Working Draft
MEF W149 v0.1

LSO Allegro, LSO Interlude and LSO Legato Service Function Testing API - Developer Guide

This draft represents MEF work in progress and is subject to change.

December 2024

Table of Contents

List of Contributing Members

The following members of the MEF participated in the development of this document and have requested to be included in this list.

Member

Table 1. Contributing Members

1. Abstract

This standard is intended to assist the implementation of the Application Programming Interfaces (APIs) for the Service Function Testing functionality of the Service Orchestration Function at the LSO Allegro, LSO Interlude and LSO Legato Interface Reference Points (IRPs), for which requirements and use cases are defined in MEF W136.1 [MEF W136.1]. The requirements and use cases are the same for all IRPs. This standard consists of this document and complementary API definitions for Service Funtion Testing Management and Service Function Testing Notifications.

This standard normatively incorporates the following files by reference as if they were part of this document from the GitHub repository:

MEF-LSO-Allegro-SDK

- `serviceApi/sft/serviceFunctionTesting.api.yaml`
- `serviceApi/sft/serviceFunctionTestingNotification.api.yaml`

MEF-LSO-Interlude-SDK

- `serviceApi/sft/serviceFunctionTesting.api.yaml`
- `serviceApi/sft/serviceFunctionTestingNotification.api.yaml`

MEF-LSO-Legato-SDK

- `serviceApi/sft/serviceFunctionTesting.api.yaml`
- `serviceApi/sft/serviceFunctionTestingNotification.api.yaml`

The Service Function Testing API is defined using OpenAPI 3.0 [OAS-V3]

2. Terminology and Abbreviations

This section aims to clarify the terminology used throughout this document. In many cases, the authoritative definitions of terms can be found in separate documents. To ensure accuracy and consistency, the third column of this document serves to provide the appropriate references from MEF or external sources that govern these definitions.

In addition, terms defined in the standards referenced below are included in this document by reference and are not repeated in the table below:

- MEF W136.1 *Allegro, Interlude and Legato Service Function Testing BR&UC* [MEF W136.1]
- MEF 55.1 *Lifecycle Service Orchestration (LSO): Reference Architecture and Framework* [MEF 55.1]

Term	Definition	Source
API Endpoint	The endpoint of a communication channel (the complete URL of an API Resource) to which the HTTP-REST requests are addressed to operate on the *API Resource*.	rapidapi.com This document
API Resource	A REST Resource. In REST, the primary data representation is called Resource. In this document, *API Resource* is defined as an OAS *SchemaObject* with specified *API Endpoints*.	restfulapi.net This document
Bundled	Two or more Test Profiles are related together in a bun-dle and are given an order in which they are run.	MEF W136.1
Dependency	The related Test Profile is dependent on the success or failure of another Test Profile. As an example if test 1 passes, then test 2 is performed. If test 1 fails, then test 2 is not performed.	MEF W136.1
Notification	A notification is a representation of an event that is exchanged between interested parties. An event is a significant occurrence or change in system state that is important from the perspective of system administration.	MEF W136.1
OpenAPI	The OpenAPI 3.0 Specification, formerly known as the Swagger specification is an API description format for REST APIs.	spec.openapis.org
Operation	An interaction between the Server and Client, potentially involving multiple back-and-forth transactions.	This document
REST API	Representational State Transfer. REST provides a set of architectural constraints that, when applied as a whole, emphasizes scalability of component interactions, generality of interfaces, independent deployment of components, and intermediary components to reduce interaction latency, enforce security, and encapsulate legacy systems.	REST API
SchemaObject	The construct that allows the definition of input and output data types. These types can represent object classes, as well as primitives and array specifications.	spec.openapis.org

Term	Definition	Source
Service Function Testing	The verification of the operation or definition of the Service Under Test. Includes Service Activation and testing performed on in-service Services for mainte-nance purposes.	MEF W136.1
Service Identifier	The unique identifier for a specific Service.	MEF W136.1
Service Specification	The specification of a set of attributes that define a Service type. These are defined in MEF 100, MEF 101, and MEF 102.	MEF W136.1
Test Job	A definition of SFT for a specific Service Identifier.	MEF W136.1
Test Profile	Detailed specification that includes the Test Job attributes and Service Specifications that are specified to be tested by this Test Profile.	MEF W136.1

Table 2. Terminology

Term	Definition	Source
API	Application Programming Interface. In this document, API is used synonymously with REST API.	This document
BUS	Business Applications	MEF 55.1
CUS	Customer Application Coordinator	MEF 55.1
IRP	Interface Reference Point	This document
OAS	OpenAPI Specification	openapis.org
SFT	Service Function Testing	MEF W136.1
SOF	Service Orchestration Functionality	MEF 55.1

Table 3. Abbreviations

3. Compliance Levels

The key words **"MUST"**, **"MUST NOT"**, **"REQUIRED"**, **"SHALL"**, **"SHALL NOT"**, **"SHOULD"**, **"SHOULD NOT"**, **"RECOMMENDED"**, **"NOT RECOMMENDED"**, **"MAY"**, and **"OPTIONAL"** in this document are to be interpreted as described in BCP 14 (RFC 2119 [RFC2119], RFC 8174 [RFC8174]) when, and only when, they appear in all capitals, as shown here. All key words must be in bold text.

Items that are **REQUIRED** (contain the words **MUST** or **MUST NOT**) are labeled as **[Rx]** for required. Items that are **RECOMMENDED** (contain the words **SHOULD** or **SHOULD NOT**) are labeled as **[Dx]** for desirable. Items that are **OPTIONAL** (contain the words MAY or OPTIONAL) are labeled as **[Ox]** for optional.

A paragraph preceded by **[CRa]<** specifies a conditional mandatory requirement that **MUST** be followed if the condition(s) following the "<" have been met. For example, **"[CR1]<[D38]"** indicates that Conditional Mandatory Requirement 1 must be followed if Desirable Requirement 38 has been met. A paragraph preceded by **[CDb]<** specifies a Conditional Desirable Requirement that **SHOULD** be followed if the condition(s) following the "<" have been met. A paragraph preceded by **[COc]<**specifies a Conditional Optional Requirement that **MAY** be followed if the condition(s) following the "<" have been met.

4. Introduction

The Service Function Testing (SFT) API allows Buyers to create, retrieve, and update Test Profiles and Test Jobs, as well as receive notifications containing updates or changes to the state of Test Profiles and Test Jobs. This functionality enables the execution of tests during service verification, activation, or maintenance.

This standard specification document describes the Application Programming Interface (API) for Service Function Testing functionality of the LSO Allegro Interface Reference Point (IRP), LSO Interlude Interface Reference Point (IRP) and LSO Sonata IRP as defined in the *MEF 55.1 Lifecycle Service Orchestration (LSO): Reference Architecture and Framework* [MEF55.1]. The LSO Reference Architecture is shown in Figure 1 with the three IRPs highlighted.

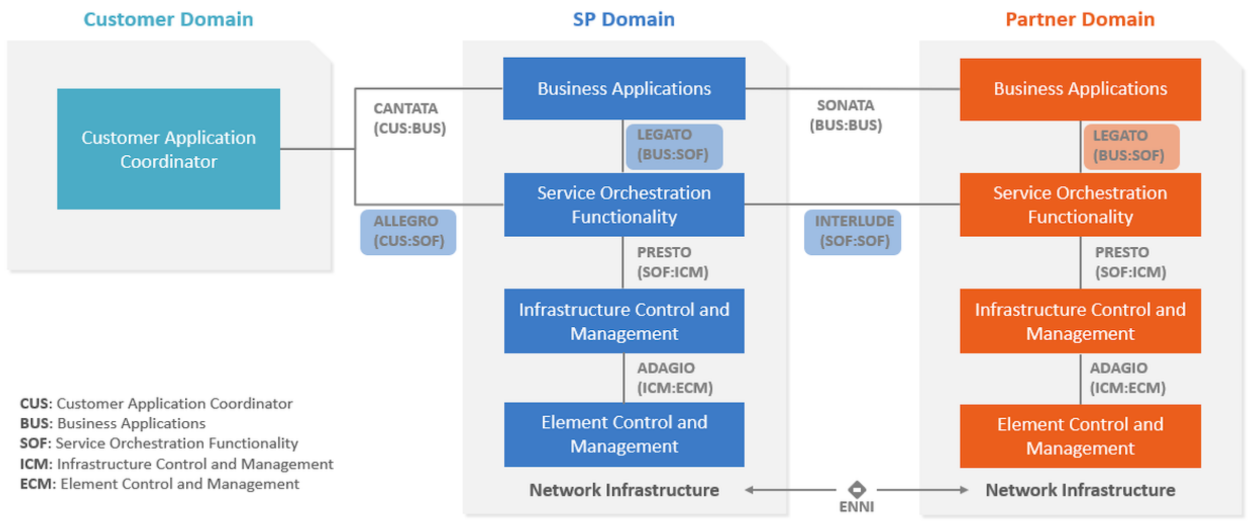

Customer Domain
SP Domain
Partner Domain
Customer Application Coordinator
CANTATA (CUS:BUS)
ALLEGRO (CUS:SOF)
Business Applications
LEGATO (BUS:SOF)
Service Orchestration Functionality
PRESTO (SOF:ICM)
Infrastructure Control and Management
ADAGIO (ICM:ECM)
Element Control and Management
Network Infrastructure
SONATA (BUS:BUS)
INTERLUDE (SOF:SOF)
ENNI
CUS: Customer Application Coordinator
BUS: Business Applications
SOF: Service Orchestration Functionality
ICM: Infrastructure Control and Management
ECM: Element Control and Management

Figure 1. The LSO Reference Architecture

Note: The use cases and business requirements in this document assume a two-actor relationship based on the set of actors in the LSO architecture. The names of the relationships are specific to the Interface Reference Point. For both Allegro and Interlude there is a Buyer and Seller. For Allegro the Buyer is the Customer and the Seller is the Service Provider. In Interlude the Buyer is the Service Provider and the Seller is the Partner. In the case of the Legato IRP, given this is within a single Service Provider or Partner, the relationship is between Client and Server, where the Business Application (BA) is the Client, and the Service Orchestration Functionality (SOF) is the Server. Considering this duality, actors in the document are referred to as Buyer/Client and Seller/Server.

4.1. Description

The scope of this API and Developer Guide covers

- Service Function Testing
  - Includes management of Test Profiles and Test Jobs
- Service Function Testing Notification
  - Includes Event Subscription/Hub and Listener notification functions

The business requirements and use cases for Service Function Testing are defined in MEF W136.1 Service Function Testing Business Requirements and Use Cases MEF136.1.

This document supports interactions over the Legato interface within a single operator as well as interaction with Partner Domain and Customer Domain through Interlude and Allegro interfaces respectively.

Business Applications (BUS), Customer Application Coordinator (CUS) and Service Orchestration Functionality (SOF) systems use the information contained within this document.

This standard is intended to support the design of API implementations that enable interoperable SOF operations (in the scope of this standard) across the Allegro IRP, Interlude IRP, and Legato IRP.

This standard is based on TMF Open API (v4.1.0) for Service Test Management TMF 653.

4.2. Conventions in the Document

- Code samples are formatted using code blocks. When notation `<< some text >>` is used in the payload sample it indicates that a comment is provided instead of an example value, and it might not comply with the OpenAPI definition.
- Model definitions are formatted as in-line code (e.g. `PerformanceJob`).
- In UML diagrams the default cardinality of associations is `0..1`. Other cardinality markers are compliant with the UML standard.
- In the API details tables and UML diagrams required attributes are marked with a * next to their names.
- In UML sequence diagrams `{{variable}}` notation is used to indicate a variable to be substituted with a correct value.

4.3. Relation to Other Documents

This API implements the Service Function Testing related requirements and use cases that are defined in MEF W136.1 [MEF136.1]. The API definition builds on TMF Open API (v4.1.0) for Service Test Management TMF 653. Service Function Testing Use Cases must support the use of MEF Service Specifications as payload.

4.4. Approach

As presented in Figure 2. the Allegro, Interlude, and Legato API frameworks consist of three structural components:

- Generic API framework
- Service-independent information (Function-specific information and Function-specific operations)
- Service-specific information (MEF service specification data model)

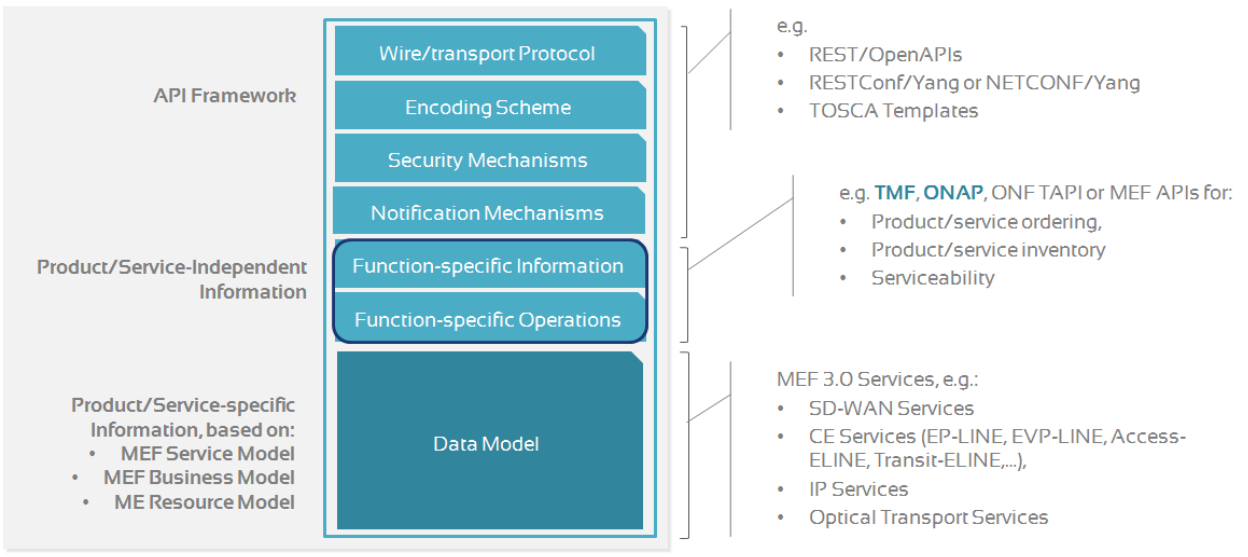

API Framework
Product/Service-Independent Information
Product/Service-specific Information, based on:
• MEF Service Model
• MEF Business Model
• ME Resource Model
Wire/transport Protocol
Encoding Scheme
Security Mechanisms
Notification Mechanisms
Function-specific Information
Function-specific Operations
Data Model
e.g.
• REST/OpenAPIs
• RESTConf/Yang or NETCONF/Yang
• TOSCA Templates
e.g. TMF, ONAP, ONF TAPI or MEF APIs for:
• Product/service ordering,
• Product/service inventory
• Serviceability
MEF 3.0 Services, e.g.:
• SD-WAN Services
• CE Services (EP-LINE, EVP-LINE, Access-ELINE, Transit-ELINE,...),
• IP Services
• Optical Transport Services

Figure 2. Allegro, Interlude and Legato API Structure

The essential concept behind the framework is to decouple the common structure, information, and operations from the specific service information content. Firstly, the Generic API Framework defines a set of design rules and patterns that are applied across all Allegro, Interlude, and Legato APIs. Secondly, the service-independent information of the framework focuses on a model of a particular Allegro, Interlude, or Legato functionality and is agnostic to any of the service specifications. For example, this standard is describing the Service Function Testing model and operations that allow creation of the service test for any service.

