpdate": "2017-08-27T00:00",
    "lifecycleStatus": "Active",
    "relatedParty": [
      {
        "href": "https://mycsp.com:8080/tmf-api/partyManagement/v4/organization/3426",
        "id": "3426",
        "name": "Broadly Broad Ltd",
        "role": "vendor"
      },
      {
        "href": "https://mycsp.com:8080/tmf-api/partyManagement/v4/individual/115566",
        "id": "115566",
        "name": "Roger Collins",
        "role": "Reviser"
      }
    ],
    "category": [
      {
        "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/category/7757",

```
        "id": "7757",
        "name": "business"
      }
    ],
    "@type": "Catalog"
  },
  {
    "id": "3830",
    "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/Catalog/3830",
    "name": "Catalog Wholesale Business",
    "description": "This catalog describes Product Offerings and technical specifications intended to address the
wholesale business segment.",
    "catalogType": "ProductCatalog",
    "version": "1.0",
    "validFor": {
      "startDateTime": "2017-08-29T00:00",
      "endDateTime": "2018-03-25T00:00"
    },
    "lastUpdate": "2017-08-27T00:00",
    "lifecycleStatus": "Active",
    "relatedParty": [
      {
        "href": "https://mycsp.com:8080/tmf-api/partyManagement/v4/organization/3426",
        "id": "3426",
        "name": "Broadly Broad Ltd",
        "role": "vendor"
      },
      {
        "href": "https://mycsp.com:8080/tmf-api/partyManagement/v4/individual/115566",
        "id": "115566",
        "name": "Roger Collins",
        "role": "Reviser"
      }
    ],
    "category": [
      {
        "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/category/7757",
        "id": "7757",
        "name": "business"
      }
    ],
    "@type": "Catalog"
  }
]
```

Retrieve catalog

```
GET /catalog/{id}?fields=...&{filtering}
```

Description

This operation retrieves a catalog 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

Here's an example of a request for retrieving a specific catalog.

Request
GET {apiRoot}/catalog/3830 Accept: application/json

Response

200
 	
``
{
  "id": "3830",
  "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/Catalog/3830",
  "name": "Catalog Wholesale Business",
  "description": "This catalog describes Product Offerings and technical specifications intended to address the wholesale business segment.",
  "catalogType": "ProductCatalog",
  "version": "1.0",
  "validFor": {
    "startDateTime": "2017-08-29T00:00",
    "endDateTime": "2018-03-25T00:00"
  },
  "lastUpdate": "2017-08-27T00:00",
  "lifecycleStatus": "Active",
  "relatedParty": [
    {
      "href": "https://mycsp.com:8080/tmf-api/partyManagement/v4/organization/3426",
      "id": "3426",
      "name": "Broadly Broad Ltd",
      "role": "vendor"
    },
    {
      "href": "https://mycsp.com:8080/tmf-api/partyManagement/v4/individual/115566",
      "id": "115566",
      "name": "Roger Collins",
      "role": "Reviser"
    }
  ],
  "category": [
    {
      "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/category/7757",
      "id": "7757",
``

```
        "name": "business"
      }
   ],
   "@type": "Catalog"
}
```

Create catalog

POST /catalog

Description

This operation creates a catalog entity.

Mandatory and Non Mandatory Attributes

The following tables provide the list of mandatory and non mandatory attributes when creating a Catalog, 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
name	

Non Mandatory Attributes	Rule
catalogType	
category	
description	
lastUpdate	
lifecycleStatus	
relatedParty	
validFor	endDateTime (if present) should be later than startDateTime (if present)
version	Default is **1.0**

Usage Samples

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

Request

POST {apiRoot}/catalog
Content-Type: application/json

{
    "name": "Catalog Wholesale Business",
    "description": "This catalog describes Product Offerings and technical specifications intended to address the wholesale business segment.",

---

```
    "@type": "Catalog"
}
```

Response

```
201

{
   "id": "2355",
   "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/Catalog/2355",
   "name": "Catalog Wholesale Business",
   "description": "This catalog describes Product Offerings and technical specifications intended to address the wholesale
business segment.",
   "lastUpdate": "2017-08-27T00:00",
   "lifecycleStatus": "Tentative",
   "@type": "Catalog"
}
```

Patch catalog

PATCH /catalog/{id}

Description

This operation allows partial updates of a catalog 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
catalogType	
category	
description	
lifecycleStatus	Should match a list of valid values
name	
relatedParty	
validFor	endDateTime (if present) should be later than startDateTime (if present)
version	Should not be semantically "less" than the current version

Non Patchable Attributes	Rule
id	
href	
lastUpdate	

Usage Samples

Here's an example of a request for patching a catalog. In this example, a new version is set, together with validity period.

Request

```
PATCH {apiRoot}/catalog/3830
Content-Type: application/merge-patch+json

{
   "version": "2.0",
   "validFor": {
      "startDateTime": "2018-03-25T00:00",
      "endDateTime": "2018-09-25T00:00"
   },
   "@type": "Catalog"
}
```

Response

```
200

{
   "id": "3830",
   "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/Catalog/3830",
   "name": "Catalog Wholesale Business",
   "description": "This catalog describes Product Offerings and technical specifications intended to address the wholesale business segment.",
   "catalogType": "ProductCatalog",
   "version": "2.0",
   "validFor": {
      "startDateTime": "2018-03-25T00:00",
      "endDateTime": "2018-09-25T00:00"
   },
   "lastUpdate": "2017-08-27T00:00",
   "lifecycleStatus": "Active",
   "relatedParty": [
      {
         "href": "https://mycsp.com:8080/tmf-api/partyManagement/v4/organization/3426",
         "id": "3426",
         "name": "Broadly Broad Ltd",
         "role": "vendor"
      },
      {
```

```
        "href": "https://mycsp.com:8080/tmf-api/partyManagement/v4/individual/115566",
        "id": "115566",
        "name": "Roger Collins",
        "role": "Reviser"
      }
  ],
  "category": [
    {
        "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/category/7757",
        "id": "7757",
        "name": "business"
      }
  ],
  "@type": "Catalog"
}
```

Delete catalog

DELETE /catalog/{id}

Description

This operation deletes a catalog entity.

Usage Samples

Here's an example of a request for deleting a catalog.

Request
DELETE {apiRoot}/catalog/3830
Response
204

OPERATIONS ON CATEGORY

List categories

GET /category?fields=...&{filtering}

Description

This operation list category entities.

Attribute selection is enabled for all first level attributes.

Filtering may be available depending on the compliance level supported by an implementation.

Usage Samples

Here's an example of a request for retrieving multiple categories.

Request
GET {apiRoot}/category Accept: application/json
Response

200
 	
[
  {
    "id": "1708",
    "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/Category/1708",
    "name": "Cloud Services",
    "description": "A category to hold all available cloud service offers",
    "version": "1.0",
    "validFor": {
      "startDateTime": "2017-08-24T00:00",
      "endDateTime": "2018-03-25T00:00"
    },
    "lifecycleStatus": "Active",
    "isRoot": true,
    "lastUpdate": "2017-08-27T00:00",
    "subCategory": [
      {
        "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/category/6086",
        "id": "6086",
        "name": "Cloud Storage",
        "version": "1.0"
      },
      {
        "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/category/6087",
        "id": "6087",
        "name": "Software as a Service",
        "version": "1.0"
      }
    ],
    "productOffering": [
      {
        "id": "7655",
        "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productOffering/7655",

```
            "name": "Hosted Basic Firewall for business"
        }
    ],
    "@type": "Category"
},
{
    "id": "3435",
    "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/Category/3435",
    "name": "Business Services",
    "description": "A category to hold all available Business service offers",
    "version": "1.0",
    "validFor": {
        "startDateTime": "2017-08-24T00:00",
        "endDateTime": "2018-03-25T00:00"
    },
    "lifecycleStatus": "Active",
    "isRoot": true,
    "lastUpdate": "2017-08-27T00:00",
    "subCategory": [
        {
            "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/category/3466",
            "id": "6086",
            "name": "Managed Services",
            "version": "1.0"
        },
        {
            "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/category/3467",
            "id": "3467",
            "name": "Mobile for Corporates",
            "version": "1.0"
        }
    ],
    "productOffering": [
        {
            "id": "7655",
            "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productOffering/7655",
            "name": "Hosted Basic Firewall for business"
        }
    ],
    "@type": "Category"
}
]
```

Retrieve category

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

Description

This operation retrieves a category 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

Here's an example of a request for retrieving a specific category.

Request
GET {apiRoot}/category/1708 Accept: application/json

Response

```
200

{
    "id": "1708",
    "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/ProductCategory/1708",
    "name": "Cloud Services",
    "description": "A category to hold all available cloud service offers",
    "version": "1.0",
    "validFor": {
        "startDateTime": "2017-08-24T00:00",
        "endDateTime": "2018-03-25T00:00"
    },
    "lifecycleStatus": "Active",
    "lastUpdate": "2017-08-27T00:00",
    "subCategory": [
        {
            "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/category/6086",
            "id": "6086",
            "name": "Cloud Storage",
            "version": "1.0"
        },
        {
            "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/category/6087",
            "id": "6087",
            "name": "Software as a Service",
            "version": "1.0"
        }
    ],
    "productOffering": [
        {
            "id": "7655",
            "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productOffering/7655",
            "name": "Hosted Basic Firewall for business"
        }
    ],
    "@type": "Category"
}
```

Create category

POST /category

Description

This operation creates a category entity.

Mandatory and Non Mandatory Attributes

The following tables provide the list of mandatory and non mandatory attributes when creating a Category, 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
name	

Non Mandatory Attributes	Rule
description	
isRoot	Default is **true**
lastUpdate	
lifecycleStatus	
parentId	If isRoot is **false**, parentId is mandatory
productOffering	
subCategory	
validFor	endDateTime (if present) should be later than startDateTime (if present)
version	Default is **1.0**

Usage Samples

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

Request

POST {apiRoot}/category
Content-Type: application/json
 	
{
   "name": "Cloud Services",
   "description": "A category to hold all available cloud service offers",
   "@type": "Category"
}

Response

```
201

{
    "id": "1708",
    "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/Category/1708",
    "name": "Cloud Services",
    "description": "A category to hold all available cloud service offers",
    "version": "1.0",
    "lastUpdate": "2017-08-27T00:00",
    "@type": "Category"
}
```

Patch category

PATCH /category/{id}

Description

This operation allows partial updates of a category 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
description	
isRoot	
lifecycleStatus	Should match a list of valid values
name	
parentId	To be updated in compliance with the parentId. When isRoot is patched to false, parentId should indicate the parent category. When isRoot is patched to true, parentId should be empty.
productOffering	
subCategory	
validFor	endDateTime (if present) should be later than startDateTime (if present)
version	Should not be semantically "less" than the current version

Non Patchable Attributes	Rule
id	
href	
lastUpdate	

Usage Samples

Here's an example of a request for patching a category. In this example, a new version is set, together with validity period.

Request

PATCH {apiRoot}/category/1708
Content-Type: application/merge-patch+json
 	
{
   "version": "2.0",
   "validFor": {
      "startDateTime": "2018-03-25T00:00",
      "endDateTime": "2018-09-25T00:00"
   },
   "@type": "Category"
}

Response

200
 	
{
  "id": "1708",
  "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/Category/1708",
  "name": "Cloud Services",
  "description": "A category to hold all available cloud service offers",
  "version": "2.0",
  "validFor": {
    "startDateTime": "2018-03-25T00:00",
    "endDateTime": "2018-09-25T00:00"
  },
  "lifecycleStatus": "Active",
  "isRoot": true,
  "lastUpdate": "2017-08-27T00:00",
  "subCategory": [
    {
      "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/category/6086",
      "id": "6086",
      "name": "Cloud Storage",
      "version": "1.0"
    },
    {
      "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/category/6087",
      "id": "6087",
      "name": "Software as a Service",
      "version": "1.0"
    }

```
    ],
    "productOffering": [
      {
        "id": "7655",
        "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productOffering/7655",
        "name": "Basic Firewall for business"
      }
    ],
    "@type": "Category"
}
```

Delete category

DELETE /category/{id}

Description

This operation deletes a category entity.

