

# TM Forum Specification

## Service Activation and Configuration API User Guide

**TMF640**

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N/A

## INTRODUCTION

Services may be activated or configured by the Activation and Configuration API.

The following examples use the characteristic specification and the strongly typed patterns.

- 1) Using the characteristic specification pattern. When the characteristic specification pattern is used it is assumed that a service specification with the corresponding characteristic specifications exist.

```
"id" : "id1234567890",
"href" : "http://..",
  "state" : "active",
  "serviceSpecification":{
    "id":"conferenceBridgeEquipment",
    "href":"http://serverlocation:port/catalogManagement/serviceSpecification /conferenceBridgeEquipment"
  },
"characteristic":[
{
  "name":"numberOfVc500Units",
  "valueType": "integer",
  "value":"1"
},
{
  "name":"numberOfVc100Units",
  "valueType": "integer",
  "value":"2"
},
{
  "name":"routerType",
  "valueType": "string",
  "value":"CiscoASR1000"
},
{
  "name":"powerSupply",
  "valueType": "string",
  "value":"UK"
}
}]
}
```

- 2) Using the Strongly typed pattern. When the strongly typed pattern is used it is assumed that a corresponding YAML or JSON schema is defined for the Service.

```
{
  "id" : "id1234567890",
  "href" : "http://..",
  "state" : "active",
  "@type" : "conferenceBridgeEquipment",
  "@schemaLocation" : "http://../conferenceBridgeEquipment.json",

  "serviceSpecification":{
    "id":"conferenceBridgeEquipment",
    "href":"http://serverlocation:port/catalogManagement/serviceSpecification /conferenceBridgeEquipment"
  },
  "numberOfVc500Units": "1",
}
```

```
"numberOfVc100Units": "2",  
"routerType": "CiscoASR1000",  
"powerSupply": "UK"  
}  
}
```

## SAMPLE USE CASES

The order to activate functional area includes all activities to support the business/customer layer in delivering ordered services. Order to activate also includes any changes (inflight and post activation) along with lifecycle management of the service.

### Use Cases include:

- Create new service
- Monitor long running service creation process
- Modify inflight service creation
- Cancel inflight service creation
- Modify existing service
- Suspend service / restore service
- Remove service
- Check feasibility of a service
- Design and Assign a service and reserve resources
- Create an inactive service
- Activate an inactive service
- Retrieve service details



## 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 TypeAService or TypeBService inheriting properties from the base Service entity.

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

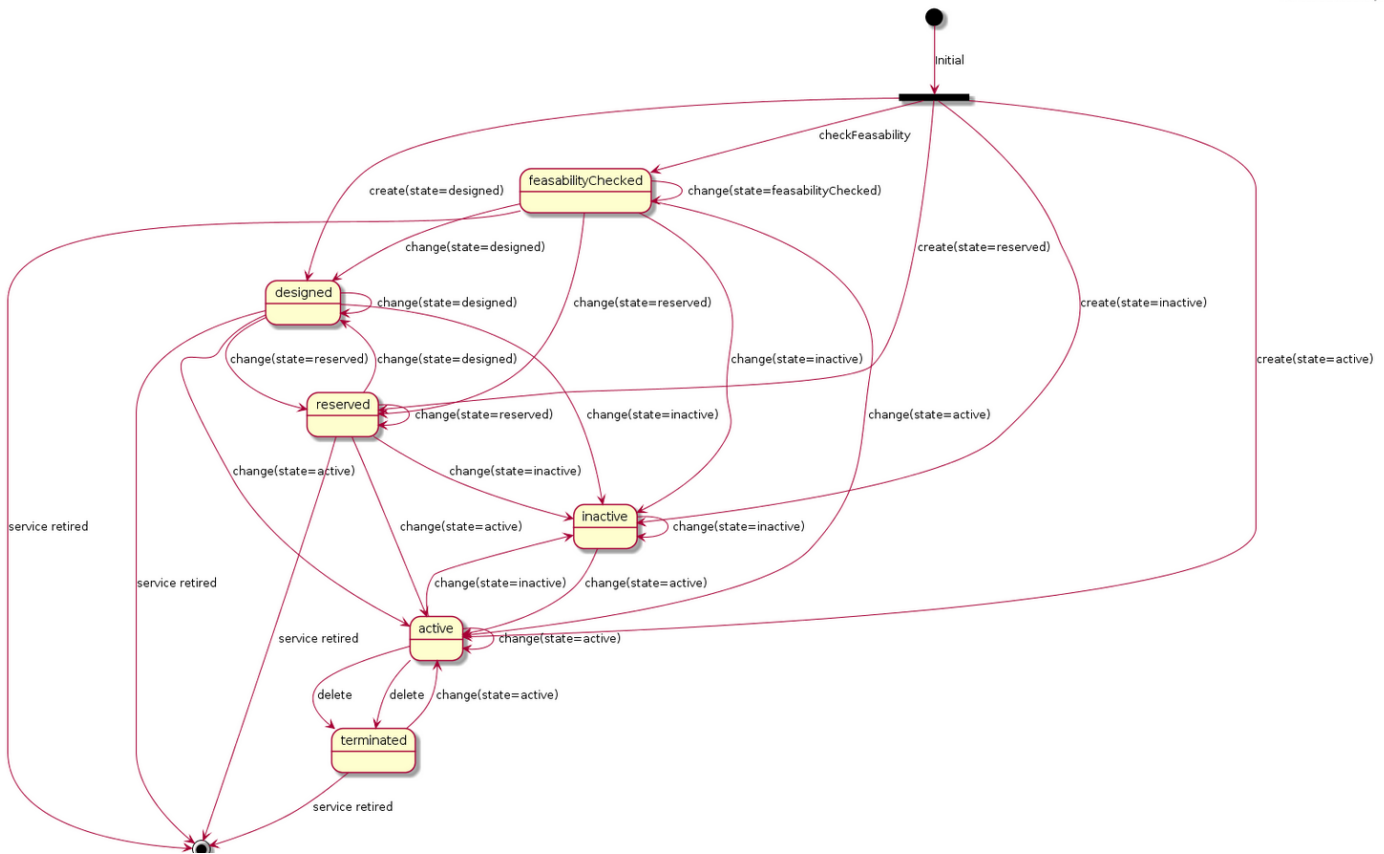
The @type attribute provides a way to represent the actual class type of an entity. For example, within a list of Service instances some may be instances of TypeAService where other could be instances of TypeBService. The @type gives this information. All resources and sub-resources of this API have 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.





