TM Forum Specification

Service Qualification Management API REST Specification

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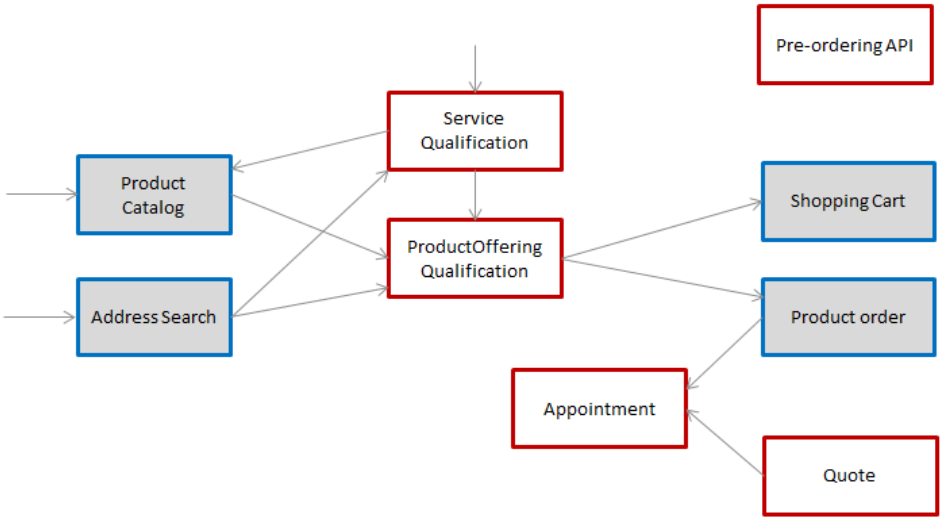
Introduction

The following document is the specification of the REST API for ServiceQualification management. It includes the model definition as well as all available operations.

In the Open Digital Economy where multiple actors (SDPs, CSPs, …) may be involved with the delivery of an end-to-end service, those actors need to collaborate and interact with the customer as needed.

Following diagram shows ServiceQualification API within pre-ordering API package:



Service Qualification API is one of Pre-Ordering Management API Family. Service Qualification API goal is to provide service technical eligibility in the context of the interaction. This API allows to :

- request a specific service eligibility,
- look for service eligibles (or not) from a service category,
- look for service eligibles (or not) from a service specification and characteristics.

Because the API allows describing service from the inventory, it is also possible to use it to retrieve service available to complete existing service.

In the request, the following attributes could/must be filled:

- service, serviceSpecification, category or service characteristics will be indicated (at least one is mandatory),
- relatedParty, for which the qualification must be done,
- place, where the customer wants his service,
- expected qualification date.

In the response, the API will provide qualification result but also:

- Eligibility unavailability reason (if any)
- Alternate service proposal (if any).

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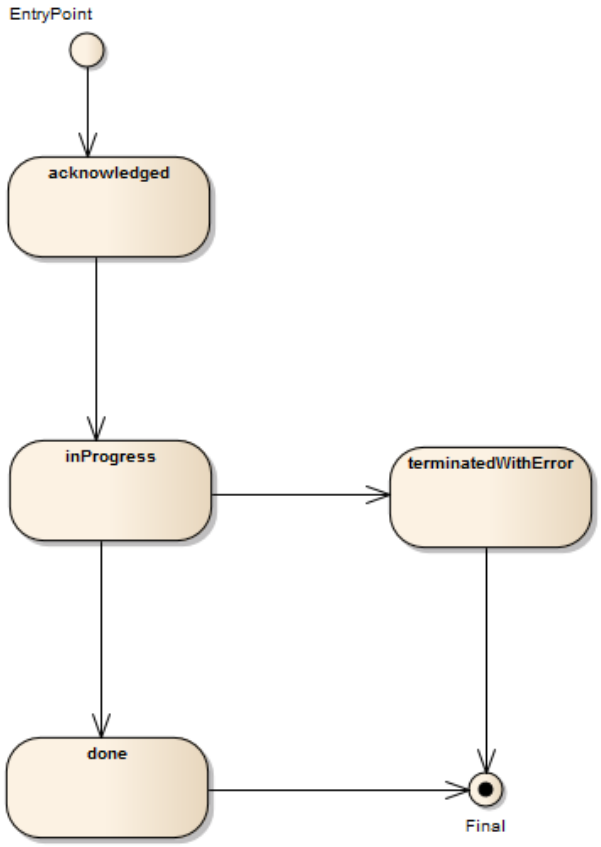
Lifecycle

Note that an implementation of the specification may enrich the list of states depicted in the diagram. The state machine specifying the typical state change transitions is provided below.



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SAMPLE USE CASES

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

To provide some use-cases:

- Retrieve maximum download/upload speed for an access service at a specified address
- Check if we can deliver new access and IPTV (4k) services at a specified address
- Check if we can deliver new IP TV service at the same location of an existing and active Accesse service (i.e. without explicitly specifying address)
- Check if we can upgrade the download speed of an existing and active service from 100 Mb/s to 600Mb/s

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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 BillingAccount and SettlementAccount inheriting properties from the abstract Account 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 Account instances some may be instances of BillingAccount where other could be instances of SettlementAccount. The @type gives this information. All resources and sub-resources of this API have a @type attributes that can be provided when this is useful.

The @referredType can be used within reference entities (like for instance an AccountRef 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 BillingAccountRef or SettlementAccountRef, 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.