Usage Samples

Here's an example of a request for deleting a category.

Request
DELETE {apiRoot}/category/1708

Response
204

OPERATIONS ON PRODUCT OFFERING

List product offerings

GET /productOffering?fields=...&{filtering}

Description

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

Usage Samples

Here's an example of a request for retrieving multiple offerings.

Request
GET {apiRoot}/productOffering?version=2.1 Accept: application/json

Response
| 200<br><br>```json
[
  {
    "id": "7655",
    "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productOffering/7655",
    "name": "Basic Firewall for Business",
    "description": "This product offering suggests a firewall service that can be deployed in business customer premise.",
    "version": "1.0",
    "validFor": {
      "startDateTime": "2017-08-23T00:00",
      "endDateTime": "2018-03-25T00:00"
    },
    "lastUpdate": "2017-08-27T00:00",
    "lifecycleStatus": "Active",
    "isBundle": false,
    "isSellable": true,
    "statusReason": "Released for sale",
    "place": [
      {
        "id": "9979",
        "href": "https://mycsp.com:8080/tmf-api/geographicAddressManagement/v4/geographicAddress/9979",
        "name": "San Francisco Bay Area",
        "@referredType": "GeographicAddress"
      }
    ],
    "serviceLevelAgreement": {
      "id": "8082",
      "href": "https://mycsp.com:8080/tmf-api/slaManagement/v4/sla/8082",
      "name": "Gold SLA for Business",
      "@referredType": "BusinessSLA"
    },
    "productSpecification": {
      "id": "9881",
      "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/9881",
      "version": "1.1",
      "name": "Robotics999",
      "@referredType": "DeviceSpecification"
    },
``` |

```
    "channel": [
      {
        "id": "4406",
        "href": "https://mycsp.com:8080/tmf-api/salesChannelManagement/v4/channel/4406",
        "name": "Online Channel"
      }
    ],
    "serviceCandidate": {
      "id": "8167",
      "href": "https://mycsp.com:8080/tmf-api/serviceCatalogManagement/v4/serviceCandidate/8167",
      "version": "1.1",
      "name": "Mega Max"
    },
    "category": [
      {
        "id": "2646",
        "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/category/2646",
        "version": "2.1",
        "name": "Cloud"
      }
    ],
    "resourceCandidate": {
      "id": "8937",
      "href": "https://mycsp.com:8080/tmf-api/resourceCatalogManagement/v4/resourceCandidate/8937",
      "name": "Mega Band"
    },
    "productOfferingTerm": [
      {
        "name": "New Client Condition",
        "description": "This product offering term is for new client at fix duration of less than a year",
        "duration": {
          "amount": 3,
          "units": "Month"
        },
        "validFor": {
          "startDateTime": "2017-06-15T00:00",
          "endDateTime": "2018-01-13T00:00"
        }
      }
    ],
    "productOfferingPrice": [
      {
        "id": "1747",
        "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productOfferingPrice/1747",
        "name": "Recurring Monthly Price for Business Firewall"
      }
    ],
    "attachment": [
      {
        "description": "This attachment gives a block diagram of the firewall.",
        "mimeType": "image/jpeg",
        "url": "https://mycsp.com:7070/docloader?docnum=3534536"
      }
    ],
    "marketSegment": [
```

```
          {
            "id": "1266",
            "href": "https://mycsp.com:8080/tmf-api/productOfferingReferences/v4/marketSegmentRef/1266",
            "name": "North Region"
          }
        ],
        "prodSpecCharValueUse": [
          {
            "name": "Number of Ports",
            "description": "The total Number of Ports for this product",
            "valueType": "number",
            "minCardinality": 1,
            "maxCardinality": 1,
            "validFor": {
              "startDateTime": "2017-06-17T00:00",
              "endDateTime": "2018-01-13T00:00"
            },
            "productSpecCharacteristicValue": [
              {
                "isDefault": true,
                "valueType": "number",
                "validFor": {
                  "startDateTime": "2017-06-16T00:00",
                  "endDateTime": "2018-01-13T00:00"
                },
                "value": 8
              },
              {
                "isDefault": false,
                "valueType": "number",
                "validFor": {
                  "startDateTime": "2017-06-16T00:00",
                  "endDateTime": "2018-01-13T00:00"
                },
                "value": 16
              }
            ],
            "productSpecification": {
              "id": "9881",
              "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/9881",
              "version": "1.1"
            }
          }
        ],
        "@type": "ProductOffering"
    },
    {
      "id": "4995",
      "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productOffering/4995",
      "name": "Enhanced Broadband for business",
      "description": "This product offering suggesting broadband with high speed bandwidth that can be deployed in business customer premise.",
      "version": "1.0",
      "validFor": {
        "startDateTime": "2017-08-23T00:00",
```

```
          "endDateTime": "2018-03-25T00:00"
      },
      "lastUpdate": "2017-08-27T00:00",
      "lifecycleStatus": "Active",
      "isBundle": false,
      "isSellable": true,
      "statusReason": "None",
      "place": [
          {
              "id": "9979",
              "href": "https://mycsp.com:8080/tmf-api/geographicAddressManagement/v4/geographicAddress/9979",
              "name": "San Francisco Bay Area",
              "@referredType": "GeographicAddress"
          }
      ],
      "serviceLevelAgreement": {
          "id": "8082",
          "href": "https://mycsp.com:8080/tmf-api/slaManagement/v4/sla/8082",
          "name": "Gold SLA for Business",
          "@referredType": "BusinessSLA"
      },
      "productSpecification": {
          "id": "9709",
          "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/9709",
          "version": "1.1",
          "name": "High Broadband TP-Link",
          "@referredType": "DeviceSpecification"
      },
      "channel": [
          {
              "id": "4406",
              "href": "https://mycsp.com:8080/tmf-api/salesChannelManagement/v4/channel/4406",
              "name": "Online Channel"
          }
      ],
      "serviceCandidate": {
          "id": "8169",
          "href": "https://mycsp.com:8080/tmf-api/serviceCatalogManagement/v4/serviceCandidate/8169",
          "version": "1.1",
          "name": "Broadband"
      },
      "category": [
          {
              "id": "2646",
              "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/category/2646",
              "version": "2.1",
              "name": "Cloud"
          }
      ],
      "resourceCandidate": {
          "id": "8939",
          "href": "https://mycsp.com:8080/tmf-api/resourceCatalogManagement/v4/resourceCandidate/8939",
          "name": "DSLAM"
      },
      "productOfferingTerm": [
```

```
            {
              "name": "New Client Condition",
              "description": "This product offering term is for new client at fix duration of less than a year",
              "duration": {
                "amount": 3,
                "units": "Month"
              },
              "validFor": {
                "startDateTime": "2017-06-15T00:00",
                "endDateTime": "2018-01-13T00:00"
              }
            }
          ],
          "productOfferingPrice": [
            {
              "id": "3311",
              "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productOfferingPrice/3311",
              "name": "Recurring Monthly Price for Business Broadband"
            }
          ],
          "attachment": [
            {
              "description": "This attachment gives an installation diagram of the customer premise equipment.",
              "mimeType": "image/jpeg",
              "url": "https://mycsp.com:7070/docloader?docnum=45693879"
            }
          ],
          "marketSegment": [
            {
              "id": "1266",
              "href": "https://mycsp.com:8080/tmf-api/productOfferingReferences/v4/marketSegmentRef/1266",
              "name": "North Region"
            }
          ],
          "prodSpecCharValueUse": [
            {
              "name": "Bandwidth",
              "description": "The total Number of Mbps for this product",
              "valueType": "number",
              "minCardinality": 1,
              "maxCardinality": 1,
              "validFor": {
                "startDateTime": "2017-06-17T00:00",
                "endDateTime": "2018-01-13T00:00"
              },
              "productSpecCharacteristicValue": [
                {
                  "isDefault": true,
                  "valueType": "number",
                  "validFor": {
                    "startDateTime": "2017-06-16T00:00",
                    "endDateTime": "2018-01-13T00:00"
                  },
                  "value": 1000
                },
```

```
                {
                  "isDefault": false,
                  "valueType": "number",
                  "validFor": {
                    "startDateTime": "2017-06-16T00:00",
                    "endDateTime": "2018-01-13T00:00"
                  },
                  "value": 2000
                }
              ],
              "productSpecification": {
                "id": "9709",
                "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/9709",
                "version": "1.1"
              }
            }
          ],
          "@type": "ProductOffering"
      }
]
```

Retrieve product offering

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

Description

This operation retrieves a product offering 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

Here's an example of a request for retrieving a specific offering.

Request
GET {apiRoot}/productOffering/7655 Accept: application/json
Response

200
 	
{
  "id": "7655",
  "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productOffering/7655",

```
    "name": "Basic Firewall for Business",
    "description": "This product offering suggests a firewall service that can be deployed in business customer premise.",
    "version": "1.0",
    "validFor": {
        "startDateTime": "2017-08-23T00:00",
        "endDateTime": "2018-03-25T00:00"
    },
    "lastUpdate": "2017-08-27T00:00",
    "lifecycleStatus": "Active",
    "isBundle": false,
    "isSellable": true,
    "statusReason": "Released for sale",
    "place": [
        {
            "id": "9979",
            "href": "https://mycsp.com:8080/tmf-api/geographicAddressManagement/v4/geographicAddress/9979",
            "name": "San Francisco Bay Area",
            "@referredType": "GeographicAddress"
        }
    ],
    "serviceLevelAgreement": {
        "id": "8082",
        "href": "https://mycsp.com:8080/tmf-api/slaManagement/v4/sla/8082",
        "name": "Gold SLA for Business",
        "@referredType": "BusinessSLA"
    },
    "productSpecification": {
        "id": "9881",
        "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/9881",
        "version": "1.1",
        "name": "Robotics999",
        "@referredType": "DeviceSpecification"
    },
    "channel": [
        {
            "id": "4406",
            "href": "https://mycsp.com:8080/tmf-api/salesChannelManagement/v4/channel/4406",
            "name": "Online Channel"
        }
    ],
    "serviceCandidate": {
        "id": "8167",
        "href": "https://mycsp.com:8080/tmf-api/serviceCatalogManagement/v4/serviceCandidate/8167",
        "version": "1.1",
        "name": "Mega Max"
    },
    "category": [
        {
            "id": "2646",
            "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/category/2646",
            "version": "2.1",
            "name": "Cloud"
        }
    ],
    "resourceCandidate": {
```

```
    "id": "8937",
    "href": "https://mycsp.com:8080/tmf-api/resourceCatalogManagement/v4/resourceCandidate/8937",
    "name": "Mega Band"
  },
  "productOfferingTerm": [
    {
      "name": "New Client Condition",
      "description": "This product offering term is for new client at fix duration of less than a year",
      "duration": {
        "amount": 3,
        "units": "Month"
      },
      "validFor": {
        "startDateTime": "2017-06-15T00:00",
        "endDateTime": "2018-01-13T00:00"
      }
    }
  ],
  "productOfferingPrice": [
    {
      "id": "1747",
      "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productOfferingPrice/1747",
      "name": "Recurring Monthly Price for Business Firewall"
    }
  ],
  "attachment": [
    {
      "description": "This attachment gives a block diagram of the firewall.",
      "mimeType": "image/jpeg",
      "url": "https://mycsp.com:7070/docloader?docnum=3534536"
    }
  ],
  "marketSegment": [
    {
      "id": "1266",
      "href": "https://mycsp.com:8080/tmf-api/productOfferingReferences/v4/marketSegmentRef/1266",
      "name": "North Region"
    }
  ],
  "prodSpecCharValueUse": [
    {
      "name": "Number of Ports",
      "description": "The total Number of Ports for this product",
      "valueType": "number",
      "minCardinality": 1,
      "maxCardinality": 1,
      "validFor": {
        "startDateTime": "2017-06-17T00:00",
        "endDateTime": "2018-01-13T00:00"
      },
      "productSpecCharacteristicValue": [
        {
          "isDefault": true,
          "valueType": "number",
          "validFor": {
```

