**TM Forum Specification**

**Service Test Management API REST Specification**

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# INTRODUCTION

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

The Service Test API provides a standardized mechanism for placing a service test with all of the necessary test parameters. The API consists of a simple set of operations that interact with CRM/Service Management systems in a consistent manner. A service test is a procedure intended to check the quality, performance, or reliability of a service.

Service Test Management API manages service test resource and service specification test resource:

* A service test specification describes the service test in terms of parameters to be configured and measures to be taken.
* A service exists for a controlled test invocation on a service. The service test is executed according to a schedule. and contains service test configuration parameters that are to be applied at execution time, and service test measures that result.

# SAMPLE USE CASES

## Service Test for Customer Experience Assurance

The Service Test can be used for customer experience assurance while:

* The subscriber can launch service test from Self Service Portal to make sure the service quality while his/her experience is not good.
* The Call Center operator can execute service test to check the quality and analyze root cause for response while one customer has complaint

**CC**



Customer

Service Test Management

Complaint

Service Test Request

Response

Feedback



Service Test Request

It could improve customer expereice and increase FCR(First Call Resolution) much.

It could improve customer expereice and increase FCR(First Call Resolution) much.

## Planned Service Test for Importance Service

The test job can be defined for some important services that the test will be executed against them periodically to assurance the service quality and find potential service downgrading in advance to avoid massive impact to customers.

# 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.

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. All resources and sub-resources of this API have a @type attributes that can be provided when this is useful. Such as ServiceTest, ServiceTestSpecification Entity. 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 ServiceRef) to explicitly denote the actual entity type of the referred class. Notice that in reference entities the @type, when used, denotes the class types of the reference itself, such as ServiceRef, 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.

Notice that because these meta-attributes have a generic meaning we will not repeat their definition in the resource description tables of each resource and each sub-resource.

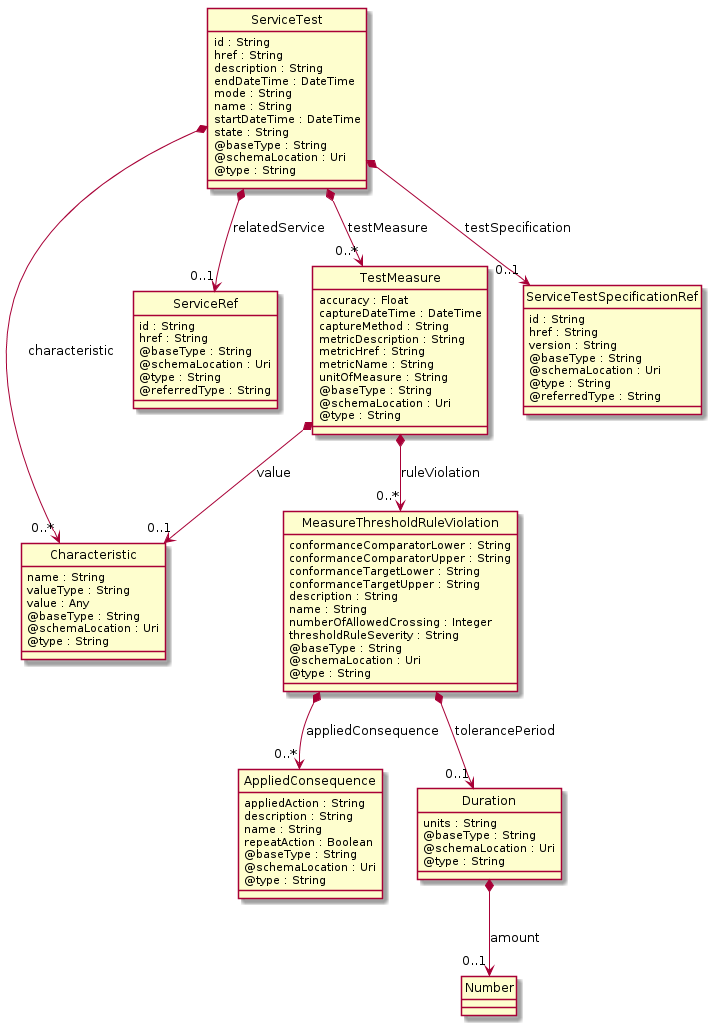
# RESOURCE MODEL

## Managed Entity and Task Resource Models

### Service Test resource

A service test is an entity that exists for a controlled test invocation on a service. The service   
test is executed according to a schedule and contains service test configuration parameters that are to be   
applied at execution time, and service test measures that result.

**Resource model**



**Field descriptions**

*ServiceTest* fields

|  |  |
| --- | --- |
| characteristic | A list of characteristics (Characteristic [\*]). List of characteristics with values that define the test run. |
| description | A string. Description of the service test. |
| endDateTime | A date time (DateTime). The end date and time of the service test. |
| href | A string. Hyperlink to access the service test. |
| id | A string. The identifier of the service test. |
| mode | A string. An indication of whether the service test is running in  "PROACTIVE" or "ONDEMAND" mode. |
| name | A string. The name of the service test. |
| relatedService | A service reference (ServiceRef). The actual service being tested. |
| startDateTime | A date time (DateTime). The start date and time of the service test. |
| state | A string. The actual state the service test is in. |
| testMeasure | A list of test measures (TestMeasure [\*]). The results of the test in terms of the measured metrics. |
| testSpecification | A service test specification reference (ServiceTestSpecificationRef). The specification for this test. |

*AppliedConsequence* sub-resource

An Applied Consequence defines the action (prescribed action or notification) to take when a   
MeasureThresholdRuleViolation occurs.