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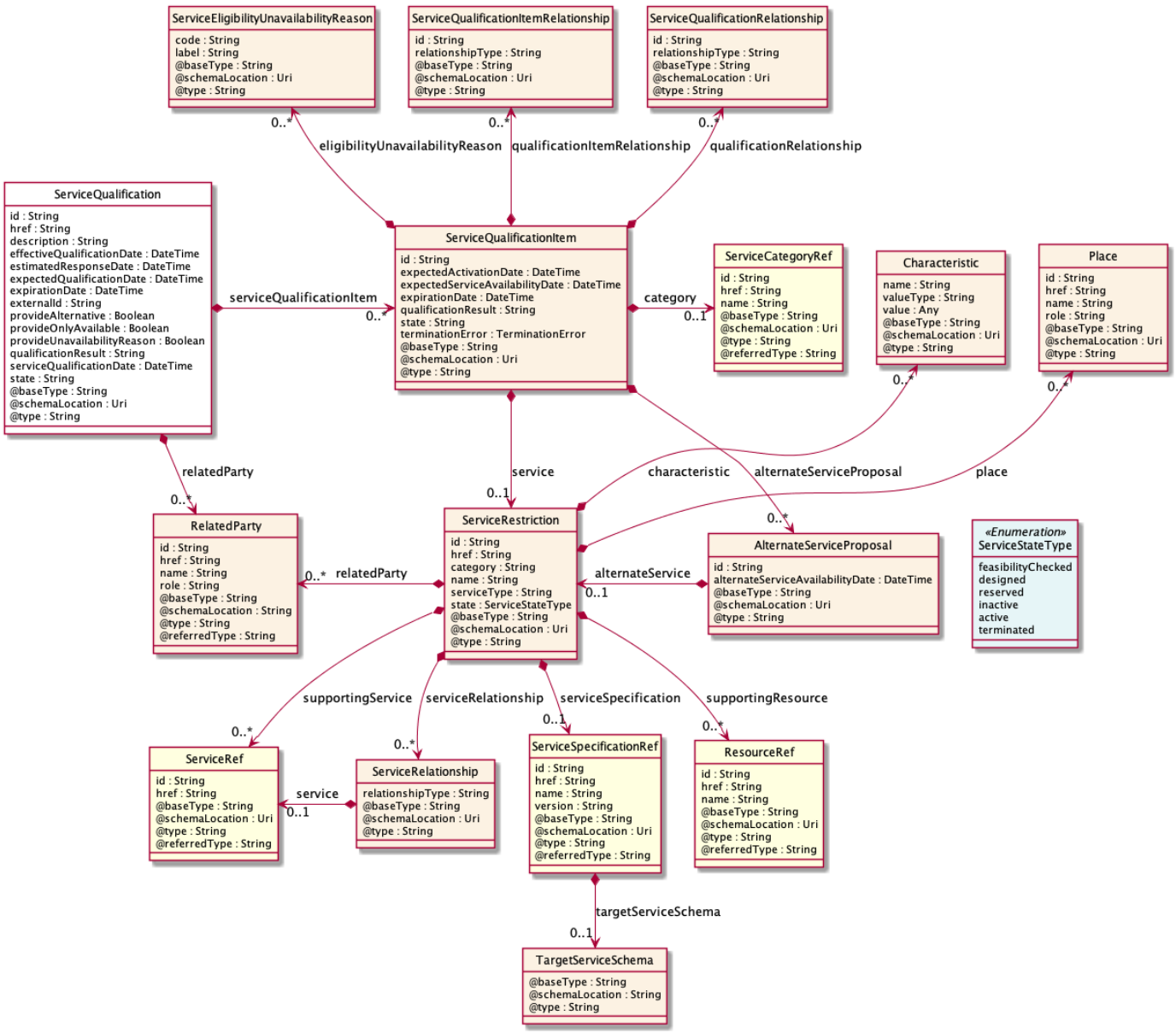
RESOURCE MODEL

Managed Entity and Task Resource Models

Service Qualification resource

ServiceQualification is used to perform a technical eligibility. It allows to retrieve a list of services that are technically available in the context of the interaction (place, party, service characteristics, ...).

Resource model



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Field descriptions

ServiceQualification fields

description	A string. Description of the serviceQualification.
effectiveQualificationDate	A date time (DateTime). Effective date to serviceQualification completion.
estimatedResponseDate	A date time (DateTime). Date when the requester expect to provide an answer for the qualification request.
expectedQualificationDate	A date time (DateTime). A date (DateTime). Deadline date when the requester expected a qualification answer.
expirationDate	A date time (DateTime). Date when the qualification response expires.
externalId	A string. Identifier provided by the requester.
href	A string. Hyperlink to access the serviceQualification.
id	A string. Unique identifier of the serviceQualification resource.
provideAlternative	A boolean. When the value is TRUE means that alternative solutions should be provided.
provideOnlyAvailable	A boolean. When the value is TRUE means that only available service must be listed in the response.
provideUnavailabilityReason	A boolean. When the value is TRUE means that unavailability reason are expected for non available service.
qualificationResult	A string. Qualification result for this serviceQualification. It could be: qualified (all qualification item are qualified), alternate (At least one item alternate and no item with unqualified), unqualified (At least one item unqualified).
relatedParty	A list of related parties (RelatedParty [*]). A list of related party references, defines party or party role linked to this request.
serviceQualificationDate	A date time (DateTime). Date when the serviceQualification was submitted.
serviceQualificationItem	A list of service qualification items (ServiceQualificationItem [1..*]).
state	A string. State of the serviceQualification (acknowledged, inProgress, terminatedWithError, done).

AlternateServiceProposal sub-resource

Alternate service proposal is used when the requested service is not available with characteristic and date asked for. An alternate proposal could be a distinct serviceSpecification close to requested one or same as requested but with a different activation date.

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alternateService	A service restriction (ServiceRestriction). In the context of a service order and depending on 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.
alternateServiceAvailabilityDate	A date time (DateTime). Alternate availability date in case seller is not able to meet requested expected availability date for the service.
id	A string. Identifier of a alternate service proposal.

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.

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.

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name	A string. Name of the related party.
role	A string. Role of the related party.

ServiceEligibilityUnavailabilityReason sub-resource

Reason for eligibility result if the ServiceQualification result is no (meaning the Service is not available).

code	A string. Unavailability reason code.
label	A string. Unavailability reason label.