The following table provided service state explanation:

A service is in state...	when the Service Component Activation Interface shall support the following operations
<b>feasibilityChecked</b>	The service component OS is requested to determine whether the necessary resources are available and sufficient for the installation of a given service. It should be noted that this is just an initial feasibility check and no RFS is created.
<b>designed</b>	The Service Component OS is requested to design the service. This could be use to allocate resource but nothing is supposed to be reserved.
<b>reserved</b>	The Service Component OS is requested to reserve a resource, or a set of resources, required for a service. This situation allows for the requesting OS to determine whether the underlying resources are available and reserve them in order to support a service (a RFS). As a result of the reservation request, a service is instantiated & reserved.
<b>inactive</b>	The service is deactivated - The Resource Facing service is deactivated and thus is no longer available for service. It remains allocated to the CFS that is managed by the high level service activation OS
<b>active</b>	The service component OS is requested to activate a given resource facing service such that the component is fully available and active as part of the CFS.
<b>terminated</b>	When this request is complete, all RFS component shall be in active state The service is 'logically deleted'. The resource facing service is deleted and thus allocated from the CFS. All associated resources are freed and made available for service to other users.

**Field descriptions**Service fields

category	A string. Is it a customer facing or resource facing service.
description	A string. Free-text description of the service.
endDate	A date time (DateTime). Date when the service ends.
feature	A list of features (Feature [*]). A list of feature associated with this service.
hasStarted	A boolean. If TRUE, this Service has already been started.
href	A string. Reference of the service.
id	A string. Unique identifier of the service.
isBundle	A boolean. If true, the service is a ServiceBundle which regroup a service hierachy. If false, the service is a 'atomic' service (hierachy leaf).
isServiceEnabled	A boolean. If FALSE and hasStarted is FALSE, this particular Service has NOT been enabled for use - if FALSE and hasStarted is TRUE then the service has failed.
isStateful	A boolean. If TRUE, this Service can be changed without affecting any other services.
name	A string. Name of the service.
note	A list of notes (Note [*]). A list of notes made on this service.
place	A list of related place ref or values (RelatedPlaceRefOrValue [*]). A list of places (Place [*]). Used to define a place useful for the service (for example a geographical place whre the service is installed).
relatedEntity	A list of related entity ref or values (RelatedEntityRefOrValue [*]). A list of related entity in relationship with this service.
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 [*]).
serviceDate	A string. Date when the service was created (whatever its status).
serviceOrderItem	A list of related service order items (RelatedServiceOrderItem [*]). A list of service order items related to this service.

serviceRelationship	A list of service relationships (ServiceRelationship [*]). A list of service relationships (ServiceRelationship [*]). Describes links with other service(s) in the inventory.
serviceSpecification	A service specification reference (ServiceSpecificationRef). The specification from which this service was instantiated.
serviceType	A string. Business type of the service.
startDate	A date time (DateTime). Date when the service starts.
startMode	A string. This attribute is an enumerated integer that indicates how the Service is started, such as: 0: Unknown; 1: Automatically by the managed environment; 2: Automatically by the owning device; 3: Manually by the Provider of the Service; 4: Manually by a Customer of the Provider; 5: Any of the above.
state	A service state type (ServiceStateType). The life cycle state of the service, such as designed, reserved, active, etc...
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 ref or values (ServiceRefOrValue [*]). A list of supporting services (SupportingService [*]). A collection of services that support this service (bundling, link CFS to RFS).

#### Characteristic sub-resource

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

@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). A URI to a JSON-Schema file that defines additional attributes and relationships.
@type	A string. When sub-classing, this defines the sub-class Extensible name.
characteristicRelationship	A list of characteristic relationships (CharacteristicRelationship [*]). Another Characteristic that is related to the current Characteristic;.
id	A string. Unique identifier of the characteristic.
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.

#### CharacteristicRelationship sub-resource

Another Characteristic that is related to the current Characteristic;.

id A string. Unique identifier of the characteristic.

relationshipType A string. The type of relationship.

#### Feature sub-resource

Configuration feature.

constraint A list of constraint references (ConstraintRef [\*]). This is a list of feature constraints.

featureCharacteristic A list of characteristics (Characteristic [1..\*]). This is a list of Characteristics for a particular feature.

featureRelationship A list of feature relationships (FeatureRelationship [\*]). Configuration feature.

id A string. Unique identifier of the feature.

isBundle A boolean. True if this is a feature group. Default is false.

isEnabled A boolean. True if this feature is enabled. Default is true.

name A string. This is the name for the feature.

#### FeatureRelationship sub-resource

Configuration feature.

id A string. Unique identifier of the target feature.

name A string. This is the name of the target feature.

relationshipType A string. This is the type of the feature relationship.

validFor A time period. The period for which this feature relationship is valid.

#### 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.

id A string. Identifier of the note within its containing entity (may or may not be globally unique, depending on provider implementation).

text A string. Text of the note.

#### RelatedEntityRefOrValue sub-resource

A reference to an entity, where the type of the entity is not known in advance. A related entity defines a entity described by reference or by value linked to a specific entity. The polymorphic attributes @type, @schemaLocation & @referredType are related to the Entity and not the RelatedEntityRefOrValue class itself.

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

#### 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.
name	A string. Name of the related entity.
href	An uri (Uri). Hyperlink reference.
id	A string. unique identifier.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). A URI to a JSON-Schema file that defines additional attributes and relationships.
@type	A string. When sub-classing, this defines the sub-class Extensible name.
role	A string. Role played by the related party.

