

TM Forum Specification

Service Test Management API User Guide

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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 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:

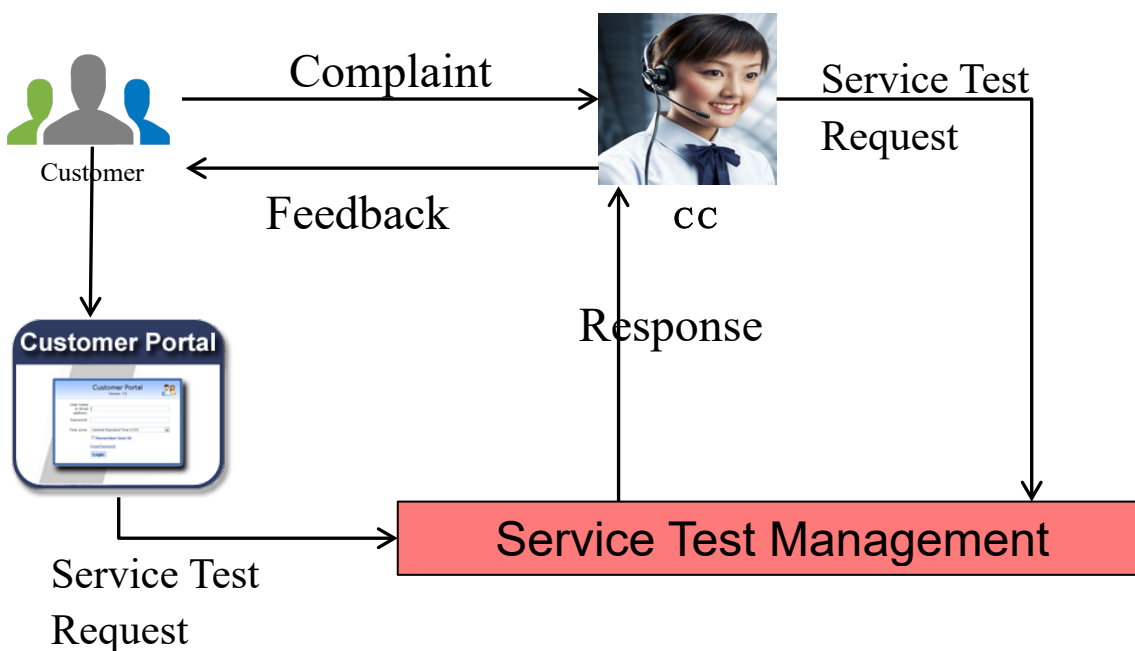
- A service test specification describes the service test in terms of parameters to be configured and measures to be taken.
- A service exists for a controlled test invocation on a service. The service test is executed according to a schedule. and contains service test configuration parameters that are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



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

Planned Service Test for Important Services

The test job can be defined for some important services where the tests can be executed periodically to assure the service quality and find potential service downgrade in advance to avoid 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.

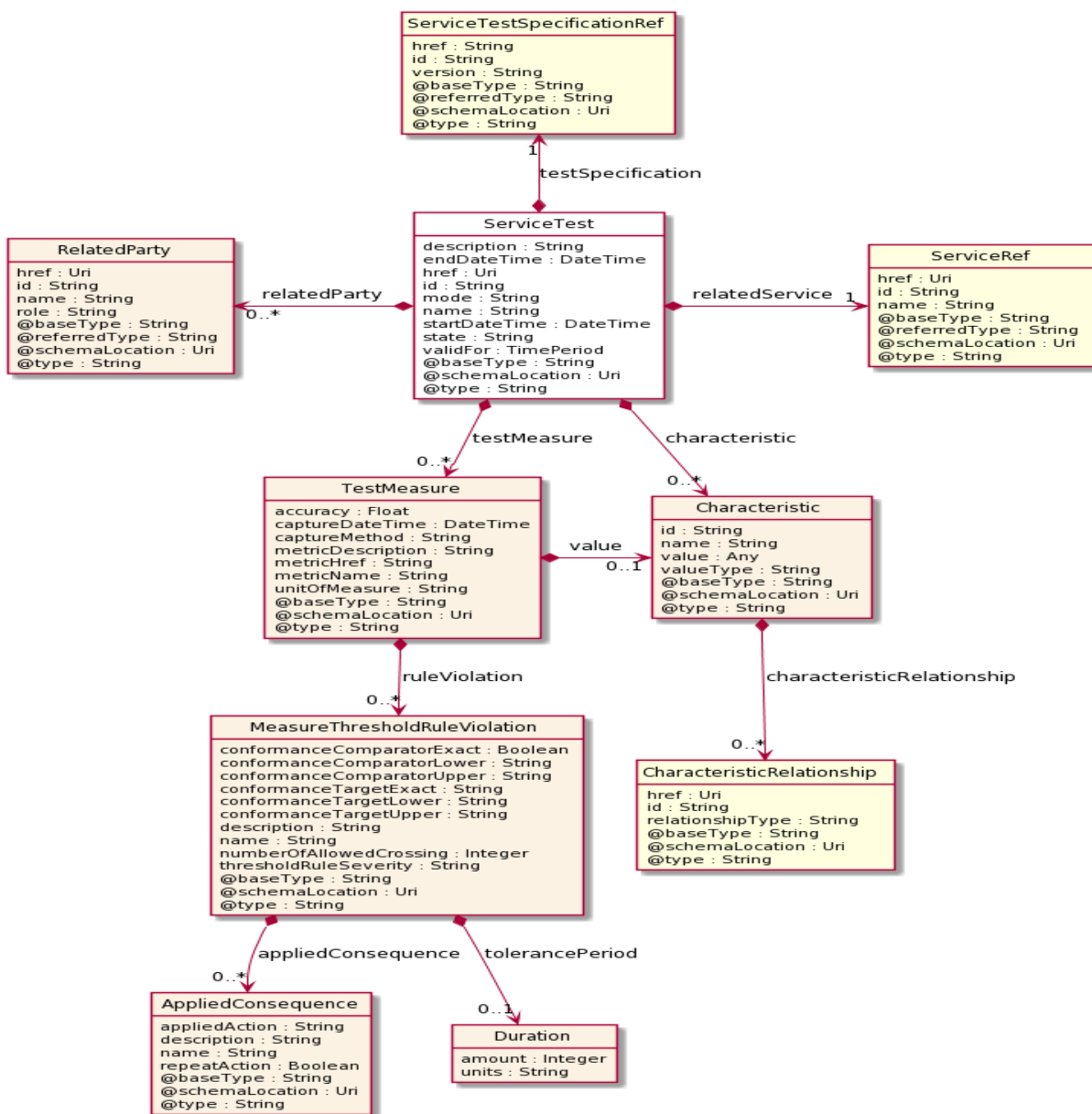
RESOURCE MODEL

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 descriptionsServiceTest fields

