Frameworx Specification

Service Inventory API REST Specification

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TABLE OF CONTENTS

NOTICE 2
Table of Contents 3
List of Tables 5
Introduction 6
SAMPLE USE CASES 7
Service inventory query for a customer 7
Service inventory update as part of service provisioning 7
RESOURCE MODEL 8
Managed Entity and Task Resource Models 8
Service resource 8
Notification Resource Models 15
Service Creation Notification 16
Service Attribute Value Change Notification 16
Service State Change Notification 17
Service Batch Notification 17
Service Remove Notification 18
API OPERATIONS 19
Operations on Service 19
List services 20
Retrieve service 21
Create service 23
Patch service 26
Delete service 28
API NOTIFICATIONS 29
Register listener 29
Unregister listener 30

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Publish Event to listener 30
Acknowledgements 32
Release History 32

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LIST OF TABLES

N/A

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INTRODUCTION

The following document is intended to provide details of the REST API interface for Service Inventory. The intent of this API is to provide a consistent/standardized mechanism to query and manipulate the Service inventory.

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SAMPLE USE CASES

Service inventory query for a customer

The Service Inventory API can be used to query the service instances for a customer via Self Service Portal or the Call Centre operator can query the service instances on behalf of the customer while a customer may have a complaint or a query.

Note: Only the CustomerFacingServices instances will be presented to the customer.

Service inventory update as part of service provisioning

The Service Inventory API can be called by the Service Order Management to create a new service instance/ update an existing service instance in the Service Inventory.

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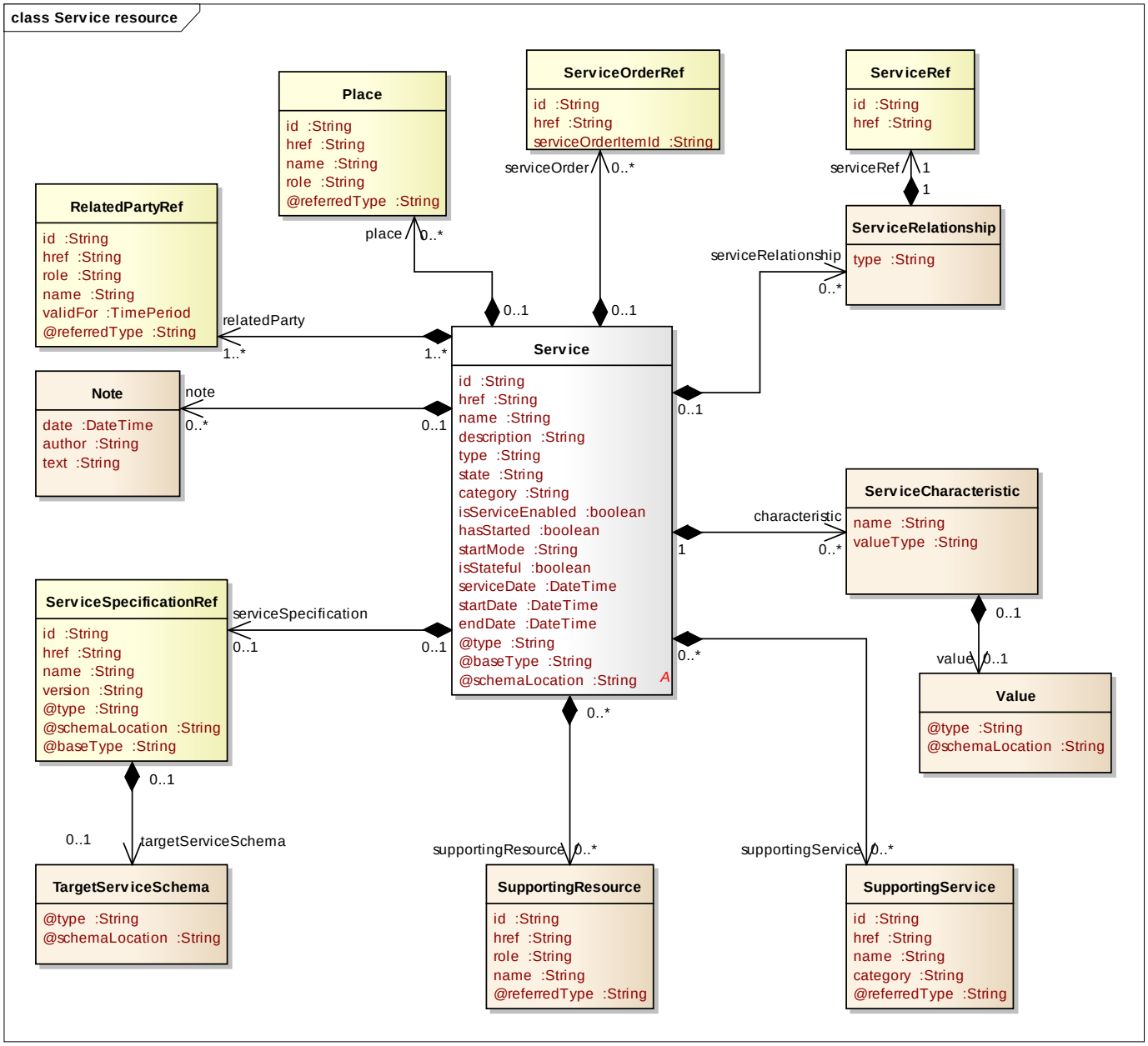
RESOURCE MODEL