This Developer Guide does not define MEF SFT Specifications but can be used in combination with any SFT Specifications defined by or compliant with MEF.

Figure 3 presents the relationship between the Service Function Testing API entities and the SFT Specification model. The `serviceSpecificTestProfileAttributes` serves as an extension point for configuring service-specific parameters. On the other hand, the `testMeasureAttributes` acts as an extension point for capturing and representing the outcome of Service Function Testing.

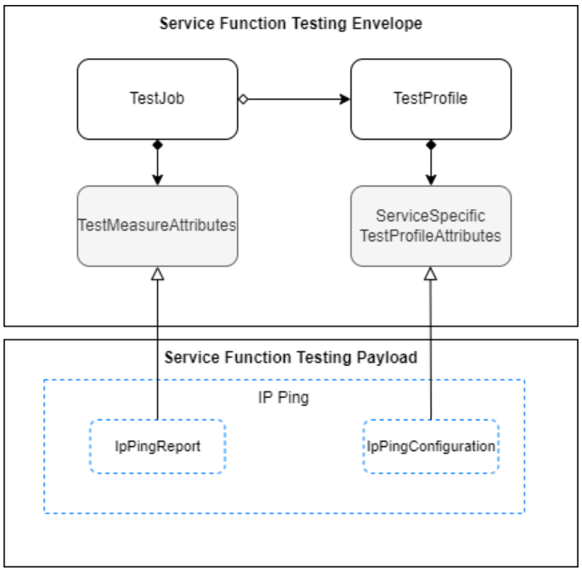

Service Function Testing Envelope
TestJob
TestProfile
TestMeasureAttributes
ServiceSpecific TestProfileAttributes
Service Function Testing Payload
IP Ping
IpPingReport
IpPingConfiguration

Figure 3. Service specification for Allegro, Interlude, Legato

4.5. High-Level Flow

The Service Function Testing API in essence allows the BUS to request SOF to manage Test Profiles and Test Jobs. Typically, Test Profiles are associated with one or more Test Jobs, but a Test Job can be created without an associated Test Profile. In such cases, parameters normally provided by the Test Profile are included directly in the Test Job itself. The SFT Notification API facilitates the exchange of information about significant changes in the system state between interested parties Figure 4. presents an example of a high-level flow of Service Function Testing provisioning.

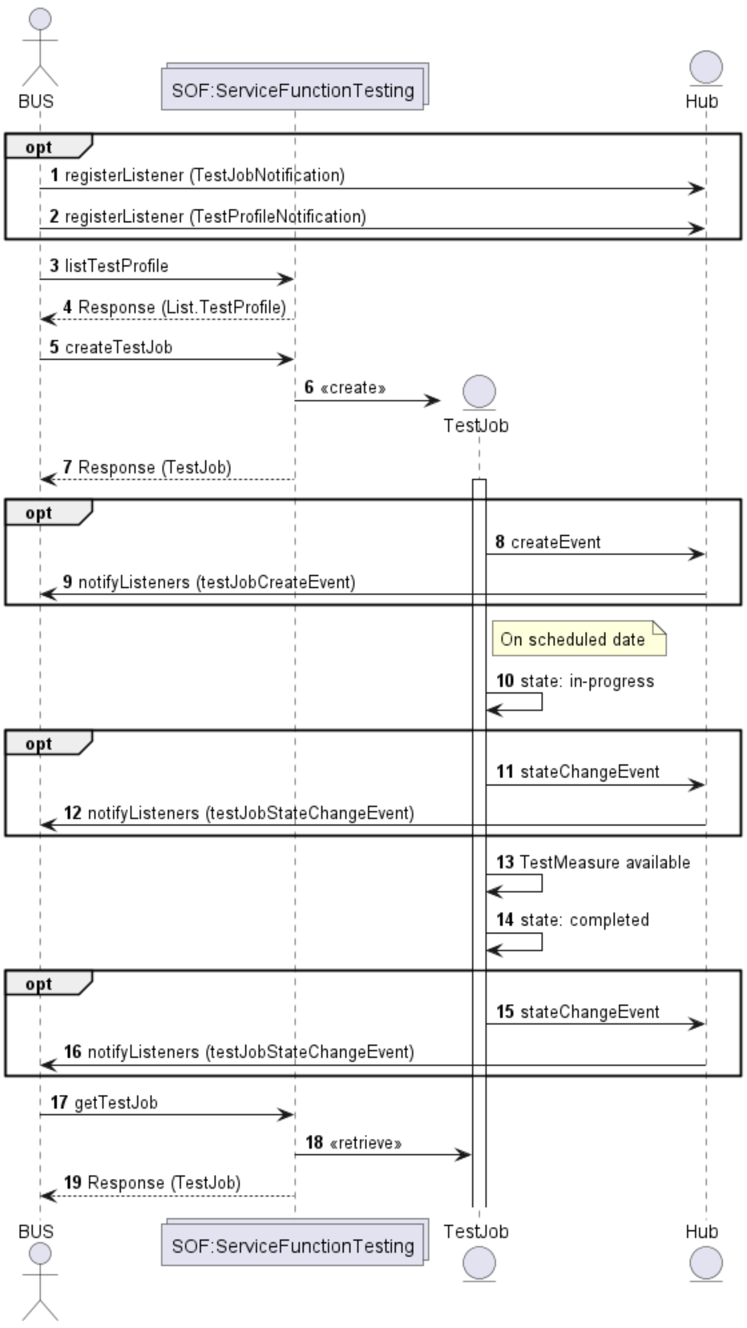

BUS
SOF:ServiceFunctionTesting
Hub
opt
1 registerListener (TestJobNotification)
2 registerListener (TestProfileNotification)
3 listTestProfile
4 Response (List.TestProfile)
5 createTestJob
6 «create»
TestJob
7 Response (TestJob)
opt
8 createEvent
9 notifyListeners (testJobCreateEvent)
On scheduled date
10 state: in-progress
opt
11 stateChangeEvent
12 notifyListeners (testJobStateChangeEvent)
13 TestMeasure available
14 state: completed
opt
15 stateChangeEvent
16 notifyListeners (testJobStateChangeEvent)
17 getTestJob
18 «retrieve»
19 Response (TestJob)
BUS
SOF:ServiceFunctionTesting
TestJob
Hub

Figure 4. High-Level Flow

The following steps describe the high-level flow:

- The BUS system registers listeners for notifications related to `TestJob` and `TestProfile` events via the Hub.
  Note1: SFT Notifications are optional and do not impact end-to-end flow
- The BUS system retrieves a list of `TestProfiles` by sending a request to the SOF system.
- When querying `TestProfile` instances the BUS system uses the *Service Function Testing API*.
- The BUS system initiates new Test Job by sending a request containing `TestJob` entity to the SOF system.
- The BUS system can start Test Job with or without `TestProfile` which is a template containing common configuration shared by multiple `TestJob` entities.
- During creation of new Test Job, the SOF internally uses the *Service Function Testing API* to instantiate the `TestJob`
  - The SOF starts Test Job by creating a `TestJob` entity which may or may not contain a reference to the `TestProfile`.
  - The `TestJob` is processed by the SOF as per the state transition rules described in 6.6.4.

- (optional) The SOF reports the `TestJob` state changes.
- On a scheduled date according to schedule definition, Test Job is started.
- (optional) The SOF reports the `TestJob` state change.
- The BUS system retrieves `TestJob` containing `TestMeasureAttributes` through *Service Function Testing API*

The same *Service Function Testing API* is used by the BUS to create **new** `TestJob` instances, as well as update **existing** ones or trigger state transitions.

Figure 5 presents relations between entities that are managed through *Service Function Testing API*. The diagram is simplified and does not contain all types of objects.

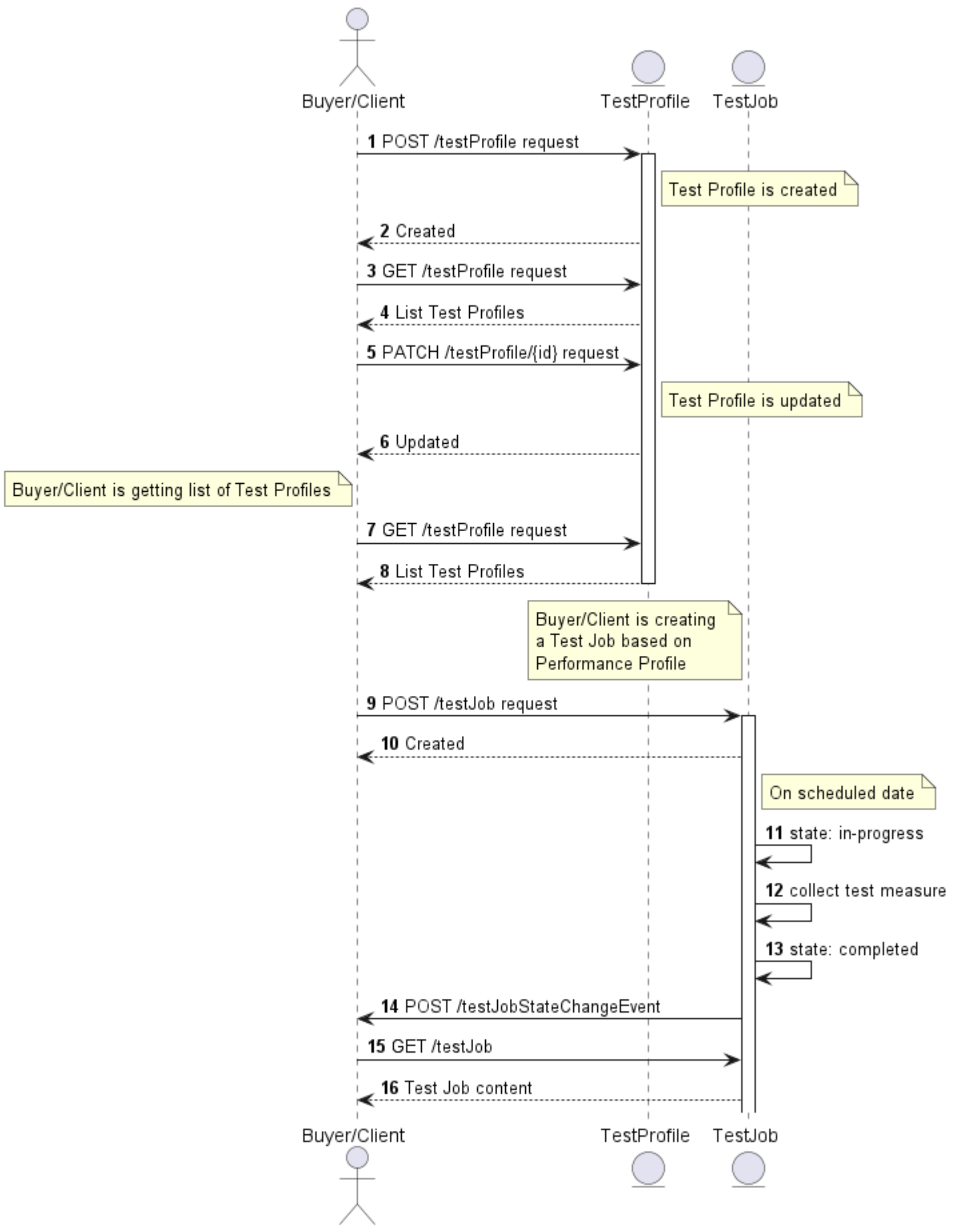


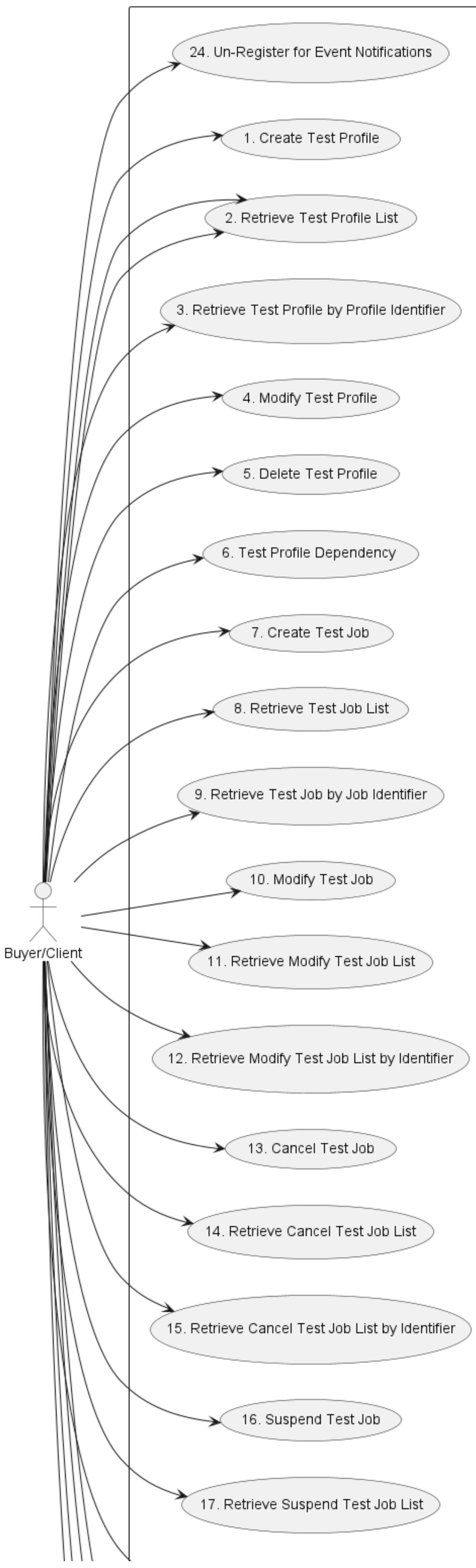
Figure 5. The flow between API endpoints

5. API Description

This section presents the API structure and design patterns. It starts with the high-level use cases diagram. Then it describes the REST endpoints with use case mapping. Next, it explains the design pattern that is used to combine service-agnostic and service-specific parts of API payloads. Finally, payload validation and API security aspects are discussed.

