TM Forum Specification

Service Ordering Management API REST Specification

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Introduction

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

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

- The Order Management system has access to a catalog system
- A service order will describe a list of service order items.
- A service order item references an action on an existing or future service.
- By service we designed Customer-Facing Service (CFS) as well as Resource Facing Service (RFS).

From a component perspective, a service order should be available

- from a Service Orchestration Component (and it could mix CFS and RFS)
- from an Infrastructure Control & Management component (and it would have only RFS)

SAMPLE USE CASES

Reader will find example of use cases using Usage API in “Open Digital Business Scenarios and Use Cases” document.

Support of polymorphism and extension

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 TypeAServiceOrder or TypeBServiceOrder inheriting properties from the base ServiceOrder 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 ServiceOrder instances some may be instances of TypeAServiceOrder where other could be instances of TypeBServiceOrder . 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 a 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

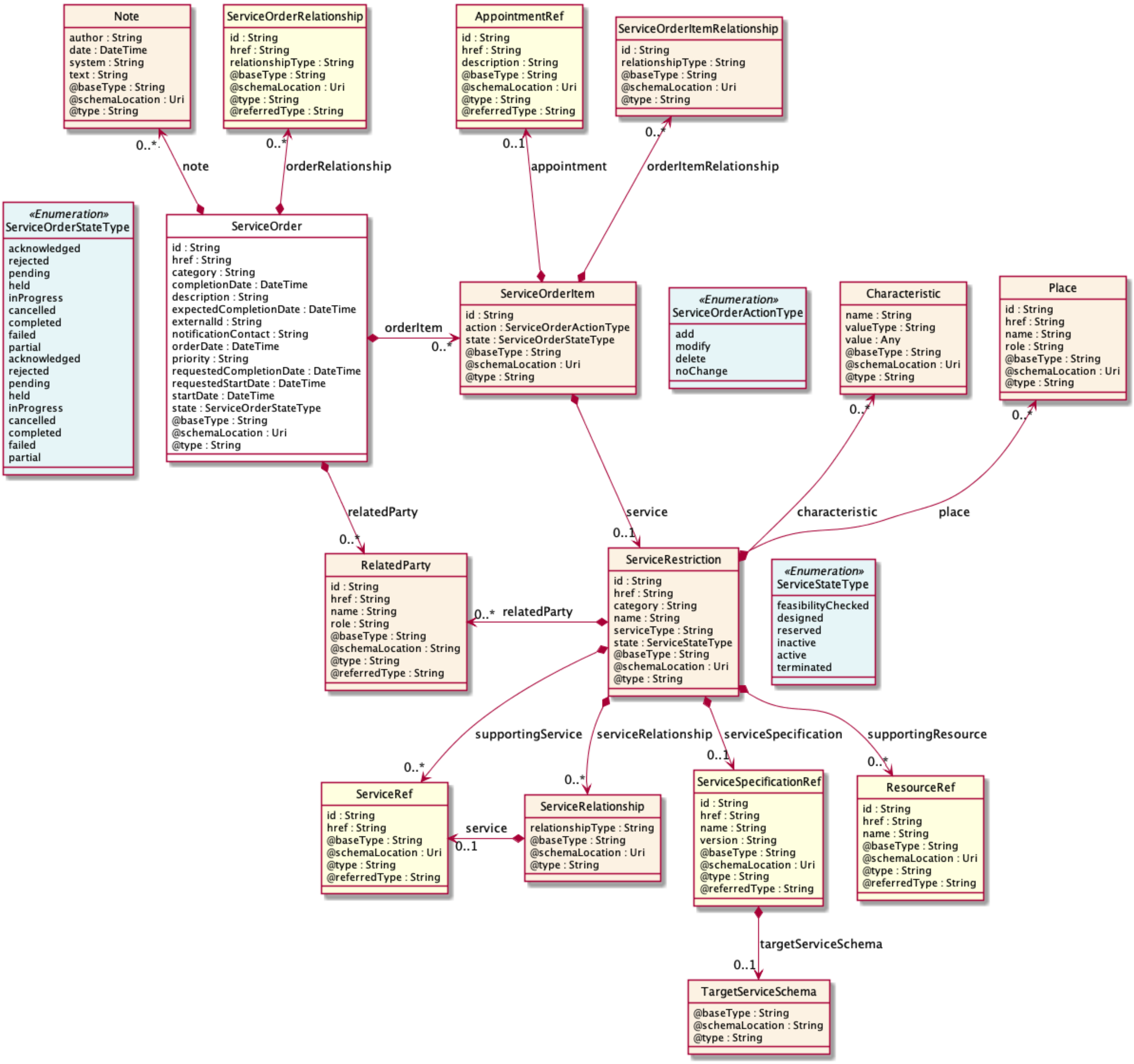
RESOURCE MODEL

Managed Entity and Task Resource Models

Service Order resource

A Service Order is a type of order which can be used to describe a group of operations on service – one service order item per service. An action at the level of the service order item describe the operation to be done on a service (add, changer, terminate for example). The service order is triggered from the BSS system in charge of the product order management to the SOM (Service order Management) system that will manage the service fulfillment.

Resource model



Field descriptions

ServiceOrder fields

category	A string. Used to categorize the order, useful for the OM system, such as: Broadband, TVOption.
completionDate	A date time (DateTime). Effective delivery date amended by the provider.

description A string. A free-text description of the service order.

expectedCompletionDate A date time (DateTime). Expected delivery date amended by the provider.

externalId A string. ID given by the consumer to facilitate searches.

href A string. Hyperlink to access the order.

id A string. ID created on repository side.

note A list of notes (Note [*]). Extra-information about the order; e.g. useful to add extra delivery information that could be useful for a human process.

notificationContact A string. Contact attached to the order to send back information regarding this order.

orderDate A date time (DateTime).

orderItem A list of service order items (ServiceOrderItem [1..*]). A list of service order items to be processed by this order.

orderRelationship A list of service order relationships (ServiceOrderRelationship [*]). A list of service orders related to this order (e.g. prerequisite, dependent on).

priority A string. Can be used by consumers to prioritize orders in a Service Order Management system.

relatedParty A list of related parties (RelatedParty [*]). A list of parties which are involved in this order and the role they are playing.

requestedCompletionDate A date time (DateTime). Requested delivery date from the requestors perspective.

requestedStartDate A date time (DateTime). Order start date wished by the requestor.

startDate A date time (DateTime). Date when the order was started for processing.

state A service order state type (ServiceOrderStateType). State of the order: described in the state-machine diagram.