#### RelatedPlaceRefOrValue sub-resource

Related Entity reference. A related place defines a place described by reference or by value linked to a specific entity. The polymorphic attributes @type, @schemaLocation & @referredType are related to the place entity and not the RelatedPlaceRefOrValue class itself.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
name	A string. A user-friendly name for the place, such as [Paris Store], [London Store],

[Main Home].

href	A string. Unique reference of the place.
id	A string. Unique identifier of the place.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). A URI to a JSON-Schema file that defines additional attributes and relationships.
@type	A string. When sub-classing, this defines the sub-class Extensible name.
role	A string.

#### RelatedServiceOrderItem sub-resource

RelatedServiceOrderItem (a ServiceOrder item) .The service order item which triggered service creation/change/termination.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
itemAction	An order item action type (OrderItemActionType). Action of the order item for this service.
itemId	A string. Identifier of the order item where the service was managed.
role	A string. role of the service order item for this service.
serviceOrderHref	A string. Reference of the related entity.
serviceOrderId	A string. Unique identifier of a related entity.

#### ServiceRefOrValue sub-resource

A Service to be created defined by value or existing defined by reference. The polymorphic attributes @type, @schemaLocation & @referredType are related to the Service entity and not the RelatedServiceRefOrValue class itself.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
name	A string. Name of the service.
href	A string. Reference of the service.
id	A string. Unique identifier of the service.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). A URI to a JSON-Schema file that defines additional attributes and relationships.



@type	A string. When sub-classing, this defines the sub-class Extensible name.
category	A string. Is it a customer facing or resource facing service.
description	A string. Free-text description of the service.
endDate	A date time (DateTime). Date when the service ends.
hasStarted	A boolean. If TRUE, this Service has already been started.
isBundle	A boolean. If true, the service is a ServiceBundle which regroup a service hierachy. If false, the service is a 'atomic' service (hierachy leaf).
isServiceEnabled	A boolean. If FALSE and hasStarted is FALSE, this particular Service has NOT been enabled for use - if FALSE and hasStarted is TRUE then the service has failed.
isStateful	A boolean. If TRUE, this Service can be changed without affecting any other services.
serviceDate	A string. Date when the service was created (whatever its status).
serviceType	A string. Business type of the service.
startDate	A date time (DateTime). Date when the service starts.
startMode	A string. This attribute is an enumerated integer that indicates how the Service is started, such as: 0: Unknown; 1: Automatically by the managed environment; 2: Automatically by the owning device; 3: Manually by the Provider of the Service; 4: Manually by a Customer of the Provider; 5: Any of the above.
feature	A list of features (Feature [*]). A list of feature associated with this service.
note	A list of notes (Note [*]). A list of notes made on this service.
place	A list of related place ref or values (RelatedPlaceRefOrValue [*]). A list of places (Place [*]). Used to define a place useful for the service (for example a geographical place whre the service is installed).
relatedEntity	A list of related entity ref or values (RelatedEntityRefOrValue [*]). A list of related entity in relationship with this service.
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 [*]).
serviceOrderItem	A list of related service order items (RelatedServiceOrderItem [*]). A list of service order items related to this service.

serviceRelationship	A list of service relationships (ServiceRelationship [*]). A list of service relationships (ServiceRelationship [*]). Describes links with other service(s) in the inventory.
serviceSpecification	A service specification reference (ServiceSpecificationRef). The specification from which this service was instantiated.
state	A service state type (ServiceStateType). The life cycle state of the service, such as designed, reserved, active, etc...
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 ref or values (ServiceRefOrValue [*]). A list of supporting services (SupportingService [*]). A collection of services that support this service (bundling, link CFS to RFS).

ServiceRelationship sub-resource

relationshipType	A string.
service	A service ref or value (ServiceRefOrValue). A Service to be created defined by value or existing defined by reference. The polymorphic attributes @type, @schemaLocation & @referredType are related to the Service entity and not the RelatedServiceRefOrValue class itself.
serviceRelationshipCharacteristic	A list of characteristics (Characteristic [*]). Describes a given characteristic of an object or entity through a name/value pair.

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.

ResourceRef relationship

@referredType	A string. The actual type of the target instance when needed for disambiguation.
---------------	--

name	A string. Name of the related entity.
href	An uri (Uri). Hyperlink reference.
id	A string. unique identifier.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). A URI to a JSON-Schema file that defines additional attributes and relationships.
@type	A string. When sub-classing, this defines the sub-class Extensible name.

### 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.
name	A string. Name of the related entity.
href	An uri (Uri). Hyperlink reference.
id	A string. unique identifier.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). A URI to a JSON-Schema file that defines additional attributes and relationships.
@type	A string. When sub-classing, this defines the sub-class Extensible name.
version	A string. Service specification version.