```
                    "startDateTime": "2017-06-16T00:00",
                    "endDateTime": "2018-01-13T00:00"
                },
                "value": 8
            },
            {
                "isDefault": false,
                "valueType": "number",
                "validFor": {
                    "startDateTime": "2017-06-16T00:00",
                    "endDateTime": "2018-01-13T00:00"
                },
                "value": 16
            }
        ],
        "productSpecification": {
            "id": "9881",
            "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/9881",
            "version": "1.1"
        }
    }
    ],
    "@type": "ProductOffering"
}
```

Create product offering

POST /productOffering

Description

This operation creates a product offering entity.

Mandatory and Non Mandatory Attributes

The following tables provide the list of mandatory and non mandatory attributes when creating a ProductOffering, 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
name	

Non Mandatory Attributes	Rule
agreement	
attachment	
bundledProductOffering	Mandatory if isBundle is **true**
category	
channel	
description	
isBundle	default is **false**

isSellable	default is **true**
lastUpdate	
lifecycleStatus	
marketSegment	
place	
prodSpecCharValueUse	
productOfferingPrice	
productOfferingTerm	
productSpecification	Mandatory if isBundle is **false**
resourceCandidate	
serviceCandidate	
serviceLevelAgreement	
statusReason	
validFor	endDateTime (if present) should be later than startDateTime (if present)
version	Default is **1.0**

Usage Samples

Here's an example of a request for creating a specific offering. The request includes the product specification and the category.

Request

```
POST {apiRoot}/productOffering
Content-Type: application/json

{
  "name": "Basic Firewall for Business",
  "description": "This product offering suggests a firewall service that can be deployed in business customer premise.",
  "version": "1.0",
  "validFor": {
    "startDateTime": "2017-08-23T00:00",
    "endDateTime": "2018-03-25T00:00"
  },
  "isBundle": false,
  "isSellable": true,
  "statusReason": "Released for sale",
  "place": [
    {
      "id": "9979",
      "href": "https://mycsp.com:8080/tmf-api/geographicAddressManagement/v4/geographicAddress/9979",
      "name": "San Francisco Bay Area",
      "@referredType": "GeographicAddress"
    }
  ],
  "serviceLevelAgreement": {
    "id": "8082",
    "href": "https://mycsp.com:8080/tmf-api/slaManagement/v4/sla/8082",
    "name": "Gold SLA for Business",
```

```
        "@referredType": "BusinessSLA"
      },
      "productSpecification": {
        "id": "9881",
        "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/9881",
        "version": "1.1",
        "name": "Robotics999",
        "@referredType": "DeviceSpecification"
      },
      "channel": [
        {
          "id": "4406",
          "href": "https://mycsp.com:8080/tmf-api/salesChannelManagement/v4/channel/4406",
          "name": "Online Channel"
        }
      ],
      "serviceCandidate": {
        "id": "8167",
        "href": "https://mycsp.com:8080/tmf-api/serviceCatalogManagement/v4/serviceCandidate/8167",
        "version": "1.1",
        "name": "Mega Max"
      },
      "category": [
        {
          "id": "2646",
          "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/category/2646",
          "version": "2.1",
          "name": "Cloud"
        }
      ],
      "resourceCandidate": {
        "id": "8937",
        "href": "https://mycsp.com:8080/tmf-api/resourceCatalogManagement/v4/resourceCandidate/8937",
        "name": "Mega Band"
      },
      "productOfferingTerm": [
        {
          "name": "New Client Condition",
          "description": "This product offering term is for new client at fix duration of less than a year",
          "duration": {
            "amount": 3,
            "units": "Month"
          },
          "validFor": {
            "startDateTime": "2017-06-15T00:00",
            "endDateTime": "2018-01-13T00:00"
          }
        }
      ],
      "productOfferingPrice": [
        {
          "id": "1747",
          "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productOfferingPrice/1747",
          "name": "Recurring Monthly Price for Business Firewall"
        }
```

```
    ],
    "attachment": [
        {
            "description": "This attachment gives a block diagram of the firewall.",
            "mimeType": "image/jpeg",
            "url": "https://mycsp.com:7070/docloader?docnum=3534536"
        }
    ],
    "marketSegment": [
        {
            "id": "1266",
            "href": "https://mycsp.com:8080/tmf-api/productOfferingReferences/v4/marketSegmentRef/1266",
            "name": "North Region"
        }
    ],
    "prodSpecCharValueUse": [
        {
            "name": "Number of Ports",
            "description": "The total Number of Ports for this product",
            "valueType": "number",
            "minCardinality": 1,
            "maxCardinality": 1,
            "validFor": {
                "startDateTime": "2017-06-17T00:00",
                "endDateTime": "2018-01-13T00:00"
            },
            "productSpecCharacteristicValue": [
                {
                    "isDefault": true,
                    "valueType": "number",
                    "validFor": {
                        "startDateTime": "2017-06-16T00:00",
                        "endDateTime": "2018-01-13T00:00"
                    },
                    "value": 8
                },
                {
                    "isDefault": false,
                    "valueType": "number",
                    "validFor": {
                        "startDateTime": "2017-06-16T00:00",
                        "endDateTime": "2018-01-13T00:00"
                    },
                    "value": 16
                }
            ],
            "productSpecification": {
                "id": "9881",
                "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/9881",
                "version": "1.1"
            }
        }
    ],
    "@type": "ProductOffering"
}
```

Response

201

```
{
   "id": "7655",
   "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productOffering/7655",
   "name": "Basic Firewall for Business",
   "description": "This product offering suggests a firewall service that can be deployed in business customer premise.",
   "version": "1.0",
   "validFor": {
      "startDateTime": "2017-08-23T00:00",
      "endDateTime": "2018-03-25T00:00"
   },
   "lastUpdate": "2017-08-27T00:00",
   "lifecycleStatus": "Tentative",
   "isBundle": false,
   "isSellable": true,
   "statusReason": "Released for sale",
   "place": [
      {
         "id": "9979",
         "href": "https://mycsp.com:8080/tmf-api/geographicAddressManagement/v4/geographicAddress/9979",
         "name": "San Francisco Bay Area",
         "@referredType": "GeographicAddress"
      }
   ],
   "serviceLevelAgreement": {
      "id": "8082",
      "href": "https://mycsp.com:8080/tmf-api/slaManagement/v4/sla/8082",
      "name": "Gold SLA for Business",
      "@referredType": "BusinessSLA"
   },
   "productSpecification": {
      "id": "9881",
      "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/9881",
      "version": "1.1",
      "name": "Robotics999",
      "@referredType": "DeviceSpecification"
   },
   "channel": [
      {
         "id": "4406",
         "href": "https://mycsp.com:8080/tmf-api/salesChannelManagement/v4/channel/4406",
         "name": "Online Channel"
      }
   ],
   "serviceCandidate": {
      "id": "8167",
      "href": "https://mycsp.com:8080/tmf-api/serviceCatalogManagement/v4/serviceCandidate/8167",
      "version": "1.1",
      "name": "Mega Max"
```

```
    },
    "category": [
      {
        "id": "2646",
        "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/category/2646",
        "version": "2.1",
        "name": "Cloud"
      }
    ],
    "resourceCandidate": {
      "id": "8937",
      "href": "https://mycsp.com:8080/tmf-api/resourceCatalogManagement/v4/resourceCandidate/8937",
      "name": "Mega Band"
    },
    "productOfferingTerm": [
      {
        "name": "New Client Condition",
        "description": "This product offering term is for new client at fix duration of less than a year",
        "duration": {
          "amount": 3,
          "units": "Month"
        },
        "validFor": {
          "startDateTime": "2017-06-15T00:00",
          "endDateTime": "2018-01-13T00:00"
        }
      }
    ],
    "productOfferingPrice": [
      {
        "id": "1747",
        "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productOfferingPrice/1747",
        "name": "Recurring Monthly Price for Business Firewall"
      }
    ],
    "attachment": [
      {
        "description": "This attachment gives a block diagram of the firewall.",
        "mimeType": "image/jpeg",
        "url": "https://mycsp.com:7070/docloader?docnum=3534536"
      }
    ],
    "marketSegment": [
      {
        "id": "1266",
        "href": "https://mycsp.com:8080/tmf-api/productOfferingReferences/v4/marketSegmentRef/1266",
        "name": "North Region"
      }
    ],
    "prodSpecCharValueUse": [
      {
        "name": "Number of Ports",
        "description": "The total Number of Ports for this product",
        "valueType": "number",
        "minCardinality": 1,
```

```
            "maxCardinality": 1,
            "validFor": {
                "startDateTime": "2017-06-17T00:00",
                "endDateTime": "2018-01-13T00:00"
            },
            "productSpecCharacteristicValue": [
                {
                    "isDefault": true,
                    "valueType": "number",
                    "validFor": {
                        "startDateTime": "2017-06-16T00:00",
                        "endDateTime": "2018-01-13T00:00"
                    },
                    "value": 8
                },
                {
                    "isDefault": false,
                    "valueType": "number",
                    "validFor": {
                        "startDateTime": "2017-06-16T00:00",
                        "endDateTime": "2018-01-13T00:00"
                    },
                    "value": 16
                }
            ],
            "productSpecification": {
                "id": "9881",
                "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/9881",
                "version": "1.1"
            }
        }
    ],
    "@type": "ProductOffering"
}
```

Patch product offering

PATCH /productOffering/{id}

Description

This operation allows partial updates of a product offering 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
agreement	
attachment	
bundledProductOffering	mandatory if isBundle is **true**
category	
channel	
description	
isBundle	
isSellable	
lifecycleStatus	Should match a list of valid values
marketSegment	
name	
place	
prodSpecCharValueUse	
productOfferingPrice	
productOfferingTerm	
productSpecification	mandatory if isBundle is **false**
resourceCandidate	
serviceCandidate	
serviceLevelAgreement	
statusReason	
validFor	endDateTime (if present) should be later than startDateTime (if present)
version	Should not be semantically "less" than the current version

Non Patchable Attributes	Rule
id	
href	
lastUpdate	

Usage Samples

Here's an example of a request for patching an offering. In this example, a new version is set, together with validity period.

Request

```
PATCH {apiRoot}/productOffering/7655
Content-Type: application/merge-patch+json

{
   "version": "3.1",
   "validFor": {
      "startDateTime": "2018-03-23T00:00",
```

```
          "endDateTime": "2018-09-25T00:00"
    },
    "@type": "ProductOffering"
}
```

Response

200

```
{
    "id": "7655",
    "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productOffering/7655",
    "name": "Basic Firewall for Business",
    "description": "This product offering suggests a firewall service that can be deployed in business customer premise.",
    "version": "3.1",
    "validFor": {
        "startDateTime": "2018-03-23T00:00",
        "endDateTime": "2018-09-25T00:00"
    },
    "lastUpdate": "2017-08-27T00:00",
    "lifecycleStatus": "Active",
    "isBundle": false,
    "isSellable": true,
    "statusReason": "Released for sale",
    "place": [
        {
            "id": "9979",
            "href": "https://mycsp.com:8080/tmf-api/geographicAddressManagement/v4/geographicAddress/9979",
            "name": "San Francisco Bay Area",
            "@referredType": "GeographicAddress"
        }
    ],
    "serviceLevelAgreement": {
        "id": "8082",
        "href": "https://mycsp.com:8080/tmf-api/slaManagement/v4/sla/8082",
        "name": "Gold SLA for Business",
        "@referredType": "BusinessSLA"
    },
    "productSpecification": {
        "id": "9881",
        "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/9881",
        "version": "1.1",
        "name": "Robotics999",
        "@referredType": "DeviceSpecification"
    },
    "channel": [
        {
            "id": "4406",
            "href": "https://mycsp.com:8080/tmf-api/salesChannelManagement/v4/channel/4406",
            "name": "Online Channel"
        }
    ],
    "serviceCandidate": {
```