ServiceQualificationItem sub-resource

A ServiceQualificationItem relates to a specific service being checked in a qualification operation.

alternateServiceProposal	A list of alternate service proposals (AlternateServiceProposal [*]). Alternate service proposal is used when the requested service is not available with characteristic and date asked for. An alternate proposal could be a distinct service Spec close to requested one or same as requested but with a different availability date.
category	A service category reference (ServiceCategoryRef). The category resource is used to group product offerings, service and resource candidates in logical containers. Categories can contain other categories and/or product offerings, resource or service candidates.
eligibilityUnavailabilityReason	A list of service eligibility unavailability reasons (ServiceEligibilityUnavailabilityReason [*]). A list of eligibility unavailability reasons (EligibilityUnavailabilityReason [*]). Reason for eligibility result if the serviceQualification result is no (meaning the service is not available).
expectedActivationDate	A date time (DateTime). The date when the service is expected to be activated.
expectedServiceAvailabilityDate	A date time (DateTime). Date when the requester looks for service availability.
expirationDate	A date time (DateTime). Date when the qualification item response expires.
id	A string. Id of the Service Qualification Item.
qualificationItemRelationship	A list of service qualification item relationships (ServiceQualificationItemRelationship [*]). A list of qualification item relationships used to describe relationship between serviceQualification item from the same serviceQualification.
qualificationRelationship	A list of service qualification relationships (ServiceQualificationRelationship [*]). Stucture used to describe relationship between serviceQualification item from the same serviceQualification.

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qualificationResult	A string. Qualification result for serviceQualification item. It could be: - qualified (request service are available), - unqualified (requested not available and not alternate available), - alternate (requested not available but proposal available).
service	A service restriction (ServiceRestriction). Configure the service characteristics (only configurable characteristics and necessary only if a non default value is selected) and/or identify the service that needs to be modified/deleted.
state	A string. State of the serviceQualification item (acknowledged, inProgress, terminatedWithError, done).
terminationError	A list of termination errors (TerminationError [*]). If qualificationItem has not been done properly this lists the error(s) that caused termination of the qualification.

ServiceQualificationItemRelationship sub-resource

Stucture used to describe relationship between serviceQualification items from the same serviceQualification.

id	A string. Id of the serviceQualificationItem (from the same serviceQualificationItem).
relationshipType	A string. Type of relationship (ex: reliesOn, connectedTo, etc...).

ServiceQualificationRelationship sub-resource

id	A string. The id of the target qualification pointed to by this relationship.
relationshipType	A string. The type of relationship.

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 on 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.

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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.

TerminationError sub-resource

This indicates an error that caused a qualificationItem to be terminated.

id	A string. Unique identifier of the termination error.
value	A string. Text to describe the termination error - for example: Unable to proceed to qualification because incomplete information provided.

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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.

ServiceCategoryRef relationship

The (service) category resource is used to group service candidates in logical containers. Categories can contain other categories.

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

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.

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Json representation sample

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


```
{
  "description": "Maximum download/upload speed for access at an address",
  "effectiveQualificationDate": "2017-10-25T12:14:16.361Z",
  "estimatedResponseDate": "2017-10-25T12:13:16.361Z",
  "expectedQualificationDate": "2017-10-25T12:13:16.361Z",
  "expirationDate": "2017-11-25T12:13:16.361Z",
  "href": "https://mycsp.com:8080/tmf-api/serviceQualificationManagement/v4/serviceQualification/5565",
  "id": "5565",
  "provideAlternative": true,
  "provideOnlyAvailable": false,
  "provideUnavailabilityReason": false,
  "serviceQualificationDate": "2017-10-25T12:13:16.361Z",
  "state": "done",
  "serviceQualificationItem": [
    {
      "id": "1",
      "qualificationResult": "qualified",
      "state": "done",
      "service": {
        "serviceSpecification": {
          "id": "111",
          "href": "https://mycsp.com:8080/tmf-api/serviceCatalogManagement/v4/serviceSpecification/111",
          "name": "CFS_Access"
        },
        "serviceCharacteristic": [
          {
            "name": "downloadSpeed",
            "valueType": "object",
            "value": {
              "@type": "Bandwidth",
              "@schemaLocation": "https://mycsp.com:8080/tmf-api/schema/Service/Bandwidth.schema.json",
              "speed": "300Mb/s"
            }
          },
          {
            "name": "uploadSpeed",
            "valueType": "object",
            "value": {
              "@type": "Bandwidth",
              "@schemaLocation": "https://mycsp.com:8080/tmf-api/schema/Service/Bandwidth.schema.json",
              "speed": "100Mb/s"
            }
          }
        ],
        "place": [
          {
            "href": "https://mycsp.com:8080/tmf-api/geographicAddressManagement/v4/geographicAddress/25511",
            "id": "25511",
            "name": "160 de Versailles Avenue 75016 Paris France",
            "role": "installationAddress",
            "@type": "GeographicAddress"
```