5.1. High-level use cases

Figure 6 presents a high-level use case diagram. It aims to help understand the endpoint mapping. Use cases are described extensively in chapter 6.


24. Un-Register for Event Notifications
1. Create Test Profile
2. Retrieve Test Profile List
3. Retrieve Test Profile by Profile Identifier
4. Modify Test Profile
5. Delete Test Profile
6. Test Profile Dependency
7. Create Test Job
8. Retrieve Test Job List
9. Retrieve Test Job by Job Identifier
10. Modify Test Job
11. Retrieve Modify Test Job List
12. Retrieve Modify Test Job List by Identifier
13. Cancel Test Job
14. Retrieve Cancel Test Job List
15. Retrieve Cancel Test Job List by Identifier
16. Suspend Test Job
17. Retrieve Suspend Test Job List
Buyer/Client

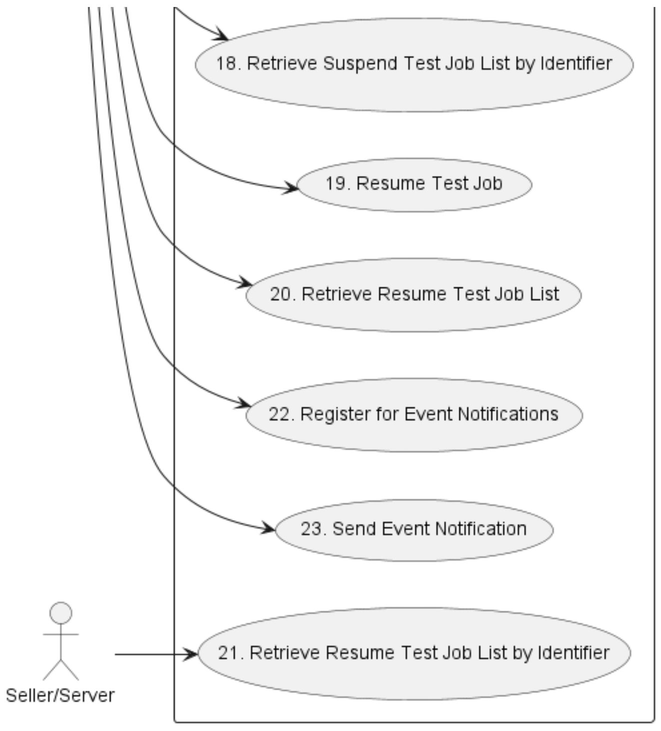

18. Retrieve Suspend Test Job List by Identifier
19. Resume Test Job
20. Retrieve Resume Test Job List
22. Register for Event Notifications
23. Send Event Notification
21. Retrieve Resume Test Job List by Identifier
Seller/Server

Figure 6. Use cases

5.2. API Endpoint and Operation Description

5.2.1. Seller/Server (SOF) side Service Function Testing API Endpoints

Base URL for Allegro:

```
https://{{serverBase}}:{{port}}
{{?/sof_prefix}}/mefApi/allegro/serviceFunctionTesting/v1/
```

Base URL for Interlude:

```
https://{{serverBase}}:{{port}}
{{?/sof_prefix}}/mefApi/interlude/serviceFunctionTesting/v1/
```

Base URL for Legato:

```
https://{{serverBase}}:{{port}}
{{?/sof_prefix}}/mefApi/legato/serviceFunctionTesting/v1/
```

The following API endpoints are implemented by the Seller/Server (SOF) and allow the Buyer/Client (SOF/CUS/BUS) to create, retrieve and modify `TestJob`and `TestProfile` instances. The endpoints and corresponding data model are defined in `serviceApi/sft/serviceFunctionTesting.api.yaml`.

API Endpoint	Description	MEF W136.1 Use Case Mapping
POST /testJob	A request initiated by the Buyer/Client to create a Test Job in the Seller/Server system.	6,7
GET /testJob	The Buyer/Client requests a list of Test Jobs based on a set of filter criteria.	13

API Endpoint	Description	MEF W136.1 Use Case Mapping
GET /testJob/{{id}}	The Buyer/Client requests detailed information about a single Test Job.	14
POST /modifyTestJob	A request initiated by the Buyer/Client to Modify a Test Job in the Seller/Server system.	11,12
GET /modifyTestJob	The Buyer/Client requests a list of Modify Test Jobs based on a set of filter criteria.	11,12
GET /modifyTestJob/{{id}}	The Buyer/Client requests detailed information about a single Modify Test Job.	11,12
POST /cancelTestJob	A request initiated by the Buyer/Client to create a Cancel Test Job in the Seller/Server system.	10
GET /cancelTestJob	The Buyer/Client requests a list of Cancel Test Jobs based on a set of filter criteria.	10
GET /cancelTestJob/{{id}}	The Buyer/Client requests detailed information about a single Cancel Test Job.	10
POST /suspendTestJob	A request initiated by the Buyer/Client to create a Suspend Test Job in the Seller/Server system.	8
GET /suspendTestJob	The Buyer/Client requests a list of Suspend Test Jobs based on a set of filter criteria.	8
GET /suspendTestJob/{{id}}	The Buyer/Client requests detailed information about a single Suspend Test Job.	8
POST /resumeTestJob	A request initiated by the Buyer/Client to create a Resume Test Job in the Seller/Server system.	9
GET /resumeTestJob	The Buyer/Client requests a list of Resume Test Jobs based on a set of filter criteria.	9
GET /resumeTestJob/{{id}}	The Buyer/Client requests detailed information about a single Resume Test Job.	9
POST /testProfile	A request initiated by the Administrator to create a Test Profile in the Seller/Server system.	1
GET /testProfile	The Administrator or Buyer/Client requests a list of Test Profiles based on a set of filter criteria.	4
GET /testProfile/{{id}}	The Administrator or Buyer/Client requests detailed information about a single Test Profile.	5
PATCH /testProfile/{{id}}	A request initiated by the Administrator to partially modify a Test Profile in the Seller/Server system.	2
DELETE /testProfile/{{id}}	A request initiated by the Administrator to delte a Test Profile in the Seller/Server system.	3

Table 4. Seller/Server (SOF) Service Function Testing mandatory API endpoints

[R1] Seller/Server (SOF) **MUST** support all API endpoints listed in Table 4.

API endpoints listed in Table 5 are optional and may be exposed by the SOF.

API Endpoint	Description	MEF W136.1 Use Case Mapping
POST /hub	The Buyer/Client or Administrator requests to subscribe to the Test Job and/or Test Profile Notifications.	15
GET /hub/{{id}}	The Buyer/Client or Administrator retrieves a specific `EventSubscription` from the SOF, that matches the *`id`* value provided as *`path`* parameter.	
DELETE /hub/{{id}}	The Buyer/Client or Administrator requests to unsubscribe from the Test Job and/or Test Profile Notifications.	16

Table 5. Seller/Server (SOF) Service Function Testing optional API endpoints

[O1] The implementation **MAY** support API endpoints listed in Table 5.

5.2.2. Buyer/Client (CUS, BUS, SOF) side Service Function Testing API Endpoints

Base URL for Allegro:

```
https://{{serverBase}}:{{port}}
{{?/sof_prefix}}/mefApi/allegro/serviceFunctionTestingNotification/v2/
```

Base URL for Interlude:

```
https://{{serverBase}}:{{port}}
{{?/sof_prefix}}/mefApi/interlude/serviceFunctionTestingNotification/v2/
```

Base URL for Legato:

```
https://{{serverBase}}:{{port}}
{{?/sof_prefix}}/mefApi/legato/serviceFunctionTestingNotification/v2/
```

The following API Endpoints are used by SOF to post notifications to registered CUS, BUS, or SOF listeners. The endpoints and corresponding data model are defined in `serviceApi/sft/serviceFunctionTestingNotification.api.yaml`

API Endpoint	Description	MEF W136.1 Use Case Mapping
POST /listener/testJobCreateEvent	A request initiated by the Seller/Server to notify Buyer/Client on `TestJob` instance creation.	17
POST /listener/testJobAttributeValueChangeEvent	A request initiated by the Seller/Server to notify Buyer/Client on the `TestJob` instance attribute value change.	17
POST /listener/testJobStateChangeEvent	A request initiated by the Seller/Server to notify Buyer/Client on the `TestJob` instance state change.	17

API Endpoint	Description	MEF W136.1 Use Case Mapping
POST /listener/testProfileCreateEvent	A request initiated by the Seller/Server to notify Buyer/Client on `TestProfile` instance creation.	17
POST /listener/testProfileStateChangeEvent	A request initiated by the Seller/Server to notify Buyer/Client on the `TestProfile` instance state change.	17
POST /listener/testProfileAttributeValueChangeEvent	A request initiated by the Seller/Server to notify Buyer/Client on the `TestProfile` instance attribute value change.	17
POST /listener/testProfileDeleteEvent	A request initiated by the Seller/Server to notify Buyer/Client on `TestProfile` instance deletion.	17

Table 6. Buyer/Client (CUS, BUS, SOF) Service Function Testing API endpoints

[O2] The Buyer/Client (CUS, BUS, SOF) **MAY** support API endpoints listed in Table 6.

[O3] The Buyer/Client (CUS, BUS, SOF) **MAY** register to receive Service Function Testing notifications.

[R2] The Seller/Server **MUST** support sending notifications to API endpoints listed in Table 6 to the registered Buyer/Client.

5.3. Integration of Service Testing Specification into Service Function Testing API

Service Function Testing API discussed in this document is a generic envelope that allows for the lifecycle management of relevant Service Function Testing objects. The API itself does not provide explicit definitions for configuring service testing or prescribing the structure of output data. However, it offers flexible extensibility to accommodate the configuration of service-specific testing objectives and results. This allows for customization and adaptation to various testing requirements and desired data formats. This testing configuration and result schemas are defined using JsonSchema (draft 7) format JSON Schema draft 7 and can be integrated into the `TestJob` using the TMF extension pattern.

The extension hosting types in the API data model are:

- `ServiceSpecificTestProfileAttributes` - this type is extended with Service Specific attributes that define how a Test is performed for a given Test Specification.
- `TestMeasureAttribute` - this type is extended with specific Test Measure attributes schema

The `@type` attribute of those extension hosting types must be set to a value that uniquely identifies the service testing configuration. A unique identifier for MEF standard service schemas is in URN format and is assigned by MEF. This identifier is provided as root schema `$id`. Use of non-MEF standard service testing configuration is allowed. In such a case the schema identifier must be agreed upon between the Buyer/Client and the Seller/Server.

The example below shows a header of a schema, which describes the IP Ping Service Function Testing configuration, where `"$id": urn:mef:lso:spec:legato:ip-ping-configuration:v0.0.1:all` is the above-mentioned URN:

```
'$schema': http://json-schema.org/draft-07/schema#
'$id': urn:mef:lso:spec:legato:ip-ping-configuration:v0.0.1:all
title: MEF LSO Legato - IP Ping Service Function Testing Configuration
```

Service Testing configuration payload is introduced in multiple SFT API entities through a `serviceSpecificTestProfileAttributes` attribute of type `ServiceSpecificTestProfileAttributes` which is used as an extension point for configuration attributes.

In terms of test job results, the appropriate payload is introduced via `TestMeasureAttribute`. This entity is used as an extension point for Test Job specific output content.

Implementations might choose to integrate selected Service Function Testing specifications to data model during development. In such a case an integrated data model is built, and monitoring specifications are in an inheritance relationship accordingly with either `ServicePayloadSpecificAttributes` or `ResultPayload` as described in the OAS specification. This pattern is called **Static Binding**. The snippets below present an example of a static binding of the envelope API with exemplary MEF monitoring specifications, for both extension points.

```
ServiceSpecificTestProfileAttributes:
    type: object
    description: >-
        ServiceSpecificTestProfileAttributes is used as an extension point for MEF
        service specific test profile configuration. It includes
        definition of service/entity and applicable test job
        objectives. The `@type` attribute is used as a discriminator.
    discriminator:
        mapping:
        urn:mef:lso:spec:legato:ip-ping-configuration:v0.0.1:all: '#/components/schemas/IpPingConfiguration'
    propertyName: '@type'
    properties:
    '@type':
        description: >-
        The named type must be a subclass of ServiceSpecificTestProfileAttributes.
        type: string
    required:
    - '@type'
```

```
IpPingConfiguration:
  allOf:
    - $ref: '#/components/schemas/ServiceSpecificTestProfileAttributes'
    - type: object
      description: IP Ping Service Function Testing Configuration Schema.
```

```
TestMeasureAttributes:
    type: object
    description: >-
        TestMeasureAttributes is used as an extension point for schema to be used that de-fines the
        Test Result attributes. The `@type` attribute is used as a discriminator.
    discriminator:
        mapping:
        urn:mef:lso:spec:legato:ip-ping-monitoring-results:v0.0.1:all: '#/components/schemas/IpPingResults'
    propertyName: '@type'
    properties:
    '@type':
        description: >-
        The named type must be a subclass of TestMeasureAttributes.
        type: string
```

```
      required:
      - '@type'
```

```
IpPingResults:
  allOf:
    - $ref: '#/components/schemas/TestMeasureAttributes'
    - type: object
      description: IP Ping Service Function Testing Results Schema.
```

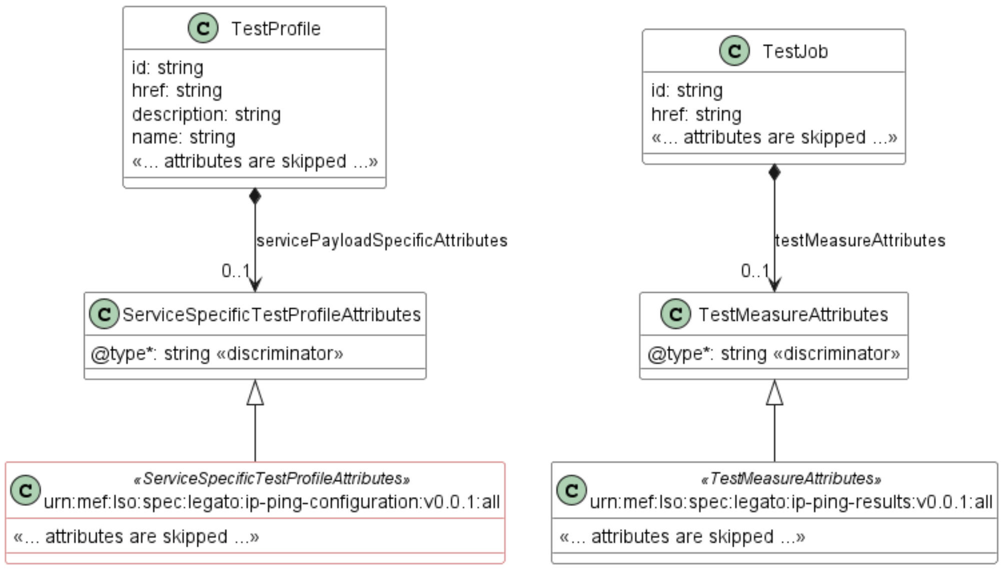
Alternatively, implementations might choose not to build an integrated model and choose a different mechanism allowing runtime validation of service-specific fragments of the payload. The system can validate a given monitoring configuration against a new schema without redeployment. This pattern is called **Dynamic Binding.**

Regardless of the chosen implementation pattern, the HTTP payload is
the same. Both implementation approaches must conform to the requirements specified below.