```
      "id": "8167",
      "href": "https://mycsp.com:8080/tmf-api/serviceCatalogManagement/v4/serviceCandidate/8167",
      "version": "1.1",
      "name": "Mega Max"
    },
    "category": [
      {
        "id": "2646",
        "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/category/2646",
        "version": "2.1",
        "name": "Cloud"
      }
    ],
    "resourceCandidate": {
      "id": "8937",
      "href": "https://mycsp.com:8080/tmf-api/resourceCatalogManagement/v4/resourceCandidate/8937",
      "name": "Mega Band"
    },
    "productOfferingTerm": [
      {
        "name": "New Client Condition",
        "description": "This product offering term is for new client at fix duration of less than a year",
        "duration": {
          "amount": 3,
          "units": "Month"
        },
        "validFor": {
          "startDateTime": "2017-06-15T00:00",
          "endDateTime": "2018-01-13T00:00"
        }
      }
    ],
    "productOfferingPrice": [
      {
        "id": "1747",
        "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productOfferingPrice/1747",
        "name": "Recurring Monthly Price for Business Firewall"
      }
    ],
    "attachment": [
      {
        "description": "This attachment gives a block diagram of the firewall.",
        "mimeType": "image/jpeg",
        "url": "https://mycsp.com:7070/docloader?docnum=3534536"
      }
    ],
    "marketSegment": [
      {
        "id": "1266",
        "href": "https://mycsp.com:8080/tmf-api/productOfferingReferences/v4/marketSegmentRef/1266",
        "name": "North Region"
      }
    ],
    "prodSpecCharValueUse": [
      {
```

```
        "name": "Number of Ports",
        "description": "The total Number of Ports for this product",
        "valueType": "number",
        "minCardinality": 1,
        "maxCardinality": 1,
        "validFor": {
          "startDateTime": "2017-06-17T00:00",
          "endDateTime": "2018-01-13T00:00"
        },
        "productSpecCharacteristicValue": [
          {
            "isDefault": true,
            "valueType": "number",
            "validFor": {
              "startDateTime": "2017-06-16T00:00",
              "endDateTime": "2018-01-13T00:00"
            },
            "value": 8
          },
          {
            "isDefault": false,
            "valueType": "number",
            "validFor": {
              "startDateTime": "2017-06-16T00:00",
              "endDateTime": "2018-01-13T00:00"
            },
            "value": 16
          }
        ],
        "productSpecification": {
          "id": "9881",
          "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/9881",
          "version": "1.1"
        }
      }
    ],
    "@type": "ProductOffering"
}
```

Delete product offering

DELETE /productOffering/{id}

Description

This operation deletes a product offering entity.

Usage Samples

Here's an example of a request for deleting an offering.

Request
DELETE {apiRoot}/productOffering/7655

Response
204

OPERATIONS ON PRODUCT OFFERING PRICE

List product offering prices

GET /productOfferingPrice?fields=...&{filtering}

Description

This operation list product offering price entities.

Attribute selection is enabled for all first level attributes.

Filtering may be available depending on the compliance level supported by an implementation.

Usage Samples

Here's an example of a request for retrieving multiple prices.

Request
GET {apiRoot}/productOfferingPrice?version=2.1 Accept: application/json

Response

200
 	
[
  {
    "id": "4998",
    "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productOfferingPrice/4998",
    "name": "Recurring Charge for business High Broadband",
    "description": "This pricing describes the recurring charge for broadband with high bandwidth that can be deployed in business customer premise.",
    "version": "1.0",
    "validFor": {

```
          "startDateTime": "2017-08-23T00:00",
          "endDateTime": "2018-03-25T00:00"
      },
      "priceType": "recurring",
      "recurringChargePeriodType": "monthly",
      "recurringChargePeriodLength": 1,
      "lastUpdate": "2017-08-27T00:00",
      "isBundle": false,
      "lifecycleStatus": "Active",
      "price": {
          "unit": "EUR",
          "amount": 50
      },
      "percentage": 0.0,
      "productOfferingTerm": [
          {
              "name": "12 Month",
              "description": "12 month contract",
              "duration": {
                  "amount": 12,
                  "units": "Month"
              },
              "validFor": {
                  "startDateTime": "2017-04-19T16:42:23.0Z",
                  "endDateTime": "2017-06-19T00:00:00.0Z"
              }
          }
      ],
      "place": [
          {
              "id": "9979",
              "href": "https://mycsp.com:8080/tmf-api/geographicAddressManagement/v4/geographicAddress/9979",
              "name": "San Francisco Bay Area",
              "@referredType": "GeographicAddress"
          }
      ],
      "constraint": [
          {
              "@referredType": "PriceConstraint",
              "name": "PriceRuleNo2",
              "id": "535",
              "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/constraint/535"
          }
      ],
      "pricingLogicAlgorithm": {
          "id": "533",
          "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/PricingLogicAlgorithm/533",
          "@type": "RecurringRatingPLA",
          "@baseType": "PricingLogicAlgorithm",
          "@schemaLocation": "https://mycsp.com:8080/tmf-api/schema/Product/RecurringRatingPLA.schema.json",
          "name": "PLA_rec",
          "description": "Algorithm that rates Recurring event",
          "plaSpecId": "525",
          "validFor": {
              "startDateTime": "2017-04-19T16:42:23.0Z",
```

```
            "endDateTime": "2018-06-19T00:00:00.0Z"
          }
        },
        "tax": [
          {
            "taxAmount": {
              "unit": "EUR",
              "value": 10
            },
            "taxCategory": "VAT",
            "taxRate": 20.0
          }
        ],
        "@type": "ProductOfferingPrice"
      },
      {
        "id": "7655",
        "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productOfferingPrice/7655",
        "name": "Recurring Charge for Business Firewall",
        "description": "This pricing describes the recurring charge for a firewall service that can be deployed in business
customer premise.",
        "version": "2.1",
        "validFor": {
          "startDateTime": "2017-08-23T00:00",
          "endDateTime": "2018-03-25T00:00"
        },
        "priceType": "recurring",
        "recurringChargePeriodType": "monthly",
        "recurringChargePeriodLength": 1,
        "lastUpdate": "2017-08-27T00:00",
        "isBundle": false,
        "lifecycleStatus": "Active",
        "price": {
          "unit": "EUR",
          "amount": 50
        },
        "percentage": 0.0,
        "productOfferingTerm": [
          {
            "name": "12 Month",
            "description": "12 month contract",
            "duration": {
              "amount": 12,
              "units": "Month"
            },
            "validFor": {
              "startDateTime": "2017-04-19T16:42:23.0Z",
              "endDateTime": "2017-06-19T00:00:00.0Z"
            }
          }
        ],
        "place": [
          {
            "id": "9979",
            "href": "https://mycsp.com:8080/tmf-api/geographicAddressManagement/v4/geographicAddress/9979",
```

```
        "name": "San Francisco Bay Area",
        "@referredType": "GeographicAddress"
      }
    ],
    "constraint": [
      {
        "@referredType": "PriceConstraint",
        "name": "PriceRuleNo1",
        "id": "525",
        "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/constraint/525"
      }
    ],
    "pricingLogicAlgorithm": {
      "id": "533",
      "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/PricingLogicAlgorithm/533",
      "@type": "RecurringRatingPLA",
      "@baseType": "PricingLogicAlgorithm",
      "@schemaLocation": "https://mycsp.com:8080/tmf-api/schema/Product/RecurringRatingPLA.schema.json",
      "name": "PLA_rec",
      "description": "Algorithm that rates Recurring event",
      "plaSpecId": "525",
      "validFor": {
        "startDateTime": "2017-04-19T16:42:23.0Z",
        "endDateTime": "2018-06-19T00:00:00.0Z"
      }
    },
    "tax": [
      {
        "taxAmount": {
          "unit": "EUR",
          "value": 10
        },
        "taxCategory": "VAT",
        "taxRate": 20.0
      }
    ],
    "@type": "ProductOfferingPrice"
  }
]
```

Retrieve product offering price

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

Description

This operation retrieves a product offering price 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

Here's an example of a request for retrieving a specific price.

Request
GET {apiRoot}/productOfferingPrice/4994 Accept: application/json

Response

200
 	
``
{
   "id": "7655",
   "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productOfferingPrice/7655",
   "name": "Recurring Charge for Business Firewall",
   "description": "This pricing describes the recurring charge for a firewall service that can be deployed in business customer premise.",
   "version": "2.1",
   "validFor": {
      "startDateTime": "2017-08-23T00:00",
      "endDateTime": "2018-03-25T00:00"
   },
   "priceType": "recurring",
   "recurringChargePeriodType": "monthly",
   "recurringChargePeriodLength": 1,
   "lastUpdate": "2017-08-27T00:00",
   "isBundle": false,
   "lifecycleStatus": "Active",
   "price": {
      "unit": "EUR",
      "amount": 50
   },
   "percentage": 0.0,
   "productOfferingTerm": [
      {
         "name": "12 Month",
         "description": "12 month contract",
         "duration": {
            "amount": 12,
            "units": "Month"
         },
         "validFor": {
            "startDateTime": "2017-04-19T16:42:23.0Z",
            "endDateTime": "2017-06-19T00:00:00.0Z"
         }
      }
   ],
   "place": [
      {
         "id": "9979",
         "href": "https://mycsp.com:8080/tmf-api/geographicAddressManagement/v4/geographicAddress/9979",
         "name": "San Francisco Bay Area",
``

```
            "@referredType": "GeographicAddress"
        }
    ],
    "constraint": [
        {
            "@referredType": "PriceConstraint",
            "name": "PriceRuleNo1",
            "id": "525",
            "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/constraint/525"
        }
    ],
    "pricingLogicAlgorithm": {
        "id": "533",
        "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/PricingLogicAlgorithm/533",
        "@type": "RecurringRatingPLA",
        "@baseType": "PricingLogicAlgorithm",
        "@schemaLocation": "https://mycsp.com:8080/tmf-api/schema/Product/RecurringRatingPLA.schema.json",
        "name": "PLA_rec",
        "description": "Algorithm that rates Recurring event",
        "plaSpecId": "525",
        "validFor": {
            "startDateTime": "2017-04-19T16:42:23.0Z",
            "endDateTime": "2018-06-19T00:00:00.0Z"
        }
    },
    "tax": [
        {
            "taxAmount": {
                "unit": "EUR",
                "value": 10
            },
            "taxCategory": "VAT",
            "taxRate": 20.0
        }
    ],
    "@type": "ProductOfferingPrice"
}
```

Create product offering price

POST /productOfferingPrice

Description

This operation creates a product offering price entity.

Mandatory and Non Mandatory Attributes

The following tables provide the list of mandatory and non mandatory attributes when creating a ProductOfferingPrice, 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

name	

Non Mandatory Attributes	Rule
@baseType	
@schemaLocation	
@type	
bundledPopRelationship	Mandatory if isBundle is **true**
constraint	
description	
isBundle	default is **false**
lastUpdate	
lifecycleStatus	
percentage	
place	
popRelationship	
price	
priceType	Mandatory if isBundle is **false**, in which case value should match a list of valid values
pricingLogicAlgorithm	
prodSpecCharValueUse	
productOfferingTerm	
recurringChargePeriodLength	
recurringChargePeriodType	
tax	
unitOfMeasure	
validFor	endDateTime (if present) should be later than startDateTime (if present)
version	Default is **1.0**

Usage Samples

Here's an example of a request for creating a specific price.

Request

```
POST {apiRoot}/productOfferingPrice
Content-Type: application/json

{
   "name": "Recurring Charge for Business Firewall",
   "description": "This pricing describes the recurring charge for a firewall service that can be deployed in business customer premise.",
   "version": "2.1",
   "validFor": {
      "startDateTime": "2017-08-23T00:00",
      "endDateTime": "2018-03-25T00:00"
   },
   "priceType": "recurring",
```