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```
            }
          ]
        },
        "expectedServiceAvailabilityDate": "2017-10-27T12:14:16.361Z",
        "expirationDate": "2017-11-25T12:13:16.361Z"
      }
    ],
    "relatedParty": [
      {
        "id": "14",
        "href": "https://mycsp.com:8080/tmf-api/partyManagement/v4/party/14",
        "role": "requester",
        "name": "John Doe",
        "@referredType": "Individual"
      }
    ],
    "externalId": "SQ102",
    "qualificationResult": "qualified",
    "@baseType": "ServiceQualification",
    "@type": "CFServiceQualification",
    "@schemaLocation": "https://mycsp.com:8080/tmf-api/schema/Service/CFServiceQualification.schema.json"
}
```


Notification Resource Models

3 notifications are defined for this API

Notifications related to ServiceQualification:

- ServiceQualificationCreateNotification
- ServiceQualificationChangeNotification
- ServiceQualificationDeleteNotification

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).

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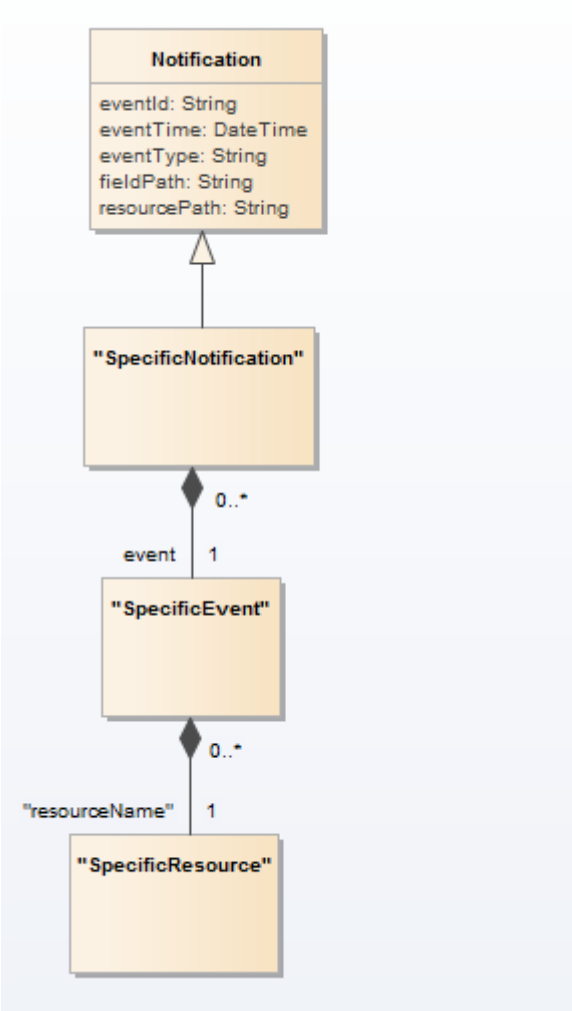

Service Qualification Create Notification

Notification ServiceQualificationCreateNotification case for resource ServiceQualification

Json representation sample

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

```
{
  "eventId":"00001",
  "eventTime":"2015-11-16T16:42:25-04:00",
  "eventType":"ServiceQualificationCreateNotification",
   "event": {
     "serviceQualification" :
        {-- SEE ServiceQualification RESOURCE SAMPLE --}
  }
}
```

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Service Qualification Change Notification

Notification ServiceQualificationChangeNotification case for resource ServiceQualification

Json representation sample

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

```
{
   "eventId":"00001",
   "eventTime":"2015-11-16T16:42:25-04:00",
   "eventType":"ServiceQualificationChangeNotification",
    "event": {
      "serviceQualification" :
         {-- SEE ServiceQualification RESOURCE SAMPLE --}
   }
}
```

Service Qualification Delete Notification

Notification ServiceQualificationDeleteNotification case for resource ServiceQualification

Json representation sample

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

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

Notifications are also described in a subsequent section.

Operations on Service Qualification

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List service qualifications

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

Description

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

Usage Samples

Here's an example of a request for retrieving multiple service qualifications. Get the id, href, and effective qualification date for done serviceQualifications.

Request

```
GET {apiRoot}/serviceQualification?fields=id,href,effectiveQualificationDate&state=done
Accept: application/json
```

Response

```
200

[
  {
    "id": "56",
    "href": "https://mycsp.com:8080/tmf-api/serviceQualificationManagement/v4/serviceQualification/56",
    "effectiveQualificationDate": "2017-10-25T12:13:16.361Z"
  },
  {
    "id": "46",
    "href": "https://mycsp.com:8080/tmf-api/serviceQualificationManagement/v4/serviceQualification/46",
    "effectiveQualificationDate": "2017-07-01T12:13:16.361Z"
  },
  {
    "id": "31",
    "href": "https://mycsp.com:8080/tmf-api/serviceQualificationManagement/v4/serviceQualification/31",
    "effectiveQualificationDate": "2017-03-15T12:13:16.361Z"
  }
]
```

Retrieve service qualification

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

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Description

This operation retrieves a service qualification 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 qualification.

Request

```
GET {apiRoot}/serviceQualification/5565
Accept: application/json
```

Response

```
200

{
  "description": "Maximum download/upload speed for access at an address",
  "effectiveQualificationDate": "2017-10-25T12:14:16.361Z",
  "estimatedResponseDate": "2017-10-25T12:13:16.361Z",
  "expectedQualificationDate": "2017-10-25T12:13:16.361Z",
  "expirationDate": "2017-11-25T12:13:16.361Z",
  "href": "https://mycsp.com:8080/tmf-api/serviceQualificationManagement/v4/serviceQualification/5565",
  "id": "5565",
  "provideAlternative": true,
  "provideOnlyAvailable": false,
  "provideUnavailabilityReason": false,
  "serviceQualificationDate": "2017-10-25T12:13:16.361Z",
  "state": "done",
  "serviceQualificationItem": [
    {
      "id": "1",
      "qualificationResult": "qualified",
      "state": "done",
      "service": {
        "serviceSpecification": {
          "id": "111",
          "href": "https://host:port/serviceCatalogManagement/v4/serviceSpecification/111",
          "name": "CFS_Access"
        },
        "serviceCharacteristic": [
          {
            "name": "downloadSpeed",
            "valueType": "object",
            "value": {
              "@type": "Bandwidth",
```

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```
                "@schemaLocation": "https://mycsp.com:8080/tmf-api/schema/Service/Bandwidth.schema.json",
                "speed": "300Mb/s"
              }
            },
            {
              "name": "uploadSpeed",
              "valueType": "object",
              "value": {
                "@type": "Bandwidth",
                "@schemaLocation": "https://mycsp.com:8080/tmf-api/schema/Service/Bandwidth.schema.json",
                "speed": "100Mb/s"
              }
            }
          ],
          "place": [
            {
              "href": "https://mycsp.com:8080/tmf-api/geographicAddressManagement/v4/geographicAddress/25511",
              "id": "25511",
              "name": "160 de Versailles Avenue 75016 Paris France",
              "role": "installationAddress",
              "@type": "GeographicAddress"
            }
          ]
        },
        "expectedServiceAvailabilityDate": "2017-10-27T12:14:16.361Z",
        "expirationDate": "2017-11-25T12:13:16.361Z"
      }
    ],
    "relatedParty": [
      {
        "id": "14",
        "href": "https://mycsp.com:8080/tmf-api/partyManagement/v4//party/14",
        "role": "requester",
        "name": "John Doe",
        "@referredType": "Individual"
      }
    ],
    "externalId": "SQ102",
    "qualificationResult": "qualified",
    "@baseType": "ServiceQualification",
    "@type": "CFServiceQualification",
    "@schemaLocation": "https://mycsp.com:8080/tmf-api/schema/Service/CFServiceQualification.schema.json"
}
```


Create service qualification

`POST /serviceQualification`

Description

This operation creates a service qualification entity.