Characteristic sub-resource

Describes a given characteristic of an object or entity through a name/value pair.

name A string. Name of the characteristic.

value An any (Any). The value of the characteristic.

valueType A string. Data type of the value of the characteristic.

Note sub-resource

Extra information about a given entity.

author	A string. Author of the note.
date	A date time (DateTime). Date of the note.
system	A string. Describes the system from which the action related to this note was done.
text	A string. Text of the note.

Place sub-resource

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

href	A string. Unique reference of the place.
id	A string. Unique identifier of the place.
name	A string. A user-friendly name for the place, such as [Paris Store], [London Store], [Main Home].
role	A string. Role of the place, such as: [home delivery], [shop retrieval]).

RelatedParty sub-resource

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

@baseType	A string. When sub-classing, this defines the super-class.
@referredType	A string. The actual type of the target instance when needed for disambiguation.
@schemaLocation	A string. A URI to a JSON-Schema file that defines additional attributes and relationships.
@type	A string. When sub-classing, this defines the sub-class entity name.
href	A string. Reference of the related party, could be a party reference or a party role reference.
id	A string. Unique identifier of a related party.
name	A string. Name of the related party.
role	A string. Role of the related party.

ServiceOrderItem sub-resource

action	A service order action type (ServiceOrderActionType). The action to be carried out on the Service. Can be: add, modify, delete, noChange.
appointment	An appointment reference (AppointmentRef). An appointment that was set up with a related party for this order item.
id	A string. Identifier of the individual line item.
orderItemRelationship	A list of service order item relationships (ServiceOrderItemRelationship [*]). A list of order items related to this order item.
service	A service restriction (ServiceRestriction). The Service to be acted on by the order item.
state	A service order state type (ServiceOrderStateType). State of the order item: described in the state machine diagram. This is the requested state.

ServiceOrderItemRelationship sub-resource

Linked service order item to the one containing this attribute.

id	A string. Unique identifier of a service order item.
relationshipType	A string. The type of related order item, can be: dependency if the order item needs to be not started until another order item is complete.

ServiceOrderRelationship sub-resource

Linked service order to the one containing this attribute.

@referredType	A string. The entity type of the related order.
href	A string. A hyperlink to the related order.
id	A string. The id of the related order.
relationshipType	A string. The type of related order, such as: [dependency] if the order needs to be [not started] until another order item is complete (a service order in this case) or [cross-ref] to keep track of the source order (a productOrder).

ServiceRelationship sub-resource

Describes links with services of the same category (useful for bundled services).

relationshipType	A string. The type of relationship (e.g. depends on, enables).
service	A service reference (ServiceRef). The service being referred to.

ServiceRestriction sub-resource

In the context of a service order and depending of the action requested (add/modify/delete/noChange) this data structure captures the configuration to apply to an existing subscribed service or to a new one.

category A string. Is it a customer facing or resource facing service.

href A string. Reference of the service.

id A string. Unique identifier of the service.

name A string. Name of the service.

place A list of places (Place [*]). A list of places (Place [*]). Used to define a place useful for the service (for example a delivery geographical place).

relatedParty A list of related parties (RelatedParty [*]). A list of related party references (RelatedParty [*]). A related party defines party or party role linked to a specific entity.

serviceCharacteristic A list of characteristics (Characteristic [*]). A list of characteristics that characterize this service (ServiceCharacteristic [*]).

serviceRelationship A list of service relationships (ServiceRelationship [*]). A list of service relationships (ServiceRelationship [*]). Describes links with other service(s) in the inventory (useful for describing relies-on, relies-from between CFS for example).

serviceSpecification A service specification reference (ServiceSpecificationRef). The specification from which this service was instantiated.

serviceType A string. Business type of the service.

state A service state type (ServiceStateType). The life cycle state of the service, such as: [feasibilityChecked], [designed].

supportingResource A list of resource references (ResourceRef [*]). A list of supporting resources (SupportingResource [*]).Note: only Service of type RFS can be associated with Resources.

supportingService A list of service references (ServiceRef [*]). A list of supporting services (SupportingService [*]). A collection of services that support this service (bundling, link CFS to RFS).

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.

AppointmentRef relationship

Refers an appointment, such as a Customer presentation or internal meeting or site visit.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
description	A string. An explanatory text regarding the appointment made with a party.
href	A string. The reference of the appointment.
id	A string. The identifier of the referred appointment.

ResourceRef relationship

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

ServiceRef relationship

Service reference, for when Service is used by other entities.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
href	A string. reference of the service.
id	A string. Id of the service.

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.