```
    "recurringChargePeriodType": "monthly",
    "recurringChargePeriodLength": 1,
    "isBundle": false,
    "price": {
      "unit": "EUR",
      "amount": 50
    },
    "percentage": 0.0,
    "productOfferingTerm": [
      {
        "name": "12 Month",
        "description": "12 month contract",
        "duration": {
          "amount": 12,
          "units": "Month"
        },
        "validFor": {
          "startDateTime": "2017-04-19T16:42:23.0Z",
          "endDateTime": "2017-06-19T00:00:00.0Z"
        }
      }
    ],
    "place": [
      {
        "id": "9979",
        "href": "https://mycsp.com:8080/tmf-api/geographicAddressManagement/v4/geographicAddress/9979",
        "name": "San Francisco Bay Area",
        "@referredType": "GeographicAddress"
      }
    ],
    "constraint": [
      {
        "@referredType": "PriceConstraint",
        "name": "PriceRuleNo1",
        "id": "525",
        "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/constraint/525"
      }
    ],
    "pricingLogicAlgorithm": {
      "id": "533",
      "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/PricingLogicAlgorithm/533",
      "@type": "RecurringRatingPLA",
      "@baseType": "PricingLogicAlgorithm",
      "@schemaLocation": "https://mycsp.com:8080/tmf-api/schema/Product/RecurringRatingPLA.schema.json",
      "name": "PLA_rec",
      "description": "Algorithm that rates Recurring event",
      "plaSpecId": "525",
      "validFor": {
        "startDateTime": "2017-04-19T16:42:23.0Z",
        "endDateTime": "2018-06-19T00:00:00.0Z"
      }
    },
    "tax": [
      {
        "taxAmount": {
```

```
            "unit": "EUR",
            "value": 10
        },
        "taxCategory": "VAT",
        "taxRate": 20.0
    }
  ],
  "@type": "ProductOfferingPrice"
}
```

Response

201

```
{
  "id": "7655",
  "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productOfferingPrice/7655",
  "name": "Recurring Charge for Business Firewall",
  "description": "This pricing describes the recurring charge for a firewall service that can be deployed in business customer premise.",
  "version": "2.1",
  "validFor": {
    "startDateTime": "2017-08-23T00:00",
    "endDateTime": "2018-03-25T00:00"
  },
  "priceType": "recurring",
  "recurringChargePeriodType": "monthly",
  "recurringChargePeriodLength": 1,
  "lastUpdate": "2017-08-27T00:00",
  "isBundle": false,
  "lifecycleStatus": "Tentative",
  "price": {
    "unit": "EUR",
    "amount": 50
  },
  "percentage": 0.0,
  "productOfferingTerm": [
    {
      "name": "12 Month",
      "description": "12 month contract",
      "duration": {
        "amount": 12,
        "units": "Month"
      },
      "validFor": {
        "startDateTime": "2017-04-19T16:42:23.0Z",
        "endDateTime": "2017-06-19T00:00:00.0Z"
      }
    }
  ],
  "place": [
    {
      "id": "9979",
```

```
          "href": "https://mycsp.com:8080/tmf-api/geographicAddressManagement/v4/geographicAddress/9979",
          "name": "San Francisco Bay Area",
          "@referredType": "GeographicAddress"
        }
      ],
      "constraint": [
        {
          "@referredType": "PriceConstraint",
          "name": "PriceRuleNo1",
          "id": "525",
          "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/constraint/525"
        }
      ],
      "pricingLogicAlgorithm": {
        "id": "533",
        "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/PricingLogicAlgorithm/533",
        "@type": "RecurringRatingPLA",
        "@baseType": "PricingLogicAlgorithm",
        "@schemaLocation": "https://mycsp.com:8080/tmf-api/schema/Product/RecurringRatingPLA.schema.json",
        "name": "PLA_rec",
        "description": "Algorithm that rates Recurring event",
        "plaSpecId": "525",
        "validFor": {
          "startDateTime": "2017-04-19T16:42:23.0Z",
          "endDateTime": "2018-06-19T00:00:00.0Z"
        }
      },
      "tax": [
        {
          "taxAmount": {
            "unit": "EUR",
            "value": 10
          },
          "taxCategory": "VAT",
          "taxRate": 20.0
        }
      ],
      "@type": "ProductOfferingPrice"
}
```

Patch product offering price

PATCH /productOfferingPrice/{id}

Description

This operation allows partial updates of a product offering price 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
@baseType	
@schemaLocation	
@type	
bundledPopRelationship	mandatory if isBundle is **true**
constraint	
description	
isBundle	
lifecycleStatus	Should match a list of valid values
name	
percentage	
place	
popRelationship	
price	
priceType	mandatory if isBundle is **false**, in which case value should match a list of valid values
pricingLogicAlgorithm	
prodSpecCharValueUse	
productOfferingTerm	
recurringChargePeriodLength	
recurringChargePeriodType	
tax	
unitOfMeasure	
validFor	endDateTime (if present) should be later than startDateTime (if present)
version	Should not be semantically "less" than the current version

Non Patchable Attributes	Rule
id	
href	
lastUpdate	

Usage Samples

Here's an example of a request for patching a price. In this example, a new version is set, together with validity period.

Request

```
PATCH {apiRoot}/productOfferingPrice/4994
Content-Type: application/merge-patch+json

{
   "version": "3.1",
   "validFor": {
      "startDateTime": "2018-03-23T00:00",
      "endDateTime": "2018-09-25T00:00"
   },
   "@type": "ProductOfferingPrice"
}
```

Response

```
200

{
   "id": "7655",
   "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productOfferingPrice/7655",
   "name": "Recurring Charge for Business Firewall",
   "description": "This pricing describes the recurring charge for a firewall service that can be deployed in business customer premise.",
   "version": "3.1",
   "validFor": {
      "startDateTime": "2018-03-23T00:00",
      "endDateTime": "2018-09-25T00:00"
   },
   "priceType": "recurring",
   "recurringChargePeriodType": "monthly",
   "recurringChargePeriodLength": 1,
   "lastUpdate": "2017-08-27T00:00",
   "isBundle": false,
   "lifecycleStatus": "Active",
   "price": {
      "unit": "EUR",
      "amount": 50
   },
   "percentage": 0.0,
   "productOfferingTerm": [
      {
         "name": "12 Month",
         "description": "12 month contract",
         "duration": {
            "amount": 12,
            "units": "Month"
         },
         "validFor": {
            "startDateTime": "2017-04-19T16:42:23.0Z",
            "endDateTime": "2017-06-19T00:00:00.0Z"
         }
      }
   ],
   "place": [
```

```
    {
      "id": "9979",
      "href": "https://mycsp.com:8080/tmf-api/geographicAddressManagement/v4/geographicAddress/9979",
      "name": "San Francisco Bay Area",
      "@referredType": "GeographicAddress"
    }
  ],
  "constraint": [
    {
      "@referredType": "PriceConstraint",
      "name": "PriceRuleNo1",
      "id": "525",
      "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/constraint/525"
    }
  ],
  "pricingLogicAlgorithm": {
    "id": "533",
    "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/PricingLogicAlgorithm/533",
    "@type": "RecurringRatingPLA",
    "@baseType": "PricingLogicAlgorithm",
    "@schemaLocation": "https://mycsp.com:8080/tmf-api/schema/Product/RecurringRatingPLA.schema.json",
    "name": "PLA_rec",
    "description": "Algorithm that rates Recurring event",
    "plaSpecId": "525",
    "validFor": {
      "startDateTime": "2017-04-19T16:42:23.0Z",
      "endDateTime": "2018-06-19T00:00:00.0Z"
    }
  },
  "tax": [
    {
      "taxAmount": {
        "unit": "EUR",
        "value": 10
      },
      "taxCategory": "VAT",
      "taxRate": 20.0
    }
  ],
  "@type": "ProductOfferingPrice"
}
```

Delete product offering price

DELETE /productOfferingPrice/{id}

Description

This operation deletes a product offering price entity.

Usage Samples

Here's an example of a request for deleting a price.

Request
DELETE {apiRoot}/productOfferingPrice/4994
Response
204

OPERATIONS ON PRODUCT SPECIFICATION

List product specifications

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

Description

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

Usage Samples

Here's an example of a request for retrieving multiple product specifications.

Request
GET {apiRoot}/productSpecification?relatedParty.id=1234 Accept: application/json
Response

200
 	
[
  {
    "id": "7655",
    "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/7655",
    "name": "Cisco Firepower NGFW",
    "brand": "Cisco",
    "productNumber": "CSC-340-NGFW",

```
    "description": "Powerful product that integrates with a firewall, including intrusion prevention, advanced malware
protection, cloud-based sandboxing, URL filtering, endpoint protection, web gateway, email security, network traffic
analysis, network access control and CASB.",
    "isBundle": true,
    "lastUpdate": "2017-04-19T16:42:23.0Z",
    "lifecycleStatus": "Active",
    "validFor": {
      "startDateTime": "2017-06-19T00:00:00.0Z",
      "endDateTime": "2018-04-19T16:42:23.0Z"
    },
    "version": "2.1",
    "relatedParty": [
      {
        "id": "1234",
        "href": "https://mycsp.com:8080/tmf-api/partyManagement/v4/partyRole/1234",
        "role": "Owner",
        "name": "Gustave Flaubert",
        "validFor": {
          "startDateTime": "2017-03-19T16:42:23-04:00"
        }
      }
    ],
    "attachment": [
      {
        "name": "Product Picture",
        "mimeType": "image/jpeg",
        "url": "https://mycsp.com:7070/docloader?docnum=774451234"
      },
      {
        "name": "Product Manual",
        "mimeType": "application/pdf",
        "url": "https://mycsp.com:7070/docloader?docnum=774454321"
      }
    ],
    "bundledProductSpecification": [
      {
        "id": "15",
        "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/15",
        "name": "URL Filter"
      },
      {
        "id": "64",
        "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/64",
        "name": "Malware Protector"
      }
    ],
    "targetProductSchema": {
      "@type": "Firewall",
      "@schemaLocation": "https://mycsp.com:8080/tmf-api/schema/Product/Firewall.schema.json"
    },
    "productSpecificationRelationship": [
      {
        "id": "23",
        "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/23",
        "relationshipType": "Dependency",
```

```
            "validFor": {
                "startDateTime": "2017-04-19T16:42:23.0Z"
            }
        }
    ],
    "serviceSpecification": [
        {
            "id": "22",
            "href": "https://mycsp.com:8080/tmf-api/serviceCatalogManagement/v4/serviceSpecification/22",
            "name": "Firewall",
            "version": "1.0"
        }
    ],
    "resourceSpecification": [
        {
            "id": "63",
            "href": "https://mycsp.com:8080/tmf-api/resourceCatalogManagement/v4/resourceSpecification/63",
            "name": "Firewall Port",
            "version": "1.0"
        }
    ],
    "productSpecCharacteristic": [
        {
            "name": "Number of Ports",
            "description": "The total Number of Ports for this product",
            "valueType": "number",
            "configurable": true,
            "minCardinality": 1,
            "maxCardinality": 1,
            "isUnique": true,
            "productSpecCharRelationship": [
                {
                    "id": "43",
                    "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/43",
                    "relationshipType": "Dependency",
                    "name": "Bandwidth",
                    "validFor": {
                        "startDateTime": "2017-04-19T16:42:23-04:00"
                    }
                }
            ],
            "productSpecCharacteristicValue": [
                {
                    "isDefault": true,
                    "valueType": "number",
                    "validFor": {
                        "startDateTime": "2017-06-16T00:00",
                        "endDateTime": "2018-01-13T00:00"
                    },
                    "value": 8
                },
                {
                    "isDefault": false,
                    "valueType": "number",
                    "validFor": {
```