Managed Entity and Task Resource Models

SERVICE RESOURCE

Service is an abstract base class for defining the Service hierarchy. All Services are characterized as either being possibly visible and usable by a Customer or not. This gives rise to the two subclasses of Service: CustomerFacingService and ResourceFacingService.

Resource model



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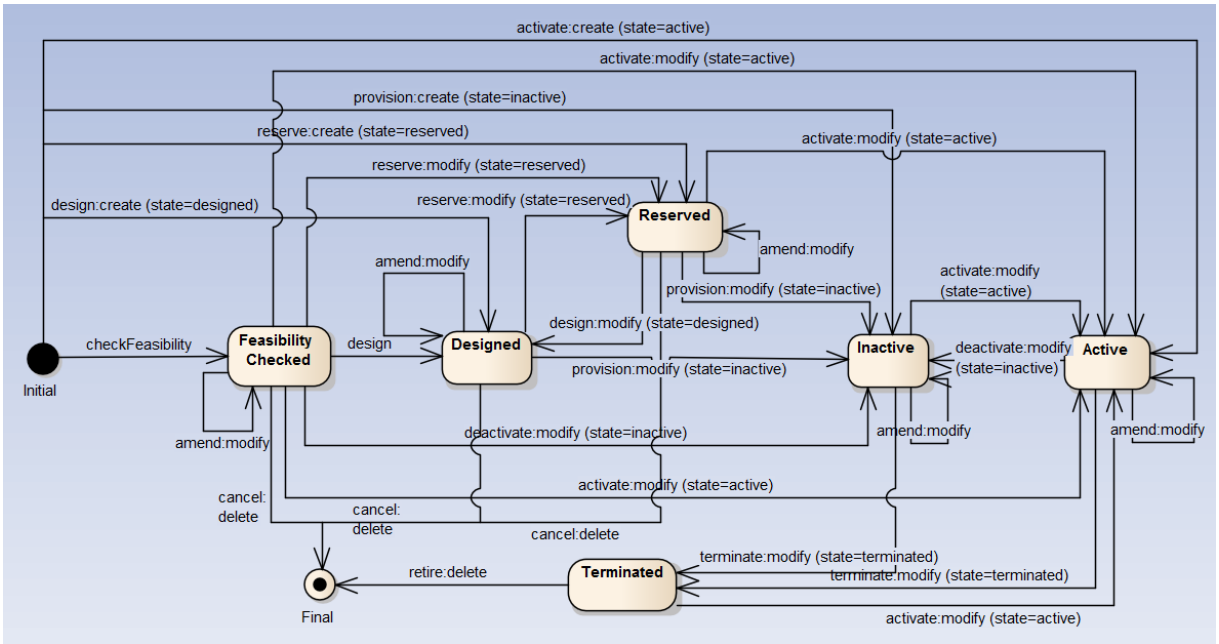
Lifecycle

Here is the state machine diagram for a Service.