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Mandatory and Non Mandatory Attributes

The following tables provides the list of mandatory and non mandatory attributes when creating a ServiceQualification, 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
serviceQualificationItem	At least one serviceQualification item must be in the request.

Non Mandatory Attributes	Default Value	Rule
description		
effectiveQualificationDate		
estimatedResponseDate		
expectedQualificationDate		
expirationDate		
externalId		
provideAlternative	false	
provideOnlyAvailable	true	
provideUnavailabilityReason	false	
qualificationResult		only filled on server side
relatedParty		
serviceQualificationDate		This date is filled on server side when the request is recorded.
state		only filled on server side

Additional Rules

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

Context	Mandatory Sub-Attributes
serviceQualificationItem	category OR productOffering OR product
category	id OR href
relatedParty	role + id OR href
qualificationItemRelationship	type, id
serviceRelationship	type, id
characteristic	name, value
serviceSpecification	id OR href

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The following pre-conditions apply for this operation.

Pre-conditions
PATCH allowed if state different than Accepted or Rejected.

Usage Samples

Here's an example of a request for creating a ServiceQualification resource to retrieve the maximum download/upload speed for an Access service at a specified address. The request contains one item with the reference of the service qualification to be qualified and the place where.

Request

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

{
  "description": "Maximum download/upload speed for access at an address",
  "externalId": "SQ101",
  "expectedQualificationDate": "2017-10-25T12:13:16.361Z",
  "provideAlternative": true,
  "provideOnlyAvailable": false,
  "provideUnavailabilityReason": false,
  "serviceQualificationItem": [
    {
      "id": "1",
      "service": {
        "serviceSpecification": {
          "id": "111",
          "href": "https://mycsp.com:8080/tmf-api/serviceCatalogManagement/v4/serviceSpecification/111",
          "name": "CFS_Access"
        },
        "serviceCharacteristic": [
          {
            "name": "downloadSpeed"
          },
          {
            "name": "uploadSpeed"
          }
        ],
        "place": [
          {
            "href": "https://mycsp.com:8080/tmf-api/geographicAddressManagement/v4/geographicAddress/25511",
            "id": "25511",
            "name": "160 de Versailles Avenue 75016 Paris France",
            "role": "installationAddress",
            "@type": "GeographicAddress"
          }
        ],
        "expectedServiceAvailabilityDate": "2017-10-27T12:14:16.361Z"
      }
```

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```
    }
  ],
  "relatedParty": [
    {
      "id": "14",
      "href": "https://mycsp.com:8080/tmf-api/partyManagement/v4/party/14",
      "role": "requester",
      "name": "John Doe",
      "@referredType": "Individual"
    }
  ]
}
```


Response

201


```
{
  "href": "https://mycsp.com:8080/tmf-api/serviceQualificationManagement/v4/serviceQualification/5565",
  "id": "5565",
  "serviceQualificationDate": "2017-10-25T12:13:16.361Z",
  "description": "Maximum download/upload speed for access at an address",
  "state": "done",
  "externalId": "SQ101",
  "qualificationResult": "qualified",
  "expectedQualificationDate": "2017-10-25T12:13:16.361Z",
  "estimatedResponseDate": "2017-10-25T12:13:16.361Z",
  "effectiveQualificationDate": "2017-10-25T12:14:16.361Z",
  "expirationDate": "2017-11-25T12:13:16.361Z",
  "provideAlternative": true,
  "provideOnlyAvailable": false,
  "provideUnavailabilityReason": false,
  "serviceQualificationItem": [
    {
      "id": "1",
      "state": "done",
      "expectedServiceAvailabilityDate": "2017-10-27T12:14:16.361Z",
      "expirationDate": "2017-11-25T12:13:16.361Z",
      "qualificationResult": "qualified",
      "service": {
        "serviceSpecification": {
          "id": "111",
          "href": "https://mycsp.com:8080/tmf-api/serviceCatalogManagement/v4/serviceSpecification/111",
          "name": "CFS_Access"
        },
        "serviceCharacteristic": [
          {
            "name": "downloadSpeed",
            "valueType": "object",
            "value": {
              "@type": "Bandwidth",
              "@schemaLocation": "https://mycsp.com:8080/tmf-api/schema/Service/Bandwidth.schema.json",
              "speed": "300Mb/s"
```


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```
            }
          },
          {
            "name": "uploadSpeed",
            "valueType": "object",
            "value": {
              "@type": "Bandwidth",
              "@schemaLocation": "https://mycsp.com:8080/tmf-api/schema/Service/Bandwidth.schema.json",
              "speed": "100Mb/s"
            }
          }
        ],
        "place": [
          {
            "href": "https://mycsp.com:8080/tmf-api/geographicAddressManagement/v4/geographicAddress/25511",
            "id": "25511",
            "name": "160 de Versailles Avenue 75016 Paris France",
            "role": "installationAddress",
            "@type": "GeographicAddress"
          }
        ]
      }
    }
  ],
  "relatedParty": [
    {
      "id": "14",
      "href": "https://mycsp.com:8080/tmf-api/partyManagement/v4/party/14",
      "role": "requester",
      "name": "John Doe",
      "@referredType": "Individual"
    }
  ]
}
```


Here's an example of a request for creating a ServiceQualification resource to check if an access service with IPTV (4K) can be delivered at a specified address. The request contains two items: one for the access service and the other for the IPTV that relies on the access service.

Request


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

{
  "externalId": "SQ102",
  "description": "Deliver access and IPTV at a given address",
  "expectedQualificationDate": "2017-10-25T12:13:16.361Z",
  "provideAlternative": true,
  "provideOnlyAvailable": true,
  "provideUnavailabilityReason": false,
  "serviceQualificationItem": [
```