|  |  |
| --- | --- |
| appliedAction | A string. The action for a violated threshold. This could be a hyperlink to  the action. |
| description | A string. A narrative that explains in detail what the consequence is. |
| name | A string. A word, term, or phrase by which Consequence is known and  distinguished from other MetricDefMeasureConsequences. |
| repeatAction | A boolean. An indicator used to specify that a consequence should cease  being applied if a value is in the same range as the previous value or continue being applied if a value is in the same range as the previous value.  If the repeatAction is True, if the consequence is always applied as soon as the MetricMeasure value is in the range of values and if the repeatAction is False, the consequence is applied only if the previous MetricMeasure value was not in the same range. |

*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. |

*Duration* sub-resource

A time interval in a given unit of time.

|  |  |
| --- | --- |
| amount | A number (Number). Time interval (number of seconds, munutes, hours, etc.). |
| units | A string. Unit of time (seconds, minutes, hours, etc.). |

*MeasureThresholdRuleViolation* sub-resource

A measureThresholdRuleViolation is a violation of a rule that defines the in the   
MericDefMeasureThresholdRule.

|  |  |
| --- | --- |
| appliedConsequence | A list of applied consequences (AppliedConsequence [\*]). An Applied Consequence defines the action (prescribed action or notification) to take when a MeasureThresholdRuleViolation occurs. |
| conformanceComparatorLower | A string. An operator that when applied on a value specifies whether a  threshold is crossed or ceased to be crossed. This operator is used to compare with the conformanceTargetLower. |
| conformanceComparatorUpper | A string. An operator that when applied on a value specifies whether a  threshold is crossed or ceased to be crossed. This operator is used to compare with the conformanceTargetUpper. |
| conformanceTargetLower | A string. A value used to determine if the threshold is crossed or ceases  to be crossed. It represents the lower limit. The value should be less than the conformanceTargetUpper. The conformance comparators should also be logically defined so as to not lead to a logically impossible condition. |
| conformanceTargetUpper | A string. A value used to determine if the threshold is crossed or ceases  to be crossed. It represents the Upper limit. The value should be greater than the conformanceTargetLower. The conformance comparators should also be logically defined so as to not lead to a logically impossible condition. |
| description | A string. Description for the MetricDefMeasureThresholdRule . |
| name | A string. Name for the MetricDefMeasureThresholdRule . |
| numberOfAllowedCrossing | An integer. The number of allowed crossing occurrences in reference to the  tolerancePeriod without a consequence being initiated. |
| thresholdRuleSeverity | A string. A threshold can be generated in different severity levels. A  crossing for each level may require a different condition and possibly trigger a different consequence. |
| tolerancePeriod | A duration (Duration). An interval of time of allowed crossing occurrences before a  consequence being initiated. |

*TestMeasure* sub-resource

A TestMeasure specifies a measure of a specific aspect of a product, service, or resource test, such as lost packets or connectivity status.

|  |  |
| --- | --- |
| accuracy | A float. The number of digits of accuracy captured for associated Metrics. |
| captureDateTime | A date time (DateTime). The date and time that the metric was captured. |
| captureMethod | A string. The method used to capture the Metrics (This may be replaced by a set of entities similar to the Performance Monitoring Ref). |
| metricDescription | A string. Brief description of the metric. |
| metricHref | A string. Hyperlink to access a metric for detail information. |
| metricName | A string. The name of the metric. |
| ruleViolation | A list of measure threshold rule violations (MeasureThresholdRuleViolation [\*]). A list of rules that were violated in this test measure. |
| unitOfMeasure | A string. The unit of measure for the metric values, such as meters, cubic yards, kilograms [ISO 1000]. |
| value | A characteristic (Characteristic). The value of Metric in the test. This also could be a document to record all values captured during the service test. |

*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. |

*ServiceTestSpecificationRef* relationship

The service test specification used by the service test.

|  |  |
| --- | --- |
| @referredType | A string. The actual type of the target instance when needed for disambiguation. |
| href | A string. Hyperlink to access a service test specification. |
| id | A string. Identifier of a service test specification. |
| version | A string. Version of a service test specification. |

**Json representation sample**

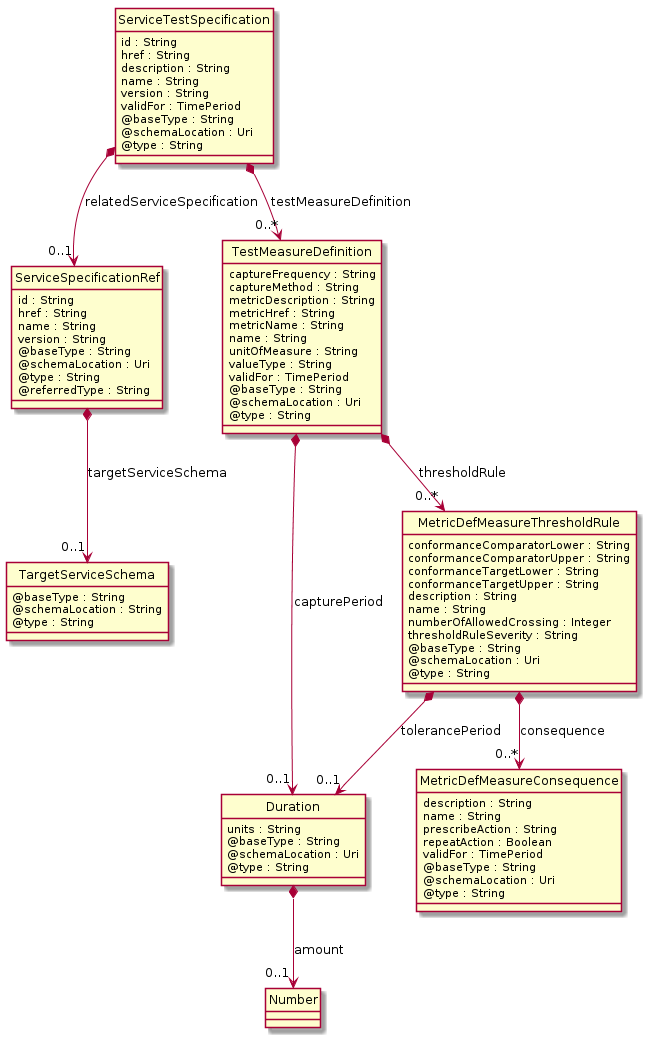
We provide below the json representation of an example of a 'ServiceTest' resource object