[R3] `ServiceSpecificTestProfileAttributes` and `ServiceSpecificTestProfileAttributes` types are extension points that **MUST** be used to integrate service test properties into a request/response payload.

[R4] The `@type` property of `ServiceSpecificTestProfileAttributes` and `ServiceSpecificTestProfileAttributes` **MUST** be used to specify the type of the extending entity.

[R5] Attributes specified in the payload must conform to the test definition specified in the `@type` property.



TestProfile
id: string
href: string
description: string
name: string
«... attributes are skipped ...»
servicePayloadSpecificAttributes
0..1
ServiceSpecificTestProfileAttributes
@type*: string «discriminator»
«ServiceSpecificTestProfileAttributes»
urn:mef:lso:spec:legato:ip-ping-configuration:v0.0.1:all
«... attributes are skipped ...»
TestJob
id: string
href: string
«... attributes are skipped ...»
testMeasureAttributes
0..1
TestMeasureAttributes
@type*: string «discriminator»
«TestMeasureAttributes»
urn:mef:lso:spec:legato:ip-ping-results:v0.0.1:all
«... attributes are skipped ...»

Figure 7. The Extension Pattern with Sample Service-Specific Extension

Figure 7 presents two MEF Service Function Testing schemas that represent configuration and result classes for IP services. When these schemas are used, the `@type` of `ServicePayloadSpecificAttributes` takes `"urn:mef:lso:spec:legato:ip-ping-monitoring-configuration:v0.0.1:all"` value to indicate which test specification should be used to interpret a set of service-specific attributes included in the payload. Similarly, for `ResultPayload`, the `@type` attribute takes `"urn:mef:lso:spec:legato:ip-ping-monitoring-results:v0.0.1:all"` value which indicates how the resulting test job collection should be interpreted.

5.4. Model structure and validation

The structure of the payloads exchanged via Allegro, Interlude, and Legato Service Function Testing API endpoints is defined using:

- OpenAPI version 3.0 for the service-agnostic part of the payload
- JsonSchema (draft 7) for the service-specific part of the payload

[R6] Implementations **MUST** use payloads that conform to these definitions.

5.5. Security Considerations

Although the Legato IRP is internal to a Service Provider/Operator business boundary, it is expected that some minimal security mechanisms are in place for any communication over this IRP. There must also be authorization mechanisms in place to control what a particular Buyer/Client or SOF is allowed to do and what information may be obtained. For Allegro and Interlude IRPs, security should follow rules for external communication. The definition of the exact security mechanism and configuration is outside the scope of this document. The LSO Security mechanisms are defined by MEF 128.1 *LSO API Security Profiles* [MEF128.1].

6. API Interactions and Flows

This section provides a detailed insight into the API functionality, use cases, and flows. It starts with Table 7 presenting a list and short description of all business use cases then present the variants of end-to-end interaction flows, and in the following subchapters describe the API usage flow and examples for each of the use cases.

Use Case #	Use Case Name	Use Case Description
1	Create Test Profile	A request initiated by the Buyer/Client to create a Test Profile in the Seller/Server system.
2	Retrieve List of Test Profiles	The Buyer/Client requests a list of Test Profiles based on a set of filter criteria. The Seller/Server returns a summarized list of Test Profiles.
3	Retrieve Test Profile by Profile Identifier	The Buyer/Client requests detailed information about a single Test Profile based on the Test Profile Identifier.
4	Modify Test Profile	A request initiated by the Buyer/Client to modify a Test Profile in the Seller/Server system based on a Test Profile Identifier.
5	Delete Test Profile	The Buyer/Client requests deletion of the Test Profile by specifying the Test Profile Identifier.
6	Test Profile Dependency	A request initiated by the Buyer/Client to make a Test Profile in the Seller/Server system dependent on another Test Profile.
7	Create Test Job	A request initiated by the Buyer/Client to create a Test Job in the Seller/Server system
8	Retrieve List of Test Jobs	The Buyer/Client requests a list of Test Jobs based on a set of filter criteria. The Seller/Server returns a summarized list of Test Jobs.
9	Retrieve Test Job by Job Identifier	The Buyer/Client requests detailed information about a single Test Job based on the Test Job Identifier.
10	Modify Test Job	A request initiated by the Buyer/Client to Modify a Test Job in the Seller/Server system.
11	Retrieve List of Modify Test Jobs	The Buyer/Client requests a list of Modify Test Job based on a set of filter criteria. The Seller/Server returns a summarized list of Modify Test Jobs.
12	Retrieve Modify Test Job by Job Identifier	The Buyer/Client requests detailed information about a single Modify Test Job based on the Modify Test Job Identifier.
13	Cancel Test Job	A request initiated by the Buyer/Client to Cancel a Test Job in the Seller/Server system.
14	Retrieve List of Cancel Test Jobs	The Buyer/Client requests a list of Cancel Test Job based on a set of filter criteria. The Seller/Server returns a summarized list of Cancel Test Jobs.
15	Retrieve Cancel Test Job by Job Identifier	The Buyer/Client requests detailed information about a single Cancel Test Job based on the Cancel Test Job Identifier.

Use Case #	Use Case Name	Use Case Description
16	Suspend Test Job	A request initiated by the Buyer/Client to Suspend a Test Job in the Seller/Server system.
17	Retrieve List of Suspend Test Jobs	The Buyer/Client requests a list of Suspend Test Job based on a set of filter criteria. The Seller/Server returns a summarized list of Suspend Test Jobs.
18	Retrieve Suspend Test Job by Job Identifier	The Buyer/Client requests detailed information about a single Suspend Test Job based on the Suspend Test Job Identifier.
19	Resume Test Job	A request initiated by the Buyer/Client to Resume a Test Job in the Seller/Server system.
20	Retrieve List of Resume Test Jobs	The Buyer/Client requests a list of Resume Test Job based on a set of filter criteria. The Seller/Server returns a summarized list of Resume Test Jobs.
21	Retrieve Resume Test Job by Job Identifier	The Buyer/Client requests detailed information about a single Resume Test Job based on the Resume Test Job Identifier.
22	Register for Event Notifications	The Buyer/Client requests to subscribe to Test Profile and/or Test Job Notifictions.
23	Send Event Notification	A request initiated by the Seller/Server to notify the Buyer/Client.
24	Unregister for Event Notifications	The Buyer/Client requests to unsubscribe to Test Profile and/or Test Job Notifications.

Table 7. Use cases description

6.1. Use case 1: Create a Test Profile

Test Profile is a template that is used to simplify the Test Job provisioning. Common attributes can be defined in the Test Profile which can be centralized and leveraged across multiple Test Jobs.

6.1.1. Interaction flow

The flow of this use case is described in Figure 8.

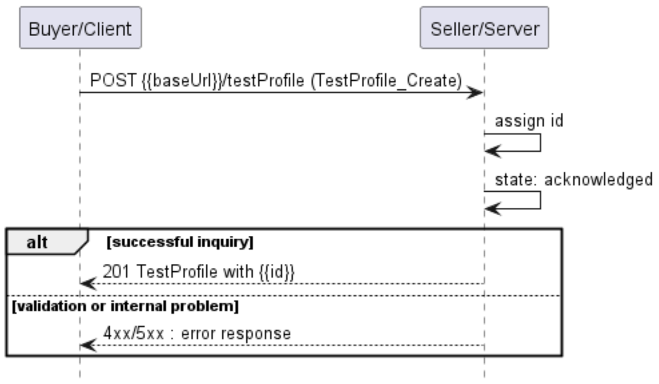

Buyer/Client
Seller/Server
POST {{baseUrl}}/testProfile (TestProfile_Create)
assign id
state: acknowledged
alt
[successful inquiry]
201 TestProfile with {{id}}
[validation or internal problem]
4xx/5xx : error response

Figure 8. Use Case 1 - Test Profile create request flow

Buyer/Client is the actor allowed to execute the Test Profile create request.

[R7] - Buyer/Client **MUST** have access rights to create Test Profile.

The Buyer/Client sends a request with a `TestProfile_Create` type in the body. The SOF performs request validation, assigns an `id`, and returns `TestProfile` type in the response body, with a `state` set to `acknowledged`. From this point, the Test Profile will undergo further validations before it is ready to be used, and its state is set to `completed`. The Buyer/Client can track the progress of the process either by subscribing for notifications or by periodically polling the `TestProfile`. The two patterns are presented in the following diagrams.

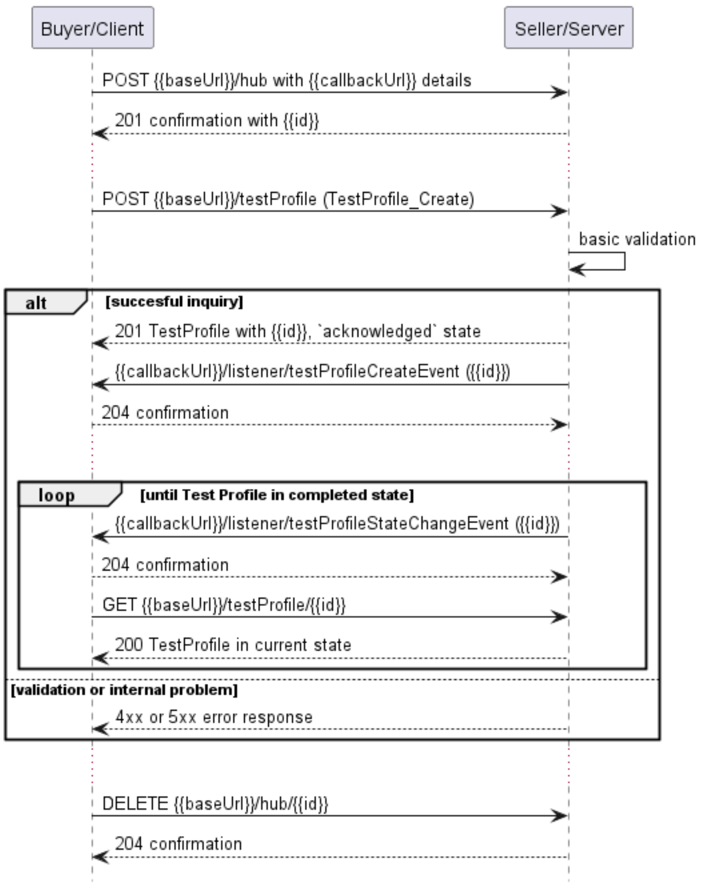

Buyer/Client
Seller/Server
POST {{baseUrl}}/hub with {{callbackUrl}} details
201 confirmation with {{id}}
POST {{baseUrl}}/testProfile (TestProfile_Create)
basic validation
alt
[succesful inquiry]
201 TestProfile with {{id}}, `acknowledged` state
{{callbackUrl}}/listener/testProfileCreateEvent ({{id}})
204 confirmation
loop
[until Test Profile in completed state]
{{callbackUrl}}/listener/testProfileStateChangeEvent ({{id}})
204 confirmation
GET {{baseUrl}}/testProfile/{{id}}
200 TestProfile in current state
[validation or internal problem]
4xx or 5xx error response
DELETE {{baseUrl}}/hub/{{id}}
204 confirmation

Figure 9. Test Profile progress tracking - Notifications

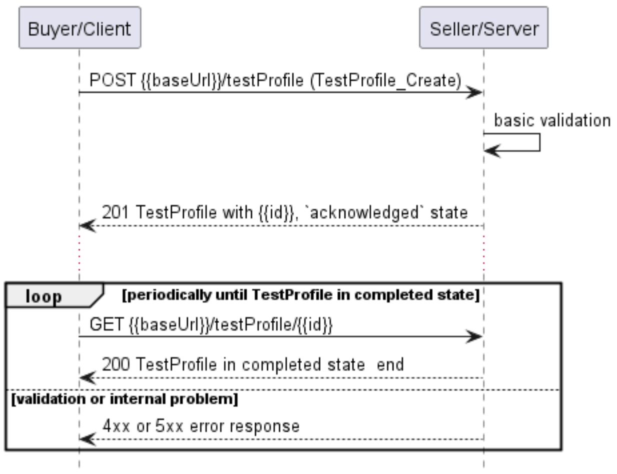

Buyer/Client
Seller/Server
POST {{baseUrl}}/testProfile (TestProfile_Create)
basic validation
201 TestProfile with {{id}}, `acknowledged` state
loop
[periodically until TestProfile in completed state]
GET {{baseUrl}}/testProfile/{{id}}
200 TestProfile in completed state end
[validation or internal problem]
4xx or 5xx error response

Figure 10. Test Profile progress tracking - Polling

Note: The context of notifications is not a part of the considered use case itself. It is presented to show the big picture of end-to-end flow. This applies also to all further use case flow diagrams with notifications.

6.1.2. Create Test Profile Request

Figure 11 presents the most important part of the data model used during the Create Test Profile request (`POST /testProfile`) and response. The model of the request message - `TestProfile_Create` is a subset of the `TestProfile_Common` model and contains only attributes that can (or must) be set by the requestor. The Seller/Server then enriches the entity in the response with additional information.