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```
    {
      "id": "1",
      "expectedServiceAvailabilityDate": "2017-10-27T12:14:16.361Z",
      "service": {
        "serviceSpecification": {
          "id": "111",
          "href": "https://mycsp.com:8080/tmf-api/serviceCatalogManagement/v4/serviceSpecification/111",
          "name": "CFS_Access"
        },
        "serviceCharacteristic": [
          {
            "name": "downloadSpeed"
          },
          {
            "name": "uploadSpeed"
          }
        ],
        "place": [
          {
            "href": "https://mycsp.com:8080/tmf-api/geographicAddressManagement/v4/geographicAddress/25511",
            "id": "25511",
            "name": "160 de Versailles Avenue 75016 Paris France",
            "role": "installationAddress",
            "@type": "GeographicAddress"
          }
        ]
      }
    },
    {
      "id": "2",
      "expectedServiceAvailabilityDate": "2017-10-27T12:14:16.361Z",
      "service": {
        "serviceSpecification": {
          "id": "222",
          "href": "https://mycsp.com:8080/tmf-api/serviceCatalogManagement/v4/serviceSpecification/222",
          "name": "CFS_IPTV"
        },
        "serviceCharacteristic": [
          {
            "name": "4kEnabled",
            "valueType": "boolean",
            "value": true
          }
        ]
      },
      "qualificationItemRelationship": [
        {
          "type": "reliesOn",
          "id": "1"
        }
      ]
    }
  ]
}
```


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Response

201


```
{
  "id": "57",
  "href": "https://mycsp.com:8080/tmf-api/serviceQualificationManagement/v4/serviceQualification/57",
  "serviceQualificationDate": "2017-10-25T12:13:16.361Z",
  "externalId": "SQ102",
  "description": "Deliver access and IPTV at a given address",
  "state": "done",
  "qualificationResult": "qualified",
  "expectedQualificationDate": "2017-10-25T12:13:16.361Z",
  "estimatedResponseDate": "2017-10-25T12:13:16.361Z",
  "effectiveQualificationDate": "2017-10-25T12:14:16.361Z",
  "expirationDate": "2017-11-25T12:13:16.361Z",
  "provideAlternative": true,
  "provideOnlyAvailable": true,
  "provideUnavailabilityReason": false,
  "serviceQualificationItem": [
    {
      "id": "1",
      "state": "done",
      "expectedServiceAvailabilityDate": "2017-10-27T12:14:16.361Z",
      "expirationDate": "2017-11-25T12:13:16.361Z",
      "qualificationResult": "qualified",
      "service": {
        "serviceSpecification": {
          "id": "111",
          "href": "https://mycsp.com:8080/tmf-api/serviceCatalogManagement/v4/serviceSpecification/111",
          "name": "CFS_Access"
        },
        "serviceCharacteristic": [
          {
            "name": "downloadSpeed",
            "valueType": "object",
            "value": {
              "@type": "Bandwidth",
              "@schemaLocation": "https://mycsp.com:8080/tmf-api/schema/Service/Bandwidth.schema.json",
              "speed": "300Mb/s"
            }
          },
          {
            "name": "uploadSpeed",
            "valueType": "object",
            "value": {
              "@type": "Bandwidth",
              "@schemaLocation": "https://mycsp.com:8080/tmf-api/schema/Service/Bandwidth.schema.json",
              "speed": "100Mb/s"
            }
          }
        ],
```


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```
          "place": [
            {
              "href": "https://mycsp.com:8080/tmf-api/geographicAddressManagement/v4/geographicAddress/25511",
              "id": "25511",
              "name": "160 de Versailles Avenue 75016 Paris France",
              "role": "installationAddress",
              "@type": "GeographicAddress"
            }
          ]
        }
      },
      {
        "id": "2",
        "state": "done",
        "expectedServiceAvailabilityDate": "2017-10-27T12:14:16.361Z",
        "expirationDate": "2017-11-25T12:13:16.361Z",
        "qualificationResult": "qualified",
        "service": {
          "serviceSpecification": {
            "id": "222",
            "href": "https://mycsp.com:8080/tmf-api/serviceCatalogManagement/v4/serviceSpecification/222",
            "name": "CFS_IPTV"
          },
          "serviceCharacteristic": [
            {
              "name": "4kEnabled",
              "valueType": "boolean",
              "value": true
            }
          ]
        },
        "qualificationItemRelationship": [
          {
            "type": "reliesOn",
            "id": "1"
          }
        ]
      }
    ],
    "relatedParty": [
      {
        "id": "14",
        "href": "https://mycsp.com:8080/tmf-api/partyManagement/v4/party/14",
        "role": "requester",
        "name": "John Doe",
        "@referredType": "Individual"
      }
    ]
}
```


Here's an example of a request for creating a ServiceQualification resource to check if a new IP TV service can be delivered at the same location of an existing and active Access service. Before doing the service qualification, the Access service has been retrieved from the service inventory and we get its id. The request contains one item for

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the IP TV service and we use the service relationship to describe the dependency with the Access service with id 741.