|  |
| --- |
| {  "href": "https://mycsp.com:8080/tmf-api/serviceTestManagement/v4/serviceTest/3112",   "id": "3112",   "description:": "This service test is a simple one",   "endDateTime": "2016-03-02T24:00:00",   "mode": "PROACTIVE",   "startDateTime": "2016-03-02T00:00:00",   "state": "Completed",   "relatedService": {  "href": "https://mycsp.com:8080/tmf-api/serviceManagement/v4/service/21",   "id": "21",   "name": "gameService"  },   "testSpecification": {  "href": "https://mycsp.com:8080/tmf-api/serviceTestManagement/v4/serviceTestSpecification/22",   "id": "22",   "@referredType": "PerformanceTestSpecification"  },   "characteristic": [  {  "name": "number",   "valueType": "integer",   "value": 3  },   {  "name": "restart",   "valueType": "boolean",   "value": true  }  ],   "testMeasure": [  {  "accuracy": 0.0001,   "captureDateTime": "2016-03-02T11:12:00",   "captureMethod": "automatic capture by instrument",   "metricDescription": "This is the flow speed in a service",   "metricHref": "https://mycsp.com:8080/tmf-api/metricManagement/v4/metric/21",   "metricName": "Flow speed",   "unitOfMeasure": "A second",   "value": {  "valueType": "bits",   "value": {  "@type": "integer",   "value": 3000  }  },   "ruleViolation": [  {  "conformanceTargetUpper": "2500",   "conformanceComparatorUpper": "greater than ",   "description": "This speed is greater than the target upper",   "name": "tooMuchTraffic",   "numberOfAllowedCrossing": 0,   "thresholdRuleSeverity": "1",   "appliedConsequence": [  {  "appliedAction": "sendWarning",   "description": "send a warning to the system",   "name": "sendWarning",   "repeatAction": false  },   {  "appliedAction": "generateReport",   "description": "generate a waring report ",   "name": "generateReport",   "repeatAction": false  }  ]  }  ]  }  ],   "@type": "PerformanceTest",   "@schemaLocation": "https://mycsp.com:8080/tmf-api/schema/Service/PerformanceTest.schema.json",   "@baseType": "ServiceTest" } |

### Service Test Specification resource

The service test specification describes the service test in terms of parameters to be configured and   
measures to be taken.

**Resource model**



**Field descriptions**

*ServiceTestSpecification* fields

|  |  |
| --- | --- |
| description | A string. Description of a service test specification. |
| href | A string. Hyperlink to access a service test specification. |
| id | A string. Identifier of a service test specification. |
| name | A string. Name of a service test specification. |
| relatedServiceSpecification | A service specification reference (ServiceSpecificationRef). The related service specification. |
| testMeasureDefinition | A list of test measure definitions (TestMeasureDefinition [\*]). A list of definitions for the measurements for the test defined by this specification. |
| validFor | A time period. The period of time for which this specification is valid. |
| version | A string. Version of a service test specification. |

*Duration* sub-resource

A time interval in a given unit of time.

|  |  |
| --- | --- |
| amount | A number (Number). Time interval (number of seconds, munutes, hours, etc.). |
| units | A string. Unit of time (seconds, minutes, hours, etc.). |

*MetricDefMeasureConsequence* sub-resource

A MetricDefMeasureConsequence defines the action (prescribed action or notification) to take when a   
MetricDefMeasureThresholdRule is crossed.

|  |  |
| --- | --- |
| description | A string. A narrative that explains in detail what the consequence is. |
| name | A string. A word, term, or phrase by which a  MetricDefMeasureConsequence is known and distinguished from other MetricDefMeasureConsequences. |
| prescribeAction | A string. Recommended remedy for a violated threshold. This could be  the hyperlink to the action. |
| repeatAction | A boolean. An indicator used to specify that a consequence should cease  being applied if a value is in the same range as the previous value or continue being applied if a value is in the same range as the previous value.  If the repeatAction is True, if the consequence is always applied as soon as the MetricMeasure value is in the range of values and if the repeatAction is False, the consequence is applied only if the previous MetricMeasure value was not in the same range. |
| validFor | A time period. A valid duration of a thing. |

*MetricDefMeasureThresholdRule* sub-resource

A MetricDefMeasureThresholdRule is a rule that defines the condition (raise or clear) to achieve to apply   
consequences when a threshold is crossed or ceased to be crossed. It also defines the severity of the   
raise or clear of the threshold.