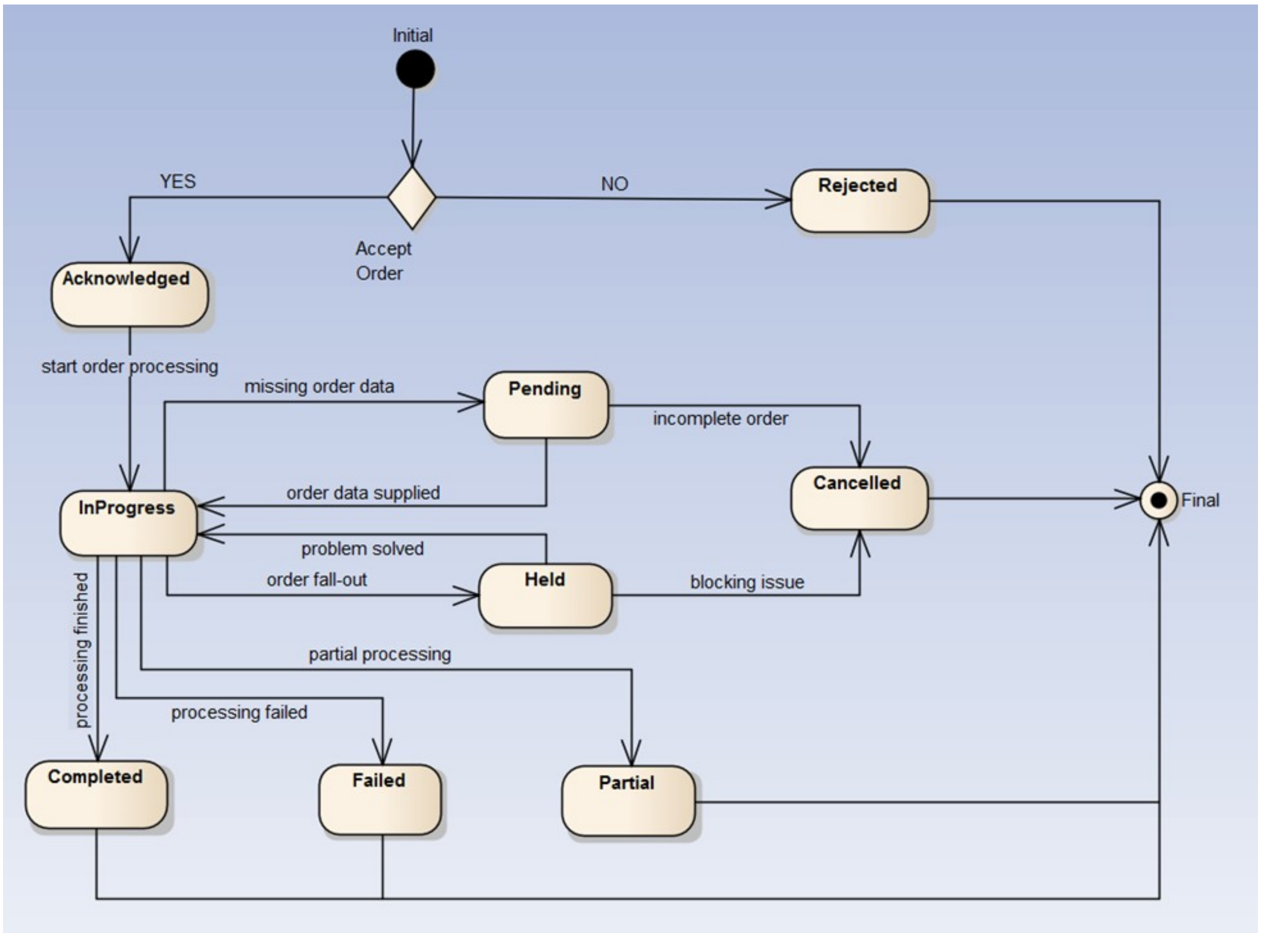
targetServiceSchema	A target service schema (TargetServiceSchema). A target service schema reference (TargetServiceSchemaRef). The reference object to the schema and type of target service which is described by service specification.
version	A string. Service specification version.

Lifecycle

Here is the state machine diagram for a Service order. Each order state is described in the table below.

The order item states are the same as the order ones except 'Partial' status which is not available for service order item.

Note that the order and order item states are tightly linked and need to be consistent (see table below):