Request

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

{
  "externalId": "SQ103",
  "description": "Deliver IPTV at the same location of an existing access",
  "expectedQualificationDate": "2017-10-25T12:13:16.361Z",
  "provideAlternative": true,
  "provideOnlyAvailable": true,
  "provideUnavailabilityReason": true,
  "serviceQualificationItem": [
    {
      "id": "1",
      "expectedServiceAvailabilityDate": "2017-10-27T12:14:16.361Z",
      "service": {
        "serviceSpecification": {
          "id": "222",
          "href": "https://mycsp.com:8080/tmf-api/serviceCatalogManagement/v4/serviceSpecification/222",
          "name": "CFS_IPTV"
        },
        "serviceRelationship": [
          {
            "relationshipType": "ReliesOn",
            "href": "ServiceQualification_create_3_request.sample.json",
            "id": "741"
          }
        ]
      }
    }
  ],
  "relatedParty": [
    {
      "id": "16",
      "href": "https://mycsp.com:8080/tmf-api/partyManagement/v4/party/16",
      "role": "requester",
      "name": "Adam Smith",
      "@referredType": "Individual"
    }
  ]
}
```

Response

```
201

{
```

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```
  "id": "58",
  "href": "https://mycsp.com:8080/tmf-api/serviceQualificationManagement/v4/serviceQualification/58",
  "serviceQualificationDate": "2017-10-25T12:13:16.361Z",
  "externalId": "SQ103",
  "description": "Deliver IPTV at the same location of an existing access",
  "state": "done",
  "qualificationResult": "qualified",
  "expectedQualificationDate": "2017-10-25T12:13:16.361Z",
  "estimatedResponseDate": "2017-10-25T12:13:16.361Z",
  "effectiveQualificationDate": "2017-10-25T12:14:16.361Z",
  "expirationDate": "2017-11-25T12:13:16.361Z",
  "provideAlternative": true,
  "provideOnlyAvailable": true,
  "provideUnavailabilityReason": true,
  "serviceQualificationItem": [
    {
      "id": "1",
      "state": "done",
      "expectedServiceAvailabilityDate": "2017-10-27T12:14:16.361Z",
      "expirationDate": "2017-11-25T12:13:16.361Z",
      "qualificationResult": "qualified",
      "service": {
        "serviceSpecification": {
          "id": "222",
          "href": "https://mycsp.com:8080/tmf-api/serviceCatalogManagement/v4/serviceSpecification/222",
          "name": "CFS_IPTV"
        },
        "serviceRelationship": [
          {
            "relationshipType": "ReliesOn",
            "id": "741"
          }
        ]
      }
    }
  ],
  "relatedParty": [
    {
      "id": "16",
      "href": "https://mycsp.com:8080/tmf-api/partyManagement/v4/party/16",
      "role": "requester",
      "name": "Adam Smith",
      "@referredType": "Individual"
    }
  ]
}
```


Here's an example of a request for creating a ServiceQualification resource to check if we can upgrade the download speed of an existing and active Access service from 100 Mb/s to 600 Mb/s. Before doing the service qualification, the Access service has been retrieved from the service inventory and we get its id. The request contains one item for the Access service. We don’t need to specify service specification and place information in the request. Providing the inventory id for the requested service to be qualified should be enough.

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Request

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


```
{
  "externalId": "SQ104",
  "description": "Upgrade the download speed of an existing access",
  "expectedQualificationDate": "2017-10-25T12:13:16.361Z",
  "provideAlternative": false,
  "provideOnlyAvailable": true,
  "provideUnavailabilityReason": false,
  "serviceQualificationItem": [
    {
      "id": "1",
      "expectedServiceAvailabilityDate": "2017-10-27T12:14:16.361Z",
      "service": {
        "id": "741",
        "serviceCharacteristic": [
          {
            "name": "downloadSpeed",
            "valueType": "object",
            "value": {
              "@type": "Bandwidth",
              "@schemaLocation": "https://mycsp.com:8080/tmf-api/schema/Service/Bandwidth.schema.json",
              "speed": "600Mb/s"
            }
          }
        ]
      }
    }
  ],
  "relatedParty": [
    {
      "id": "16",
      "href": "https://mycsp.com:8080/tmf-api/partyManagement/v4/party/16",
      "role": "requester",
      "name": "Adam Smith",
      "@referredType": "Individual"
    }
  ]
}
```


Response

201


```
{
  "id": "59",
  "href": "https://mycsp.com:8080/tmf-api/serviceQualificationManagement/v4/serviceQualification/59",
  "serviceQualificationDate": "2017-10-25T12:13:16.361Z",
  "externalId": "SQ104",
```


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```
  "description": "Upgrade the download speed of an existing access",
  "state": "done",
  "qualificationResult": "qualified",
  "expectedQualificationDate": "2017-10-25T12:13:16.361Z",
  "estimatedResponseDate": "2017-10-25T12:13:16.361Z",
  "effectiveQualificationDate": "2017-10-25T12:14:16.361Z",
  "expirationDate": "2017-11-25T12:13:16.361Z",
  "provideAlternative": false,
  "provideOnlyAvailable": true,
  "provideUnavailabilityReason": false,
  "serviceQualificationItem": [
    {
      "id": "1",
      "state": "done",
      "expectedServiceAvailabilityDate": "2017-10-27T12:14:16.361Z",
      "expirationDate": "2017-11-25T12:13:16.361Z",
      "qualificationResult": "qualified",
      "service": {
        "id": "741",
        "serviceCharacteristic": [
          {
            "name": "downloadSpeed",
            "valueType": "object",
            "value": {
              "@type": "Bandwidth",
              "@schemaLocation": "https://mycsp.com:8080/tmf-api/schema/Service/Bandwidth.schema.json",
              "speed": "600Mb/s"
            }
          }
        ]
      }
    }
  ],
  "relatedParty": [
    {
      "id": "16",
      "href": "https://mycsp.com:8080/tmf-api/partyManagement/v4/party/16",
      "role": "requester",
      "name": "Adam Smith",
      "@referredType": "Individual"
    }
  ]
}
```


Patch service qualification

PATCH /serviceQualification/{id}

Description

This operation allows partial updates of a service qualification 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.

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

Patchable and Non Patchable Attributes

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

Patchable Attributes	Rule
description	Could be patched by the requester only if serviceQualification is acknowledged or inProgress
estimatedResponseDate	Only modified by server side
expectedQualificationDate	Could be patched by the requester only if serviceQualification is acknowledged
expirationDate	Only modified by server side
externalId	Could be patched by the requester only if serviceQualification is acknowledged or inProgress
provideAlternative	Could be patched by the requester only if serviceQualification is acknowledged or inProgress
provideOnlyAvailable	Could be patched by the requester only if serviceQualification is acknowledged or inProgress
provideUnavailabilityReason	Could be patched by the requester only if serviceQualification is acknowledged or inProgress
qualificationResult	
relatedParty	Could be patched by the requester only if serviceQualification is acknowledged or inProgress
serviceQualificationItem	
state	Only modified by server side

Non Patchable Attributes	Rule
id	
href	
effectiveQualificationDate	
serviceQualificationDate	
serviceQualificationItem. qualificationItemResult	Provided by server once qualification done

Additional Rules

The following pre-conditions apply for this operation.

Pre-conditions
PATCH allowed if state different than *done* or *terminatedWithError*.

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Usage Samples

Here's an example of a request for patching a service qualification. In this example, the downstream bandwidth is increased to 400Mb/s.

Request