### Json representation sample

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

```
{
  "id": "123-456",
  "href": "http://serverlocation:port/serviceActivationConfiguration/v4/service/123-456",
  "category": "MobileService",
  "description": "Mobile Line ",
  "hasStarted": true,
  "isBundle": false,
  "isServiceEnabled": true,
  "isStateful": true,
  "serviceDate": "020-04-01T12:15:39.434Z",
  "startDate": "2020-04-03T12:15:39.434Z",
  "feature": [
    {
      "id": "1",
      "isBundle": false,
      "isEnabled": true,
    }
  ]
}
```

```
"name": "Voice",
"featureCharacteristic": [
  {
    "id": "1",
    "name": "VoiceFeatureCharacteristic",
    "valueType": "object",
    "value": [
      {
        "voiceStandard": "enable",
        "voWifi": "disable",
        "roaming": "enable",
        "@schemaLocation": ".../serviceSpecification/11/featureSpecification/1/VoiceFeatureCharacteristic.json",
        "@type": "VoiceFeatureCharacteristic"
      }
    ],
    "@type": "FeatureCharacteristic"
  }
],
"@type": "Feature"
},
{
  "id": "2",
  "isEnabled": false,
  "name": "Data",
  "featureCharacteristic": [
    {
      "id": "75",
      "name": "isGreen",
      "valueType": "string",
      "value": "enable"
    }
  ],
  "@type": "Feature"
},
{
  "id": "3",
  "isEnabled": true,
  "name": "Messaging",
  "featureCharacteristic": [
    {
      "id": "74",
      "name": "incomingSMS",
      "valueType": "string",
      "value": "enable"
    },
    {
      "id": "73",
      "name": "outgoingSMS",
      "valueType": "string",
      "value": "enable"
    }
  ],
  "@type": "Feature"
}
],
"relatedParty": [
```

```

{
  "id": "78",
  "href": ".../partyManagement/v4/organization/78",
  "name": "TMF Telco",
  "role": "Service Provider",
  "@referredType": "Organization"
},
{
  "id": "12",
  "href": ".../partyManagement/v4/individual/12",
  "name": "Jean Pontus",
  "role": "user",
  "@referredType": "Individual"
}
],
"serviceCharacteristic": [
  {
    "id": "89",
    "name": "MSISDN",
    "valueType": "string",
    "value": "415-275-7439"
  }
],
"serviceSpecification": {
  "id": "cfs45",
  "href": ".../serviceCatalog/v4/serviceSpecification/cfs45",
  "name": "c_Mobile",
  "@type": "serviceSpecification",
  "@referredType": "ServiceSpecification"
},
"state": "active",
"supportingService": [
  {
    "serviceSpecification": {
      "id": "cfs89",
      "href": ".../serviceCatalog/v4/serviceSpecification/cfs89",
      "name": "c_MobileSupport",
      "@type": "serviceSpecification",
      "@referredType": "ServiceSpecification"
    },
    "serviceCharacteristic": [
      {
        "id": "sd-8",
        "name": "IMSI",
        "valueType": "string",
        "value": "228 01 21 76510739 "
      }
    ],
    "state": "active",
    "@type": "Service"
  }
],
{
  "id": "741-853",
  "href": "http://serverlocation:port/serviceActivationConfiguration/v4/service/741-853",
  "@referredType": "Service",
  "@type": "ServiceRef"
}

```

```

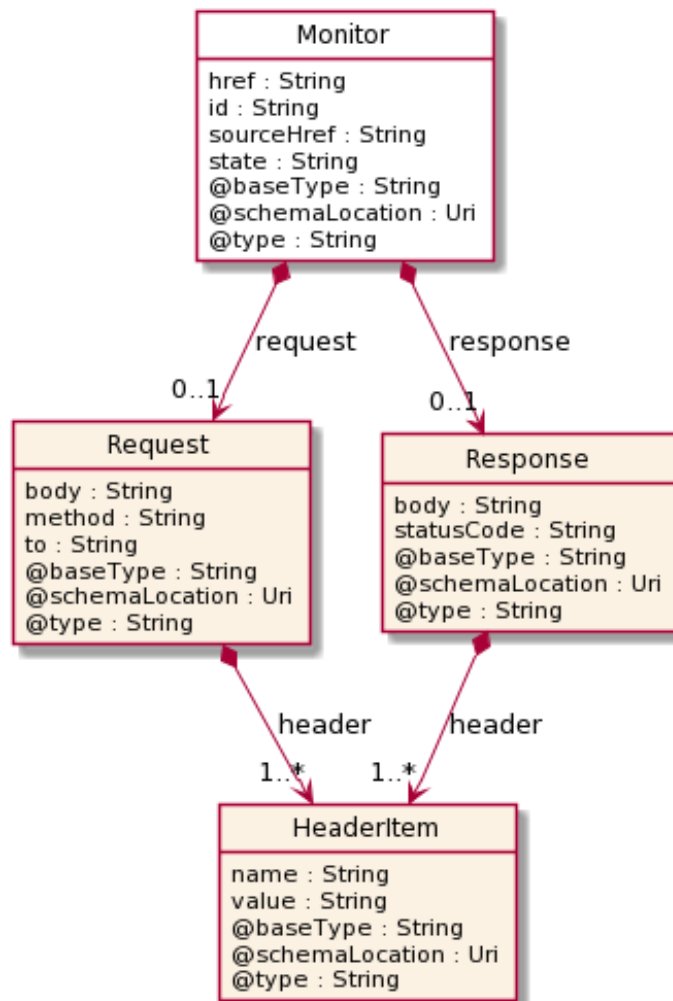
    }
  ],
  "@type": "Service"
}

```

## Monitor resource

Monitoring of resources.

### Resource model



### Field descriptions

#### Monitor fields

- href** A string. reference to this monitor.
- id** A string. Identifier of an instance of the monitor. Required to be unique within the resource type. Used in URIs as the identifier for specific instances of a type.
- request** A request (Request). Represents the request.

response	A response (Response). Represents the response.
sourceHref	A string. The monitored resource href.
state	A string. The Monitor state of the resource. InProgress, InError, Completed.

HeaderItem sub-resource

An item typically included in a request or response.

name	A string. The name of the header item, e.g. locale.
value	A string. The value of the header item, e.g. en-us.

Request sub-resource

A response to a request.

body	A string. The body of the request. For example for an HTTP request might contain content of a form .
header	A list of header items (HeaderItem [1..*]). Items included in the header of the request. For example for an HTTP request might contain requested locale, basic authentication.
method	A string. The protocol of the request, e.g. http.
to	A string. The target of the request, e.g. a URL for an HTTP request.

Response sub-resource

A response to a request.

body	A string. The body of the response. For example for an HTTP response might contain HTML for rendering.
header	A list of header items (HeaderItem [1..*]). Items included in the header of the response. For example for an HTTP response might contain negotiated locale.
statusCode	A string. The status of the response. For example for an HTTP response would be codes such as 200, 400, etc.