|  |  |
| --- | --- |
| conformanceComparatorLower | A string. An operator that when applied on a value specifies whether a  threshold is crossed or ceased to be crossed. This operator is used to Service Test Management API REST Specification compare with the conformanceTargetLower. |
| conformanceComparatorUpper | A string. An operator that when applied on a value specifies whether a  threshold is crossed or ceased to be crossed. This operator is used to compare with the conformanceTargetUpper. |
| conformanceTargetLower | A string. A value used to determine if the threshold is crossed or ceases  to be crossed. It represents the lower limit. The value should be less than the conformanceTargetUpper. The conformance comparators should also be logically defined so as to not lead to a logically impossible condition. |
| conformanceTargetUpper | A string. A value used to determine if the threshold is crossed or ceases  to be crossed. It represents the Upper limit. The value should be greater than the conformanceTargetLower. The conformance comparators should also be logically defined so as to not lead to a logically impossible condition. |
| consequence | A list of metric def measure consequences (MetricDefMeasureConsequence [\*]). A list of consequences (actions, notifications) that will arise if the threshold is crossed. |
| description | A string. Description for the MetricDefMeasureThresholdRule . |
| name | A string. Name for the MetricDefMeasureThresholdRule . |
| numberOfAllowedCrossing | An integer. The number of allowed crossing occurrences in reference to the  tolerancePeriod without a consequence being initiated. |
| thresholdRuleSeverity | A string. A threshold can be generated in different severity levels. A  crossing for each level may require a different condition and possibly trigger a different consequence. |
| tolerancePeriod | A duration (Duration). An interval of time of allowed crossing occurrences before a consequence being initiated. |

*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. |

*TestMeasureDefinition* sub-resource

A TestMeasureDefinition specifies a measure of a specific aspect of a product, service, or resource test, such as lost packets or connectivity status.

|  |  |
| --- | --- |
| captureFrequency | A string. The frequency of capture for the metric. Note: This may be replaced by a set of entities similar to the Performance Monitoring. |
| captureMethod | A string. The method used to capture the Metric. Note: This may be replaced by a set of entities similar to the Performance Monitoring. |
| capturePeriod | A duration (Duration). A period of the capture. |
| metricDescription | A string. Brief description of the metric. |
| metricHref | A string. Hyperlink to access a metric for detail information. |
| metricName | A string. The name of a metric that in the test measure. |
| name | A string. The name of the TestMeasureDefinition. |
| thresholdRule | A list of metric def measure threshold rules (MetricDefMeasureThresholdRule [\*]). The rule(s) associated with the measure threshold. |
| unitOfMeasure | A string. Name of a service test specification. |
| validFor | A time period. The time period for which this definition is valid. |
| valueType | A string. A kind of value that the Metric value can take on, such as numeric, text, and so forth. |

*ServiceSpecificationRef* relationship

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

|  |  |
| --- | --- |
| @referredType | A string. The actual type of the target instance when needed for disambiguation. |
| href | A string. Reference of the serviceSpecification. |
| id | A string. Unique identifier of the service specification. |
| name | A string. Name of the requiredServiceSpecification. |
| targetServiceSchema | A target service schema (TargetServiceSchema). A target service schema reference (TargetServiceSchemaRef). The reference object to the schema and type of target service which is described by service specification. |
| version | A string. Service specification version. |

**Json representation sample**

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

|  |
| --- |
| {  "description": "a service description",   "href": "https://mycsp.com:8080/tmf-api/serviceTestManagement/v4/serviceTestSpecification/12",   "id": "12",   "version": "1.0",   "name": "monkey test",   "validFor": {  "endDateTime": "2017-03-01T00:00:00",   "startDateTime": "2016-03-01T00:00:00"  },   "testMeasureDefinition": [  {  "captureFrequency": "once",   "captureMethod": "automatic capture by instrument",   "metricDescription": "This is the flow speed in a service",   "metricHref": "https://mycsp.com:8080/tmf-api/metricManagement/v4/metric/21",   "metricName": "Flow speed",   "name": "Definition of Flow speed",   "unitOfMeasure": "A second",   "valueType": "bits",   "capturePeriod": {  "amount": "5",   "units": "seconds"  },   "thresholdRule": [  {  "conformanceTargetUpper": "2500",   "conformanceComparatorUpper": "greater than ",   "description": "This speed is greater than the target upper",   "name": "tooMuchTraffic",   "numberOfAllowedCrossing": 0,   "thresholdRuleSeverity": "1",   "tolerancePeriod": {  "amount": "15",   "units": "minutes"  },   "consequence": [  {  "prescribeAction": "sendWarning",   "description": "send a warning to the system",   "name": "sendWarning",   "repeatAction": false,   "validFor": {  "endDateTime": "2017-03-01T00:00:00",   "startDateTime": "2016-03-01T00:00:00"  }  },   {  "prescribeAction": "generateReport",   "description": "generate a waring report ",   "name": "generateReport",   "repeatAction": false,   "validFor": {  "endDateTime": "2017-03-01T00:00:00",   "startDateTime": "2016-03-01T00:00:00"  }  }  ]  }  ],   "validFor": {  "endDateTime": "2017-03-01T00:00:00",   "startDateTime": "2016-03-01T00:00:00"  }  }  ],   "relatedServiceSpecification": {  "href": "https://mycsp.com:8080/tmf-api/serviceCatalogManagement/v4/serviceSpecification/31",   "id": "31",   "@referredType": "vCPEServiceSpecification"  },   "@baseType": "ServiceTestSpecification",   "@type": "PerformanceTestSpecification",   "@schemaLocation": "https://mycsp.com:8080/tmf-api/schema/service/PerformanceTestSpecification.schema.json" } |