@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). A URI to a JSON-Schema file that defines additional attributes and relationships.
@type	A string. When sub-classing, this defines the sub-class Extensible name.
href	An uri (Uri). Hyperlink reference.
id	A string. unique identifier.
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.
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.
relatedParty	A list of related parties (RelatedParty [*]). Party related to the 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. Recommended states are found in ExecutionStateType schema possible values include acknowledged, rejected, pending, inProgress, cancelled, completed and failed.
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.
validFor	A time period. The validity time for the test results.

AppliedConsequence sub-resource

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

@baseType	A string. When sub-classing, this defines the super-class.
-----------	--

@schemaLocation	An uri (Uri). A URI to a JSON-Schema file that defines additional attributes and relationships.
@type	A string. When sub-classing, this defines the sub-class Extensible name.
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.

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

CharacteristicRelationship sub-resource

Another Characteristic that is related to the current Characteristic;.

href	An uri (Uri). Hyperlink reference.
id	A string. Unique identifier of the characteristic.

@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). A URI to a JSON-Schema file that defines additional attributes and relationships.
@type	A string. When sub-classing, this defines the sub-class Extensible name.
relationshipType	A string. The type of relationship.

Duration sub-resource

A time interval in a given unit of time.

amount	An integer. Time interval (number of seconds, minutes, 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.

@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). A URI to a JSON-Schema file that defines additional attributes and relationships.
@type	A string. When sub-classing, this defines the sub-class Extensible name.
appliedConsequence	A list of applied consequences (AppliedConsequence [*]). An Applied Consequence defines the action (prescribed action or notification) to take when a MeasureThresholdRuleViolation occurs.
conformanceComparatorExact	A boolean. An operator that when applied on a value specifies whether it is the same target value or not. This operator is used to compare with the conformanceTargetExact if used.
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 if used.
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 if used.
conformanceTargetExact	A string. To cater for values that are not numerical test metrics (e.g. a DSL line can be Synchronised or Unsynchronised. If the latter, the test should result in a rule violation).The allowed value can contain a REGEX expression.

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 if used. 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 if used. 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.

RelatedParty sub-resource

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

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

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.

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

ServiceTestSpecificationRef relationship

The service test specification used by the service test.

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

Provided below is 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": "2016-03-02T24:00:00.00Z",
  "mode": "PROACTIVE",
  "startDateTime": "2016-03-02T00:00:00.00Z",
  "state": "Completed",
  "validFor": {
    "startDateTime": "2016-03-02T00:00:00.00Z",
    "endDateTime": "2016-03-02T24:00:00.00Z"
  },
  "relatedParty": [
    {
      "href": "https://mycsp.com:8080/tmf-api/partyManagement/v4/organization/3336",
      "id": "3336",
      "name": "IoT Soluvec Ltd",
      "role": "vendor",
      "@referredType": "Partner"
    }
  ],
  "relatedService": {
    "href": "https://mycsp.com:8080/tmf-api/serviceManagement/v4/service/21",
    "id": "21",
    "name": "gameService",
    "@referredType": "Service"
  },
  "testSpecification": {
    "href": "https://mycsp.com:8080/tmf-api/serviceTestManagement/v4/serviceTestSpecification/22",
    "id": "22",
    "@referredType": "ServiceTestSpecification"
  },
  "characteristic": [
    {
      "id": "1",
      "name": "something significant",
    }
  ]
}
```