**Json representation sample**

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

```
{
  "id": "44555",
  "href": "https://serverlocation:port/ServiceActivationAndConfiguration/v4/monitor/44555",
  "state": "completed",
  "request": {
    "method": "POST",
```

```
"to": "http://serverlocation:port/serviceActivationConfiguration/v4/service/",
"body": "Active Mobile Line",
"header": [
  {
    "name": "locale",
    "value": "en-us"
  }
],
},
"response": {
  "statusCode": "201",
  "body": "Activated Mobile Line",
  "header": [
    {
      "name": "locale",
      "value": "en-us"
    }
  ]
},
},
"sourceHref": "http://serverlocation:port/serviceActivationConfiguration/v4/service/123-456",
"@type": "Monitor"
}
```

## Notification Resource Models

8 notifications are defined for this API

Notifications related to Service:

- ServiceCreateEvent
- ServiceAttributeValueChangeEvent
- ServiceStateChangeEvent
- ServiceDeleteEvent

Notifications related to Monitor:

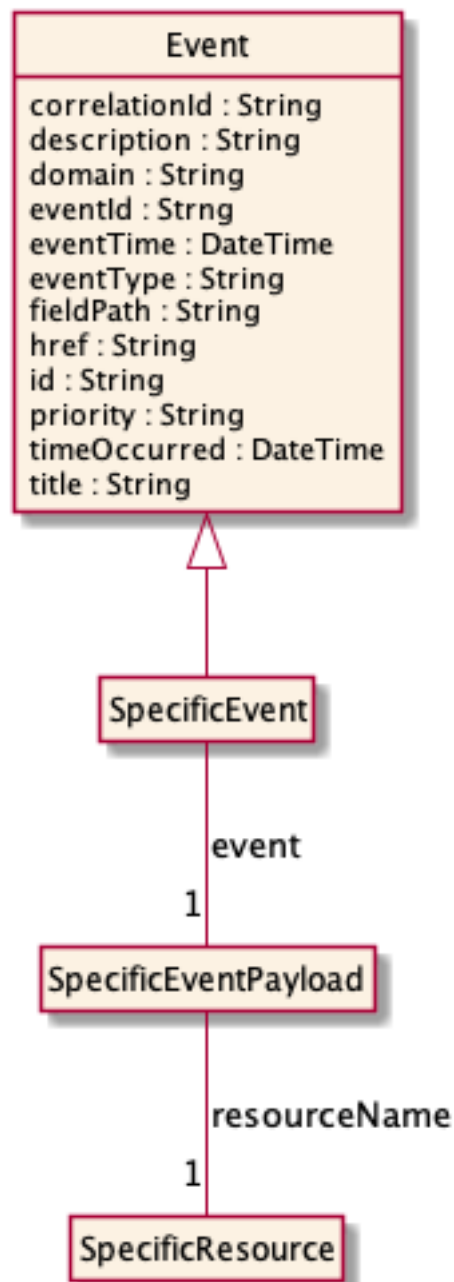
- MonitorCreateEvent
- MonitorAttributeValueChangeEvent
- MonitorStateChangeEvent
- MonitorDeleteEvent

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).





## Service Create Event

Notification ServiceCreateEvent case for resource Service

### Json representation sample

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

```

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

```

    {
      {-- SEE Service RESOURCE SAMPLE --}
    }
  }

```

## Service Attribute Value Change Event

Notification ServiceAttributeValueChangeEvent case for resource Service

### Json representation sample

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

```

{
  "eventId":"00001",
  "eventTime":"2015-11-16T16:42:25-04:00",
  "eventType":"ServiceAttributeValueChangeEvent",
  "event": {
    "service" :
      {-- SEE Service RESOURCE SAMPLE --}
  }
}

```

## Service State Change Event

Notification ServiceStateChangeEvent case for resource Service

### Json representation sample

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

```

{
  "eventId":"00001",
  "eventTime":"2015-11-16T16:42:25-04:00",
  "eventType":"ServiceStateChangeEvent",
  "event": {
    "service" :
      {-- SEE Service RESOURCE SAMPLE --}
  }
}

```

## Service Delete Event

Notification ServiceDeleteEvent case for resource Service

### Json representation sample

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

```

{

```

```
"eventId":"00001",
"eventTime":"2015-11-16T16:42:25-04:00",
"eventType":"ServiceDeleteEvent",
"event": {
  "service" :
    {-- SEE Service RESOURCE SAMPLE --}
}
}
```

## Monitor Create Event

Notification MonitorCreateEvent case for resource Monitor

### Json representation sample

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

```
{
  "eventId":"00001",
  "eventTime":"2015-11-16T16:42:25-04:00",
  "eventType":"MonitorCreateEvent",
  "event": {
    "monitor" :
      {-- SEE Monitor RESOURCE SAMPLE --}
  }
}
```

## Monitor Attribute Value Change Event

Notification MonitorAttributeValueChangeEvent case for resource Monitor

### Json representation sample

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

```
{
  "eventId":"00001",
  "eventTime":"2015-11-16T16:42:25-04:00",
  "eventType":"MonitorAttributeValueChangeEvent",
  "event": {
    "monitor" :
      {-- SEE Monitor RESOURCE SAMPLE --}
  }
}
```

## Monitor State Change Event

Notification MonitorStateChangeEvent case for resource Monitor

### Json representation sample

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

```
{
  "eventId":"00001",
  "eventTime":"2015-11-16T16:42:25-04:00",
  "eventType":"MonitorStateChangeEvent",
  "event": {
    "monitor" :
      {-- SEE Monitor RESOURCE SAMPLE --}
  }
}
```

### Monitor Delete Event

Notification MonitorDeleteEvent case for resource Monitor

#### Json representation sample

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

```
{
  "eventId":"00001",
  "eventTime":"2015-11-16T16:42:25-04:00",
  "eventType":"MonitorDeleteEvent",
  "event": {
    "monitor" :
      {-- SEE Monitor 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

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 Service

#### List services

**GET /service?fields=...&{filtering}**

#### Description

This operation list service 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 services from the network.

<b>Request</b>
GET /tmf-api/ServiceActivationAndConfiguration/v4/service?fields=id,name,state&serviceType=Cloud&state=Active Accept: application/json
<b>Response</b>
200  [ { "id": "5351", "name": "vCPE serial 1355615", "state": "active" }, { "id": "5352", "name": "vDPI serial 1355445", "state": "active" } ]

## Retrieve service

**GET /service/{id}?fields=...&{filtering}**

### Description

This operation retrieves a service 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 service from the network. The level of detail returned is minimal, according to what might be held in the network.