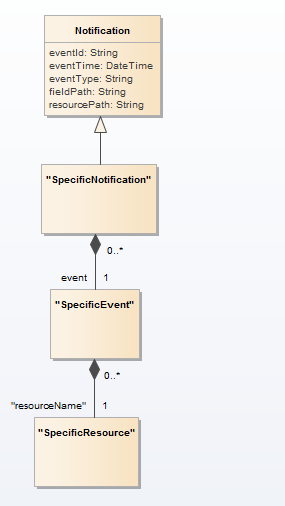
## Notification Resource Models

6 notifications are defined for this API

Notifications related to ServiceTest:  
 - ServiceTestCreateNotification  
 - ServiceTestAttributeValueChangeNotification  
 - ServiceTestDeleteNotification

Notifications related to ServiceTestSpecification:  
 - ServiceTestSpecificationCreateNotification  
 - ServiceTestSpecificationAttributeValueChangeNotification  
 - ServiceTestSpecificationDeleteNotification

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



### Service Test Create Notification

Notification ServiceTestCreateNotification case for resource ServiceTest

**Json representation sample**

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

|  |
| --- |
| {  "eventId":"00001",  "eventTime":"2015-11-16T16:42:25-04:00",  "eventType":"ServiceTestCreateNotification",  "event": {  "serviceTest" :   {-- SEE ServiceTest RESOURCE SAMPLE --}  } } |

### Service Test Attribute Value Change Notification

Notification ServiceTestAttributeValueChangeNotification case for resource ServiceTest

**Json representation sample**

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

|  |
| --- |
| {  "eventId":"00001",  "eventTime":"2015-11-16T16:42:25-04:00",  "eventType":"ServiceTestAttributeValueChangeNotification",  "event": {  "serviceTest" :   {-- SEE ServiceTest RESOURCE SAMPLE --}  } } |

### Service Test Delete Notification

Notification ServiceTestDeleteNotification case for resource ServiceTest

**Json representation sample**

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

|  |
| --- |
| {  "eventId":"00001",  "eventTime":"2015-11-16T16:42:25-04:00",  "eventType":"ServiceTestDeleteNotification",  "event": {  "serviceTest" :   {-- SEE ServiceTest RESOURCE SAMPLE --}  } } |

### Service Test Specification Create Notification

Notification ServiceTestSpecificationCreateNotification case for resource ServiceTestSpecification

**Json representation sample**

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

|  |
| --- |
| {  "eventId":"00001",  "eventTime":"2015-11-16T16:42:25-04:00",  "eventType":"ServiceTestSpecificationCreateNotification",  "event": {  "serviceTestSpecification" :   {-- SEE ServiceTestSpecification RESOURCE SAMPLE --}  } } |

### Service Test Specification Attribute Value Change Notification

Notification ServiceTestSpecificationAttributeValueChangeNotification case for resource ServiceTestSpecification

**Json representation sample**

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

|  |
| --- |
| {  "eventId":"00001",  "eventTime":"2015-11-16T16:42:25-04:00",  "eventType":"ServiceTestSpecificationAttributeValueChangeNotification",  "event": {  "serviceTestSpecification" :   {-- SEE ServiceTestSpecification RESOURCE SAMPLE --}  } } |

### Service Test Specification Delete Notification

Notification ServiceTestSpecificationDeleteNotification case for resource ServiceTestSpecification

**Json representation sample**

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

|  |
| --- |
| {  "eventId":"00001",  "eventTime":"2015-11-16T16:42:25-04:00",  "eventType":"ServiceTestSpecificationDeleteNotification",  "event": {  "serviceTestSpecification" :   {-- SEE ServiceTestSpecification RESOURCE SAMPLE --}  } } |

# API OPERATIONS

Remember the following Uniform Contract:

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

Filtering and attribute selection rules are described in the TMF REST Design Guidelines Part 1 document.

Notifications are also described in a subsequent section.

## Operations on Service Test

### List service tests

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

**Description**

This operation list service test 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 service tests.

|  |
| --- |
| **Request** |
| GET {apiRoot}/serviceTest?fields=id,category,name,state&mode=PROACTIVE&state=Completed Accept: application/json |
| **Response** |
| 200  [  {  "href": "https://mycsp.com:8080/tmf-api/serviceTestManagement/v4/serviceTest/3112",   "id": "3112",   "description:": "This service test is a simple one",   "endDateTime": "2016-03-02T24:00:00",   "mode": "PROACTIVE",   "startDateTime": "2016-03-02T00:00:00",   "state": "Completed",   "relatedService": {  "href": "https://mycsp.com:8080/tmf-api/serviceManagement/v4/service/21",   "id": "21",   "name": "gameService"  },   "testSpecification": {  "href": "https://mycsp.com:8080/tmf-api/serviceTestManagement/v4/serviceTestSpecification/22",   "id": "22",   "@referredType": "PerformanceTestSpecification"  },   "characteristic": [  {  "name": "number",   "valueType": "integer",   "value": 3  },   {  "name": "restart",   "valueType": "boolean",   "value": true  }  ],   "testMeasure": [  {  "accuracy": 0.0001,   "captureDateTime": "2016-03-02T11:12:00",   "captureMethod": "automatic capture by instrument",   "metricDescription": "This is the flow speed in a service",   "metricHref": "https://mycsp.com:8080/tmf-api/metricManagement/v4/metric/21",   "metricName": "Flow speed",   "unitOfMeasure": "A second",   "value": {  "valueType": "bits",   "value": {  "@type": "integer",   "value": 3000  }  },   "ruleViolation": [  {  "conformanceTargetUpper": "2500",   "conformanceComparatorUpper": "greater than ",   "description": "This speed is greater than the target upper",   "name": "tooMuchTraffic",   "numberOfAllowedCrossing": 0,   "thresholdRuleSeverity": "1",   "appliedConsequence": [  {  "appliedAction": "sendWarning",   "description": "send a warning to the system",   "name": "sendWarning",   "repeatAction": false  },   {  "appliedAction": "generateReport",   "description": "generate a waring report ",   "name": "generateReport",   "repeatAction": false  }  ]  }  ]  }  ],   "@type": "PerformanceTest",   "@schemaLocation": "https://mycsp.com:8080/tmf-api/schema/Service/PerformanceTest.schema.json",   "@baseType": "ServiceTest"  } ] |