Field descriptions

Service fields

Field	Description
id	A string. "id" is the ID created for the service.
href	A string. Reference of the service.
name	A string. "name" is the name of the service.
description	A string. free-text description of the service.
type	A string; Type of the service – could for example CFS, RFS, compositeCFS, atomicCFS, compositeRFS, atomicRFS, etc…
state	A string. The life cycle state of the service: - feasibilityChecked - designed - reserved - active - inactive - terminated
category	A string. Is it a customer facing or resource facing service.
isServiceEnabled	A boolean. For use. If the value of this attribute is FALSE, then this means that this particular Service has NOT been enabled for use.
hasStarted	A boolean. This is a Boolean attribute that, if TRUE, signifies that this Service has already been started. If the value of this attribute is FALSE, then this signifies that this Service has NOT been Started.

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startMode	A string. This attribute is an enumerated integer that indicates how the Service is started. Values include: 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.
isStateful	A boolean. This is a Boolean attribute that, if TRUE, means that this Service can be changed without affecting any other services.
serviceDate	A date time (DateTime). Date when the service was created (whatever its status).
startDate	A date time (DateTime). startDate is the date when the service starts → meaning it shifts to 'active' status (the first time).
endDate	A date time (DateTime). endDate is the date when the service ends → meaning it shifts to 'terminated' status
@baseType	A string. Indicates the base type of the resource. Here it should be valued to Service.
@type	A string. Indicates the type of resource..
@schemaLocation	A string. A link to the schema describing this REST resource.
serviceOrder	A list of service order reference (ServiceOrderRef). A Service Order is a request to perform an action on a specific Service and it contained service order item.
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).
characteristic	A list of service characteristics (ServiceCharacteristic [*]).
supportingService	A list of supporting services (SupportingService [*]). A collection of services that support this service (bundling, link CFS to RFS).
supportingResource	A list of supporting resources (SupportingResource [*]).Note: only Service of type RFS can be associated with Resources.
serviceSpecification	A service specification reference (ServiceSpecificationRef). ServiceSpecification(s) required realizing a ProductSpecification.
place	A list of places (Place [*]). Used to define a place useful for the service (for example a delivery geographical place).
note	A list of notes (Note [*]). Extra information about the service.
relatedParty	A list of related party references (RelatedPartyRef [1..*]). A related party defines party or party role linked to a specific entity.

Note sub-resource

Extra information about the service.

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

Place

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Used to define a place of interest for the service (for example installation address).

Field	Description
id	A string. ID of an existing place
href	A string. Reference of a place (for instance in google map).
role	A string. The role of the place (e.g. install site, a-address, z-address for leased line, geoFencing perimeter).
@referredType	A string. The type of the referred appointment

ServiceCharacteristic

Structure to describe the characteristics of the service.

Field	Description
name	A string. Name of the characteristic.
valueType	A string. Value type of the characteristic. Could a simple attribute or a complex one as a table or an array.
value	A string. A link to a value description structure.

Value

Structure to describe the Characteristic value of the service.

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

ServiceRelationship sub-resource

Describes links with services of the same category (useful for relies-on, relies-from relationships between services).

Field	Description
type	A string. Describes links with services of the same category (useful for bundled services, or to describe relies On relationship between services for example).
serviceRef	A service reference (ServiceRef). Useful to link services of the same category.

ServiceRef relationship

Service reference. Useful to link services.

Field	Description
href	A string. reference of the service.
id	A string. Id of the service.

SupportingResource sub-resource

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A collection of resource(s) supporting the service. – Note: only Service of type RFS can be associated with Resources.

Field	Description
href	A string. Reference of the supporting resource.
id	A string. Unique identifier of the supporting resource.
role	A string. Role of the supporting resource
name	A string. Name of the resource supporting the service.
@referredTypa	A string; Type of the resource.

SupportingService sub-resource

A collection of services that support this service -This could be used to described

- service bundling (composite/atomic) for CFS as RFS
- relationship from CFS to list supporting RFS

Field	Description
href	A string. Reference of the supporting service.
id	A string. Unique identifier of the supporting service.
category	A string. Category of the supporting service.
name	A string. Name of the supporting service.
@referredType	A string; Type of the resource.

RelatedPartyRef relationship

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

Field	Description
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.
validFrom	A timePeriod – Period of time when this party is relevant
@referredType	A string; Type of the party.

ServiceOrderRef relationship

A Service Order is a request to perform an action on a specific Service.

Field	Description
href	A string. The Hyperlink to access the related Service Order.
id	A string. Unique identifier of the related Service Order.
serviceOrderItemId	A string. Id of the service order creating/modifying this service

ServiceSpecification relationship

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Service specification reference is a class that offers characteristics to describe service.