<b>Request</b>
GET /tmf-api/ServiceActivationAndConfiguration/v4/service/123-456 Accept: application/json
<b>Response</b>

```
200
{
  "id": "123-456",
  "href": "http://serverlocation:port/serviceActivationConfiguration/v4/service/123-456",
  "category": "MobileService",
  "description": "Mobile Line ",
  "hasStarted": true,
  "isBundle": false,
  "isServiceEnabled": true,
  "isStateful": true,
  "serviceDate": "020-04-01T12:15:39.434Z",
  "startDate": "2020-04-03T12:15:39.434Z",
  "feature": [
    {
      "id": "1",
      "isBundle": false,
      "isEnabled": true,
      "name": "Voice",
      "featureCharacteristic": [
        {
          "id": "1",
          "name": "VoiceFeatureCharacteristic",
          "valueType": "object",
          "value": [
            {
              "voiceStandard": "enable",
              "voWifi": "disable",
              "roaming": "enable",
              "@schemaLocation": ".../serviceSpecification/11/featureSpecification/1/VoiceFeatureCharacteristic.json",
              "@type": "VoiceFeatureCharacteristic"
            }
          ]
        }
      ],
      "@type": "FeatureCharacteristic"
    }
  ],
  "@type": "Feature"
},
{
  "id": "2",
  "isEnabled": false,
  "name": "Data",
  "@type": "Feature",
  "featureCharacteristic": [
    {
      "id": "75",
      "name": "isGreen",
      "valueType": "string",
      "value": "enable"
    }
  ]
},
{
  "id": "3",
```

```
"isEnabled": true,
"name": "Messaging",
"featureCharacteristic": [
  {
    "id": "74",
    "name": "incomingSMS",
    "valueType": "string",
    "value": "enable"
  },
  {
    "id": "73",
    "name": "outgoingSMS",
    "valueType": "string",
    "value": "enable"
  }
],
"@type": "Feature"
},
"relatedParty": [
  {
    "id": "78",
    "href": "http://serverlocation:port/partyManagement/v4/organization/78",
    "name": "TMF Telco",
    "role": "Service Provider",
    "@referredType": "Organization"
  },
  {
    "id": "12",
    "href": "http://serverlocation:port/partyManagement/v4/individual/12",
    "name": "Jean Pontus",
    "role": "user",
    "@referredType": "Individual"
  }
],
"serviceCharacteristic": [
  {
    "id": "89",
    "name": "MSISDN",
    "valueType": "string",
    "value": "415-275-7439"
  }
],
"serviceSpecification": {
  "id": "cfs45",
  "href": ".../serviceCatalog/v4/serviceSpecification/cfs45",
  "name": "c_Mobile",
  "@type": "serviceSpecification",
  "@referredType": "ServiceSpecification"
},
"state": "active",
"supportingService": [
  {
    "id": "123-457",
    "href": "http://serverlocation:port/serviceActivationConfiguration/v4/service/123-457",
```



```

"hasStarted": true,
"serviceDate": "020-04-01T12:15:39.434Z",
"startDate": "2020-04-03T12:15:39.434Z",
"serviceSpecification": {
  "id": "cfs89",
  "href": "http://serverlocation:port/serviceCatalog/v4/serviceSpecification/cfs89",
  "name": "c_MobileSupport",
  "@type": "serviceSpecification",
  "@referredType": "ServiceSpecification"
},
"serviceCharacteristic": [
  {
    "id": "sd-8",
    "name": "IMSI",
    "valueType": "string",
    "value": "228 01 21 76510739 "
  }
],
"state": "active",
"@type": "Service"
},
{
  "id": "741-853",
  "href": "http://serverlocation:port/serviceActivationConfiguration/v4/service/741-853",
  "@referredType": "Service",
  "@type": "ServiceRef"
}
],
"@type": "Service"
}

```

## Create service

### POST /service

#### Description

This operation creates a service entity.

#### Mandatory and Non Mandatory Attributes

The following tables provide the list of mandatory and non mandatory attributes when creating a Service, 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
state	
serviceSpecification.id	

Non Mandatory Attributes	Rule
category	

Non Mandatory Attributes	Rule
description	
endDate	
feature	
hasStarted	
isBundle	
isServiceEnabled	
isStateful	
name	
note	
place	
relatedEntity	
relatedParty	
serviceCharacteristic	
serviceDate	
serviceOrderItem	
serviceRelationship	
serviceSpecification	
serviceType	
startDate	
startMode	
supportingResource	
supportingService	

## Usage Samples

Here's an example of a request for activating a new service on the network.