Note: `TestProfile_Create` is an entity used by the Buyer/Client to make a request. `TestProfile` is an entity used by the Seller/Server to provide a response. The request entity has a subset of attributes of the response entity. Thus for the visibility of these shared attributes `TestProfile_Common` has been introduced. However, this class is not to be used directly in the exchange.

A `TestProfile_Create` defines details of the execution of the `TestJob` that will use the profile as a template. This includes parameters that can be shared by multiple Test Jobs.

The full list of attributes is available in Section 7 and in the API specification which is an integral part of this standard.

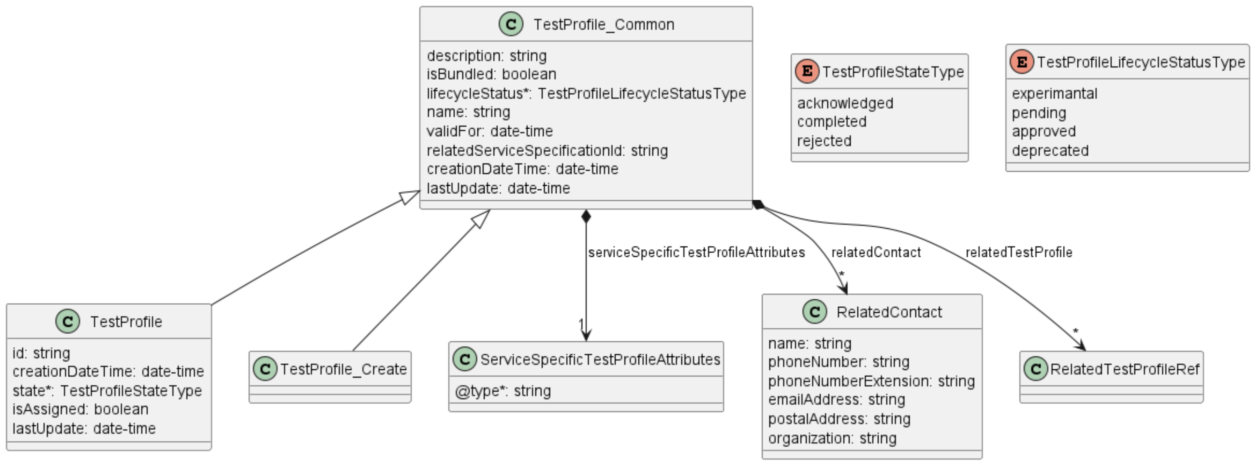


Figure 11. Test Profile Key Entities

To send a request the Buyer/Client uses the `createPerformanceProfile` operation from the API. The snippet below presents an example of a Create Test Profile request:

`Test Profile` Create Request

```
{
    "description": "Exemplary Create Test Profile request",
    "isBundled": false,
    "lifecycleStatus": "approved",
    "name": "test profile",
    "validFor": "2024-08-12T23:20:50.52Z",
    "relatedServiceSpecificationId": "6e4e338a-8105-481e-8bf6-b3ca124a4b89",
    "serviceSpecificTestProfileAttributes": {
        "@type": "IP-PING",
        "targetAddress": "192.168.5.10",
        "packetCount" : "4",
        ...
    },
    "relatedContact": {
        "name": "Contact 1",
        "phoneNumber": "003531541274"
    }
}
```

[R8] The Buyer/Seller Create Test Profile **MUST** support the following attributes: [MEF136.1 R1]

- `name`
- `lifecycleStatus`
- `validFor`

[O4] The Administrator's Create Test Profile **MAY** contain any other attributes.

6.1.3. Create Test Profile Response

Entities used for providing a response to the Create Test Profile request are presented in Figure 11. The Seller/Server responds with a `TestProfile` type, which adds some attributes to the `TestProfile_Create` that was used in the Buyer/Client request.

Note: The term "Response Code" used in the Business Requirements maps to HTTP response code, where `2xx` indicates *Success* and `4xx` or `5xx` indicate *Failure*.

The following snippet presents the Seller/Server response. It has the same structure as in the retrieve by identifier operation.

`Test Profile` Create Response

```
{
    "description": "Exemplary Create Test Profile request",
    "isBundled": false,
    "lifecycleStatus": "experimental",
    "name": "test profile",
    "validFor": "2024-08-12T23:20:50.52Z",
    "relatedServiceSpecificationId": "6e4e338a-8105-481e-8bf6-b3ca124a4b89",
    "serviceSpecificTestProfileAttributes": {
        "@type": "IP-PING",
        "targetAddress": "192.168.5.10",
        "packetCount" : "4",
        ...
    },
    "relatedContact": {
        "name": "Contact 1",
        "phoneNumber": "003531541274"
    },
    "creationDate": "204-06-12T17:47:50.399Z", << added by SOF >>
    "id": "8df0981a-0949-11ee-be56-0242ac120002", << added by SOF >>
    "lastModifiedDate": "204-06-12T17:47:50.399Z", << added by SOF >>
    "state": "acknowledged", << added by SOF >>
    "isAssigned": false << added by SOF >>
}
```

Attributes that are set by the Seller/Server in the response are marked with the `<< added by SOF >>` tag.

[R9] The Seller/Server's response **MUST** include all and unchanged attributes' values as provided by the Buyer/Client in the request.

[R10] The Seller/Server **MUST** specify the following attributes in a response:

- `creationDate`
- `id`

[R11] The `id` **MUST** remain the same value for the life of the Test Profile.

6.1.4. Test Profile State Machine

Figure 12 presents the Test Profile state machine:

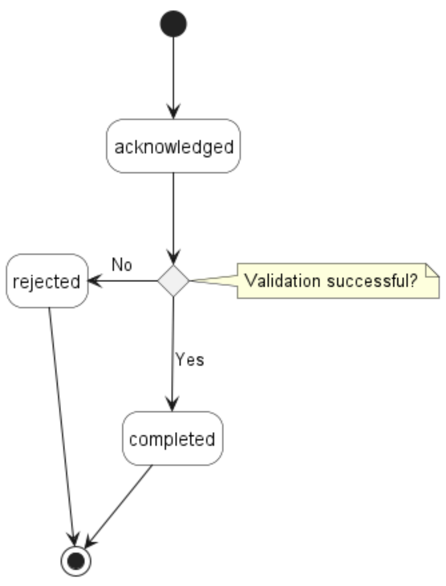


Figure 12. Test Profile State Machine

After receiving the request, the Seller/Server (SOF) performs basic checks of the message. If any problem is found an Error response is provided. If the validation passes a response is provided with `TestProfile` in `acknowledged` status. Before moving to the `completed` state, the Seller/Server performs all the remaining business and time-consuming validations. At this point, an Error response cannot be provided anymore, so the profile moves to a `rejected` state if some issues are found.

Table 8 presents the mapping between the API `state` names and the MEF W136.1 naming, together with the states description.

state	MEF W136.1 name	Description
`acknowledged`	ACKNOWLEDGED	A Create Testing Profile request has been received by the Server and has passed basic validation. Test Profile Identifier is assigned in the `Acknowledged` state. The profile remains in the `Acknowledged` state until all validations as applicable are completed. If the attributes are validated the Test Profile moves to the `COMPLETED` state. If not all attributes are validated, the request moves to the `REJECTED` state.
`completed`	COMPLETED	A Create Test Profile request passes validation and can be used as a template for Test Jobs. creation.
`rejected`	REJECTED	A Create Test Profile request fails validation and is rejected

Table 8. Test Profile states

[R12] The Seller/Server **MUST** support all Test Profile states and their associated transitions as described in Figure 12 and Table 8.

6.1.5. Test Profile Lifecycle Flow

Figure 13 presents the Test Profile Lifecycle Flow

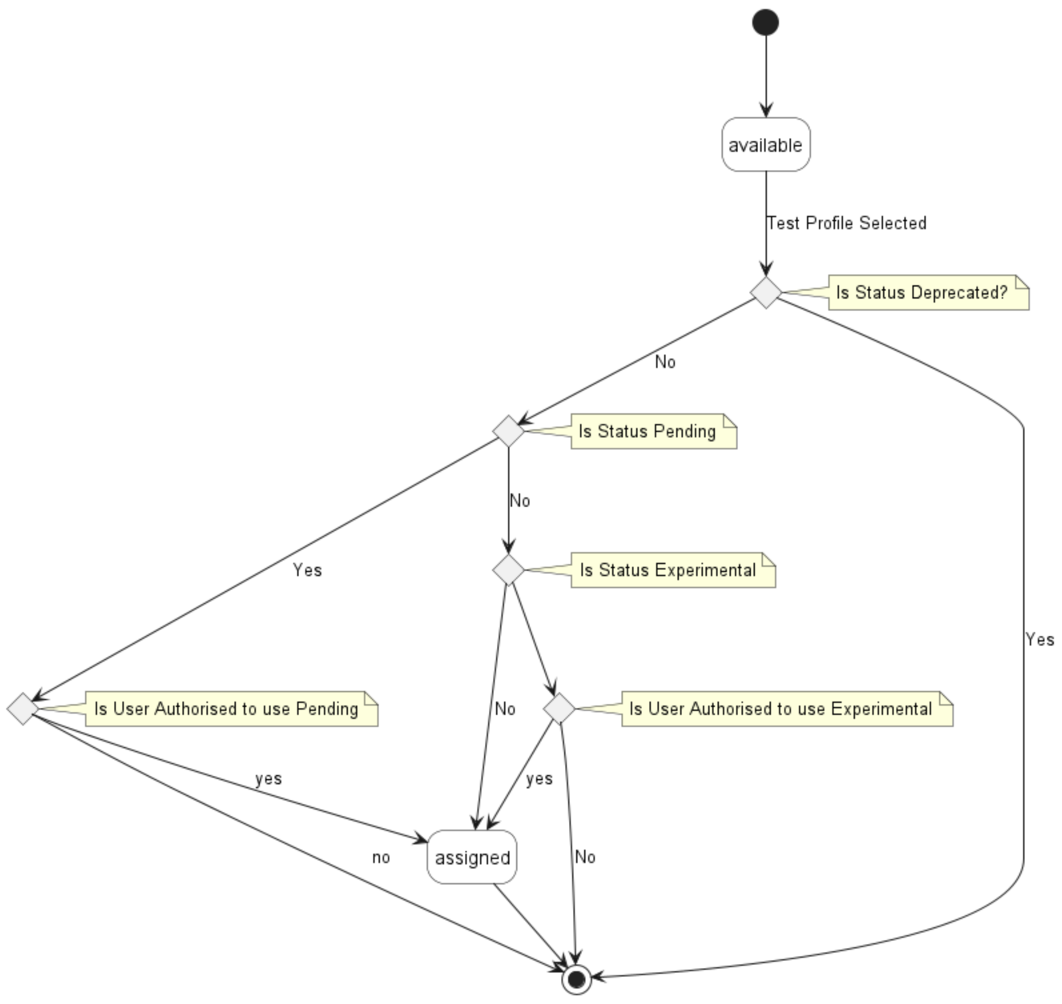


Figure 13. Test Profile Lifecycle Status Flow

Test Profiles contain the Lifecycle Status attribute that specifies where in the development process the Test Profile is located. This can range from Experimental whose use may be limited to a small number of users, to Deprecated where the Test Profile has been replaced by another Test Profile and is not intended for use. Lifecycle Status also includes Pending where the Test Profile is waiting to be approved and Approved, where the Test Profile has been approved for general use. The Lifecycle Status is often used to indicate what type of user can use the Test Profile.

Table 9 presents the mapping between the API `lifecycleStatus` names and the MEF W136.1 naming, together with the states description.

state	MEF W136.1 name	Description
`experimental`	EXPERIMENTAL	A Create Testing Profile request has been received by the Server and has passed basic validation. Test Profile Identifier is assigned in the `Acknowledged` state. The profile remains in the `Acknowledged` state until all validations as applicable are completed. If the attributes are validated the Test Profile moves to the `COMPLETED` state. If not all attributes are validated, the request moves to the `REJECTED` state.
`pending`	PENDING	A Create Test Profile request passes validation and can be used as a template for Test Jobs. creation.

state	MEF W136.1 name	Description
`approved`	APPROVED	A Create Test Profile request fails validation and is rejected
`deprecated`	DEPRECATED	A Create Test Profile request fails validation and is rejected

Table 9. Test Profile Lifecycle statuses

[R13] The Seller/Server **MUST** support all Test Profile Lifecycle Statuses and their associated transitions as described in Figure 13 and Table 9.

6.2. Use Case 2: Retrieve List of Test Profiles

The Buyer/Client can retrieve a list of `TestProfile_Find` by using a `GET /testProfile` operation with desired filtering criteria.

[O5] The Buyer/Client Retrieve List of Test Profiles request **MAY** contain none or more of the following attributes as filter criteria:

- `description`
- `creationDate.gt`
- `creationDate.lt`
- `lastUpdate.gt`
- `lastUpdate.lt`
- `relatedServiceSpecificationId`

```
https://serverRoot/mefApi/legato/serviceFunctionTesting/v1/testProfile?creationDate.gt="2024-08-
12T23:20:50.52Z"&limit=10&offset=0
```

The example above shows a Buyer/Client's request to get all Test Profile objects created after `2024-08-12T23:20:50.52Z`. Additionally, the Buyer/Client asks only for a first (`offset=0`) pack of 10 results (`limit=10`) to be returned. The correct response (HTTP code `200`) in the response body contains a list of `TestProfile_Find` objects matching the criteria. To get all the details, the Buyer/Client has to query a specific `TestProfile` by its `id`. Details related to pagination are described in section 7.1.2

If the quantity of the records requested to be returned exceeds a Seller/Server policy, the Seller/Server must choose to respond with either:

- An empty list and message that indicates the result set is too large or
- A response that indicates the result is too large and includes a subset of the matching Test Profiles.