```

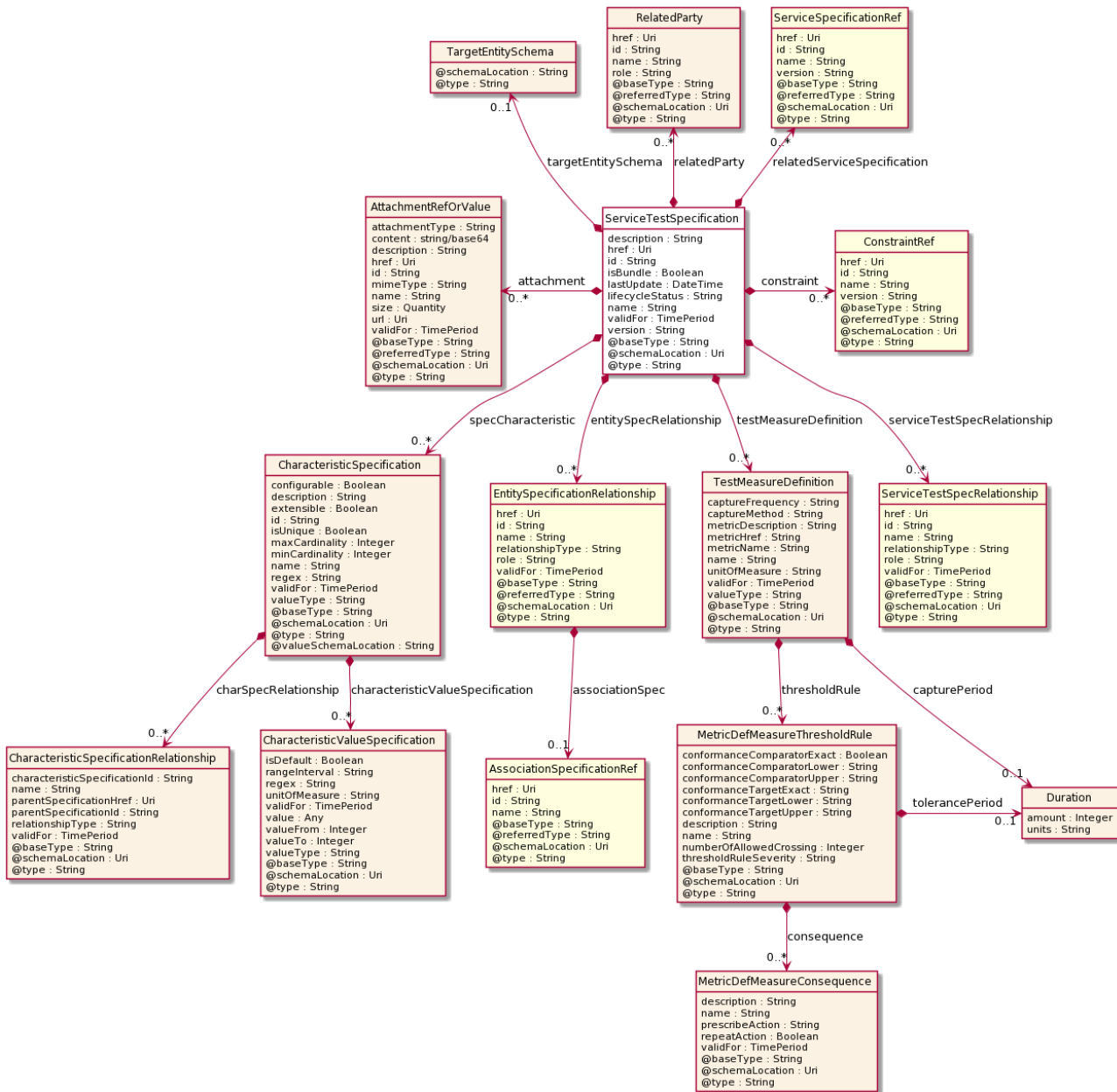
    "valueType": "number",
    "value": 3
  },
  {
    "id": "2",
    "name": "restart",
    "valueType": "boolean",
    "value": true
  }
],
"testMeasure": [
  {
    "accuracy": 0.0001,
    "captureDateTime": "2016-03-02T11:12:00.00Z",
    "captureMethod": "automatic capture by instrument",
    "metricDescription": "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": {
      "id": "3",
      "name": "Flow speed",
      "valueType": "number",
      "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 warning report",
          "name": "generateReport",
          "repeatAction": false
        }
      ]
    }
  ]
}
],
"@type": "ServiceTest",
"@schemaLocation": "https://mycsp.com:8080/tmf-api/schema/Service/ServiceTest.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.

isBundle	A boolean. isBundle determines whether specification represents a single specification (false), or a bundle of specifications (true).
lastUpdate	A date time (DateTime). Date and time of the last update of the specification.
lifecycleStatus	A string. Used to indicate the current lifecycle status of this catalog item.
name	A string. Name given to the specification.
version	A string. specification version.
href	An uri (Uri). Hyperlink reference.
id	A string. unique identifier.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). A URI to a JSON-Schema file that defines additional attributes and relationships.
@type	A string. When sub-classing, this defines the sub-class Extensible name.
description	A string. Description of a service test specification.
relatedServiceSpecification	A list of service specification references (ServiceSpecificationRef [*]). The related service specification may relate to more than one service specification.
serviceTestSpecRelationship	A list of service test spec relationships (ServiceTestSpecRelationship [*]). A list of service test specifications related to this specification e.g. dependency, substitution.
testMeasureDefinition	A list of test measure definitions (TestMeasureDefinition [*]). A list of definitions for the measurements for the test defined by this specification.
attachment	A list of attachment ref or values (AttachmentRefOrValue [*]). Attachments that may be of relevance to this specification, such as picture, document, media.
constraint	A list of constraint references (ConstraintRef [*]). This is a list of constraint references applied to this specification.
entitySpecRelationship	A list of entity specification relationships (EntitySpecificationRelationship [*]). Relationship to another specification.
relatedParty	A list of related parties (RelatedParty [*]). Parties who manage or otherwise have an interest in this specification.
specCharacteristic	A list of characteristic specifications (CharacteristicSpecification [*]). List of characteristics that the entity can take.

targetEntitySchema	A target entity schema (TargetEntitySchema). Pointer to a schema that defines the target entity.
validFor	A time period. The period for which this REST resource is valid.

AttachmentRefOrValue sub-resource

An attachment by value or by reference. An attachment complements the description of an element, for example through a document, a video, a picture.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
description	A string. A narrative text describing the content of the attachment.
href	An uri (Uri). URI for this Attachment.
id	A string. Unique identifier for this particular attachment.
url	An uri (Uri). Uniform Resource Locator, is a web page address (a subset of URI).
name	A string. The name of the attachment.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). A URI to a JSON-Schema file that defines additional attributes and relationships.
@type	A string. When sub-classing, this defines the sub-class Extensible name.
attachmentType	A string. Attachment type such as video, picture.
content	A base 6 4 (Base64). The actual contents of the attachment object, if embedded, encoded as base64.
contentType	A string. Attachment mime type such as extension file for video, picture and document.
size	A quantity (Quantity). The size of the attachment.
validFor	A time period. The period of time for which the attachment is valid.

CharacteristicSpecification sub-resource

This class defines a characteristic specification.

@valueSchemaLocation	A string. This (optional) field provides a link to the schema describing the value type.
configurable	A boolean. If true, the Boolean indicates that the target Characteristic is configurable.

description	A string. A narrative that explains the CharacteristicSpecification.
extensible	A boolean. An indicator that specifies that the values for the characteristic can be extended by adding new values when instantiating a characteristic for a resource.
id	A string. Unique ID for the characteristic.
isUnique	A boolean. An indicator that specifies if a value is unique for the specification. Possible values are; "unique while value is in effect" and "unique whether value is in effect or not".
maxCardinality	An integer. The maximum number of instances a CharacteristicValue can take on. For example, zero to five phone numbers in a group calling plan, where five is the value for the maxCardinality.
minCardinality	An integer. The minimum number of instances a CharacteristicValue can take on. For example, zero to five phone numbers in a group calling plan, where zero is the value for the minCardinality.
name	A string. A word, term, or phrase by which this characteristic specification is known and distinguished from other characteristic specifications.
regex	A string. A rule or principle represented in regular expression used to derive the value of a characteristic value.
valueType	A string. A kind of value that the characteristic can take on, such as numeric, text and so forth.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). A URI to a JSON-Schema file that defines additional attributes and relationships.
@type	A string. When sub-classing, this defines the sub-class Extensible name.
charSpecRelationship	A list of characteristic specification relationships (CharacteristicSpecificationRelationship [*]). An aggregation, migration, substitution, dependency or exclusivity relationship between/among Specification Characteristics.
characteristicValueSpecification	A list of characteristic value specifications (CharacteristicValueSpecification [*]). A CharacteristicValueSpecification object is used to define a set of attributes, each of which can be assigned to a corresponding set of attributes in a CharacteristicSpecification object. The values of the attributes in the CharacteristicValueSpecification object describe the values of the attributes that a corresponding Characteristic object can take on.

validFor A time period. The period of time for which a characteristic is applicable.