Field	Description
id	A string. Unique identifier of the service specification.
href	A string. Reference of the service specification.
version	A string. Version of the service specification.
name	A string. Name of the service specification.
@type	A string. Indicates the (class) type of resource (here service specification).
@schemaLocation	A string. URL to get to the schema description file.
@baseType	A string. Indicates the base type of the sub resource. Here it should be valued to 'ServiceSpecification'.

TargetServiceSchema sub-resource

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

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

Json representation sample

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


```
{
  "id":"11",
  "href":"http://..../service/11",
  "name":"NiceService",
  "description":"Service inventory sample",
  "@type":"vCPE",
  "state":"Active",
  "type":"CFS",
  "category":"Cloud",
  "isServiceEnabled":true,
  "hasStarted":true,
  "startMode":"1",
  "isStateful":true,
  "serviceDate":"2018-01-15T12:26:11.747Z",
  "startDate":"2018-01-15T12:26:11.747Z",
  "serviceSpecification":{
    "id":"12",
    "href":"http://...:serviceSpecification/12",
    "name":"vCPE",
    "version":"1",
    "@type":"vCPE",
    "@schemaLocation":"http..."
  },
  "serviceCharacteristic":[
    {
      "name":"vCPE_IP",
```


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```
      "valueType":"String",
      "value":{
        "@type":"IPAddress",
        "@schemaLocation":"http....",
        "vCPE_IP":"193.218.236.21"
      }
    }
  ],
  "serviceRelationship":[
    {
      "type":"ReliesOn",
      "service":{
        "id":"19",
        "href":"http://..../service/19"
      }
    }
  ],
  "supportingService":[
    {
      "id":"17",
      "href":"http://..../service/17",
      "name":"supporting service vxwn",
      "@referredType":"vxwn"
    }
  ],
  "supportingResource":[
    {
      "id":"99",
      "href":"http://..../resource/99",
      "name":"GenInfra",
      "@referredType":"Infra"
    },
    {
      "id":"94",
      "href":"http://..../resource/94",
      "name":"BNG_MUX",
      "@referredType":"MUX"
    }
  ],
  "relatedParty":[
    {
      "id":"456",
      "href":"http://serverlocation:port/partyManagement/party/456",
      "role":"user"
    }
  ],
  "serviceOrder":[
    {
      "id":"42",
      "href":"http://serverlocation:port/orderManagement/serviceOrder/42",
      "serviceOrderItem":"1"
    }
  ],
  "note":[
```


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```
    {
      "date":"2018-01-15T12:26:11.748Z",
      "author":"Jean Pontus",
      "text":"bla bla bla"
    }
  ]
}
```


Notification Resource Models

5 notifications are defined for this API

Notifications related to Service:
- ServiceCreationNotification
- ServiceAttributeValueChangeNotification
- ServiceStateChangeNotification
- ServiceBatchNotification
- ServiceRemoveNotification

The notification structure for all notifications in this API follows 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).

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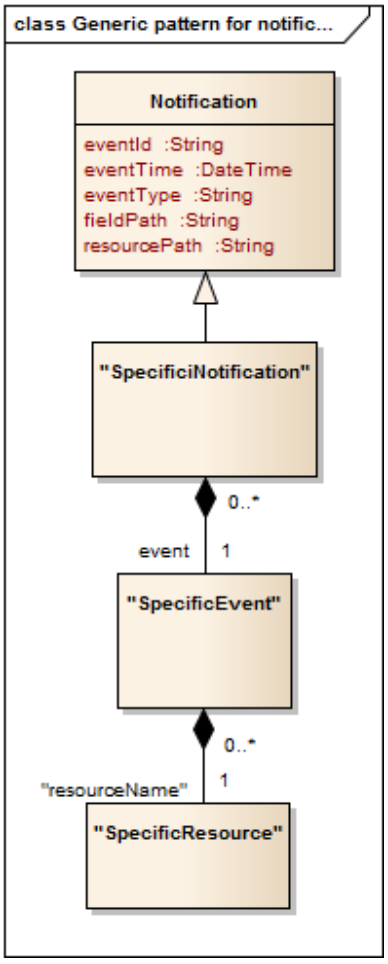

SERVICE CREATION NOTIFICATION

Notification sent when a new Service resource is created.