```
                        "startDateTime": "2017-06-16T00:00",
                        "endDateTime": "2018-01-13T00:00"
                    },
                    "value": 16
                },
                {
                    "isDefault": false,
                    "valueType": "number",
                    "validFor": {
                        "startDateTime": "2017-06-16T00:00",
                        "endDateTime": "2018-01-13T00:00"
                    },
                    "value": 24
                }
            ],
            "validFor": {
                "startDateTime": "2017-04-19T16:42:23.0Z"
            }
        },
        {
            "name": "Color",
            "description": "Color of the Firewall housing",
            "valueType": "string",
            "configurable": true,
            "minCardinality": 1,
            "maxCardinality": 1,
            "extensible": true,
            "isUnique": true,
            "productSpecCharacteristicValue": [
                {
                    "isDefault": true,
                    "valueType": "string",
                    "value": "Black"
                },
                {
                    "isDefault": false,
                    "valueType": "string",
                    "value": "White"
                }
            ],
            "validFor": {
                "startDateTime": "2017-04-19T16:42:23.0Z"
            }
        }
    ],
    "@type": "ProductSpecification"
},
{
    "id": "5563",
    "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/5563",
    "name": "Deep Packet Inspection",
    "brand": "HPE",
    "productNumber": "HPE-367-DPI",
    "description": "This product specification describes a Deep Packet Inspection product that can be deployed in
customer premise.",
```

```json
      "isBundle": true,
      "lastUpdate": "2017-08-27T00:00",
      "lifecycleStatus": "In Design",
      "validFor": {
         "startDateTime": "2017-08-23T00:00",
         "endDateTime": "2018-03-25T00:00"
      },
      "version": "1.0",
      "relatedParty": [
         {
            "id": "1234",
            "href": "https://mycsp.com:8080/tmf-api/partyManagement/v4/partyRole/1234",
            "role": "Owner",
            "name": "Gustave Flaubert",
            "validFor": {
               "startDateTime": "2017-03-19T16:42:23-04:00"
            }
         }
      ],
      "attachment": [
         {
            "name": "Product Picture",
            "mimeType": "image/jpeg",
            "url": "https://mycsp.com:7070/docloader?docnum=774455534"
         },
         {
            "name": "Product Manual",
            "mimeType": "application/pdf",
            "url": "https://mycsp.com:7070/docloader?docnum=774467734"
         }
      ],
      "targetProductSchema": {
         "@type": "DPI",
         "@schemaLocation": "https://mycsp.com:8080/tmf-api/schema/Product/DPI.schema.json"
      },
      "serviceSpecification": [
         {
            "id": "55",
            "href": "https://mycsp.com:8080/tmf-api/serviceCatalogManagement/v4/serviceSpecification/55",
            "name": "DPI Service",
            "version": "1.0"
         }
      ],
      "@type": "ProductSpecification"
   }
]
```

Retrieve product specification

```
GET /productSpecification/{id}?fields=...&{filtering}
```

Description

This operation retrieves a product specification 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

Here's an example of a request for retrieving a specific specification.

Request
GET {apiRoot}/productSpecification/7655 Accept: application/json
Response

200
 	
{
  "id": "7655",
  "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/7655",
  "name": "Cisco Firepower NGFW",
  "brand": "Cisco",
  "productNumber": "CSC-340-NGFW",
  "description": "Powerful product that integrates with a firewall, including intrusion prevention, advanced malware protection, cloud-based sandboxing, URL filtering, endpoint protection, web gateway, email security, network traffic analysis, network access control and CASB.",
  "isBundle": true,
  "lastUpdate": "2017-04-19T16:42:23.0Z",
  "lifecycleStatus": "Active",
  "validFor": {
    "startDateTime": "2017-06-19T00:00:00.0Z",
    "endDateTime": "2018-04-19T16:42:23.0Z"
  },
  "version": "2.1",
  "relatedParty": [
    {
      "id": "1234",
      "href": "https://mycsp.com:8080/tmf-api/partyManagement/v4/partyRole/1234",
      "role": "Owner",
      "name": "Gustave Flaubert",
      "validFor": {
        "startDateTime": "2017-03-19T16:42:23-04:00"
      }
    }
  ],
  "attachment": [
    {
      "name": "Product Picture",
      "mimeType": "image/jpeg",

```
            "url": "https://mycsp.com:7070/docloader?docnum=774451234"
        },
        {
            "name": "Product Manual",
            "mimeType": "application/pdf",
            "url": "https://mycsp.com:7070/docloader?docnum=774454321"
        }
    ],
    "bundledProductSpecification": [
        {
            "id": "15",
            "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/15",
            "name": "URL Filter"
        },
        {
            "id": "64",
            "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/64",
            "name": "Malware Protector"
        }
    ],
    "targetProductSchema": {
        "@type": "Firewall",
        "@schemaLocation": "https://mycsp.com:8080/tmf-api/schema/Product/Firewall.schema.json"
    },
    "productSpecificationRelationship": [
        {
            "id": "23",
            "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/23",
            "relationshipType": "Dependency",
            "validFor": {
                "startDateTime": "2017-04-19T16:42:23.0Z"
            }
        }
    ],
    "serviceSpecification": [
        {
            "id": "22",
            "href": "https://mycsp.com:8080/tmf-api/serviceCatalogManagement/v4/serviceSpecification/22",
            "name": "Firewall",
            "version": "1.0"
        }
    ],
    "resourceSpecification": [
        {
            "id": "63",
            "href": "https://mycsp.com:8080/tmf-api/resourceCatalogManagement/v4/resourceSpecification/63",
            "name": "Firewall Port",
            "version": "1.0"
        }
    ],
    "productSpecCharacteristic": [
        {
            "name": "Number of Ports",
            "description": "The total Number of Ports for this product",
            "valueType": "number",
```

```
              "configurable": true,
              "minCardinality": 1,
              "maxCardinality": 1,
              "isUnique": true,
              "productSpecCharRelationship": [
                {
                  "id": "43",
                  "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/43",
                  "relationshipType": "Dependency",
                  "name": "Bandwidth",
                  "validFor": {
                    "startDateTime": "2017-04-19T16:42:23-04:00"
                  }
                }
              ],
              "productSpecCharacteristicValue": [
                {
                  "isDefault": true,
                  "valueType": "number",
                  "validFor": {
                    "startDateTime": "2017-06-16T00:00",
                    "endDateTime": "2018-01-13T00:00"
                  },
                  "value": 8
                },
                {
                  "isDefault": false,
                  "valueType": "number",
                  "validFor": {
                    "startDateTime": "2017-06-16T00:00",
                    "endDateTime": "2018-01-13T00:00"
                  },
                  "value": 16
                },
                {
                  "isDefault": false,
                  "valueType": "number",
                  "validFor": {
                    "startDateTime": "2017-06-16T00:00",
                    "endDateTime": "2018-01-13T00:00"
                  },
                  "value": 24
                }
              ],
              "validFor": {
                "startDateTime": "2017-04-19T16:42:23.0Z"
              }
            },
            {
              "name": "Color",
              "description": "Color of the Firewall housing",
              "valueType": "string",
              "configurable": true,
              "minCardinality": 1,
              "maxCardinality": 1,
```

```
        "extensible": true,
        "isUnique": true,
        "productSpecCharacteristicValue": [
          {
            "isDefault": true,
            "valueType": "string",
            "value": "Black"
          },
          {
            "isDefault": false,
            "valueType": "string",
            "value": "White"
          }
        ],
        "validFor": {
          "startDateTime": "2017-04-19T16:42:23.0Z"
        }
      }
    ],
    "@type": "ProductSpecification"
}
```

Create product specification

POST /productSpecification

Description

This operation creates a product specification entity.

Mandatory and Non Mandatory Attributes

The following tables provide the list of mandatory and non mandatory attributes when creating a ProductSpecification, 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
name	

Non Mandatory Attributes	Rule
attachment	
brand	
bundledProductSpecification	mandatory if isBundle is **true**
description	
isBundle	default is **false**
lastUpdate	
lifecycleStatus	
productNumber	
productSpecCharacteristic	
productSpecificationRelationship	

relatedParty	
resourceSpecification	
serviceSpecification	
targetProductSchema	
validFor	endDateTime (if present) should be later than startDateTime (if present)
version	Default is **1.0**

Usage Samples

Here's an example of a request for creating a specification.

Request

```
POST {apiRoot}/productSpecification
Content-Type: application/json

{
   "name": "Cisco Firepower NGFW",
   "brand": "Cisco",
   "productNumber": "CSC-340-NGFW",
   "description": "Powerful product that integrates with a firewall, including intrusion prevention, advanced malware
protection, cloud-based sandboxing, URL filtering, endpoint protection, web gateway, email security, network traffic
analysis, network access control and CASB.",
   "isBundle": true,
   "validFor": {
      "startDateTime": "2017-06-19T00:00:00.0Z",
      "endDateTime": "2018-04-19T16:42:23.0Z"
   },
   "version": "2.1",
   "relatedParty": [
      {
         "id": "1234",
         "href": "https://mycsp.com:8080/tmf-api/partyManagement/v4/partyRole/1234",
         "role": "Owner",
         "name": "Gustave Flaubert",
         "validFor": {
            "startDateTime": "2017-03-19T16:42:23-04:00"
         }
      }
   ],
   "attachment": [
      {
         "name": "Product Picture",
         "mimeType": "image/jpeg",
         "url": "https://mycsp.com:7070/docloader?docnum=774451234"
      },
      {
         "name": "Product Manual",
         "mimeType": "application/pdf",
         "url": "https://mycsp.com:7070/docloader?docnum=774454321"
      }
```

```json
        ],
        "bundledProductSpecification": [
            {
                "id": "15",
                "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/15",
                "name": "URL Filter"
            },
            {
                "id": "64",
                "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/64",
                "name": "Malware Protector"
            }
        ],
        "targetProductSchema": {
            "@type": "Firewall",
            "@schemaLocation": "https://mycsp.com:8080/tmf-api/schema/Product/Firewall.schema.json"
        },
        "productSpecificationRelationship": [
            {
                "id": "23",
                "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/23",
                "relationshipType": "Dependency",
                "validFor": {
                    "startDateTime": "2017-04-19T16:42:23.0Z"
                }
            }
        ],
        "serviceSpecification": [
            {
                "id": "22",
                "href": "https://mycsp.com:8080/tmf-api/serviceCatalogManagement/v4/serviceSpecification/22",
                "name": "Firewall",
                "version": "1.0"
            }
        ],
        "resourceSpecification": [
            {
                "id": "63",
                "href": "https://mycsp.com:8080/tmf-api/resourceCatalogManagement/v4/resourceSpecification/63",
                "name": "Firewall Port",
                "version": "1.0"
            }
        ],
        "productSpecCharacteristic": [
            {
                "name": "Number of Ports",
                "description": "The total Number of Ports for this product",
                "valueType": "number",
                "configurable": true,
                "minCardinality": 1,
                "maxCardinality": 1,
                "isUnique": true,
                "productSpecCharRelationship": [
                    {
                        "id": "43",
```

```
              "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/43",
              "relationshipType": "Dependency",
              "name": "Bandwidth",
              "validFor": {
                 "startDateTime": "2017-04-19T16:42:23-04:00"
              }
           }
        ],
        "productSpecCharacteristicValue": [
           {
              "isDefault": true,
              "valueType": "number",
              "validFor": {
                 "startDateTime": "2017-06-16T00:00",
                 "endDateTime": "2018-01-13T00:00"
              },
              "value": 8
           },
           {
              "isDefault": false,
              "valueType": "number",
              "validFor": {
                 "startDateTime": "2017-06-16T00:00",
                 "endDateTime": "2018-01-13T00:00"
              },
              "value": 16
           },
           {
              "isDefault": false,
              "valueType": "number",
              "validFor": {
                 "startDateTime": "2017-06-16T00:00",
                 "endDateTime": "2018-01-13T00:00"
              },
              "value": 24
           }
        ],
        "validFor": {
           "startDateTime": "2017-04-19T16:42:23.0Z"
        }
     },
     {
        "name": "Color",
        "description": "Color of the Firewall housing",
        "valueType": "string",
        "configurable": true,
        "minCardinality": 1,
        "maxCardinality": 1,
        "extensible": true,
        "isUnique": true,
        "productSpecCharacteristicValue": [
           {
              "isDefault": true,
              "valueType": "string",
              "value": "Black"
```

```
            },
            {
                "isDefault": false,
                "valueType": "string",
                "value": "White"
            }
        ],
        "validFor": {
            "startDateTime": "2017-04-19T16:42:23.0Z"
        }
    }
    ],
    "@type": "ProductSpecification"
}
```

Response