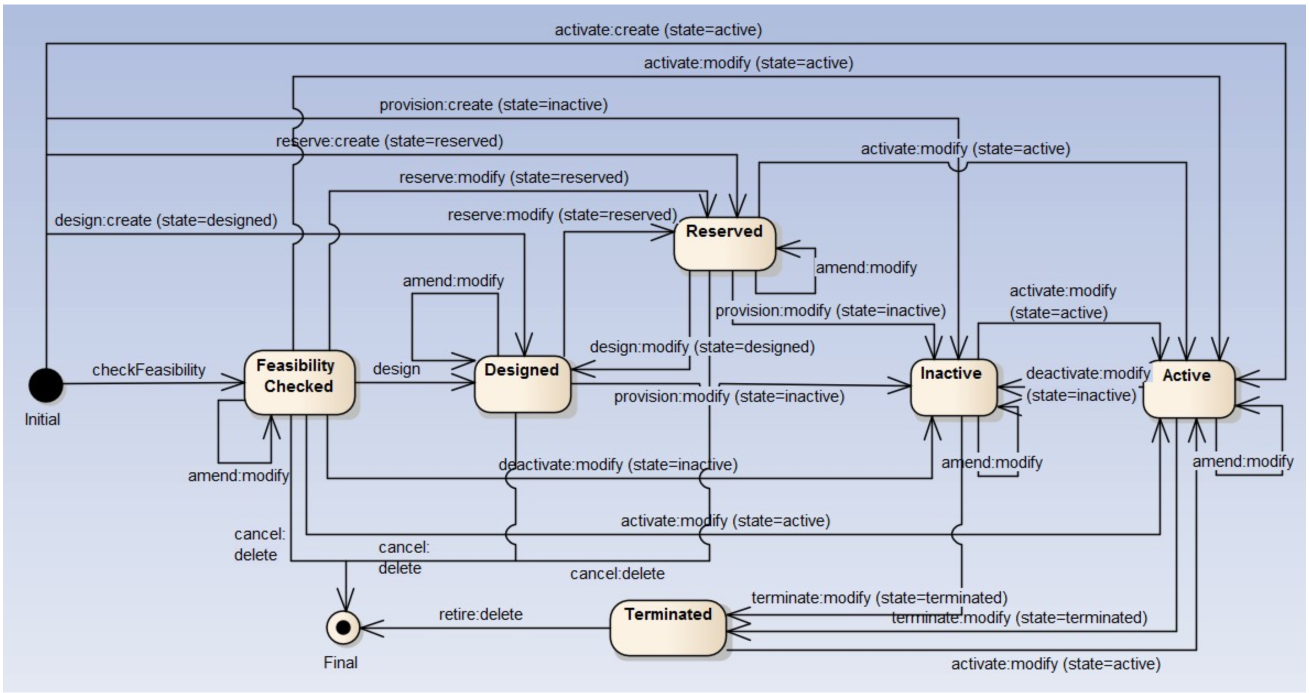


The following table provides service order state and service order item state description:

The following table provides service order state and service order item state description:

Acknowledged	The Acknowledged state is where an order has been received and has passed message and basic business validations.
In Progress	The In Progress state is when service delivery has started.
Cancelled	The Cancelled state is where an In-Flight Order has been successfully cancelled.
Completed	The Completed state is where an order has complete provision and the service is now active.
Rejected	The Rejected state is where:

Service State model:


activate:create (state=active)
activate:modify (state=active)
provision:create (state=inactive)
reserve:create (state=reserved)
activate:modify (state=active)
reserve:modify (state=reserved)
design:create (state=designed)
reserve:modify (state=reserved)
Reserved
amend:modify
amend:modify
activate:modify
(state=active)
provision:modify (state=inactive)
design:modify (state=designed)
checkFeasibility
Feasibility
Checked
design
Designed
Inactive
deactivate:modify
(state=inactive)
Active
provision:modify (state=inactive)
Initial
amend:modify
deactivate:modify (state=inactive)
amend:modify
amend:modify
activate:modify (state=active)
cancel:
delete
cancel:
delete
cancel:delete
terminate:modify (state=terminated)
terminate:modify (state=terminated)
retire:delete
Terminated
Final
activate:modify (state=active)

Note: 'Feasability Checked' should not be managed through service order. A dedicated API provides service qualification; This API is part of the pre-ordering domain.

source service state	action	target service state
blank	add	Designed (valued in order item service state) Reserved (valued in order item service state) Inactive (valued in order item service state) Active – by default
Designed	modify	Reserved (valued in order item service state) Inactive (valued in order item service state) Designed– by default
Designed	delete	*not relevant…service removed*
Reserved	delete	*not relevant…service removed*

source service state	action	target service state
Inactive	modify	Terminated (valued in order item service state) Active (valued in order item service state) Inactive– by default
Active		Active – by default Terminated (valued in order item service state) Inactive (valued in order item service state)
Terminated	delete	*not relevant…service removed*

Note: when action 'no change' is used we did not expect any state change.

Json representation sample

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

```
{
  "id": "42",
  "href": "http://serverlocation:port/serviceOrderingManagement/v4/serviceOrder/42",
  "externalId": "OrangeBSS747",
  "priority": "1",
  "description": "Service order description",
  "category": "TMF resource illustration",
  "state": "acknowledged",
  "orderDate": "2018-01-12T09:37:40.508Z",
  "completionDate": "",
  "requestedStartDate": "2018-01-15T09:37:40.508Z",
  "requestedCompletionDate": "2018-01-15T09:37:40.508Z",
  "expectedCompletionDate": "2018-01-15T09:37:40.508Z",
  "startDate": "2018-01-12T09:37:40.508Z",
  "@type": "ServiceOrder",
  "note": [{
    "date": "2018-01-15T09:37:40.508Z",
    "author": "Jean Pontus",
    "text": "Some text"
  }],
  "relatedParty": [
    {
      "id": "456",
      "href": "http://serverlocation:port/partyManagement/v4/party/456",
      "role": "requester",
      "name": "Jean Pontus",
      "@referredType": "Individual"
    }
  ],
  "orderItem": [
    {
      "id": "1",
      "action": "add",
      "state": "acknowledged",
      "service": {
        "@type": "vCPE",
        "@schemaLocation": "http//my.schemas/vCpe.schema.json",
        "state": "active",
        "serviceType": "CFS",
        "serviceCharacteristic": [
          {
            "name": "vCPE_IP",
            "valueType": "object",
            "value": {
              "@type": "IPAddress",
              "@schemaLocation": "http://my.schemas/IPAddress.schema.json",
              "vCPE_IP": "193.218.236.21"
            }
          }
        ],
        "serviceSpecification": {
          "@type": "ONAPServiceSpec",
          "@schemaLocation": "http//my.schemas/OnapServiceSpec.schema.json",
          "id": "12",
          "href": "http://.../serviceSpecification/12",
          "name": "vCPE",
          "version": "1",
          "invariantUUID": "456-852-357",
          "toscaModelURL": "http//...",
          "targetServiceSchema": {
            "@type": "vCPE",
            "@schemaLocation": "http//my.schemas/vCpe.schema.json"
          }
        }
      }
    },
    {
      "id": "2",
      "action": "modify",
      "state": "acknowledged",
      "service": {
        "id": "456",
        "href": "http://serverlocation:port/serviceInventoryManagement/v4/service/456",
        "state": "active",
        "serviceType": "CFS",
        "serviceCharacteristic": [
          {
            "name": "Characteristic1",
            "value": "newValue"
          }
        ],
        "supportingResource": [
          {
            "id": "3456_DFG5-H690",
            "href": "http://...",
            "@referredType": "CloudResource"
          }
        ]
      }
    },
    {
      "id": "3",
      "action": "add",
      "state": "acknowledged",
      "service": {
        "state": "active",
        "serviceType": "CFS",
        "serviceRelationship": [
          {
            "relationshipType": "reliesOn",
            "service": {
              "href": "https://.../serviceManagement/v4/service/45",
              "id": "45"
            }
          }
        ],
        "serviceSpecification": {
          "id": "48",
          "href": "http//..../48",
          "name": "genericService48",
          "version": "2"
        }
      }
    },
    {
      "id": "4",
      "action": "modify",
      "state": "acknowledged",
      "service": {
        "id": "12",
        "href": "http://serverlocation:port/serviceInventoryManagement/v4/service/12",
        "state": "inactive"
      }
    }
  ]
}
```