[R14] The Seller **MUST** include following attributes (if set) in the `TestProfile_Find` object in the response: [MEF136.1 R17]

- `id`
- `name`
- `description`
- `lifecycleStatus`
- `creationDate`
- `lastUpdate`
- `state`

[R15] If the request is successful, the Seller/Server MUST reply with all attributes to the Buyer/Client. [MEF136.1 R18]

[R16] In case no items matching the criteria are found, the Seller/Server **MUST** return a valid response with an empty list. [MEF136.1 R19]

[R17] If the request is unsuccessful, the Seller/Server MUST NOT echo back the criteria provided by the Buyer/Client. [MEF136.1 R20]

[R18] If the request is unsuccessful, the Seller/Server MUST return an error with explanation to the Buyer/Client. [MEF136.1 R21]

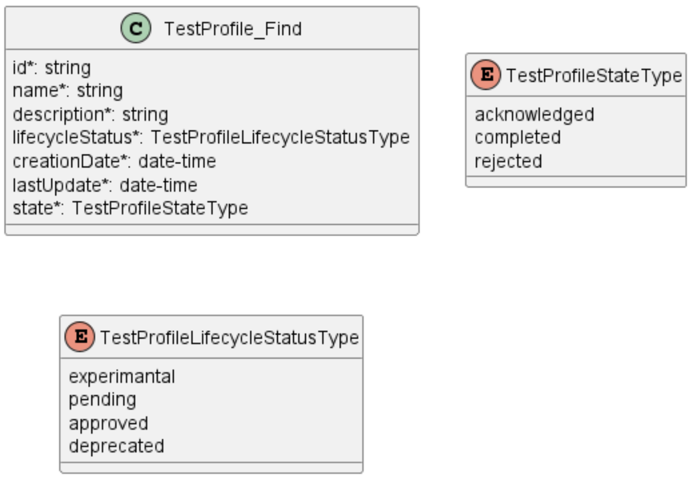


Figure 14. Use Case 2: Retrieve Test Profile List - Model

6.3. Use Case 3: Retrieve Test Profile by Profile Identifier

The Buyer/Client can get detailed information about the Test Profile from the Seller/Server by using a `GET /testProfile/{{id}}` operation. The payload returned in the response is a full representation of the Test Profile and includes all attributes the Buyer/Client has provided while sending a Test Profile create request, together with additional attributes set by Seller/Server.

Get List and Get by Identifier operations return different representations of Test Profile. Get List returns `TestProfile_Find` object which is a subset of `TestProfile` returned by the Get by Identifier operation. A response to a Get by Identifier for a `TesteProfile` with `id=8df0981a-0949-11ee-be56-0242ac120002` would return the same response as presented in section 6.1.3.

[R19] The Buyer's Retrieve Test Profile by Test Profile Identifier **MUST** include the Test Profile Identifier. [MEF136.1 R22]

[R20] The Buyer's Retrieve Test Profile by Test Profile Identifier **MUST NOT** include other attributes. [MEF136.1 R23]

[R21] If the request is successful, the Seller's response to a Retrieve Test Profile by Test Profile Identifier request MUST include all attributes [MEF136.1 R24]

[R22] If the request is unsuccessful, the Seller/Server MUST return an error with explanation to the Buyer/Client. [MEF136.1 R25]

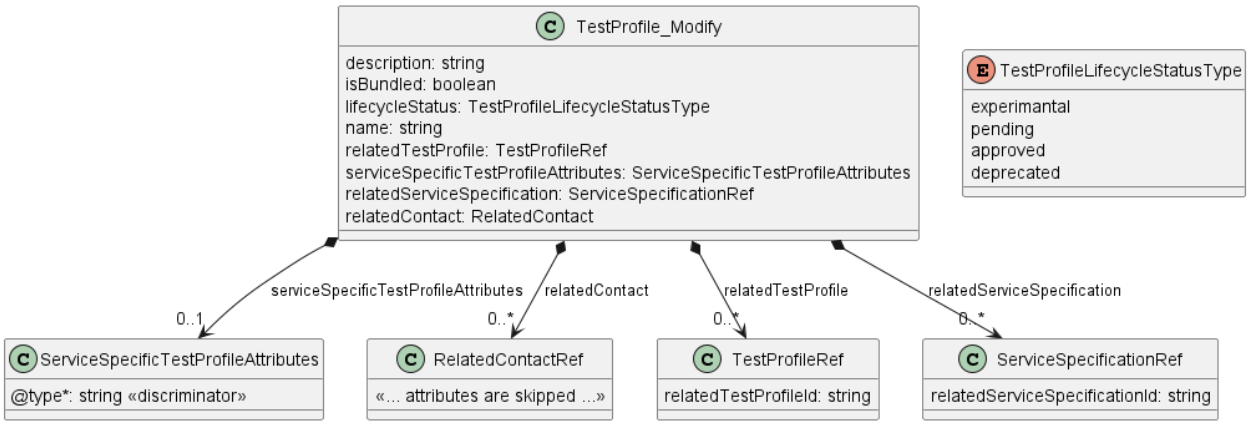
[R23] In case `id` does not allow finding a `PerformanceProfile` in Seller/Server's system, an error response `Error404` **MUST** be returned.

6.4. Use Case 4: Modify Test Profile

The update operation is realized with the use of the REST PATCH operation (`PATCH /testProfile`). For that purpose, a specialized type `TestProfile_Update` is provided. It consists of attributes limited to a subset that includes only the updateable attributes. The Test Profile cannot be used by a Test Job (isAssigned=false), otherwise Test Profile cannot be modified.

The PATCH usage recommendation follows RFC 7386 json/merge (https://tools.ietf.org/html/rfc7386).

Figure 15 presents the model used in the PATCH request. The Seller/Server responds with a `TestProfile` type which is a full representation of Test Profile instance.



TestProfile_Modify
description: string
isBundled: boolean
lifecycleStatus: TestProfileLifecycleStatusType
name: string
relatedTestProfile: TestProfileRef
serviceSpecificTestProfileAttributes: ServiceSpecificTestProfileAttributes
relatedServiceSpecification: ServiceSpecificationRef
relatedContact: RelatedContact
TestProfileLifecycleStatusType
experimantal
pending
approved
deprecated
serviceSpecificTestProfileAttributes
0..1
relatedContact
0..*
relatedTestProfile
0..*
relatedServiceSpecification
0..*
ServiceSpecificTestProfileAttributes
@type*: string «discriminator»
RelatedContactRef
«... attributes are skipped ...»
TestProfileRef
relatedTestProfileId: string
ServiceSpecificationRef
relatedServiceSpecificationId: string

Figure 15. Patch request Model

[R24] The Buyer’s Modify Test Profile request **MUST** include Test Profile Identifier and at least one other attribute from `TestProfile_Modify` object. [MEF136.1 R8]

- `description`
- `isBundled`
- `lifecycleStatus`
- `name`
- `relatedTestProfile`
- `serviceSpecificTestProfileAttributes`
- `relatedServiceSpecification`
- `relatedContact`

[O6] The Buyer’s Modify Test Profile request MAY include any other attributes from `TestProfile_Modify` object. [MEF136.1 O2]

[R25] The Seller/Server response to a Modify Test Profile request **MUST** echo back all attributes. [MEF136.1 R9]

[R26] The Seller/Server response to a Modify Test Profile request **MUST** include the following attributes: [MEF136.1 R10]

- `id`
- `creationDate`
- `lastUpdate`
- `isAssigned`

[R27] The Seller/Server **MUST** set `lastUpdate` to current date and time. [MEF136.1 R11]

[R28] If the Seller/Server encounters errors, they **MUST** return an error with explanation to the Buyer/Client. [MEF136.1 R12]

[R29] In case `id` does not allow to find a `TesteProfile` that is to be updated in Seller/Server's system, an error response `Error404` **MUST** be returned.

[R30] The Seller/Server **MUST** return an error (`Error422`) if the `TesteProfile`, `isAssigned` attribute is set to `true`.

The example below shows a request to patch a `TestProfile` that was created in section 6.1.2.

The request below aims to:

- update Test Profile `description`
- set last date that the Test Profile is valid by modifying the `validFor`
- change Test Profile `lifecycleStatus` to `approved`

```
{
  "description": "Approved IP Ping Test Profile",
  "validFor": "2025-01-12T00:00:00.000Z",
  "lifecycleStatus": "approved"
}
```

6.5. Use Case 5: Delete Test Profile

The Buyer/Client may request to delete a Test Profile by using `DELETE /testProfile/{{id}}` endpoint. This operation only requires providing the `id` in the path and has an empty `204` confirmation response.

[R31] The Buyer’s Delete Test Profile request **MUST** contain the Test Profile Identifier. [MEF136.1 R13]

[R32] The Buyer’s Delete Test Profile request **MUST NOT** contain any other attributes. [MEF136.1 R14]

[R33] If the Seller/Server encounters errors, they **MUST** return an error with explanation to the Buyer/Client. [MEF136.1 R15]

[R34] In case `id` does not allow to find a `TesteProfile` that is to be deleted in Seller/Server's system, an error response `Error404` **MUST** be returned.

[R35] The Seller/Server **MUST** return an error (`Error422`) if the `TesteProfile`, `isAssigned` attribute is set to `true`.

The sequence diagram below presents this use case in detail.

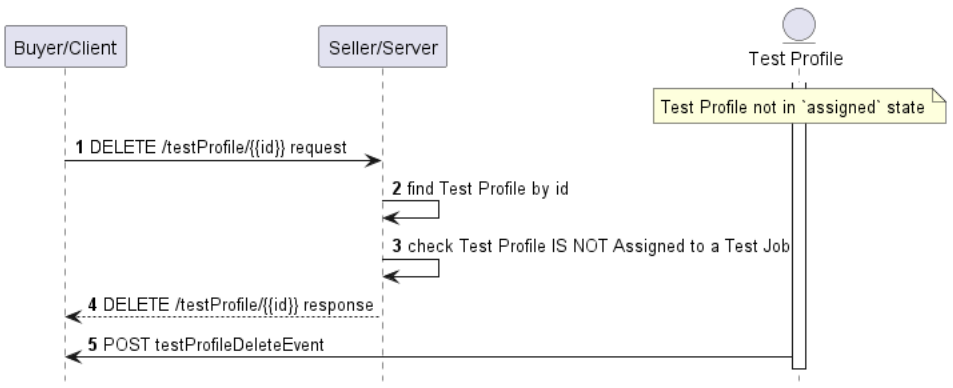

Buyer/Client
Seller/Server
Test Profile
Test Profile not in `assigned` state
1 DELETE /testProfile/{{id}} request
2 find Test Profile by id
3 check Test Profile IS NOT Assigned to a Test Job
4 DELETE /testProfile/{{id}} response
5 POST testProfileDeleteEvent

Figure 16. Delete Test Profile Flow

The Seller/Server verifies the request, then searches for a Test Profile to be deleted by the given `id`. If found, the
Seller/Server checks also if there are any Test Job objects that refer to the Test Profile (meaning `isAssigned` attribute is set to `true`). If everything is verified correctly, the Seller deletes the Test Profile , sends a successful response to a request followed by `testProfileDeleteEvent` in case the Buyer/Client subscribed for relevant notifications.

6.6. Use Case 7: Create a Test Job

A Test Job is a service-specific entity that defines the service under test, the test profile to be used, and the service-specific test attributes. The Test Job performs the actual test and makes the results available. As the Test Job runs, it follows the instructions in the test profile to execute the specified test. Once the Test Job is completed, it stores the test results in the `testMeasureAttributes` of the `TestJob` object.

For example, a Test Job can be created to execute a test on an IP service. The Test Profile, which defines how to run an ICMP ping test, is referenced in the Test Job. When the Test Job runs, it follows the steps outlined in the Test Profile to test the service. Once the test is complete, the results are made available and can be retrieved by the user.

Test Jobs can also be created without referencing a Test Profile, known as "Test Jobs without a Test Profile." These are typically used for one-off testing rather than repeatable, standardized tests. In such cases, the Test Job itself defines the attributes that would normally be outlined in the Test Profile, including the steps required to execute the test.

[O7] Test Job **MAY** use Test Profile as a template.

6.6.1. Interaction flow

The flow of this use case is shown in Figure 17.

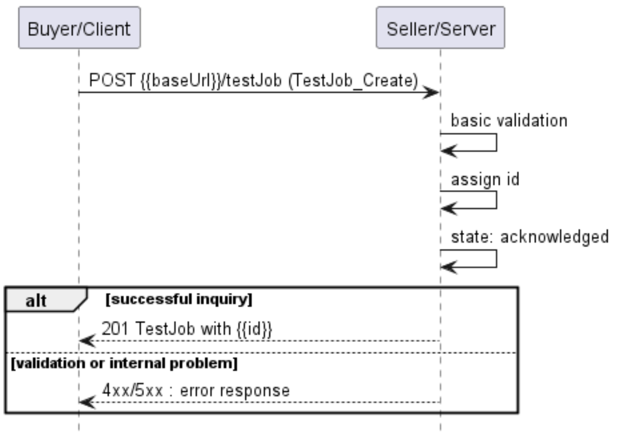


Figure 17. Use Case 7 - Test Job create request flow

The Buyer/Client sends a request with a `TestJob_Create` type in the body. The Seller/Server performs request validation, assigns an `id`, and returns the `TestJob` type in the response body, with a `state` set to `acknowledged`. From this point, the Test Job is ready for further processing. The Buyer/Client can track the progress of the process either by subscribing for notifications or by periodically polling the `TestJob`. The two patterns are presented in the following diagrams.