CharacteristicSpecificationRelationship sub-resource

An aggregation, migration, substitution, dependency or exclusivity relationship between/among Characteristic specifications. The specification characteristic is embedded within the specification whose ID and href are in this entity, and identified by its ID.

@baseType A string. When sub-classing, this defines the super-class.

@schemaLocation An uri (Uri). A URI to a JSON-Schema file that defines additional attributes and relationships.

@type A string. When sub-classing, this defines the sub-class Extensible name.

characteristicSpecificationId A string. Unique identifier of the characteristic within the specification.

name A string. Name of the target characteristic within the specification.

parentSpecificationHref An uri (Uri). Hyperlink reference to the parent specification containing the target characteristic.

parentSpecificationId A string. Unique identifier of the parent specification containing the target characteristic.

relationshipType A string. Type of relationship such as aggregation, migration, substitution, dependency, exclusivity.

validFor A time period. The period for which the object is valid.

CharacteristicValueSpecification sub-resource

specification of a value (number or text or an object) that can be assigned to a Characteristic.

@baseType A string. When sub-classing, this defines the super-class.

@schemaLocation An uri (Uri). A URI to a JSON-Schema file that defines additional attributes and relationships.

@type A string. When sub-classing, this defines the sub-class Extensible name.

isDefault A boolean. If true, the Boolean Indicates if the value is the default value for a characteristic.

rangeInterval A string. An indicator that specifies the inclusion or exclusion of the valueFrom and valueTo attributes. If applicable, possible values are "open", "closed", "closedBottom" and "closedTop".

regex A string. A regular expression constraint for given value.

unitOfMeasure	A string. A length, surface, volume, dry measure, liquid measure, money, weight, time, and the like. In general, a determinate quantity or magnitude of the kind designated, taken as a standard of comparison for others of the same kind, in assigning to them numerical values, as 1 foot, 1 yard, 1 mile, 1 square foot.
validFor	A time period. The period of time for which a value is applicable.
value	An any (Any). A discrete value that the characteristic can take on, or the actual value of the characteristic.
valueFrom	An integer. The low range value that a characteristic can take on.
valueTo	An integer. The upper range value that a characteristic can take on.
valueType	A string. A kind of value that the characteristic value can take on, such as numeric, text and so forth.

Duration sub-resource

A time interval in a given unit of time.

amount	An integer. Time interval (number of seconds, minutes, hours, etc.).
units	A string. Unit of time (seconds, minutes, hours, etc.).

EntitySpecificationRelationship sub-resource

A migration, substitution, dependency or exclusivity relationship between/among entity specifications.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
name	A string. Name of the related entity.
href	An uri (Uri). Hyperlink reference.
id	A string. unique identifier.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). A URI to a JSON-Schema file that defines additional attributes and relationships.
@type	A string. When sub-classing, this defines the sub-class Extensible name.
associationSpec	An association specification reference (AssociationSpecificationRef). A specification for an association used by this relationship.
relationshipType	A string. Type of relationship such as migration, substitution, dependency, exclusivity.
role	A string. The association role for this entity specification.

validFor A time period. The period for which the entitySpecRelationship is valid.

MetricDefMeasureConsequence sub-resource

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

@baseType A string. When sub-classing, this defines the super-class.

@schemaLocation An uri (Uri). A URI to a JSON-Schema file that defines additional attributes and relationships.

@type A string. When sub-classing, this defines the sub-class Extensible name.

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.

@baseType A string. When sub-classing, this defines the super-class.

@schemaLocation An uri (Uri). A URI to a JSON-Schema file that defines additional attributes and relationships.

@type A string. When sub-classing, this defines the sub-class Extensible name.

conformanceComparatorExact A boolean. An operator that when applied on a value specifies whether the value is the same or not. This operator is used to compare with the conformanceTargetExact if used.

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 if used.
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 if used.
conformanceTargetExact	A string. To cater for values that are not numerical test metrics (e.g. a DSL line can be Synchronised or Unsynchronised. If the latter, the test should result in a rule violation). The allowed value can contain a REGEX expression.
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 if used. 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 if used. 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.

Quantity sub-resource

An amount in a given unit.

amount	A float. Numeric value in a given unit.
units	A string. Unit.

RelatedParty sub-resource

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

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

ServiceTestSpecRelationship sub-resource

A substitution, dependency or exclusivity relationship between/among service specifications.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
name	A string. Name of the related entity.
href	An uri (Uri). Hyperlink reference.
id	A string. unique identifier.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). A URI to a JSON-Schema file that defines additional attributes and relationships.
@type	A string. When sub-classing, this defines the sub-class Extensible name.
relationshipType	A string. Type of relationship such as substitution, dependency, exclusivity.
role	A string. The association role for this service test specification.
validFor	A time period. The period for which the serviceTestSpecRelationship is valid.

TargetEntitySchema sub-resource

The reference object to the schema and type of target entity which is described by a specification.

@schemaLocation	A string. This field provides a link to the schema describing the target entity.
-----------------	--

@type A string. Class type of the target entity.

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.

@baseType A string. When sub-classing, this defines the super-class.

@schemaLocation An uri (Uri). A URI to a JSON-Schema file that defines additional attributes and relationships.

@type A string. When sub-classing, this defines the sub-class Extensible name.

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.

AssociationSpecificationRef relationship

reference to an AssociationSpecification object.

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

name A string. Name of the related entity.

href An uri (Uri). Hyperlink reference.

id A string. unique identifier.