Notification Resource Models

4 notifications are defined for this API

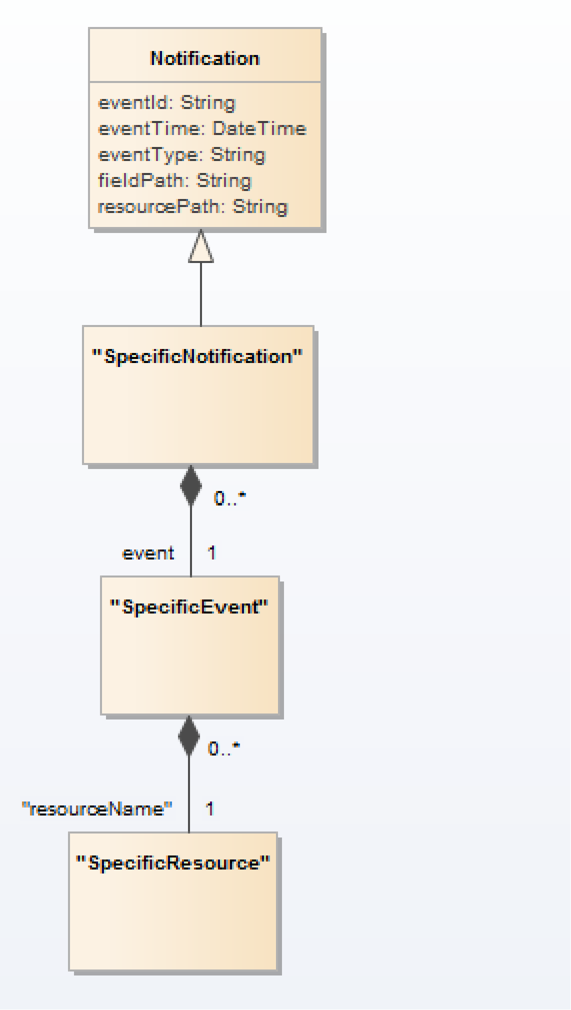
Notifications related to ServiceOrder:

- ServiceOrderCreateNotification
- ServiceOrderAttributeValueChangeNotification
- ServiceOrderStateChangeNotification
- ServiceOrderDeleteNotification

The notification structure for all notifications in this API follow the pattern depicted by the figure below.

A notification resource (depicted by "SpecificNotification" placeholder) is a sub class of a generic Notification structure containing an id of the event occurrence (eventId), an event timestamp (eventTime), and the name of the notification resource (eventType).

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



Service Order Create Notification

Notification ServiceOrderCreateNotification case for resource ServiceOrder

Json representation sample

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

```
{
   "eventId":"00001",
   "eventTime":"2015-11-16T16:42:25-04:00",
   "eventType":"ServiceOrderCreateNotification",
    "event": {
      "serviceOrder" :
         {-- SEE ServiceOrder RESOURCE SAMPLE --}
   }
}
```

Service Order Attribute Value Change Notification

Notification ServiceOrderAttributeValueChangeNotification case for resource ServiceOrder

Json representation sample

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

```
{
   "eventId":"00001",
   "eventTime":"2015-11-16T16:42:25-04:00",
   "eventType":"ServiceOrderAttributeValueChangeNotification",
    "event": {
      "serviceOrder" :
         {-- SEE ServiceOrder RESOURCE SAMPLE --}
   }
}
```

Service Order State Change Notification

Notification ServiceOrderStateChangeNotification case for resource ServiceOrder

Json representation sample

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

```
{
   "eventId":"00001",
   "eventTime":"2015-11-16T16:42:25-04:00",
   "eventType":"ServiceOrderStateChangeNotification",
    "event": {
      "serviceOrder" :
         {-- SEE ServiceOrder RESOURCE SAMPLE --}
   }
}
```

Service Order Delete Notification

Notification ServiceOrderDeleteNotification case for resource ServiceOrder

Json representation sample

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

```
{
    "eventId":"00001",
    "eventTime":"2015-11-16T16:42:25-04:00",
    "eventType":"ServiceOrderDeleteNotification",
     "event": {
        "serviceOrder" :
            {-- SEE ServiceOrder RESOURCE SAMPLE --}
    }
}
```

API OPERATIONS

Remember the following Uniform Contract:

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

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

Notifications are also described in a subsequent section.

Operations on Service Order

List service orders

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

Description

This operation list service order 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 all the service orders for a given customer that were completed before a specified date

Request

```
GET {apiRoot}/serviceOrder?state=completed&category= TMFresourceillustration &completionDate.gt=2018-01-14T00:00:00.000Z
Accept: application/json
```