Request
POST /tmf-api/ServiceActivationAndConfiguration/v4/service Content-Type: application/json  <pre>{   "category": "MobileService",   "description": "Mobile Line ",   "feature": [     {       "id": "1",       "isBundle": false,       "isEnabled": true,       "name": "Voice",       "featureCharacteristic": [         {           "id": "1",           "name": "VoiceFeatureCharacteristic",           "valueType": "object",           "value": [             {               "voiceStandard": "enable",</pre>

```
        "voWifi": "disable",
        "roaming": "enable",
        "@schemaLocation": ".../serviceSpecification/11/featureSpecification/1/VoiceFeatureCharacteristic.json",
        "@type": "VoiceFeatureCharacteristic"
    }
],
"@type": "FeatureCharacteristic"
}
],
"@type": "Feature"
},
{
  "id": "2",
  "isEnabled": false,
  "name": "Data",
  "@type": "Feature",
  "featureCharacteristic": [
    {
      "id": "75",
      "name": "isGreen",
      "valueType": "string",
      "value": "enable"
    }
  ]
},
{
  "id": "3",
  "isEnabled": true,
  "name": "Messaging",
  "featureCharacteristic": [
    {
      "id": "74",
      "name": "incomingSMS",
      "valueType": "string",
      "value": "enable"
    },
    {
      "id": "73",
      "name": "outgoingSMS",
      "valueType": "string",
      "value": "enable"
    }
  ],
  "@type": "Feature"
}
],
"relatedParty": [
  {
    "id": "78",
    "name": "TMF Telco",
    "role": "Service Provider",
    "@referredType": "Organization"
  },
  {
    "id": "12",
```

```

    "name": "Jean Pontus",
    "role": "user",
    "@referredType": "Individual"
  }
],
"serviceCharacteristic": [
  {
    "id": "89",
    "name": "MSISDN",
    "valueType": "string",
    "value": "415-275-7439"
  }
],
"serviceSpecification": {
  "id": "cfs45",
  "name": "c_Mobile",
  "@type": "serviceSpecification",
  "@referredType": "ServiceSpecification"
},
"state": "active",
"supportingService": [
  {
    "serviceSpecification": {
      "id": "cfs89",
      "href": ".../serviceCatalog/v4/serviceSpecification/cfs89",
      "name": "c_MobileSupport",
      "@type": "serviceSpecification",
      "@referredType": "ServiceSpecification"
    },
    "serviceCharacteristic": [
      {
        "id": "sd-8",
        "name": "IMSI",
        "valueType": "string",
        "value": "228 01 21 76510739 "
      }
    ],
    "state": "active",
    "@type": "Service"
  },
  {
    "id": "741-853",
    "href": "http://serverlocation:port/serviceActivationConfiguration/v4/service/741-853",
    "@referredType": "Service",
    "@type": "ServiceRef"
  }
],
"@type": "Service"
}

```

**Response**

201

```
{
  "id": "123-456",
  "href": "http://serverlocation:port/serviceActivationConfiguration/v4/service/123-456",
  "category": "MobileService",
  "description": "Mobile Line ",
  "hasStarted": true,
  "isBundle": false,
  "isServiceEnabled": true,
  "isStateful": true,
  "serviceDate": "020-04-01T12:15:39.434Z",
  "startDate": "2020-04-03T12:15:39.434Z",
  "feature": [
    {
      "id": "1",
      "isBundle": false,
      "isEnabled": true,
      "name": "Voice",
      "featureCharacteristic": [
        {
          "id": "1",
          "name": "VoiceFeatureCharacteristic",
          "valueType": "object",
          "value": [
            {
              "voiceStandard": "enable",
              "voWifi": "disable",
              "roaming": "enable",
              "@schemaLocation": ".../serviceSpecification/11/featureSpecification/1/VoiceFeatureCharacteristic.json",
              "@type": "VoiceFeatureCharacteristic"
            }
          ]
        }
      ],
      "@type": "FeatureCharacteristic"
    }
  ],
  "@type": "Feature"
},
{
  "id": "2",
  "isEnabled": false,
  "name": "Data",
  "@type": "Feature",
  "featureCharacteristic": [
    {
      "id": "75",
      "name": "isGreen",
      "valueType": "string",
      "value": "enable"
    }
  ]
},
{
  "id": "3",
  "isEnabled": true,
  "name": "Messaging",
```

```
"featureCharacteristic": [
  {
    "id": "74",
    "name": "incomingSMS",
    "valueType": "string",
    "value": "enable"
  },
  {
    "id": "73",
    "name": "outgoingSMS",
    "valueType": "string",
    "value": "enable"
  }
],
"@type": "Feature"
},
],
"relatedParty": [
  {
    "id": "78",
    "href": ".../partyManagement/v4/organization/78",
    "name": "TMF Telco",
    "role": "Service Provider",
    "@referredType": "Organization"
  },
  {
    "id": "12",
    "href": ".../partyManagement/v4/individual/12",
    "name": "Jean Pontus",
    "role": "user",
    "@referredType": "Individual"
  }
],
"serviceCharacteristic": [
  {
    "id": "89",
    "name": "MSISDN",
    "valueType": "string",
    "value": "415-275-7439"
  }
],
"serviceSpecification": {
  "id": "cfs45",
  "href": ".../serviceCatalog/v4/serviceSpecification/cfs45",
  "name": "c_Mobile",
  "@type": "serviceSpecification",
  "@referredType": "ServiceSpecification"
},
"state": "active",
"supportingService": [
  {
    "id": "123-457",
    "href": "http://serverlocation:port/serviceActivationConfiguration/v4/service/123-457",
    "hasStarted": true,
    "serviceDate": "020-04-01T12:15:39.434Z",
```

```

"startDate": "2020-04-03T12:15:39.434Z",
"serviceSpecification": {
  "id": "cfs89",
  "href": ".../serviceCatalog/v4/serviceSpecification/cfs89",
  "name": "c_MobileSupport",
  "@type": "serviceSpecification",
  "@referredType": "ServiceSpecification"
},
"serviceCharacteristic": [
  {
    "id": "sd-8",
    "name": "IMSI",
    "valueType": "string",
    "value": "228 01 21 76510739 "
  }
],
"state": "active",
"@type": "Service"
},
{
  "id": "741-853",
  "href": "http://serverlocation:port/serviceActivationConfiguration/v4/service/741-853",
  "@referredType": "Service",
  "@type": "ServiceRef"
}
],
"@type": "Service"
}

```

## Patch service

### PATCH /service/{id}

#### Description

This operation allows partial updates of a service 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	

Patchable Attributes	Rule
endDate	
feature	
hasStarted	
isBundle	
isServiceEnabled	
isStateful	
name	
note	
place	
relatedEntity	
relatedParty	
serviceCharacteristic	
serviceOrderItem	
serviceRelationship	
serviceSpecification	
serviceType	
startDate	
startMode	
state	
supportingResource	
supportingService	

Non Patchable Attributes	Rule
id	
href	
serviceDate	

## Usage Samples

Here's an example of a request for updating a service in the network. In this example, a new state is set.