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

ConstraintRef relationship

Constraint reference. The Constraint resource represents a policy/rule applied to an entity or entity spec.

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

ServiceSpecificationRef relationship

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

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

Json representation sample

Provided below is 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",
  "lifecycleStatus": "Active",
  "name": "monkey test",
  "validFor": {
    "endDateTime": "2016-03-02T24:00:00.00Z",
    "startDateTime": "2016-03-02T00:00:00.00Z"
  },
  "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": "2017-03-01T00:00:00.00Z",
                "startDateTime": "2016-03-01T00:00:00.00Z"
              }
            },
            {
              "prescribeAction": "generateReport",
              "description": "generate a waring report ",
              "name": "generateReport",
              "repeatAction": false,
              "validFor": {
                "endDateTime": "2017-03-01T00:00:00.00Z",
                "startDateTime": "2016-03-01T00:00:00.00Z"
              }
            }
          ]
        }
      ]
    }
  ]
}

```

```

    }
  }
]
},
"validFor": {
  "endDateTime": "2016-03-02T24:00:00.00Z",
  "startDateTime": "2016-03-02T00:00:00.00Z"
}
},
],
"specCharacteristic": [
{
  "name": "restart",
  "description": "This characteristic describes if restart of the service is required",
  "valueType": "boolean",
  "configurable": true,
  "validFor": {
    "startDateTime": "2016-03-02T24:00:00.00Z",
    "endDateTime": "2016-03-02T00:00:00.00Z"
  },
  "@valueSchemaLocation": "",
  "minCardinality": 0,
  "maxCardinality": 1,
  "isUnique": true,
  "regex": "",
  "extensible": false,
  "characteristicValueSpecification": [
    {
      "valueType": "boolean",
      "isDefault": false,
      "value": "true",
      "validFor": {
        "startDateTime": "2016-03-02T24:00:00.00Z",
        "endDateTime": "2016-03-02T00:00:00.00Z"
      }
    },
    {
      "valueType": "boolean",
      "isDefault": true,
      "value": "false",
      "validFor": {
        "startDateTime": "2016-03-02T24:00:00.00Z",
        "endDateTime": "2016-03-02T00:00:00.00Z"
      }
    }
  ]
}
],
"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:

- ServiceTestCreateEvent
- ServiceTestAttributeValueChangeEvent
- ServiceTestDeleteEvent

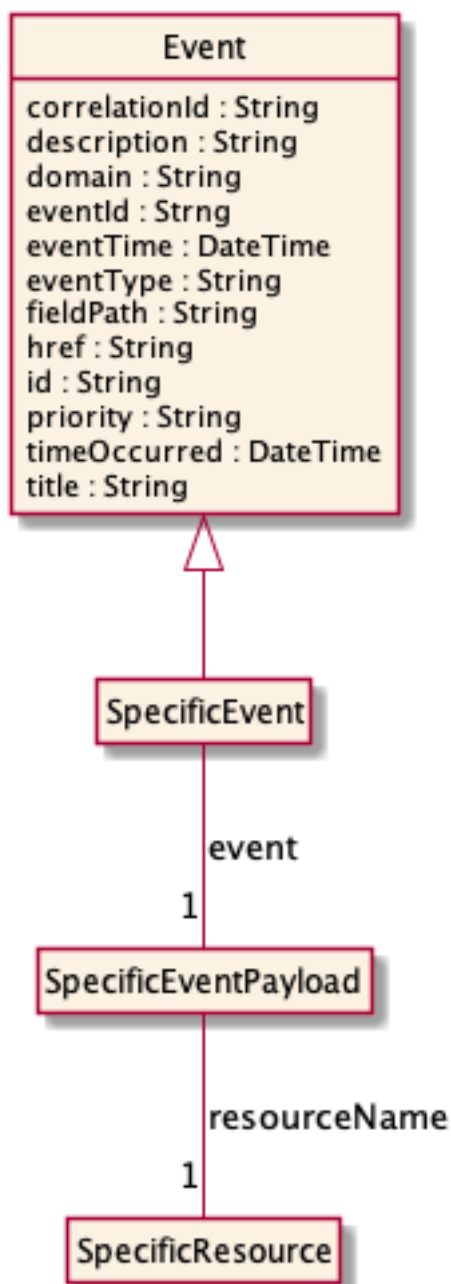
Notifications related to ServiceTestSpecification:

- ServiceTestSpecificationCreateEvent
- ServiceTestSpecificationAttributeValueChangeEvent
- ServiceTestSpecificationDeleteEvent

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

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

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



Service Test Create Event

Notification ServiceTestCreateEvent case for resource ServiceTest

Json representation sample

Provided below is the json representation of an example of a 'ServiceTestCreateEvent' notification event object

```

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

```
    {-- SEE ServiceTest RESOURCE SAMPLE --}  
  }  
}
```

Service Test Attribute Value Change Event

Notification ServiceTestAttributeValueChangeEvent case for resource ServiceTest

Json representation sample

Provided below is the json representation of an example of a 'ServiceTestAttributeValueChangeEvent' notification event object

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

Service Test Delete Event

Notification ServiceTestDeleteEvent case for resource ServiceTest

Json representation sample

Provided below is the json representation of an example of a 'ServiceTestDeleteEvent' notification event object

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

Service Test Specification Create Event

Notification ServiceTestSpecificationCreateEvent case for resource ServiceTestSpecification

Json representation sample

Provided below is the json representation of an example of a 'ServiceTestSpecificationCreateEvent' notification event object


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

Service Test Specification Attribute Value Change Event

Notification ServiceTestSpecificationAttributeValueChangeEvent case for resource ServiceTestSpecification

Json representation sample

Provided below is the json representation of an example of a 'ServiceTestSpecificationAttributeValueChangeEvent' notification event object

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

Service Test Specification Delete Event

Notification ServiceTestSpecificationDeleteEvent case for resource ServiceTestSpecification

Json representation sample

Provided below is the json representation of an example of a 'ServiceTestSpecificationDeleteEvent' notification event object

```
{
  "eventId": "00001",
  "eventTime": "2015-11-16T16:42:25-04:00",
  "eventType": "ServiceTestSpecificationDeleteEvent",
  "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 TMF630 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 /tmf-api/serviceTestManagement/v4/serviceTest?fields=id,description,mode,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", "mode": "PROACTIVE", "state": "Completed" }]