### Retrieve service test

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

**Description**

This operation retrieves a service test 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 test.

|  |
| --- |
| **Request** |
| GET {apiRoot}/serviceTest/3112 Accept: application/json |
| **Response** |
| 200  {  "href": "https://mycsp.com:8080/tmf-api/serviceTestManagement/v4/serviceTest/3112",   "id": "3112",   "description:": "This service test is a simple one",   "endDateTime": "2016-03-02T24:00:00",   "mode": "PROACTIVE",   "startDateTime": "2016-03-02T00:00:00",   "state": "Completed",   "relatedService": {  "href": "https://mycsp.com:8080/tmf-api/serviceManagement/v4/service/21",   "id": "21",   "name": "gameService"  },   "testSpecification": {  "href": "https://mycsp.com:8080/tmf-api/serviceTestManagement/v4/serviceTestSpecification/22",   "id": "22",   "@referredType": "PerformanceTestSpecification"  },   "characteristic": [  {  "name": "number",   "valueType": "integer",   "value": 3  },   {  "name": "restart",   "valueType": "boolean",   "value": true  }  ],   "testMeasure": [  {  "accuracy": 0.0001,   "captureDateTime": "2016-03-02T11:12:00",   "captureMethod": "automatic capture by instrument",   "metricDescription": "This is the flow speed in a service",   "metricHref": "https://mycsp.com:8080/tmf-api/metricManagement/v4/metric/21",   "metricName": "Flow speed",   "unitOfMeasure": "A second",   "value": {  "valueType": "bits",   "value": {  "@type": "integer",   "value": 3000  }  },   "ruleViolation": [  {  "conformanceTargetUpper": "2500",   "conformanceComparatorUpper": "greater than ",   "description": "This speed is greater than the target upper",   "name": "tooMuchTraffic",   "numberOfAllowedCrossing": 0,   "thresholdRuleSeverity": "1",   "appliedConsequence": [  {  "appliedAction": "sendWarning",   "description": "send a warning to the system",   "name": "sendWarning",   "repeatAction": false  },   {  "appliedAction": "generateReport",   "description": "generate a waring report ",   "name": "generateReport",   "repeatAction": false  }  ]  }  ]  }  ],   "@type": "PerformanceTest",   "@schemaLocation": "https://mycsp.com:8080/tmf-api/schema/Service/PerformanceTest.schema.json",   "@baseType": "ServiceTest" } |

### Create service test

**POST /serviceTest**

**Description**

This operation creates a service test entity.

**Mandatory and Non Mandatory Attributes**

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

|  |  |
| --- | --- |
| Mandatory Attributes | Rule |
| name |  |
| relatedService |  |
| testSpecification |  |

|  |  |  |
| --- | --- | --- |
| Non Mandatory Attributes | Default Value | Rule |
| characteristic |  |  |
| description |  |  |
| endDateTime |  |  |
| mode |  |  |
| startDateTime |  |  |
| state |  |  |
| testMeasure |  |  |

**Usage Samples**

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

|  |
| --- |
| **Request** |
| POST {apiRoot}/serviceTest Content-Type: application/json  {  "description:": "This service test is a simple one",   "endDateTime": "2016-03-02T24:00:00",   "mode": "PROACTIVE",   "startDateTime": "2016-03-02T00:00:00",   "state": "In Progress",   "relatedService": {  "href": "https://mycsp.com:8080/tmf-api/serviceManagement/v4/service/21",   "id": "21",   "name": "gameService"  },   "testSpecification": {  "href": "https://mycsp.com:8080/tmf-api/serviceTestManagement/v4/serviceTestSpecification/22",   "id": "22",   "@referredType": "PerformanceTestSpecification"  } } |
| **Response** |
| 201  {  "href": "https://host:port/serviceTestManagement/v2/serviceTest/89757",   "id": "89757",   "description:": "This service test is a simple one",   "endDateTime": "2016-03-02T24:00:00",   "mode": "PROACTIVE",   "startDateTime": "2016-03-02T00:00:00",   "state": "In Progress",   "relatedService": {  "href": "https://mycsp.com:8080/tmf-api/serviceManagement/v4/service/21",   "id": "21",   "name": "gameService"  },   "testSpecification": {  "href": "https://mycsp.com:8080/tmf-api/serviceTestManagement/v4/serviceTestSpecification/22",   "id": "22",   "@referredType": "PerformanceTestSpecification"  } } |

### Patch service test

**PATCH /serviceTest/{id}**

**Description**

This operation allows partial updates of a service test 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 |
| characteristic |  |
| description |  |
| endDateTime |  |
| mode |  |
| name |  |
| relatedService |  |
| startDateTime |  |
| state |  |
| testMeasure |  |
| testSpecification |  |

|  |  |
| --- | --- |
| Non Patchable Attributes | Rule |
| href |  |
| id |  |

**Usage Samples**

Here's an example of a request for patching a service test. In this example, a new state is set.