Json representation sample

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

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

SERVICE ATTRIBUTE VALUE CHANGE NOTIFICATION

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Notification sent when changing an attribute of a Service resource.

Json representation sample

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


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


SERVICE STATE CHANGE NOTIFICATION

Notification sent when changing the state of a Service resource.

Json representation sample

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


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


SERVICE BATCH NOTIFICATION

Notification sent when a batch job on resource Service changes

Json representation sample

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


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


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

SERVICE REMOVE NOTIFICATION

Notification sent when removing a Service resource.

Json representation sample

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

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

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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

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LIST SERVICES

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

Description

This operation lists service entity(ies).
Attribute selection is enabled for all first level attributes.
Filtering may be available depending on the compliance level supported by an implementation.

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

- description
- relatedParty.id
- category + state
- type + date selection
- supportingResource.id

Usage Samples

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

Get all RFS supported by a specific resource

Request
GET /serviceInventoryManagement/service?fields=id,category,name,state&category=RFS&description= Service inventory sample Accept: application/json
Response
200 [{ "id":"11", "name":"NiceService", "@type":"vCPE", "state":"Active", "category":"Cloud" },

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```
  {
  "id":"196",
  "name":"NiceServiceToo",
  "@type":"vCPE",
  "state":"Active",
  "category":"Cloud"
   },
   {
  "id":"88",
  "name":"NiceServiceAsWell",
  "@type":"Firewall",
  "state":"Inactive",
  "category":"Cloud"
   }
]
```


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 Service resource.

Request

```
GET /serviceInventoryManagement/service/11
Accept: application/json
```

Response


```
200

{
  "id":"11",
  "href":"http://..../service/11",
  "name":"NiceService",
  "description":"Service inventory sample",
```


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```
  "@type":"vCPE",
  "state":"feasibilityChecked",
  "category":"Cloud",
  "isServiceEnabled":true,
  "hasStarted":true,
  "startMode":"1",
  "isStateful":true,
  "serviceDate":"2018-01-15T12:26:11.747Z",
  "startDate":"2018-01-15T12:26:11.747Z",
  "serviceSpecification":{
    "id":"12",
    "href":"http://...:serviceSpecification/12",
    "name":"vCPE",
    "version":"1",
    "@type":"vCPE",
    "@schemaLocation":"http..."
  },
  "serviceCharacteristic":[
    {
      "name":"vCPE_IP",
      "valueType":"String",
      "value":{
        "@type":"IPAddress",
        "@schemaLocation":"http....",
        "vCPE_IP":"193.218.236.21"
      }
    }
  ],
  "serviceRelationship":[
    {
      "type":"ReliesOn",
      "service":{
        "id":"19",
        "href":"http://..../service/19"
      }
    }
  ],
  "supportingService":[
    {
      "id":"17",
      "href":"http://..../service/17",
      "name":"supporting service vxwn",
      "@referredType":"vxwn"
    }
  ],
  "supportingResource":[
    {
      "id":"99",
      "href":"http://..../resource/99",
      "name":"GenInfra",
      "@referredType":"Infra"
    },
    {
      "id":"94",
```


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```
      "href":"http://..../resource/94",
      "name":"BNG_MUX",
      "@referredType":"MUX"
    }
  ],
  "relatedParty":[
    {
      "id":"456",
      "href":"http://serverlocation:port/partyManagement/party/456",
      "role":"user"
    }
  ],
  "serviceOrder":[
    {
      "id":"42",
      "href":"http://serverlocation:port/orderManagement/serviceOrder/42",
      "serviceOrderItem":"1"
    }
  ],
  "note":[
    {
      "date":"2018-01-15T12:26:11.748Z",
      "author":"Jean Pontus",
      "text":"bla bla bla"
    }
  ]
}
```


CREATE SERVICE

POST /service

*Note: this operation is available **only to ADMIN API users***

Description

This operation creates a service entity.

Mandatory and Non Mandatory Attributes

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

- id
- href

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.

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Mandatory Attributes	Rule
state	
serviceSpecification.id	

if serviceOrder is provided	(id AND/OR href) is 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

Non Mandatory Attributes	Default Value	Rule
category		
description		
endDate	blank	
hasStarted	No	
isServiceEnabled		
isStateful	Yes	
serviceDate	Today	
startDate	Today	
startMode		
type		
serviceOrder	Structure could be not present	
supportingResource	Structure could be not present	
serviceRelationship	Structure could be not present	
place	Structure could be not present	
supportingService	Structure could be not present	
note	Structure could be not present	
serviceSpecification	Structure could be not present	
relatedParty	Structure could be not present	
characteristic	Structure could be not present	
serviceOrder	Structure could be not present	

Additional Rules

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

Context	Mandatory Sub-Attributes
serviceOrder	id, href
serviceSpecification	id, href
relatedParty	role, id or href
serviceRelationship	type, Id OR href

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Context	Mandatory Sub-Attributes
supportingService	id, href
supportingResource	id, href
note	text
place	role, id or href

Usage Samples

Here's an example of a request for creating a Service resource.

Create a CFS service in the inventory

Request