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
<pre>GET /tmf-api/serviceTestManagement/v4/serviceTest/3112 Accept: application/json</pre>
Response
<pre>200 { "href": "https://mycsp.com:8080/tmf-api/serviceTestManagement/v4/serviceTest/3112", "id": "3112", "description": "This service test is a simple one", "endDateTime": "2016-03-02T24:00:00.00Z", "mode": "PROACTIVE", "startDateTime": "2016-03-02T00:00:00.00Z", "state": "Completed", "validFor": { "startDateTime": "2016-03-02T00:00:00.00Z", "endDateTime": "2016-03-02T24:00:00.00Z" }, "relatedParty": [{ "href": "https://mycsp.com:8080/tmf-api/partyManagement/v4/organization/3336", "id": "3336", "name": "IoT Soluvec Ltd", "role": "vendor", "@referredType": "Partner" }], "relatedService": { "href": "https://mycsp.com:8080/tmf-api/serviceManagement/v4/service/21", "id": "21", "name": "gameService",</pre>

```
"@referredType": "Service"
},
"testSpecification": {
  "href": "https://mycsp.com:8080/tmf-api/serviceTestManagement/v4/serviceTestSpecification/22",
  "id": "22",
  "@referredType": "ServiceTestSpecification"
},
"characteristic": [
  {
    "id": "1",
    "name": "something significant",
    "valueType": "number",
    "value": 3
  },
  {
    "id": "2",
    "name": "restart",
    "valueType": "boolean",
    "value": true
  }
],
"testMeasure": [
  {
    "accuracy": 0.0001,
    "captureDateTime": "2016-03-02T11:12:00.00Z",
    "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": {
      "id": "3",
      "name": "Flow speed",
      "valueType": "number",
      "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 warning report",
          "name": "generateReport",
        }
      ]
    }
  ]
}
```

```

        "repeatAction": false
      }
    ]
  }
},
"@type": "ServiceTest",
"@schemaLocation": "https://mycsp.com:8080/tmf-api/schema/Service/ServiceTest.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 provide 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	Rule
@baseType	
@schemaLocation	
@type	
characteristic	
description	
endDateTime	
mode	
relatedParty	
startDateTime	
state	
testMeasure	
validFor	

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
<pre>POST /tmf-api/serviceTestManagement/v4/serviceTest Content-Type: application/json { "description": "This service test is a simple one", "name": "PerformanceTest", "endDateTime": "2016-03-02T24:00:00.00Z", "mode": "PROACTIVE", "startDateTime": "2016-03-02T00:00:00.00Z", "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" } }</pre>
Response
<pre>201 { "href": "https://host:port/serviceTestManagement/v4/serviceTest/89757", "id": "89757", "description": "This service test is a simple one", "endDateTime": "2016-03-02T24:00:00.00Z", "mode": "PROACTIVE", "startDateTime": "2016-03-02T00:00:00.00Z", "state": "In Progress", "validFor": { "startDateTime": "2016-03-02T00:00:00.00Z", "endDateTime": "2016-03-02T24:00:00.00Z" }, "relatedService": { "href": "https://mycsp.com:8080/tmf-api/serviceManagement/v4/service/21", "id": "21", "name": "gameService" }, "testSpecification": {</pre>

```

    "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	
relatedParty	
relatedService	
startDateTime	
state	
testMeasure	
testSpecification	
validFor	

Non Patchable Attributes	Rule
href	
id	
@type	
@schemaLocation	
@baseType	

Usage Samples

Here's an example of a request for patching a service test using merge-patch+json. In this example, a new state is set.

Request
<pre>PATCH /tmf-api/serviceTestManagement/v4/serviceTest/3112 Content-Type: application/merge-patch+json { "state": "Completed" }</pre>
Response
<pre>200 { "href": "https://host:port/serviceTestManagement/v4/serviceTest/89757", "id": "89757", "description": "This service test is a simple one", "endDateTime": "2016-03-02T24:00:00.00Z", "mode": "PROACTIVE", "startDateTime": "2016-03-02T00:00:00.00Z", "state": "Completed", "validFor": { "startDateTime": "2016-03-02T00:00:00.00Z", "endDateTime": "2016-03-02T24:00:00.00Z" }, "relatedParty": [{ "href": "https://mycsp.com:8080/tmf-api/partyManagement/v4/organization/3336", "id": "3336", "@referredType": "organization", "name": "IoT Soluvec Ltd", "role": "vendor" }], "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" } }</pre>

Here's an example of a request for patching a service test this time using json-patch+json. In this example, a new state is set.

Request
<pre>PATCH /tmf-api/serviceTestManagement/v4/serviceTest/3112 Content-Type: application/json-patch+json [{ "op": "replace", "path": "state", "value": "Completed" }]</pre>
Response
<pre>200 { "href": "https://host:port/serviceTestManagement/v4/serviceTest/89757", "id": "89757", "description": "This service test is a simple one", "endDateTime": "2016-03-02T24:00:00.00Z", "mode": "PROACTIVE", "startDateTime": "2016-03-02T00:00:00.00Z", "state": "Completed", "validFor": { "startDateTime": "2016-03-02T00:00:00.00Z", "endDateTime": "2016-03-02T24:00:00.00Z" }, "relatedParty": [{ "href": "https://mycsp.com:8080/tmf-api/partyManagement/v4/organization/3336", "id": "3336", "@referredType": "organization", "name": "IoT Soluvec Ltd", "role": "vendor" }], "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" } }</pre>

```
}
```

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 /tmf-api/serviceTestManagement/v4/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
<pre>GET /tmf-api/serviceTestManagement/v4/serviceTestSpecification?fields=description, href, id, version, name, validFor, relatedServiceSpecification&name=monkey test Accept: application/json</pre>
Response
<pre>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": { "endTime": "2016-03-02T24:00:00.00Z", "startTime": "2016-03-02T00:00:00.00Z" }, "relatedServiceSpecification": [{ "href": "https://mycsp.com:8080/tmf-api/serviceCatalogManagement/v4/serviceSpecification/31", "id": "31", "@referredType": "vCPEServiceSpecification" }] }]</pre>