Response

```
200

[
  {
    "id": "42",
    "href": "http://serverlocation:port/serviceOrderingManagement/v4/serviceOrder/42",
    "externalId": "OrangeBSS747",
    "priority": "1",
    "description": "Service order description",
    "category": "TMF resource illustration",
    "state": "acknowledged",
    "orderDate": "2018-01-12T09:37:40.508Z",
    "completionDate": "",
    "requestedStartDate": "2018-01-15T09:37:40.508Z",
    "requestedCompletionDate": "2018-01-15T09:37:40.508Z",
    "expectedCompletionDate": "2018-01-15T09:37:40.508Z",
    "startDate": "2018-01-12T09:37:40.508Z",
    "@type": "ServiceOrder",
    "note": [{
      "date": "2018-01-15T09:37:40.508Z",
      "author": "Jean Pontus",
      "text": "Some text"
    }],
    "relatedParty": [
      {
        "id": "456",
        "href": "http://serverlocation:port/partyManagement/v4/party/456",
        "role": "requester",
        "name": "Jean Pontus",
        "@referredType": "Individual"
      }
    ],
    "orderItem": [
      {
        "id": "1",
        "action": "add",
        "state": "acknowledged",
        "service": {
          "@type": "vCPE",
          "@schemaLocation": "http//my.schemas/vCpe.schema.json",
          "state": "active",
          "serviceType": "CFS",
          "serviceCharacteristic": [
            {
              "name": "vCPE_IP",
              "valueType": "object",
              "value": {
                "@type": "IPAddress",
                "@schemaLocation": "http://my.schemas/IPAddress.schema.json",
                "vCPE_IP": "193.218.236.21"
              }
            }
          ],
          "serviceSpecification": {
            "@type": "ONAPServiceSpec",
            "@schemaLocation": "http//my.schemas/OnapServiceSpec.schema.json",
            "id": "12",
            "href": "http://.../serviceSpecification/12",
            "name": "vCPE",
            "version": "1",
            "invariantUUID": "456-852-357",
            "toscaModelURL": "http//...",
            "targetServiceSchema": {
              "@type": "vCPE",
              "@schemaLocation": "http//my.schemas/vCpe.schema.json"
            }
          }
        }
      },
      {
        "id": "2",
        "action": "modify",
        "state": "acknowledged",
        "service": {
          "id": "456",
          "href": "http://serverlocation:port/serviceInventoryManagement/v4/service/456",
          "state": "active",
          "serviceType": "CFS",
          "serviceCharacteristic": [
            {
              "name": "Characteristic1",
              "value": "newValue"
            }
          ],
          "supportingResource": [
            {
              "id": "3456_DFG5-H690",
              "href": "http://...",
              "@referredType": "CloudResource"
            }
          ]
        }
      },
      {
        "id": "3",
        "action": "add",
        "state": "acknowledged",
        "service": {
          "state": "active",
          "serviceType": "CFS",
          "serviceRelationship": [
            {
              "relationshipType": "reliesOn",
              "service": {
                "href": "https://.../serviceManagement/v4/service/45",
                "id": "45"
              }
            }
          ],
          "serviceSpecification": {
            "id": "48",
            "href": "http//..../48",
            "name": "genericService48",
            "version": "2"
          }
        }
      },
      {
        "id": "4",
        "action": "modify",
        "state": "acknowledged",
        "service": {
          "id": "12",
          "href": "http://serverlocation:port/serviceInventoryManagement/v4/service/12",
          "state": "inactive"
        }
```

```
        }
      ]
    }
]
```

Retrieve service order

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

Description

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

Usage Samples

Here's a sample of a request for retrieving a ServiceOrder resource based on its id

Request

```
GET {apiRoot}/serviceOrder/43
Accept: application/json
```

Response

```
200

{
    "id": "42",
    "href": "http://serverlocation:port/serviceOrderingManagement/v4/serviceOrder/42",
    "externalId": "OrangeBSS747",
    "priority": "1",
    "description": "Service order description",
    "category": "TMF resource illustration",
    "state": "acknowledged",
    "orderDate": "2018-01-12T09:37:40.508Z",
    "completionDate": "",
    "requestedStartDate": "2018-01-15T09:37:40.508Z",
    "requestedCompletionDate": "2018-01-15T09:37:40.508Z",
    "expectedCompletionDate": "2018-01-15T09:37:40.508Z",
    "startDate": "2018-01-12T09:37:40.508Z",
    "@type": "ServiceOrder",
    "note": [{
        "date": "2018-01-15T09:37:40.508Z",
    "author": "Jean Pontus",
    "text": "Some text"
  }],
  "relatedParty": [
    {
      "id": "456",
      "href": "http://serverlocation:port/partyManagement/v4/party/456",
      "role": "requester",
      "name": "Jean Pontus",
      "@referredType": "Individual"
    }
  ],
  "orderItem": [
    {
      "id": "1",
      "action": "add",
      "state": "acknowledged",
      "service": {
        "@type": "vCPE",
        "@schemaLocation": "http//my.schemas/vCpe.schema.json",
        "state": "active",
        "serviceType": "CFS",
        "serviceCharacteristic": [
          {
            "name": "vCPE_IP",
            "valueType": "object",
            "value": {
              "@type": "IPAddress",
              "@schemaLocation": "http://my.schemas/IPAddress.schema.json",
              "vCPE_IP": "193.218.236.21"
            }
          }
        ],
        "serviceSpecification": {
          "@type": "ONAPServiceSpec",
          "@schemaLocation": "http//my.schemas/OnapServiceSpec.schema.json",
          "id": "12",
          "href": "http://.../serviceSpecification/12",
          "name": "vCPE",
          "version": "1",
          "invariantUUID": "456-852-357",
          "toscaModelURL": "http//...",
          "targetServiceSchema": {
            "@type": "vCPE",
            "@schemaLocation": "http//my.schemas/vCpe.schema.json"
          }
        }
      }
    },
    {
      "id": "2",
      "action": "modify",
      "state": "acknowledged",
      "service": {
        "id": "456",
        "href": "http://serverlocation:port/serviceInventoryManagement/v4/service/456",
        "state": "active",
        "serviceType": "CFS",
        "serviceCharacteristic": [
          {
            "name": "Characteristic1",
            "value": "newValue"
          }
        ],
        "supportingResource": [
          {
            "id": "3456_DFG5-H690",
            "href": "http://...",
            "@referredType": "CloudResource"
          }
        ]
      }
    },
    {
      "id": "3",
      "action": "add",
      "state": "acknowledged",
      "service": {
        "state": "active",
        "serviceType": "CFS",
        "serviceRelationship": [
          {
            "relationshipType": "reliesOn",
            "service": {
              "href": "https://.../serviceManagement/v4/service/45",
              "id": "45"
            }
          }
        ],
        "serviceSpecification": {
          "id": "48",
          "href": "http//..../48",
          "name": "genericService48",
          "version": "2"
        }
      }
    },
    {
      "id": "4",
      "action": "modify",
      "state": "acknowledged",
      "service": {
        "id": "12",
        "href": "http://serverlocation:port/serviceInventoryManagement/v4/service/12",
        "state": "inactive"
      }
      }
    ]
}
```

Create service order

POST /serviceOrder

Description

This operation creates a service order entity.