```
201

{
    "id": "7655",
    "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/7655",
    "name": "Cisco Firepower NGFW",
    "brand": "Cisco",
    "productNumber": "CSC-340-NGFW",
    "description": "Powerful product that integrates with a firewall, including intrusion prevention, advanced malware
protection, cloud-based sandboxing, URL filtering, endpoint protection, web gateway, email security, network traffic
analysis, network access control and CASB.",
    "isBundle": true,
    "lastUpdate": "2017-04-19T16:42:23.0Z",
    "lifecycleStatus": "Tentative",
    "validFor": {
        "startDateTime": "2017-06-19T00:00:00.0Z",
        "endDateTime": "2018-04-19T16:42:23.0Z"
    },
    "version": "2.1",
    "relatedParty": [
        {
            "id": "1234",
            "href": "https://mycsp.com:8080/tmf-api/partyManagement/v4/partyRole/1234",
            "role": "Owner",
            "name": "Gustave Flaubert",
            "validFor": {
                "startDateTime": "2017-03-19T16:42:23-04:00"
            }
        }
    ],
    "attachment": [
        {
            "name": "Product Picture",
            "mimeType": "image/jpeg",
            "url": "https://mycsp.com:7070/docloader?docnum=774451234"
        },
```

```
      {
        "name": "Product Manual",
        "mimeType": "application/pdf",
        "url": "https://mycsp.com:7070/docloader?docnum=774454321"
      }
    ],
    "bundledProductSpecification": [
      {
        "id": "15",
        "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/15",
        "name": "URL Filter"
      },
      {
        "id": "64",
        "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/64",
        "name": "Malware Protector"
      }
    ],
    "targetProductSchema": {
      "@type": "Firewall",
      "@schemaLocation": "https://mycsp.com:8080/tmf-api/schema/Product/Firewall.schema.json"
    },
    "productSpecificationRelationship": [
      {
        "id": "23",
        "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/23",
        "relationshipType": "Dependency",
        "validFor": {
          "startDateTime": "2017-04-19T16:42:23.0Z"
        }
      }
    ],
    "serviceSpecification": [
      {
        "id": "22",
        "href": "https://mycsp.com:8080/tmf-api/serviceCatalogManagement/v4/serviceSpecification/22",
        "name": "Firewall",
        "version": "1.0"
      }
    ],
    "resourceSpecification": [
      {
        "id": "63",
        "href": "https://mycsp.com:8080/tmf-api/resourceCatalogManagement/v4/resourceSpecification/63",
        "name": "Firewall Port",
        "version": "1.0"
      }
    ],
    "productSpecCharacteristic": [
      {
        "name": "Number of Ports",
        "description": "The total Number of Ports for this product",
        "valueType": "number",
        "configurable": true,
        "minCardinality": 1,
```

```
      "maxCardinality": 1,
      "isUnique": true,
      "productSpecCharRelationship": [
        {
          "id": "43",
          "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/43",
          "relationshipType": "Dependency",
          "name": "Bandwidth",
          "validFor": {
            "startDateTime": "2017-04-19T16:42:23-04:00"
          }
        }
      ],
      "productSpecCharacteristicValue": [
        {
          "isDefault": true,
          "valueType": "number",
          "validFor": {
            "startDateTime": "2017-06-16T00:00",
            "endDateTime": "2018-01-13T00:00"
          },
          "value": 8
        },
        {
          "isDefault": false,
          "valueType": "number",
          "validFor": {
            "startDateTime": "2017-06-16T00:00",
            "endDateTime": "2018-01-13T00:00"
          },
          "value": 16
        },
        {
          "isDefault": false,
          "valueType": "number",
          "validFor": {
            "startDateTime": "2017-06-16T00:00",
            "endDateTime": "2018-01-13T00:00"
          },
          "value": 24
        }
      ],
      "validFor": {
        "startDateTime": "2017-04-19T16:42:23.0Z"
      }
    },
    {
      "name": "Color",
      "description": "Color of the Firewall housing",
      "valueType": "string",
      "configurable": true,
      "minCardinality": 1,
      "maxCardinality": 1,
      "extensible": true,
      "isUnique": true,
```

```
            "productSpecCharacteristicValue": [
                {
                    "isDefault": true,
                    "valueType": "string",
                    "value": "Black"
                },
                {
                    "isDefault": false,
                    "valueType": "string",
                    "value": "White"
                }
            ],
            "validFor": {
                "startDateTime": "2017-04-19T16:42:23.0Z"
            }
        }
    ],
    "@type": "ProductSpecification"
}
```

Patch product specification

PATCH /productSpecification/{id}

Description

This operation allows partial updates of a product specification 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
attachment	
brand	
bundledProductSpecification	mandatory if isBundle is **true**
description	
isBundle	
lifecycleStatus	Should match a list of valid values
name	
productNumber	
productSpecCharacteristic	
productSpecificationRelationship	

relatedParty	
resourceSpecification	
serviceSpecification	
targetProductSchema	
validFor	endDateTime (if present) should be later than startDateTime (if present)
version	Should not be semantically "less" than the current version

Non Patchable Attributes	Rule
id	
href	
lastUpdate	

Usage Samples

Here's an example of a request for patching a specification. In this example, a new version is set, together with validity period.

Request

```
PATCH {apiRoot}/productSpecification/7655
Content-Type: application/merge-patch+json

{
    "version": "3.1",
    "validFor": {
        "startDateTime": "2018-03-23T00:00",
        "endDateTime": "2018-09-25T00:00"
    },
    "@type": "ProductSpecification"
}
```

Response

```
200

{
    "id": "7655",
    "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/7655",
    "name": "Cisco Firepower NGFW",
    "brand": "Cisco",
    "productNumber": "CSC-340-NGFW",
    "description": "Powerful product that integrates with a firewall, including intrusion prevention, advanced malware
protection, cloud-based sandboxing, URL filtering, endpoint protection, web gateway, email security, network traffic
analysis, network access control and CASB.",
    "isBundle": true,
    "lastUpdate": "2017-04-19T16:42:23.0Z",
```

```
      "lifecycleStatus": "Active",
      "validFor": {
        "startDateTime": "2018-03-23T00:00",
        "endDateTime": "2018-09-25T00:00"
      },
      "version": "3.1",
      "relatedParty": [
        {
          "id": "1234",
          "href": "https://mycsp.com:8080/tmf-api/partyManagement/v4/partyRole/1234",
          "role": "Owner",
          "name": "Gustave Flaubert",
          "validFor": {
            "startDateTime": "2017-03-19T16:42:23-04:00"
          }
        }
      ],
      "attachment": [
        {
          "name": "Product Picture",
          "mimeType": "image/jpeg",
          "url": "https://mycsp.com:7070/docloader?docnum=774451234"
        },
        {
          "name": "Product Manual",
          "mimeType": "application/pdf",
          "url": "https://mycsp.com:7070/docloader?docnum=774454321"
        }
      ],
      "bundledProductSpecification": [
        {
          "id": "15",
          "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/15",
          "name": "URL Filter"
        },
        {
          "id": "64",
          "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/64",
          "name": "Malware Protector"
        }
      ],
      "targetProductSchema": {
        "@type": "Firewall",
        "@schemaLocation": "https://mycsp.com:8080/tmf-api/schema/Product/Firewall.schema.json"
      },
      "productSpecificationRelationship": [
        {
          "id": "23",
          "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/23",
          "relationshipType": "Dependency",
          "validFor": {
            "startDateTime": "2017-04-19T16:42:23.0Z"
          }
        }
      ],
```

```
"serviceSpecification": [
  {
    "id": "22",
    "href": "https://mycsp.com:8080/tmf-api/serviceCatalogManagement/v4/serviceSpecification/22",
    "name": "Firewall",
    "version": "1.0"
  }
],
"resourceSpecification": [
  {
    "id": "63",
    "href": "https://mycsp.com:8080/tmf-api/resourceCatalogManagement/v4/resourceSpecification/63",
    "name": "Firewall Port",
    "version": "1.0"
  }
],
"productSpecCharacteristic": [
  {
    "name": "Number of Ports",
    "description": "The total Number of Ports for this product",
    "valueType": "number",
    "configurable": true,
    "minCardinality": 1,
    "maxCardinality": 1,
    "isUnique": true,
    "productSpecCharRelationship": [
      {
        "id": "43",
        "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productSpecification/43",
        "relationshipType": "Dependency",
        "name": "Bandwidth",
        "validFor": {
          "startDateTime": "2017-04-19T16:42:23-04:00"
        }
      }
    ],
    "productSpecCharacteristicValue": [
      {
        "isDefault": true,
        "valueType": "number",
        "validFor": {
          "startDateTime": "2017-06-16T00:00",
          "endDateTime": "2018-01-13T00:00"
        },
        "value": 8
      },
      {
        "isDefault": false,
        "valueType": "number",
        "validFor": {
          "startDateTime": "2017-06-16T00:00",
          "endDateTime": "2018-01-13T00:00"
        },
        "value": 16
      },
```

```
        {
            "isDefault": false,
            "valueType": "number",
            "validFor": {
                "startDateTime": "2017-06-16T00:00",
                "endDateTime": "2018-01-13T00:00"
            },
            "value": 24
        }
    ],
    "validFor": {
        "startDateTime": "2017-04-19T16:42:23.0Z"
    }
},
{
    "name": "Color",
    "description": "Color of the Firewall housing",
    "valueType": "string",
    "configurable": true,
    "minCardinality": 1,
    "maxCardinality": 1,
    "extensible": true,
    "isUnique": true,
    "productSpecCharacteristicValue": [
        {
            "isDefault": true,
            "valueType": "string",
            "value": "Black"
        },
        {
            "isDefault": false,
            "valueType": "string",
            "value": "White"
        }
    ],
    "validFor": {
        "startDateTime": "2017-04-19T16:42:23.0Z"
    }
}
],
"@type": "ProductSpecification"
}
```

Delete product specification

DELETE /productSpecification/{id}

Description

This operation deletes a product specification entity.

Usage Samples

Here's an example of a request for deleting a specification.

Request
DELETE {apiRoot}/productSpecification/7655
Response
204

OPERATIONS ON IMPORT JOB

List import jobs

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

Description

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

Usage Samples

Here's an example of a request for retrieving multiple import jobs.

Request
GET {apiRoot}/importJob?creationDate=2017-08-27 Accept: application/json
Response

200
 	
[
  {
    "id": "7497",
    "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/importJob/7497",
    "contentType": "application/json",

```
            "creationDate": "2018-08-27T00:00",
            "completionDate": "2018-08-27T00:05",
            "path": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/Catalog/3830",
            "status": "completed",
            "url": "https://my-platform/daily/job/NHCFD6",
            "errorLog": "http://my-platform/logging/errors.log",
            "@type": "ImportJob"
        },
        {
            "id": "7498",
            "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/importJob/7498",
            "contentType": "application/json",
            "creationDate": "2018-08-27T00:00",
            "path": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/Catalog/3830",
            "status": "started",
            "url": "https://my-platform/daily/job/NHCFD6",
            "errorLog": "http://my-platform/logging/errors.log",
            "@type": "ImportJob"
        }
]
```

Retrieve import job

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

Description

This operation retrieves an import job 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

Here's an example of a request for retrieving a specific import job.

Request
GET {apiRoot}/importJob/7497 Accept: application/json
Response

200
 	
{
  "id": "7497",
  "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/importJob/7497",

```
    "contentType": "application/json",
    "creationDate": "2018-08-27T00:00",
    "completionDate": "2018-08-27T00:05",
    "path": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/Catalog/3830",
    "status": "completed",
    "url": "https://my-platform/daily/job/NHCFD6",
    "errorLog": "http://my-platform/logging/errors.log",
    "@type": "ImportJob"
}
```

Create import job

POST /importJob

Description

This operation creates an import job entity.

Mandatory and Non Mandatory Attributes

The following tables provide the list of mandatory and non mandatory attributes when creating a ImportJob, 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
url	

Non Mandatory Attributes	Rule
completionDate	
contentType	
creationDate	
errorLog	
path	
status	

Usage Samples

Here's an example of a request for creating an import job.

Request

POST {apiRoot}/importJob
Content-Type: application/json

{
  "contentType": "application/json",
  "path": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/Catalog/3830",
  "url": "https://my-platform/daily/job/NHCFD6",