|  |
| --- |
| **Request** |
| PATCH {apiRoot}/serviceTest/3112 Content-Type: application/merge-patch+json  {  "state": "Completed" } |
| **Response** |
| 200  {  "href": "https://host:port/serviceTestManagement/v2/serviceTest/89757",   "id": "89757",   "description:": "This service test is a simple one",   "endDateTime": "2016-03-02T24:00:00",   "mode": "PROACTIVE",   "startDateTime": "2016-03-02T00:00:00",   "state": "Completed",   "relatedService": {  "href": "https://mycsp.com:8080/tmf-api/serviceManagement/v4/service/21",   "id": "21",   "name": "gameService"  },   "testSpecification": {  "href": "https://mycsp.com:8080/tmf-api/serviceTestManagement/v4/serviceTestSpecification/22",   "id": "22",   "@referredType": "PerformanceTestSpecification"  } } |

### Delete service test

**DELETE /serviceTest/{id}**

**Description**

This operation deletes a service test entity.

**Usage Samples**

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

|  |
| --- |
| **Request** |
| DELETE {apiRoot}/serviceTest/3112 |
| **Response** |
| 204 |

## Operations on Service Test Specification

### List service test specifications

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

**Description**

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

**Usage Samples**

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

|  |
| --- |
| **Request** |
| GET {apiRoot}/serviceTestSpecification?fields=description,href,id,version,name,validFor, relatedServiceSpecification&name=monkey%20test Accept: application/json |
| **Response** |
| 200  [  {  "description": "a service description",   "href": "https://mycsp.com:8080/tmf-api/serviceTestManagement/v4/serviceTestSpecification/12",   "id": "12",   "version": "1.0",   "name": "monkey test",   "validFor": {  "endDateTime": "2017-03-01T00:00:00",   "startDateTime": "2016-03-01T00:00:00"  },   "relatedServiceSpecification": {  "href": "https://mycsp.com:8080/tmf-api/serviceCatalogManagement/v4/serviceSpecification/31",   "id": "31",   "@referredType": "vCPEServiceSpecification"  }  } ] |

### Retrieve service test specification

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

**Description**

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

**Usage Samples**

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

|  |
| --- |
| **Request** |
| GET {apiRoot}/serviceTestSpecification/12 Accept: application/json |
| **Response** |
| 200  {  "description": "a service description",   "href": "https://mycsp.com:8080/tmf-api/serviceTestManagement/v4/serviceTestSpecification/12",   "id": "12",   "version": "1.0",   "name": "monkey test",   "validFor": {  "endDateTime": "2017-03-01T00:00:00",   "startDateTime": "2016-03-01T00:00:00"  },   "testMeasureDefinition": [  {  "captureFrequency": "once",   "captureMethod": "automatic capture by instrument",   "metricDescription": "This is the flow speed in a service",   "metricHref": "https://mycsp.com:8080/tmf-api/metricManagement/v4/metric/21",   "metricName": "Flow speed",   "name": "Definition of Flow speed",   "unitOfMeasure": "A second",   "valueType": "bits",   "capturePeriod": {  "amount": "5",   "units": "seconds"  },   "thresholdRule": [  {  "conformanceTargetUpper": "2500",   "conformanceComparatorUpper": "greater than ",   "description": "This speed is greater than the target upper",   "name": "tooMuchTraffic",   "numberOfAllowedCrossing": 0,   "thresholdRuleSeverity": "1",   "tolerancePeriod": {  "amount": "15",   "units": "minutes"  },   "consequence": [  {  "prescribeAction": "sendWarning",   "description": "send a warning to the system",   "name": "sendWarning",   "repeatAction": false,   "validFor": {  "endDateTime": "2017-03-01T00:00:00",   "startDateTime": "2016-03-01T00:00:00"  }  },   {  "prescribeAction": "generateReport",   "description": "generate a waring report ",   "name": "generateReport",   "repeatAction": false,   "validFor": {  "endDateTime": "2017-03-01T00:00:00",   "startDateTime": "2016-03-01T00:00:00"  }  }  ]  }  ],   "validFor": {  "endDateTime": "2017-03-01T00:00:00",   "startDateTime": "2016-03-01T00:00:00"  }  }  ],   "relatedServiceSpecification": {  "href": "https://mycsp.com:8080/tmf-api/serviceCatalogManagement/v4/serviceSpecification/31",   "id": "31",   "@referredType": "vCPEServiceSpecification"  },   "@baseType": "ServiceTestSpecification",   "@type": "PerformanceTestSpecification",   "@schemaLocation": "https://mycsp.com:8080/tmf-api/schema/service/PerformanceTestSpecification.schema.json" } |

### Create service test specification

**POST /serviceTestSpecification**

**Description**

This operation creates a service test specification entity.