Mandatory and Non Mandatory Attributes

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

POST request should be used without specifying following attributes (these attributes will be defined by server side):

- id
- href
- state
- orderDate
- completionDate (once service order completed)
- expectedCompletionDate
- startDate
- orderItem.state

Mandatory Attributes	Rule
orderItem	

Non Mandatory Attributes	Default Value	Rule
category		
completionDate		
description		
expectedCompletionDate		
externalId		
note		
notificationContact		
orderDate		
orderRelationship		

Non Mandatory Attributes	Default Value	Rule
priority	4 (lowest)	
relatedParty		
requestedCompletionDate		
requestedStartDate		
startDate		
state		

Additional Rules

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

Context	Mandatory Sub-Attributes
orderItem	id, action, service
relatedParty	name, role

The following table indicates non-mandatory sub-attributes when creating a service order.

Non Mandatory Sub Attributes	Default Value	Rule
orderItem.ServiceSpecification		The serviceSpecification may not be useful when doing a “modify” or “delete” on an owned Service
orderItem.place		
orderItem.appointment		
orderItem.orderItemRelationship		
orderRelationship		
ServiceOrderItem.Service.serviceState	active	

Following table describes additional rules to conditional mandatory attributes

if OrderRelationship is provided	type and (id AND/OR href) are required
if AppointmentRef is provided	(id AND/OR href) is required
if OrderItemRelationship is provided	type and id are required
if RelatedPartyRef is provided	(id AND/OR href AND/OR name) and role are required
if Place is provided	(id AND/OR href) and role are required
if ServiceSpecificationRef is provided	(id AND/OR href) is required
if Note is provided	date, author and text are required
if ServiceRelationship is provided	type and service (ref or value) are required
if ServiceCharacteristic is provided	name, valueType and value are required

ServiceOrderItem.Service.id AND/OR ServiceOrderItem.Service.href	Mandatory if serviceOrderItem.action different from ‘add’

The following pre-conditions apply for this operation.

Pre-conditions
When creating a service order (post) an order item should not have the state field valorized

Usage Samples

Here's a sample of a request for creating a ServiceOrder resource. We use the ‘fields’ parameter to restrict the numbers of attributes returned in the response.

Request

```
POST {apiRoot}/serviceOrder?fields=id,href
Content-Type: application/json

{
   "externalId": "OrangeBSS748",
   "priority": "1",
   "description": "Service order description",
   "category": "TMF resource illustration",
   "requestedStartDate": "2018-01-15T09:37:40.508Z",
   "requestedCompletionDate": "2018-01-15T09:37:40.508Z",
   "@type": "ServiceOrder",
   "orderItem": [
      {
         "id": "1",
         "action": "add",
         "@type": "ServiceOrder",
         "service": {
            "serviceState": "active",
            "type": "CFS",
            "serviceCharacteristic": [
               {
                  "name": "vCPE_IP",
                  "valueType": "object",
                  "value": {
                     "@type": "IPAddress",
                     "@schemaLocation": "http://my.schemas/IPAddress.schema.json",
                     "vCPE_IP": "193.218.236.26"
                  }
               }
            ],
            "serviceSpecification": {
               "id": "12",
               "href": "http://...:serviceSpecification/12",
                "name": "vCPE",
                "version": "1",
                "@type": "vCPE",
                "@schemaLocation": "http..."
            }
        }
    }
  ]
}
```

Response

```
201

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

Patch service order

PATCH /serviceOrder/{id}

Description

This operation allows partial updates of a service order entity. Support of json/merge (https://tools.ietf.org/html/rfc7386) is mandatory, support of json/patch (http://tools.ietf.org/html/rfc5789) is optional.

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

Patchable and Non Patchable Attributes

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

Patchable Attributes	Rule
category	
description	
expectedCompletionDate	
note	
notificationContact	
orderItem	
orderRelationship	

Patchable Attributes	Rule
startDate	

Conditional Patchable Attributes	Rule
relatedParty	Only when order is in “Acknowledged” state – delivery process not started
requestedCompletionDate	Only when order is in “Acknowledged” state – delivery process not started
requestedStartDate	Only when order is in “Acknowledged” state – delivery process not started
serviceOrderItem.service	Only when order is in “Acknowledged” state – delivery process not started
serviceOrderItem.appointment	Only when order is in “Acknowledged” state – delivery process not started or suspended
serviceOrderItem.orderItemRelationship	Only when order is in “Acknowledged” state – delivery process not started or suspended
serviceOrderItem.service.serviceSpecification	Only when order is in “Acknowledged” state – delivery process not started or suspended
serviceOrderItem.service.place	Only when order is in “Acknowledged” state – delivery process not started or suspended
serviceOrderItem.service.serviceRelationship	Only when order is in “Acknowledged” state – delivery process not started or suspended
serviceOrderItem.service.serviceCharacteristic	Only when order is in “Acknowledged” state – delivery process not started or suspended
serviceOrderItem.relatedParty	Only when order is in “Acknowledged” state – delivery process not started

Non Patchable Attributes	Rule
href	
id	
externalId	
priority	
state	
orderDate	
completionDate	
orderItem.id	
orderItem.action	
orderItem.state	

Additional Rules

The following pre-conditions apply for this operation.

Pre-conditions
When creating a service order (post) an order item should not have the state field valorized

Usage Samples

Here's an example of a request for patching a ServiceOrder resource with change on following attributes: description, requestedStartDate, requestedCompletionDate, vCPE IP (characteristic) value

Request