```
PATCH {apiRoot}/serviceQualification/5565
Content-Type: application/merge-patch+json

{
  "id": "57",
  "href": "https://mycsp.com:8080/tmf-api/serviceQualificationManagement/v4/serviceQualification/57",
  "serviceQualificationItem": [
    {
      "id": "1",
      "service": {
        "serviceSpecification": {
          "id": "111",
          "href": "https://mycsp.com:8080/tmf-api/serviceCatalogManagement/v4/serviceSpecification/111",
          "name": "CFS_Access"
        },
        "serviceCharacteristic": [
          {
            "name": "downloadSpeed",
            "valueType": "object",
            "value": {
              "@type": "Bandwidth",
              "@schemaLocation": "https://mycsp.com:8080/tmf-api/schema/Service/Bandwidth.schema.json",
              "speed": "400Mb/s"
            }
          }
        ]
      }
    }
  ]
}
```

Response

```
200

{
  "description": "Maximum download/upload speed for access at an address",
  "effectiveQualificationDate": "2017-10-25T12:14:16.361Z",
  "estimatedResponseDate": "2017-10-25T12:13:16.361Z",
  "expectedQualificationDate": "2017-10-25T12:13:16.361Z",
  "expirationDate": "2017-11-25T12:13:16.361Z",
  "href": "https://mycsp.com:8080/tmf-api/serviceQualificationManagement/v4/serviceQualification/5565",
  "id": "5565",
  "provideAlternative": true,
```

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```
"provideOnlyAvailable": false,
"provideUnavailabilityReason": false,
"serviceQualificationDate": "2017-10-25T12:13:16.361Z",
"state": "done",
"serviceQualificationItem": [
  {
    "id": "1",
    "qualificationResult": "qualified",
    "state": "done",
    "service": {
      "serviceSpecification": {
        "id": "111",
        "href": "https://mycsp.com:8080/tmf-api/serviceCatalogManagement/v4/serviceSpecification/111",
        "name": "CFS_Access"
      },
      "serviceCharacteristic": [
        {
          "name": "downloadSpeed",
          "valueType": "object",
          "value": {
            "@type": "Bandwidth",
            "@schemaLocation": "https://mycsp.com:8080/tmf-api/schema/Service/Bandwidth.schema.json",
            "speed": "400Mb/s"
          }
        },
        {
          "name": "uploadSpeed",
          "valueType": "object",
          "value": {
            "@type": "Bandwidth",
            "@schemaLocation": "https://mycsp.com:8080/tmf-api/schema/Service/Bandwidth.schema.json",
            "speed": "100Mb/s"
          }
        }
      ],
      "place": [
        {
          "href": "https://mycsp.com:8080/tmf-api/geographicAddressManagement/v4/geographicAddress/25511",
          "id": "25511",
          "name": "160 de Versailles Avenue 75016 Paris France",
          "role": "installationAddress",
          "@type": "GeographicAddress"
        }
      ]
    },
    "expectedServiceAvailabilityDate": "2017-10-27T12:14:16.361Z",
    "expirationDate": "2017-11-25T12:13:16.361Z"
  }
],
"relatedParty": [
  {
    "id": "14",
    "href": "https://mycsp.com:8080/tmf-api/partyManagement/v4//party/14",
    "role": "requester",
    "name": "John Doe",
```


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```
        "@referredType": "Individual"
      }
    ],
    "externalId": "SQ102",
    "qualificationResult": "qualified",
    "@baseType": "ServiceQualification",
    "@type": "CFServiceQualification",
    "@schemaLocation": "https://mycsp.com:8080/tmf-api/schema/Service/CFServiceQualification.schema.json"
}
```


Delete service qualification

`DELETE /serviceQualification/{id}`

Description

This operation deletes a service qualification entity.

Usage Samples

Here's an example of a request for deleting a service qualification.

Request
DELETE {apiRoot}/serviceQualification/5565
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 part 1. Refer to the guidelines for more details.

Register listener

POST /hub

Description

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

Behavior

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

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

Usage Samples

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

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

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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.

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Usage Samples

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

Request

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

Response
201

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

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Acknowledgements

Release History

Release Number	Date	Release led by:	Description
Release 1.0	15/04/2016	Pierre Gauthier TM Forum pgauthier@tmforum.org Takayuki Nakamura NTT nakamura.takayuki@nttcom.jp Ludovic Robert Orange Ludovic.robert@orange.com	First release of the document
Release 2.0	02/10/2017	Mariano Belaunde Orange mariano.belaunde@orange.com Ludovic Robert Orange Ludovic.robert@orange.com	Generated from API Data Model.. +update to comply with API new pattern + AP 910 feedbacks + MEF change requests redistribution to TMF
Release 18.0.0 Version 3.0.1	05-Jan-2018	Ludovic Robert Orange Ludovic.robert@orange.com Sophie Bouleau Orange Sophie.bouleau@orange.com	Alignment with ProductOfferingQualification API
Release 18.5.0 Version 4.0.0	13-Jan-2019	Jonathan Goldberg Amdocs Jonathan.Goldberg@amdocs.com	Schema alignment for NaaS APIs

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