Request
PATCH /tmf-api/ServiceActivationAndConfiguration/v4/service/123-456 Content-Type: application/merge-patch+json  <pre>{   "id": "123-456",   "serviceSpecification": {     "id": "cfs45",     "name": "c_Mobile",     "@type": "serviceSpecification",     "@referredType": "ServiceSpecification"   },   "state": "inactive",   "@type": "Service" }</pre>



Response
<pre> 200 {   "id": "123-456",   "href": "http://serverlocation:port/serviceActivationConfiguration/v4/service/123-456",   "category": "MobileService",   "description": "Mobile Line ",   "hasStarted": true,   "isBundle": false,   "isServiceEnabled": true,   "isStateful": true,   "serviceDate": "020-04-01T12:15:39.434Z",   "startDate": "2020-04-03T12:15:39.434Z",   "serviceSpecification": {     "id": "cfs45",     "href": ".../serviceCatalog/v4/serviceSpecification/cfs45",     "name": "c_Mobile",     "@type": "serviceSpecification",     "@referredType": "ServiceSpecification"   },   "state": "inactive",   "@type": "Service" } </pre>

Here's an example of a request for updating a service in the network. In this example, a new state is set.

Request
<pre> PATCH /tmf-api/ServiceActivationAndConfiguration/v4/service/123-456 Content-Type: application/json-patch+json  [   {     "op": "replace",     "path": "state",     "value": "inactive"   } ] </pre>
Response
<pre> 200  {   "id": "123-456", </pre>

```

"href": "http://serverlocation:port/serviceActivationConfiguration/v4/service/123-456",
"category": "MobileService",
"description": "Mobile Line ",
"hasStarted": true,
"isBundle": false,
"isServiceEnabled": true,
"isStateful": true,
"serviceDate": "020-04-01T12:15:39.434Z",
"startDate": "2020-04-03T12:15:39.434Z",
"serviceSpecification": {
  "id": "cfs45",
  "href": ".../serviceCatalog/v4/serviceSpecification/cfs45",
  "name": "c_Mobile",
  "@type": "serviceSpecification",
  "@referredType": "ServiceSpecification"
},
"state": "inactive",
"@type": "Service"
}

```

## Delete service

**DELETE** /service/{id}

### Description

This operation deletes a service entity.

### Usage Samples

Here's an example of a request for deactivating a service in the network.

<b>Request</b>
DELETE /tmf-api/ServiceActivationAndConfiguration/v4/service/123-456
<b>Response</b>
204

## Operations on Monitor

### List monitors

**GET /monitor?fields=...&{filtering}**

#### Description

This operation list monitor 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 monitors for service activation.

<b>Request</b>
<pre>GET /tmf-api/ServiceActivationAndConfiguration/v4/monitor?category=MobileService&amp;state=InProgress Accept: application/json</pre>
<b>Response</b>
<pre>200 [   {     "id": "44555",     "href": "https://mycsp.com:8080/tmf-api/ServiceActivationAndConfiguration/v4/monitor/44555",     "state": "In Progress"   },   {     "id": "78523",     "href": "https://mycsp.com:8080/tmf-api/ServiceActivationAndConfiguration/v4/monitor/78523",     "state": "In Progress"   },   {     "id": "45469",     "href": "https://mycsp.com:8080/tmf-api/ServiceActivationAndConfiguration/v4/monitor/45469",     "state": "In Progress"   } ]</pre>

### Retrieve monitor

**GET /monitor/{id}?fields=...&{filtering}**

**Description**

This operation retrieves a monitor 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 monitor for service activation.

<b>Request</b>
GET /tmf-api/ServiceActivationAndConfiguration/v4/monitor/44555 Accept: application/json
<b>Response</b>
200  <pre>{   "id": "44555",   "href": "https://mycsp.com:8080/tmf-api/ServiceActivationAndConfiguration/v4/monitor/44555",   "state": "In Progress",   "request": {     "method": "http",     "to": "https://mycsp.com:5050/netAPIs/activate",     "body": "ACTIVATE BBAND 144445",     "header": [       {         "name": "locale",         "value": "en-us"       }     ]   },   "response": {     "statusCode": "344",     "body": "ACTIVATE BBAND 144445 REQUEST RECEIVED PENDING",     "header": [       {         "name": "locale",         "value": "en-us"       }     ]   },   "sourceHref": "https://mycsp.com:8080/tmf-api/ServiceActivationAndConfiguration/v4/service/5351",   "@type": "Monitor" }</pre>

## 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.

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

## 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.

<b>Request</b>
DELETE /api/hub/42 Accept: application/json
<b>Response</b>
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.

<b>Request</b>
POST /client/listener Accept: application/json  { "event": { EVENT BODY }, "eventType": "EVENT_TYPE" }
<b>Response</b>
201

For detailed examples on the general TM Forum notification mechanism, see the TMF REST Design Guidelines Part 1 document.

## Acknowledgements

### Version History

Release Number	Date	Release led by:	Description
Version 1.0.0	12 Nov 2015	Pierre Gauthier TM Forum	Submitted for Fx15.5
Version 1.0.1	12 Nov 2015	Alicja Kawecki TM Forum	Updated cover, header; minor formatting/style corrections prior to publishing
Version 1.0.2	02 May 2016	Alicja Kawecki, TM Forum	Updated cover, footer, Notice to reflect TM Forum Approved status
Version 3.0.0	14 Jan 2019	Jonathan Goldberg Amdocs <a href="mailto:Jonathan.Goldberg@amdocs.com">Jonathan.Goldberg@amdocs.com</a>	Schema alignment for NaaS APIs
Version 4.0.0	28-May-2020	Ludovic Robert Orange	API alignment with 4.0.0

### Release History

Release Number	Date	Release led by:	Description
15.5.1	02 May 2016	Alicja Kawecki, TM Forum	Updated to reflect TM Forum Approved Status
18.5.0	14 Jan 2019	Jonathan Goldberg Amdocs <a href="mailto:Jonathan.Goldberg@amdocs.com">Jonathan.Goldberg@amdocs.com</a>	Schema alignment for NaaS APIs
Pre-production	28-May-2020	Ludovic Robert Orange	API alignment with 4.0.0



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