**Mandatory and Non Mandatory Attributes**

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

|  |  |
| --- | --- |
| Mandatory Attributes | Rule |
| name |  |
| relatedServiceSpecification |  |

|  |  |  |
| --- | --- | --- |
| Non Mandatory Attributes | Default Value | Rule |
| description |  |  |
| testMeasureDefinition |  |  |
| validFor |  |  |
| version |  |  |

**Usage Samples**

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

|  |
| --- |
| **Request** |
| POST {apiRoot}/serviceTestSpecification Content-Type: application/json  {  "description": "a service description",   "name": "monkey test",   "validFor": {  "endDateTime": "2017-03-01T00:00:00",   "startDateTime": "2016-03-01T00:00:00"  },   "relatedServiceSpecification": {  "href": "https://mycsp.com:8080/tmf-api/serviceCatalogManagement/v4/serviceSpecification/31",   "id": "31",   "@referredType": "vCPEServiceSpecification"  } } |
| **Response** |
| 201  {  "description": "a service description",   "href": "https://mycsp.com:8080/tmf-api/serviceTestManagement/v4/serviceTestSpecification/12",   "id": "12",   "version": "1.0",   "name": "monkey test",   "validFor": {  "endDateTime": "2017-03-01T00:00:00",   "startDateTime": "2016-03-01T00:00:00"  },   "relatedServiceSpecification": {  "href": "https://mycsp.com:8080/tmf-api/serviceCatalogManagement/v4/serviceSpecification/31",   "id": "31",   "@referredType": "vCPEServiceSpecification"  } } |

### Patch service test specification

**PATCH /serviceTestSpecification/{id}**

**Description**

This operation allows partial updates of a service test specification entity. Support of json/merge (https://tools.ietf.org/html/rfc7386) is mandatory, support of json/patch (http://tools.ietf.org/html/rfc5789) is optional.  
  
Note: If the update operation yields to the creation of sub-resources or relationships, the same rules concerning mandatory sub-resource attributes and default value settings in the POST operation applies to the PATCH operation. Hence these tables are not repeated here.

**Patchable and Non Patchable Attributes**

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

|  |  |
| --- | --- |
| Patchable Attributes | Rule |
| description |  |
| name |  |
| relatedServiceSpecification |  |
| testMeasureDefinition |  |
| version |  |

|  |  |
| --- | --- |
| Non Patchable Attributes | Rule |
| href |  |
| id |  |
| validFor |  |

**Usage Samples**

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

|  |
| --- |
| **Request** |
| PATCH {apiRoot}/serviceTestSpecification/12 Content-Type: application/merge-patch+json  {  "name": "new name" } |
| **Response** |
| 200  {  "description": "a service description",   "href": "https://mycsp.com:8080/tmf-api/serviceTestManagement/v4/serviceTestSpecification/12",   "id": "12",   "version": "1.0",   "name": "new name",   "validFor": {  "endDateTime": "2017-03-01T00:00:00",   "startDateTime": "2016-03-01T00:00:00"  },   "relatedServiceSpecification": {  "href": "https://mycsp.com:8080/tmf-api/serviceCatalogManagement/v4/serviceSpecification/31",   "id": "31",   "@referredType": "vCPEServiceSpecification"  } } |

### Delete service test specification

**DELETE /serviceTestSpecification/{id}**

**Description**

This operation deletes a service test specification entity.

**Usage Samples**

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

|  |
| --- |
| **Request** |
| DELETE {apiRoot}/serviceTestSpecification/12 |
| **Response** |
| 204 |

# API NOTIFICATIONS

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

It is assumed that the Pub/Sub uses the Register and UnRegister mechanisms described in the REST Guidelines part 1. Refer to the guidelines for more details.

## Register listener

**POST /hub**

**Description**

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

**Behavior**

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

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

**Usage Samples**

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

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

## Unregister listener

**DELETE /hub/{id}**

**Description**

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

**Behavior**

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

Returns HTTP/1.1 status code 404 if the resource is not found.

**Usage Samples**

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

|  |
| --- |
| **Request** |
| DELETE /api/hub/42  Accept: application/json |
| **Response** |
| 204 |

## Publish Event to listener

**POST /client/listener**

**Description**

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

Provides to a registered listener the description of the event that was raised. The /client/listener url is the callback url passed when registering the listener.

**Behavior**

Returns HTTP/1.1 status code 201 if the service is able to set the configuration.

**Usage Samples**

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

|  |
| --- |
| **Request** |
| POST /client/listener  Accept: application/json  {  "event": {  EVENT BODY  },  "eventType": "EVENT\_TYPE"  } |
| **Response** |
| 201 |

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

# Acknowledgements

## Version History

|  |  |  |  |
| --- | --- | --- | --- |
| **Release Number** | **Date** | **Release led by:** | **Description** |
| Release 1.0.0 | 11/28/2016 | Pierre Gauthier |  |
| Release 2.0.0 | 28-Feb-2018 | Hongxia Hao  [haohongxia@huawei.com](mailto:haohongxia@huawei.com) | **Main change points:**  1.Remove mandatory and non-mandatory related description to Conformance Profile document.  2. Align with DG 3.0 , but no hypermedia  3. Modify some names like RelatedClassRef (suggested by Mariano)  4.Modify some typos |
| Release 2.1.0 | 06-Dec-2018 | Hongxia Hao | Updated to TM Forum new brand guidelines. |
| Release 2.1.1 | 27-Jun-2018 | Adrienne Walcott | Formatting/style edits prior to R18 publishing. |
| Release 4.0 | 13-Jan-2019 | Jonathan Goldberg  [Jonathan.Goldberg@amdocs.com](mailto:Jonathan.Goldberg@amdocs.com) | Schema alignment for NaaS APIs |

## Release History

|  |  |  |  |
| --- | --- | --- | --- |
| **Release Number** | **Date** | **Release led by:** | **Description** |
| 16.5.0 | December 2016 | Yisong Jiang in HUAWEI  Pierre Gauthier | Initial Release |
| 18.0.0 | June 2018 | Hongxia Hao  [haohongxia@huawei.com](mailto:haohongxia@huawei.com) | Updated Release |
| 18.5.0 | 13-Jan-2019 | Jonathan Goldberg | Schema alignment for NaaS APIs |

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