```
PATCH {apiRoot}/serviceOrder/42
Content-Type: application/json-patch+json

ServiceOrder_partialupdate_1_request.sample.json
```

Response

```
200

{
   "id": "42",
   "href": "https://host:port/serviceOrder/42"
}
```

Delete service order

DELETE /serviceOrder/{id}

Description

This operation deletes a service order entity.

Usage Samples

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

Request

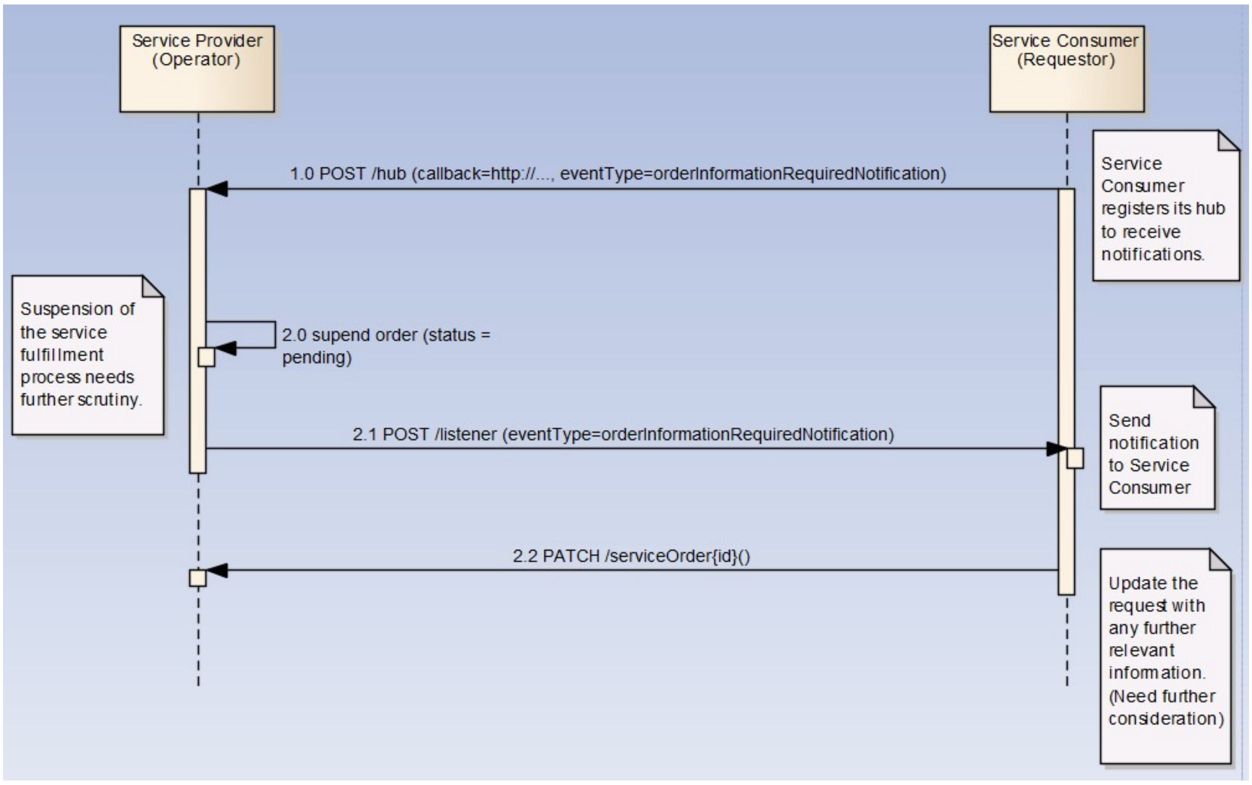
```
DELETE {apiRoot}/serviceOrder/42
```

Response
204

API NOTIFICATIONS

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

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


Service Provider (Operator)
Service Consumer (Requestor)
1.0 POST /hub (callback=http://..., eventType=orderInformationRequiredNotification)
Service Consumer registers its hub to receive notifications.
Suspension of the service fulfillment process needs further scrutiny.
2.0 supend order (status = pending)
2.1 POST /listener (eventType=orderInformationRequiredNotification)
Send notification to Service Consumer
2.2 PATCH /serviceOrder{id}()
Update the request with any further relevant information. (Need further consideration)

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.

Acknowledgements

Document History

Version History

Version Number	Date	Release led by:	Description
Release 1.0		Pierre Gauthier, TM Forum pgauthier@tmforum.org Andrew Forth aforth@amdocs.com August-Wilhelm Jagau August-wilhelm.jagau@ericsson.com	First Release of the Document.
Release 2.0	24 Oct 2016	Pierre Gauthier, TM Forum pgauthier@tmforum.org Ludovic Robert Orange ludovic.robert@orange.com Nicoleta Stoica Vofadone nicoleta.stoica@vodafone.com Jean-Luc Tymen Orange jeanluc.tymen@orange.com	Alignment with Guidelines 3.0
Release 4.0	16 Jan 2019	Pierre Gauthier, TM Forum pgauthier@tmforum.org Ludovic Robert Orange ludovic.robert@orange.com Mariano Belaunde, Orange mariano.belaunde@orange.com	

Release History

Release Number	Date	Release led by:	Description
18.5.0	16 Jan 2019	Pierre Gauthier TM Forum pgauthier@tmforum.org Ludovic Robert Orange ludovic.robert@orange.com Mariano Belaunde Orange mariano.belaunde@orange.com	

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