```
{
  "name":"NiceService",
  "description":"Service inventory sample",
  "@type":"vCPE",
  "state":"Active",
  "category":"Cloud",
  "isServiceEnabled":true,
  "hasStarted":true,
  "startMode":"1",
  "isStateful":true,
  "serviceSpecification":{
    "id":"12",
    "href":"http://...:serviceSpecification/12",
    "name":"vCPE",
    "version":"1",
    "@type":"vCPE",
    "@schemaLocation":"http..."
  },
  "serviceCharacteristic":[
    {
      "name":"vCPE_IP",
      "valueType":"String",
      "value":{
        "@type":"IPAddress",
        "@schemaLocation":"http....",
        "vCPE_IP":"193.218.236.21"
      }
    }
  ],
  "serviceRelationship":[
    {
      "type":"ReliesOn",
      "service":{
        "id":"19",
        "href":"http://..../service/19"
      }
    }
  ],
```

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```
  "relatedParty":[
    {
      "id":"456",
      "href":"http://serverlocation:port/partyManagement/party/456",
      "role":"user"
    }
  ],
  "note":[
    {
      "date":"2018-01-15T12:26:11.748Z",
      "author":"Jean Pontus",
      "text":"bla bla bla"
    }
  ]
}
```


Response

201

"{ JSON Resource Representation with every provided and default attribute}"

PATCH SERVICE

PATCH /service/{id}

*Note: this operation is available **only to ADMIN API users***

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.
Notice that patching is possible only for 'admin' API users.

Patchable Attributes	Rule
category	
description	
endDate	

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Patchable Attributes	Rule
hasStarted	
isServiceEnabled	
isStateful	
name	
startDate	
startMode	
state	
type	
serviceOrder	
supportingResource	
serviceRelationship	
place	
supportingService	
note	
relatedParty	
characteristic	
orderState	

Non Patchable Attributes	Rule
id	
href	
serviceSpecification	

Usage Samples

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

Changing the service state (using json-patch)

Request

```
PATCH /serviceInventoryManagement/service/42
Content-Type: application/json-patch+json

{
   "path": "/state",
   "value": "reserved",
   "op": "replace"
}
```

Response

```
201

{ Similar JSON as in GET response with state changed}
```

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DELETE SERVICE

DELETE /service/{id}

Note: this operation is available only to ADMIN API users

Description

This operation deletes a service entity.

Usage Samples

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

Request
DELETE /serviceInventoryManagement/service/42
Response
204

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API NOTIFICATIONS

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

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

REGISTER LISTENER

POST /hub

Description

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

Behavior

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

Return 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}

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UNREGISTER LISTENER

DELETE /hub/{id}

Description

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

Behavior

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

Return 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/event

Description

Provide 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

Return 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.

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Request

POST /event
Accept: application/json

```
{
  "eventId": "12368",
  "eventTime": "2018-01-12T13:23:43.704Z",
  "eventType": " ServiceStateChangeNotification ",
  "event": {
    "resource": "48"
  }
}
```

Response

201

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

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RELEASE HISTORY

Release Number	Date	Release led by:	Description
Release 16.5 Version 1.0.0	15-Apr-2016	Pierre Gauthier TM Forum pgauthier@tmforum.org Nicoleta Stoica Vodafone Nicoleta.stoica@vodafone.com Mariano Belaunde Orange Labs	Generated using the API data model
Release 18.0 Version 2.0.0	31-Jan-2018	Pierre Gauthier TM Forum pgauthier@tmforum.org Ludovic Robert Orange ludovic.robert@orange.com	Alignment with TMF open API guidelines 3.0 Review with SID Team (Cécile Ludwichowski)

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