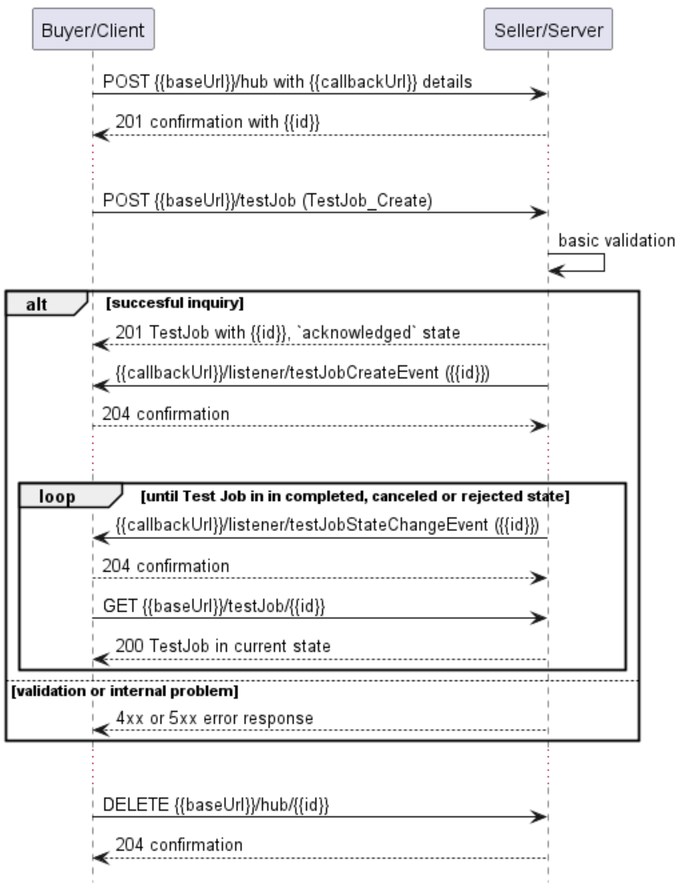

Buyer/Client
Seller/Server
POST {{baseUrl}}/hub with {{callbackUrl}} details
201 confirmation with {{id}}
POST {{baseUrl}}/testJob (TestJob_Create)
basic validation
alt
[succesful inquiry]
201 TestJob with {{id}}, `acknowledged` state
{{callbackUrl}}/listener/testJobCreateEvent ({{id}})
204 confirmation
loop
[until Test Job in in completed, canceled or rejected state]
{{callbackUrl}}/listener/testJobStateChangeEvent ({{id}})
204 confirmation
GET {{baseUrl}}/testJob/{{id}}
200 TestJob in current state
[validation or internal problem]
4xx or 5xx error response
DELETE {{baseUrl}}/hub/{{id}}
204 confirmation

Figure 18. Test Job progress tracking - Notifications

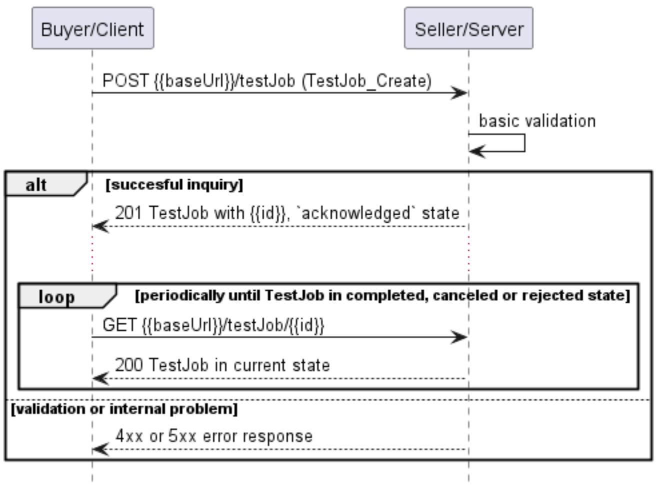

Buyer/Client
Seller/Server
POST {{baseUrl}}/testJob (TestJob_Create)
basic validation
alt
[succesful inquiry]
201 TestJob with {{id}}, `acknowledged` state
loop
[periodically until TestJob in completed, canceled or rejected state]
GET {{baseUrl}}/testJob/{{id}}
200 TestJob in current state
[validation or internal problem]
4xx or 5xx error response

Figure 19. Test Job progress tracking - Polling

Note: The context of notifications is not a part of the considered use case itself. It is presented to show the big picture of end-to-end flow. This applies also to all further use case flow diagrams with notifications.

6.6.2. Create Test Job Request with Test Profile

Figure 20 presents the most important part of the data model used during the Create Test Job request (`POST /testJob`) and response. The model of the request message - `TestJob_Create` is a subset of the `TestJob_Common` model and contains only attributes that can (or must) be set by the Buyer/Client. The Seller/Server (SOF) then enriches the entity in the response with additional information.

Note: `TestJob_Create` is an entity used by the Buyer/Client to make a request. `TestJob` is an entity used by the Seller/Server to provide a response. The request entity has a subset of attributes of the response entity. Thus for visibility of these shared attributes `TestJob_Common` has been introduced (this class is not supposed to be used directly in the exchange).

A `TestJob_Create` defines service test configuration parameters that are to be applied at execution time. It also refers to the existing `TestProfile` by its `id` or directly provides values of attributes defined by the `TestProfile` type. See chapter section 6.6.5 for more details.

The full list of attributes is available in Section 7 and in the API specification which is an integral part of this standard.

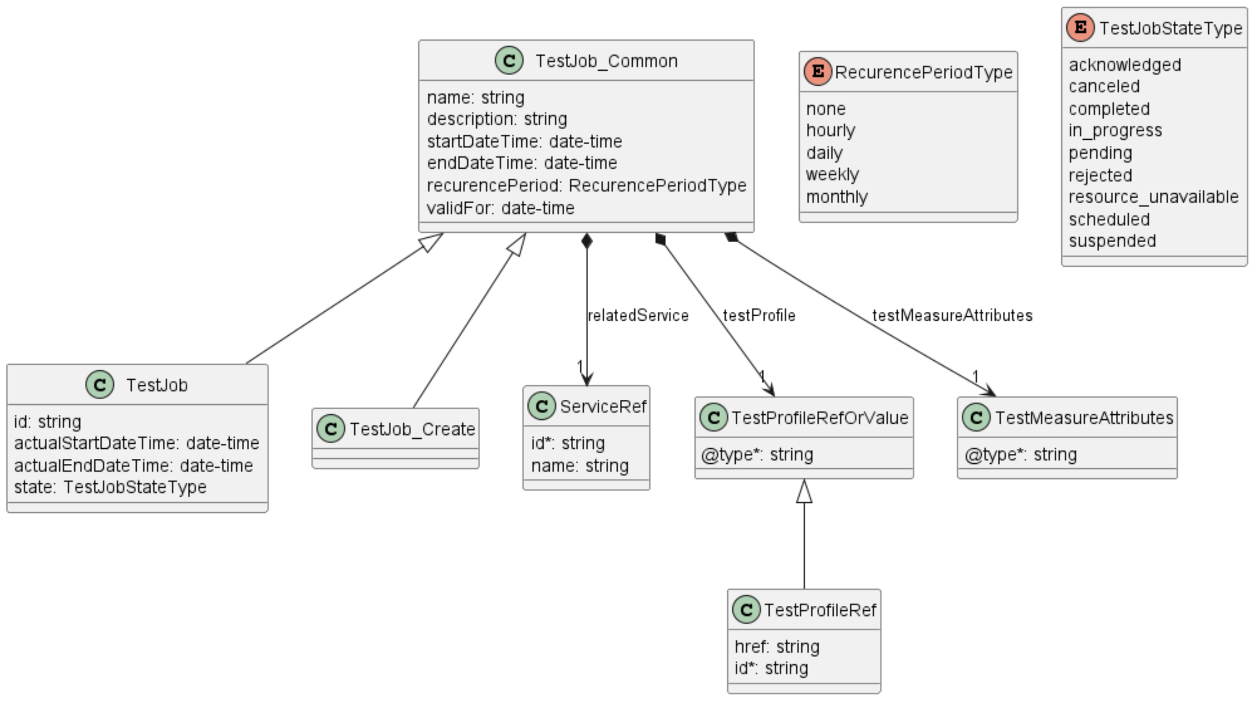


Figure 20. Test Job with Test Profile Key Entities

To send a create Test Job request the Buyer/Client uses the `createtestJob` operation from the API: `POST /testJob`. For clarity, some of the create Test Job payload's attributes might be omitted to improve examples' readability.

`Test Job` Create Request

```
{
    "name": "TestJob12345",
    "description": "Exemplary Create Test Job request",
    "startDateTime": "2024-09-08T06:36:58.354Z",
    "endDateTime": "2024-09-08T16:36:58.354Z",
    "recurrencePeriod": "hourly",
    "testProfile": {
        "@type": "testProfileRef",
        "id": "8df0981a-0949-11ee-be56-0242ac120002"
    },
    "validFor": "2024-09-08T16:36:58.354Z",
    "relatedService": {
      "id": "6e4e338a-8105-481e-8bf6-b3ca768a4b89",
      "name": "TestService12345"
    },
    "testMeasureAttributes": {
      "@type": "urn:mef:lso:spec:legato:icmp-ping:v0.0.1:all"
    }
  }
```

[R36] The Buyer's/Client's Create Test Job **MUST** support the following attributes: [MEF136.1 R26]

- Test Job Name
- Start Date Time
- End Date Time
- Valid For
- Test Profile Identifier
- Related Service Identifier
- Test Specific At-tributes

[R37] If the Valid For Date/Time is reached while a Test Job that refers to the Test Profile is active, the Seller/Server MUST complete the Test Job [MEF136.1 R27]

[R38] If the Valid For Date/Time is reached while a Test Job that refers to the Test Profile is scheduled, the Seller/Server MUST cancel the Test Job. [MEF136.1 R28]

[O8] The Buyer's/Client's Create Test Job **MAY** contain the following attributes

- Test Job Description
- Recurrence Period

6.6.3. Create Test Job with Test Profile Response

Entities used for providing a response to Create Test Job requests are presented in Figure 20. The Seller/Server responds with a `TestJob` type, which adds some attributes (like `id` or `state`) to the `TestJob_Create` that was used in the Buyer/Client request.

Note: The term "Response Code" used in the Business Requirements maps to HTTP response code, where `2xx` indicates *Success* and `4xx` or `5xx` indicate *Failure*.

The following snippet presents the Seller/Server response. It has the same structure as in the retrieve by identifier operation.

`Test Job` Create Response

```
{
  "name": "TestJob12345",
  "description": "Exemplary Create Test Job request",
  "startDateTime": "2024-09-08T06:36:58.354Z",
  "endDateTime": "2024-09-08T16:36:58.354Z",
  "recurrencePeriod": "hourly",
  "testProfile": {
      "@type": "testProfileRef",
      "id": "8df0981a-0949-11ee-be56-0242ac120002"
  },
  "validFor": "2024-09-08T16:36:58.354Z",
  "relatedService": {
    "id": "6e4e338a-8105-481e-8bf6-b3ca768a4b89",
    "name": "TestService12345"
  },
  "testMeasureAttributes": {
    "@type": "urn:mef:lso:spec:legato:icmp-ping:v0.0.1:all"
  },
  "id": "7cf0981a-0949-11ee-be56-0242ac121234", << added by SOF >>
  "state": "acknowledged", << added by SOF >>
  "actualStartDateTime": "2024-09-08T06:37:01.354Z" << added by SOF >>
}
```

Attributes that are set by the Seller/Server in the response are marked with the `<< added by SOF >>` tag.

[R39] If the request is successful, the Seller's response to a Create Test Job request **MUST** echo back all Buyer/Client provided attributes. [MEF136.1 R29]

[R40] If the request is successful, the Seller MUST return the following attributes:

- `id`
- `state` [MEF136.1 R30]

[R41] If the request is not successful, the Seller/Server **MUST NOT** echo back all Buyer/Client provided attributes. [MEF136.1 R31]

[R42] If the request is not successful, the Seller/Server **MUST NOT** return a Test Job Identifier or Test Job State. [MEF136.1 R32]

[R43] If the Seller/Server encounters errors, they **MUST** return an error with explanation to the Buyer/Client. [MEF136.1 R33]

6.6.4. Create Test Job without Test Profile Request

A Test Job can be created without referencing an existing Test Profile in the request by directly providing the required attributes typically defined by the `TestProfile`.

The `TestJob_Create` class, used as a payload for the `createTestJob` operation includes the `testProfile` attribute, which is of type `TestProfileRefOrValue`. By specifying the value of the `@type` attribute (discriminator) to `@type=TestProfileValue` it is possible to directly provide TestProfile attributes within the Test Job request.

Note: Defining attributes related to `TestProfile` in Test Job create request does not create a new `TestProfile` object.

Note: The model of the request message - `TestJob_Create` is a subset of the `TestJob_Common` model and contains only attributes that can (or must) be set by the Buyer/Client. The Seller/Server (SOF) then enriches the entity in the response with additional information.

Figure 21 illustrates the key part of the data model that can be used during the creation of a Test Job to directly provide the required attributes typically defined by the `TestProfile` type in the request (`POST /testJob`).

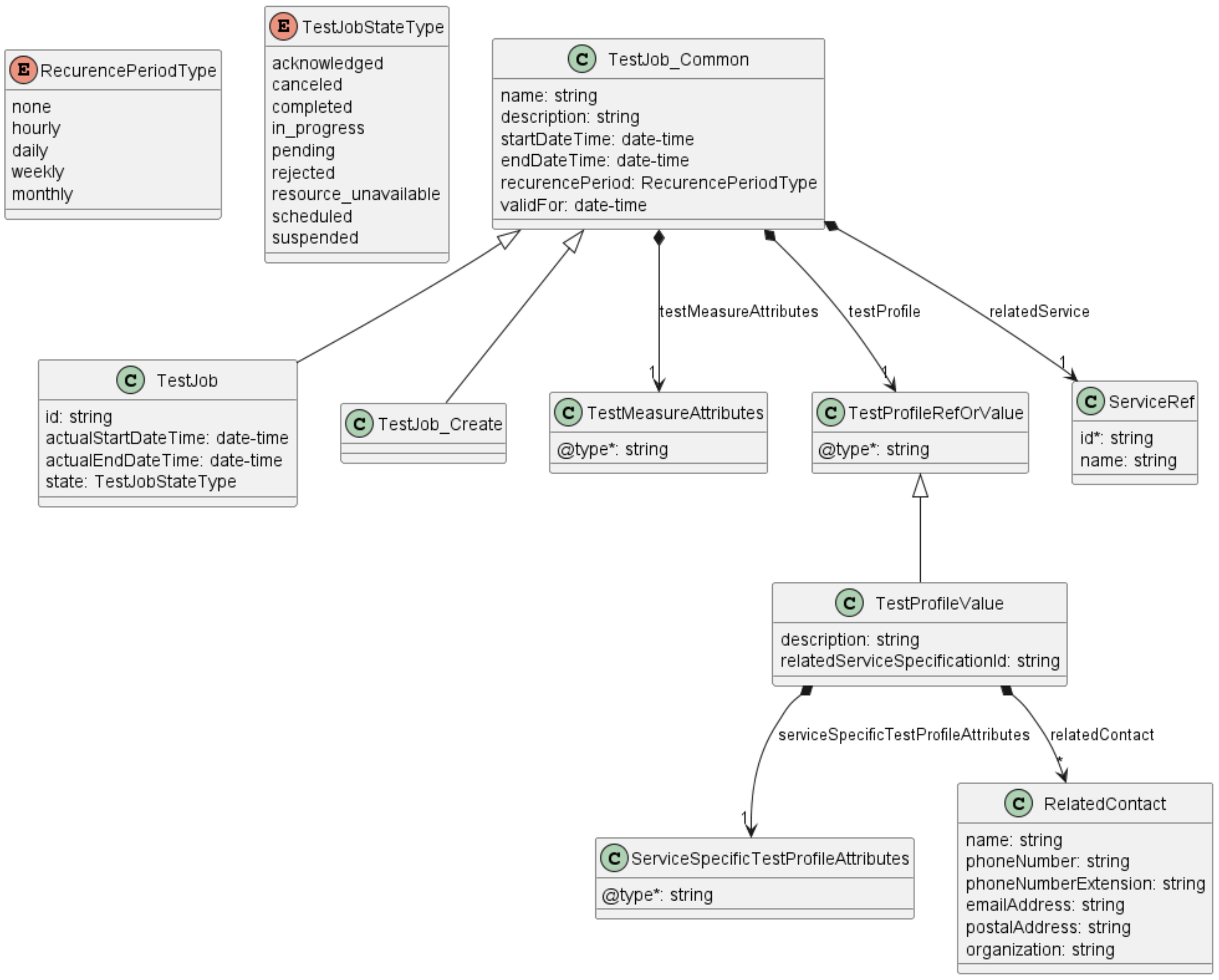


Figure 21. Test Job without Test Profile Key Entities

To send a create Test Job without Test Profile request the Buyer/Client uses the `createtestJob` operation from the API: `POST /testJob`. For clarity, some of the create Test Job payload's attributes might be omitted to improve examples' readability.