```
    "@type": "ImportJob"
}
```

Response

```
201

{
   "id": "7497",
   "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/importJob/7497",
   "contentType": "application/json",
   "creationDate": "2018-08-27T00:00",
   "path": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/Catalog/3830",
   "status": "started",
   "url": "https://my-platform/daily/job/NHCFD6",
   "errorLog": "http://my-platform/logging/errors.log",
   "@type": "ImportJob"
}
```

Delete import job

DELETE /importJob/{id}

Description

This operation deletes an import job entity.

Usage Samples

Here's an example of a request for deleting an import job.

Request

DELETE {apiRoot}/importJob/7497

Response

204

OPERATIONS ON EXPORT JOB

List export jobs

GET /exportJob?fields=...&{filtering}

Description

This operation list export job entities.

Attribute selection is enabled for all first level attributes.

Filtering may be available depending on the compliance level supported by an implementation.

Usage Samples

Here's an example of a request for retrieving multiple export jobs.

Request
GET {apiRoot}/exportJob?creationDate=2017-08-27 Accept: application/json

Response

200
 	
[
  {
    "id": "5435",
    "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/exportJob/5435",
    "contentType": "application/json",
    "creationDate": "2018-08-27T00:00",
    "path": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/Catalog/3830",
    "query": "category.id=7757",
    "status": "running",
    "url": "https://my-platform/daily/job/EHCFD6",
    "errorLog": "http://my-platform/logging/errors.log",
    "@type": "ImportJob"
  },
  {
    "id": "5431",
    "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/exportJob/5431",
    "contentType": "application/json",
    "creationDate": "2018-08-26T00:00",
    "completionDate": "2018-08-26T00:05",
    "path": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/Catalog/3830",
    "query": "category.id=7753",
    "status": "completed",
    "url": "https://my-platform/daily/job/EHCFD6",
    "errorLog": "http://my-platform/logging/errors.log",
    "@type": "ImportJob"
  }

```
]
```

Retrieve export job

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

Description

This operation retrieves an export job 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

Here's an example of a request for retrieving a specific export job.

Request
GET {apiRoot}/exportJob/1866 Accept: application/json
Response

200
 	
{
   "id": "5435",
   "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/exportJob/5435",
   "contentType": "application/json",
   "creationDate": "2018-08-27T00:00",
   "path": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/Catalog/3830",
   "query": "category.id=7757",
   "status": "running",
   "url": "https://my-platform/daily/job/EHCFD6",
   "errorLog": "http://my-platform/logging/errors.log",
   "@type": "ImportJob"
}

Create export job

POST /exportJob

Description

This operation creates an export job entity.

Mandatory and Non Mandatory Attributes

The following tables provide the list of mandatory and non mandatory attributes when creating a ExportJob, 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
url	

Non Mandatory Attributes	Rule
completionDate	
contentType	
creationDate	
errorLog	
path	
query	
status	

Usage Samples

Here's an example of a request for creating an export job.

Request

POST {apiRoot}/exportJob
Content-Type: application/json
 	
{
   "contentType": "application/json",
   "path": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/Catalog/3830",
   "query": "category.id=7757",
   "url": "https://my-platform/daily/job/EHCFD6",
   "errorLog": "http://my-platform/logging/errors.log",
   "@type": "ImportJob"
}

Response

201
 	
{
   "id": "5435",
   "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/exportJob/5435",
   "contentType": "application/json",
   "creationDate": "2018-08-27T00:00",
   "path": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/Catalog/3830",
   "query": "category.id=7757",

```
    "status": "started",
    "url": "https://my-platform/daily/job/EHCFD6",
    "errorLog": "http://my-platform/logging/errors.log",
    "@type": "ImportJob"
}
```

Delete export job

DELETE /exportJob/{id}

Description

This operation deletes an export job entity.

Usage Samples

Here's an example of a request for deleting an export job.

Request
DELETE {apiRoot}/exportJob/1866

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 part 1. Refer to the guidelines for more details.

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 Part 1 document.

LIFECYCLE MANAGEMENT EXTENSIONS TO CATALOG

In Lifecycle Management, there is a requirement to distinguish between entities existing with different life cycle version numbers and accessible via different ACL mechanisms. For example, the same Product Offerings may exist in a Catalog but with different version numbers.

It may be possible for an administrator to see all the existing versions or for a partner to see only a subset of all the existing versions.

The entity version number is not dependent on the version number of the API. For example, in PLM the same API (running at a specific version number) may be used to retrieve entities with different PLM version numbers.

In order to distinguish resources representing entities running with different version numbers and accessible though the same API version, the following directive can be used /id:(version=x) and the version attribute is added to each entity.

```
{
        "id": "42",
        "href": "http://serverlocation:port/catalogManagement/productOffering/42",
        "version": "1.0",
        "lastUpdate": "2017-04-19T16:42:23-04:00",
        "name": "Virtual Storage Medium",
        "description": "Virtual Storage Medium",
        "isBundle": "true",
        "lifecycleStatus": "Active",

.....

}
```

Note that the catalog resources in this case may have the same ID but may be distinguished by the inclusion of the version number in their ID i.e. /VirtualStorage:(version=1.0), /VirtualStorage:(version=2.0).

In the following examples, we will assume that two versions of the VirtualStorage Product Offering exist in the Product Catalog. The Inactive and Active versions respectively version 1.0 and version 2.0.

Query all versioned catalog resources

Users with different roles may have access to different versions of the entities in the catalog. For example, user A may have access to only the version 1.0 of the entities while user B may have access to version 1.0 and version 2.0.

Admin user of Catalog have access to all the versions of the resources while non-admin users have by default access to only the latest version of the entities in the Catalog.

For example, the following request on the admin endpoint will return all the versioned resources matching a specific ID.

REQUEST
GET api/admin/catalogManagement/productOffering/?id=VirtualStorage Accept: application/json
RESPONSE

200
Content-Type: application/json
[
    {
        "id": "VirtualStorage",
        "href": "http://serverlocation:port/catalogManagement/productOffering/VirtualStorage",
        "version": "1.0",
        "lastUpdate": "2017-04-19T16:42:23-04:00",
        "name": "Virtual Storage Medium",
        "description": "Virtual Storage Medium",
        "isBundle": "true",
        "lifecycleStatus": "Inactive",
 	
    …..
 	
    },
 	
    {
        "id": " VirtualStorage ",
        "href": "http://serverlocation:port/catalogManagement/productOffering/VirtualStorage",
        "version": "2.0",
        "lastUpdate": "2017-04-19T16:42:23-05:00",
        "name": "Virtual Storage Medium",
        "description": "Virtual Storage Medium",
        "isBundle": "true",
        "lifecycleStatus": "Active",
 	
    …..

```
        }

]
```

Query a specific versioned catalog resource

In general, a non-admin API user only has visibility to the latest version number or visibility to a subset of versioned catalog resources.

It may be possible for an admin API user to retrieve a resource with a specific version number by using an ID and versioning filtering criteria.

REQUEST
GET api/admin/catalogManagement/productOffering/?id=VirtualStorage&version=1.0 Accept: application/json
RESPONSE

200
Content-Type: application/json
{
       "id": "42",
       "href": "http://serverlocation:port/catalogManagement/productOffering/42",
       "version": "1.0",
       "lastUpdate": "2017-04-19T16:42:23-04:00",
       "name": "Virtual Storage Medium",
       "description": "Virtual Storage Medium",
       "isBundle": "true",
       "lifecycleStatus": "Active",
 	
       …..
 	
}

Query current version of a catalog resource

By default, only the most current version is returned (for admin and non-admin).

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

GET api/admin/catalogManagement/productOffering/VirtualStorage
Accept: application/json
</td></tr>
<tr><td>RESPONSE</td></tr>
<tr><td>

200
Content-Type: application/json

{

        "id": "42",

        "href": "http://serverlocation:port/catalogManagement/productOffering/42",

        "version": "2.0",

        "lastUpdate": "2017-04-19T16:42:23-04:00",

        "name": "Virtual Storage Medium",

        "description": "Virtual Storage Medium",

        "isBundle": "true",

        "lifecycleStatus": "Active",

        .....

}

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

Create new version of a catalog resource

POST is used to create a new version of a catalog resource.

The constraint is that the version numbers for the resource having the same ID must differ.

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

POST catalogManagement/productOffering

Content-type: application/json

{

        "id": "VirtualStorage",

        "version": "3.0",
</td></tr>
</table>

```
        "name": "Virtual Storage Medium",
        "description": "Virtual Storage Medium",
        "isBundle": "true",
        "lifecycleStatus": "Active",
        "validFor": {
                "startDateTime": "2017-04-19T16:42:23-04:00",
                "endDateTime": "2017-06-19T00:00:00-04:00"
        },
…
…
}
```

RESPONSE

```
201
Content-Type: application/json


{
        "id": "VirtualStorage",
        "href": "http://serverlocation:port/catalogManagement/productOffering/42",
        "version": "3.0",
        "lastUpdate": "2017-04-19T16:42:23-04:00",
        "name": "Virtual Storage Medium",
        "description": "Virtual Storage Medium",
        "isBundle": "true",
        "lifecycleStatus": "Active",
        "validFor": {
                "startDateTime": "2017-04-19T16:42:23-04:00",
                "endDateTime": "2017-06-19T00:00:00-04:00"
        },

…
…
}
```

Modify an existing version of a catalog resource

By default, PATCH will be acting only on the latest version of a catalog resource. For example, PATCH /…/productOffering/VirtualStorage will only update the VirtualStorage ProductOffering at Version 2.0 (which is the most current).

To update a specific version of an entity the (Version=X) directive is added to the ID (i.e. /id:(version=x).

Note that this capability is only available to API users having the proper authorizations to change the catalog entities with specific version numbers.

For example, to change the VirtualStorage versioned at 1.0 we could use:
/productOffering/VirtualStorage(Version=1.0)

REQUEST

PATCH /catalogManagement/productOffering/VirtualStorage(version=1.0)
Content-type: application/json-patch+json
{
      "lifecycleStatus": "Active"
}

RESPONSE

200
Content-Type: application/json
{
      "id": "VirtualStorage",
      "href": "http://serverlocation:port/catalogManagement/productOffering/VirtualStorage",
      "version": "1.0",
"lifecycleStatus": "Active",
…..
}

ROLE BASED ACCESS CONTROL

The user presents their credentials for authentication

If the credentials are valid

1.   The user is given access to the catalog

2.   As defined by their role(s)

3.   As defined by their access rights

4.   As defined by the access type: CRUD, discover

5.   As defined by the pre-defined filter

For example, if they issue a get on a catalog that a party has no access they get an error response

Or if they try to modify an area of the catalog but do not have Write Access they get an error response

Normally we anticipate that the OAUTH2 or Open ID Connect are used as the authorization APIs and that ACL are established between authorized parties with regards to the content of the Catalog (i.e. GET but also enable of update operations on specific entities).

ACKNOWLEDGEMENTS

DOCUMENT HISTORY

Version History

Version Number	Date	Release led by:	Description
Version 2.2.0	27-Aug-2017	Kamal Maghsoudlou Ericsson kamal.maghsoudlou@ericsson.com	Miscellaneous corrections and clarifications Incorporated comments from API team review
Version 4.0	1-July-2019	Jonathan Goldberg Amdocs Jonathan.Goldberg@amdocs.com	Schema alignment for commerce APIs in release 19.0

Release History

Release Number	Date	Release led by:	Description
Release 17.5.0	1-Nov-2017	Kamal Maghsoudlou kamal.maghsoudlou@ericsson.com	First Release of Draft Version of the Document.
Release 19.0.0	31-July-2019	Jonathan Goldberg Amdocs Jonathan.Goldberg@amdocs.com	Updated for Release 19.0

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