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
<pre>GET /tmf-api/serviceTestManagement/v4/serviceTestSpecification/12 Accept: application/json</pre>
Response
<pre>200 { "description": "a service description", "href": "https://mycsp.com:8080/tmf-api/serviceTestManagement/v4/serviceTestSpecification/12", "id": "12", "version": "1.0", "lifecycleStatus": "Active", "name": "monkey test", "validFor": { "endDateTime": "2016-03-02T24:00:00.00Z", "startDateTime": "2016-03-02T00:00:00.00Z" }, "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": [</pre>

```

    {
      "prescribeAction": "sendWarning",
      "description": "send a warning to the system",
      "name": "sendWarning",
      "repeatAction": false,
      "validFor": {
        "endDateTime": "2017-03-01T00:00:00.00Z",
        "startDateTime": "2016-03-01T00:00:00.00Z"
      }
    },
    {
      "prescribeAction": "generateReport",
      "description": "generate a warning report ",
      "name": "generateReport",
      "repeatAction": false,
      "validFor": {
        "endDateTime": "2017-03-01T00:00:00.00Z",
        "startDateTime": "2016-03-01T00:00:00.00Z"
      }
    }
  ]
},
"validFor": {
  "endDateTime": "2016-03-02T24:00:00.00Z",
  "startDateTime": "2016-03-02T00:00:00.00Z"
}
},
"specCharacteristic": [
  {
    "name": "restart",
    "description": "This characteristic describes if restart of the service is required",
    "valueType": "boolean",
    "configurable": true,
    "validFor": {
      "startDateTime": "2016-03-02T24:00:00.00Z",
      "endDateTime": "2016-03-02T00:00:00.00Z"
    },
    "@valueSchemaLocation": "",
    "minCardinality": 0,
    "maxCardinality": 1,
    "isUnique": true,
    "regex": "",
    "extensible": false,
    "characteristicValueSpecification": [
      {
        "valueType": "boolean",
        "isDefault": false,
        "value": "true",
        "validFor": {
          "startDateTime": "2016-03-02T24:00:00.00Z",
          "endDateTime": "2016-03-02T00:00:00.00Z"
        }
      }
    ]
  },
],

```

```

    {
      "valueType": "boolean",
      "isDefault": true,
      "value": "false",
      "validFor": {
        "startDateTime": "2016-03-02T24:00:00.00Z",
        "endDateTime": "2016-03-02T00:00:00.00Z"
      }
    }
  ]
},
"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 provide 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	Rule
description	
isBundle	
lastUpdate	
lifecycleStatus	
version	
@baseType	
@schemaLocation	

Non Mandatory Attributes	Rule
@type	
description	
serviceTestSpecRelationship	
testMeasureDefinition	
attachment	
constraint	
entitySpecRelationship	
relatedParty	
specCharacteristic	
targetEntitySchema	
validFor	

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 /tmf-api/serviceTestManagement/v4/serviceTestSpecification Content-Type: application/json <pre>{ "description": "a service description", "name": "monkey test", "lifecycleStatus": "Active", "validFor": { "endDateTime": "2016-03-02T24:00:00.00Z", "startDateTime": "2016-03-02T00:00:00.00Z" }, "specCharacteristic": [{ "name": "restart", "description": "This characteristic describes if restart of the service is required", "valueType": "boolean", "configurable": true, "validFor": { "startDateTime": "2016-03-02T00:00:00.00Z", "endDateTime": "2016-03-02T24:00:00.00Z" }, "@valueSchemaLocation": "", "minCardinality": 0, "maxCardinality": 1, "isUnique": true, "regex": "", "extensible": false, "characteristicValueSpecification": [{ "valueType": "boolean", "isDefault": false, </pre>


```

    "value": "false",
    "validFor": {
      "startDateTime": "2016-03-02T00:00:00.00Z",
      "endDateTime": "2016-03-02T24:00:00.00Z"
    }
  },
  {
    "valueType": "boolean",
    "isDefault": true,
    "value": "true",
    "validFor": {
      "startDateTime": "2016-03-02T00:00:00.00Z",
      "endDateTime": "2016-03-02T24:00:00.00Z"
    }
  }
]
}
],
"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",
  "lifecycleStatus": "Active",
  "validFor": {
    "endDateTime": "2016-03-02T24:00:00.00Z",
    "startDateTime": "2016-03-02T00:00:00.00Z"
  },
  "specCharacteristic": [
    {
      "name": "restart",
      "description": "This characteristic describes if restart of the service is required",
      "valueType": "boolean",
      "configurable": true,
      "validFor": {
        "startDateTime": "2016-03-02T00:00:00.00Z",
        "endDateTime": "2016-03-02T24:00:00.00Z"
      }
    },
    {
      "@valueSchemaLocation": "",

```

```

    "minCardinality": 0,
    "maxCardinality": 1,
    "isUnique": true,
    "regex": "",
    "extensible": false,
    "characteristicValueSpecification": [
      {
        "valueType": "boolean",
        "isDefault": true,
        "value": "false",
        "validFor": {
          "startDateTime": "2016-03-02T00:00:00.00Z",
          "endDateTime": "2016-03-02T24:00:00.00Z"
        }
      },
      {
        "valueType": "boolean",
        "isDefault": false,
        "value": "true",
        "validFor": {
          "startDateTime": "2016-03-02T00:00:00.00Z",
          "endDateTime": "2016-03-02T24:00:00.00Z"
        }
      }
    ]
  },
  "relatedServiceSpecification": [
    {
      "href": "https://mycsp.com:8080/tmf-api/serviceCatalogManagement/v4/serviceSpecification/31",
      "id": "31",
      "@referredType": "vCPEServiceSpecification"
    }
  ],
  "@type": "ServiceTest",
  "@schemaLocation": "https://mycsp.com:8080/tmf-api/schema/Service/ServiceTest.schema.json",
  "@baseType": "ServiceTest"
}

```

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	
isBundle	
lastUpdate	
lifecycleStatus	
name	
version	
description	
relatedServiceSpecification	
serviceTestSpecRelationship	
testMeasureDefinition	
attachment	
constraint	
entitySpecRelationship	
relatedParty	
specCharacteristic	
targetEntitySchema	

Non Patchable Attributes	Rule
href	
id	
validFor	
@type	
@schemaLocation	
@baseType	

Usage Samples

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

Request
PATCH /tmf-api/serviceTestManagement/v4/serviceTestSpecification/12 Content-Type: application/merge-patch+json <pre>{ "version": "1.1", "validFor": { "endDateTime": "2016-04-02T24:00:00.00Z", "startDateTime": "2016-03-02T00:00:00.00Z" } }</pre>

Response

200

```

{
  "description": "a service description",
  "href": "https://mycsp.com:8080/tmf-api/serviceTestManagement/v4/serviceTestSpecification/12",
  "id": "12",
  "version": "1.1",
  "name": "new name",
  "lifecycleStatus": "Active",
  "validFor": {
    "endDateTime": "2016-04-02T24:00:00.00Z",
    "startDateTime": "2016-03-02T00:00:00.00Z"
  },
  "specCharacteristic": [
    {
      "name": "restart",
      "description": "This characteristic describes if restart of the service is required",
      "valueType": "string",
      "configurable": true,
      "validFor": {
        "startDateTime": "2016-03-02T00:00:00.00Z",
        "endDateTime": "2016-03-02T24:00:00.00Z"
      },
      "@valueSchemaLocation": "",
      "minCardinality": 0,
      "maxCardinality": 1,
      "isUnique": true,
      "regex": "",
      "extensible": false,
      "characteristicValueSpecification": [
        {
          "valueType": "boolean",
          "isDefault": false,
          "value": "",
          "validFor": {
            "startDateTime": "2016-03-02T00:00:00.00Z",
            "endDateTime": "2016-03-02T24:00:00.00Z"
          }
        }
      ]
    }
  ],
  "relatedServiceSpecification": [
    {
      "href": "https://mycsp.com:8080/tmf-api/serviceCatalogManagement/v4/serviceSpecification/31",
      "id": "31",
      "@referredType": "vCPEServiceSpecification"
    }
  ],
  "@type": "ServiceTest",

```

```

"@schemaLocation": "https://mycsp.com:8080/tmf-api/schema/Service/ServiceTest.schema.json",
"@baseType": "ServiceTest"
}

```

Here's an example of a request for patching a service test specification using json-patch+json. In this example, the name is changed.

Request

PATCH /tmf-api/serviceTestManagement/v4/serviceTestSpecification/12
Content-Type: application/json-patch+json

```

[
  {
    "op": "replace",
    "path": "state",
    "value": "Completed"
  }
]

```

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",
  "lifecycleStatus": "Active",
  "validFor": {
    "endDateTime": "2016-03-02T24:00:00.00Z",
    "startDateTime": "2016-03-02T00:00:00.00Z"
  },
  "specCharacteristic": [
    {
      "name": "restart",
      "description": "This characteristic describes if restart of the service is required",
      "valueType": "boolean",
      "configurable": true,
      "validFor": {
        "startDateTime": "2016-03-02T00:00:00.00Z",
        "endDateTime": "2016-03-02T24:00:00.00Z"
      }
    }
  ],
  "@valueSchemaLocation": "",
  "minCardinality": 0,
  "maxCardinality": 1,
  "isUnique": true,
  "regex": ""
}

```

```

"extensible": false,
"characteristicValueSpecification": [
  {
    "valueType": "boolean",
    "isDefault": true,
    "value": "false",
    "validFor": {
      "startDateTime": "2016-03-02T00:00:00.00Z",
      "endDateTime": "2016-03-02T24:00:00.00Z"
    }
  },
  {
    "valueType": "boolean",
    "isDefault": false,
    "value": "true",
    "validFor": {
      "startDateTime": "2016-03-02T00:00:00.00Z",
      "endDateTime": "2016-03-02T24:00:00.00Z"
    }
  }
]
},
"relatedServiceSpecification": [
  {
    "href": "https://mycsp.com:8080/tmf-api/serviceCatalogManagement/v4/serviceSpecification/31",
    "id": "31",
    "@referredType": "vCPEServiceSpecification"
  }
],
"@type": "ServiceTest",
"@schemaLocation": "https://mycsp.com:8080/tmf-api/schema/Service/ServiceTest.schema.json",
"@baseType": "ServiceTest"
}

```

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 /tmf-api/serviceTestManagement/v4/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
<pre>POST /api/hub Accept: application/json {"callback": "http://in.listener.com"}</pre>
Response
<pre>201 Content-Type: application/json Location: /api/hub/42 {"id": "42", "callback": "http://in.listener.com", "query": null}</pre>

Unregister listener

DELETE /hub/{id}

Description

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

Behavior

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

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

Usage Samples

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

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

Version Number	Date	Release led by:	Description
1.0.0	28-Nov-2016	Pierre Gauthier	
2.0.0	28-Feb-2018	Hongxia Hao haohongxia@huawei.com	Main change points: <ol style="list-style-type: none"> 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
2.1.0	06-Dec-2018	Hongxia Hao	Updated to TM Forum new brand guidelines.
2.1.1	27-Jun-2018	Adrienne Walcott	Formatting/style edits prior to R18 publishing.
3.0.0	13-Jan-2019	Jonathan Goldberg Jonathan.Goldberg@amdocs.com	Schema alignment for NaaS APIs
4.0.0	02-Oct-2020	Johanne Mayer Ernest Bayha Abdul Majid Hussain Varun Nair	Schema alignment for release v4.0 and enhancements stemming from Jira requests.
4.1.0	06-Apr-2021	Johanne Mayer	Addition of targetExact comparator, fixing diagram issues with 0..1 vs mandatory attributes, addition of suggested test states to match with test suite.

Release History

Release Status	Date	Release led by:	Description
16.5.0	Dec-2016	Yisong Jiang in HUAWEI Pierre Gauthier	Initial Release
18.0.0	Jun-2018	Hongxia Hao	Updated Release
18.5.0	13-Jan-2019	Jonathan Goldberg	Schema alignment for NaaS APIs
Pre-production	02-Oct-2020	Johanne Mayer Ernest Bayha Abdul Majid Hussain Varun Nair	Schema alignment for API v4.0 and Jira issues fixed
Production	24-Nov-2020	Adrienne Walcott	Updated to reflect TM Forum Approved Status
Pre-production	06-Apr-2021	Johanne Mayer	Support for Jira issues raised by the community.

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