`Test Job` Create Request

```
{
    "name": "TestJob12345",
    "description": "Exemplary Create Test Job request",
    "startDateTime": "2024-09-08T06:36:58.354Z",
    "endDateTime": "2024-09-08T16:36:58.354Z",
    "recurrencePeriod": "hourly",
    "testProfile": {
        "@type": "testProfileValue",
        "description": "directly provided test profile attributes ",
        "relatedServiceSpecificationId": "6e4e338a-8105-481e-8bf6-b3ca124a4b89",
        "serviceSpecificTestProfileAttributes": {
            "@type": "IP-PING",
            "targetAddress": "192.168.5.10",
            "packetCount" : "2",
            ...
        },
        "relatedContact": {
            "name": "Contact 1",
            "phoneNumber": "003531541274"
        }
    },
    "validFor": "2024-09-08T16:36:58.354Z",
    "relatedService": {
      "id": "6e4e338a-8105-481e-8bf6-b3ca768a4b89",
      "name": "TestService12345"
    },
    "testMeasureAttributes": {
      "@type": "urn:mef:lso:spec:legato:icmp-ping:v0.0.1:all"
    }
  }
```

[R44] The Buyer's/Client's Create Test Job request **MUST** support the following attributes: [MEF136.1 R34]

- Test Job Name
- Start Date Time
- End Date Time
- Valid For
- Related Service Identifier
- Test Specific Attributes
- Service Specific Test Profile Attributes
- Related Service Specification
- Related Contact Information

6.6.. Create Test Job without Test Profile Response

Entities used for providing a response to Create Test Job requests are presented in Figure 21. The Seller/Server responds with a `TestJob` type, which adds some attributes (like `id` or `state`) to the `TestJob_Create` that was used in the Buyer/Client request.

Note: The term "Response Code" used in the Business Requirements maps to HTTP response code, where `2xx` indicates *Success* and `4xx` or `5xx` indicate *Failure*.

The following snippet presents the Seller/Server response. It has the same structure as in the retrieve by identifier operation.

`Test Job` Create Response

```
    {
      "name": "TestJob12345",
      "description": "Exemplary Create Test Job request",
      "startDateTime": "2024-09-08T06:36:58.354Z",
      "endDateTime": "2024-09-08T16:36:58.354Z",
      "recurrencePeriod": "hourly",
      "testProfile": {
          "@type": "testProfileValue",
          "description": "directly provided test profile attributes ",
          "relatedServiceSpecificationId": "6e4e338a-8105-481e-8bf6-b3ca124a4b89",
          "serviceSpecificTestProfileAttributes": {
              "@type": "IP-PING",
              "targetAddress": "192.168.5.10",
              "packetCount" : "2",
              ...
          },
          "relatedContact": {
              "name": "Contact 1",
              "phoneNumber": "003531541274"
          }
      },
      "validFor": "2024-09-08T16:36:58.354Z",
      "relatedService": {
        "id": "6e4e338a-8105-481e-8bf6-b3ca768a4b89",
        "name": "TestService12345"
      },
      "testMeasureAttributes": {
        "@type": "urn:mef:lso:spec:legato:icmp-ping:v0.0.1:all"
      },
      "id": "7cf0981a-0949-11ee-be56-0242ac121234", << added by SOF >>
      "state": "acknowledged", << added by SOF >>
      "actualStartDateTime": "2024-09-08T06:37:01.354Z" << added by SOF >>
    }
```

Attributes that are set by the Seller/Server in the response are marked with the `<< added by SOF >>` tag.

[R45] If the request is successful, the Seller's response to a Create Test Job request **MUST** echo back all Buyer/Client provided attributes. [MEF136.1 R35]

[R46] If the request is successful, the Seller MUST return the following attributes:

- `id`
- `state` [MEF136.1 R36]

[R47] If the request is not successful, the Seller/Server **MUST NOT** echo back all Buyer/Client provided attributes. [MEF136.1 R37]

[R48] If the request is not successful, the Seller/Server **MUST NOT** return a Test Job Identifier or Test Job State. [MEF136.1 R38]

[R47] If the Seller/Server encounters errors, they **MUST** return an error with explanation to the Buyer/Client. [MEF136.1 R39]

6.6.6. Test Job State Machine

Figure 22 presents the Test Job state machine:

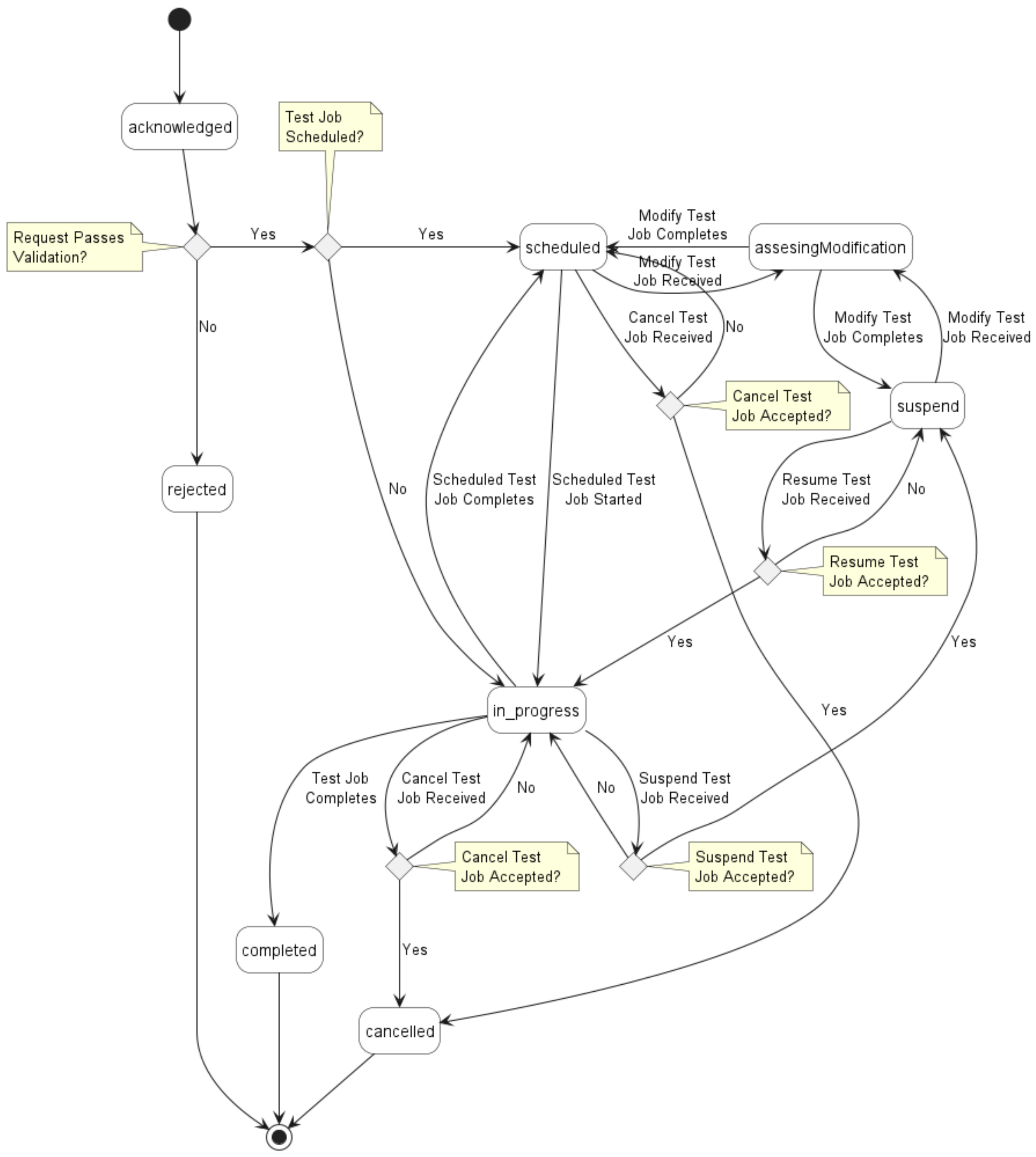


Figure 22. Test Job State Machine

After receiving the request, the Seller/Server (SOF) performs basic checks of the message. If any problem is found an Error response is provided. If the validation passes a response is provided with `TestJob` in `acknowledged` state. Next, the Seller/Server performs all the remaining business and time-consuming validations. At this point, an Error response cannot be provided anymore, so the profile moves to a `rejected` state if some issues are found. `TestJob` moves to either the `scheduled` or `inProgress` state depending on the assigned schedule. `TestJob` remains `scheduled` state until the scheduled start time is reached. After completion, the Seller/Server verifies if `TestJob` is recurring. If yes, `TestJob` moves to either `scheduled` or `inProgress` state depending on the schedule definition. Otherwise, it moves to a `completed` state. `TestJob` can be cancelled when in `scheduled` or `inProgress`. When cancellation is successful, `TestJob` moves to `cancelled` state. `TestJob` can be modified only in the `scheduled` or `suspended` state.

Table 10 presents the mapping between the API `state` names and the MEF W136.1 naming, together with the states' description.

state	MEF W136.1 name	Description

state	MEF W136.1 name	Description
`acknowledged`	ACKNOWLEDGED	The Create Test Job request has been received from the Buyer/Client and the Seller/Server has assigned a Test Job Identifier to it. If the request attributes fail validation, the Create Test Job moves to the REJECTED state. If the attributes pass validation, it is then determined if the Create Test Job Start Date Time is immediate or if the Create Test Job Start Date Time indicates that the Test Job is to be scheduled for a later date time. If the Test Job is to be scheduled the Test Job moves to the SCHEDULED state and awaits the scheduled date and time. If the Test Job is to be performed immediately, the Test Job moves to the IN_PROGRESS state and Test Results begin.
`assesingModification`	ASSESSING_MODIFICATION	A Modify Test Job request while the Test Job is in the SUSPEND or SCHEDULED state. If the Modify Test Job is accepted, the Test Job is updated. If the Modify Test Job is declined, the Test Job is not updated and returns to the SUSPEND or SCHEDULED state.
`cancelled`	CANCELLED	A Cancel Test Job request is received from the Buyer/Client. If the request is accepted, the Test Job moves to the CANCELLED state. The Test Job must be in the IN_PROGRESS, SCHEDULED, or SUSPEND, state.
`completed`	COMPLETED	The Test Job has reached the End Date Time or has completed all Test Measurements and provided Test Results.

state	MEF W136.1 name	Description
inProgress	IN_PROGRESS	Whether an immediate request or a scheduled request, the Test Job moves to the IN_PROGRESS state when it begins performing Test Results. If a Cancel Test Job request is received and accepted, the Test Job moves to the CANCELLED state. If the Cancel Test Job request is declined, the Test Job returns to the IN_PROGRESS state and continues Test Results until they are completed. If a Suspend Test Job request is received, the Test Job moves to the SUSPEND state.
rejected	REJECTED	The Create Test Job request fails validation and is rejected.
scheduled	SCHEDULED	The Test Job is scheduled to start at a later time. The Test Job stays in the SCHEDULED state until the Start Date and Time is reached. The Test Job moves to IN_PROGRESS when the Start Date and Time is reached. A Test Job with the state SCHEDULED can be moved to the SUSPEND or CANCELLED state.
suspend	SUSPEND	A Test Job in the IN_PROGRESS or SCHEDULED state receives a Suspend Test Job request. The Test Job moves to the SUSPEND state. A Test Job cannot be modified unless it is in the SUSPEND state.

Table 10. Test Job State Machine states

[R50] The Seller/Server **MUST** support all Test Job states and their associated transitions as described in Figure 21 and Table 10.

6.8. Use Case 8: Retrieve List of Test Jobs

The Buyer/Client can retrieve a list of `TestJob_Find` by using a `GET /testJob` operation with desired filtering criteria.

[R51] The Buyer/Client's Retrieve Test Job List request **MUST** contain none or more of the following filter criteria:

- `relatedServiceId`
- `testProfileId`
- `name`
- `startDateTime.gt`
- `startDateTime.lt`
- `endDateTime.gt`

- `endDateTime.lt`

[MEF136.1 R73]

```
https://serverRoot/mefApi/legato/serviceFunctionTesting/v1/testJob?relatedServiceId=6e4e338a-8105-481e-8bf6-
b3ca768a4b89&limit=10&offset=0
```

The example above shows a Buyer/Client's request to get all Test Job objects that have `relatedServiceId` equal 6e4e338a-8105-481e-8bf6-b3ca768a4b89. Additionally, the Buyer/Client asks only for a first (`offset=0`) pack of 10 results (`limit=10`) to be returned. The correct response (HTTP code `200`) in the response body contains a list of `TestJob_Find` objects matching the criteria. To get all the details, the Buyer/Client has to query a specific `TestJob` by its `id`. Details related to pagination are described in section 7.1.2

If the quantity of the records requested to be returned exceeds a Seller/Server policy, the Seller/Server must choose to respond with either:

- An empty list and message that indicates the result set is too large or
- A response that indicates the result is too large and includes a subset of the matching Test Jobs.

[R52] If successful, the Seller/Server **MUST** return a list of Test Job Identifiers that match the filter criteria along with the filter criteria [MEF136.1 R74]

[R53] If successful but no matches to the filter criteria are found, the Seller/Server **MUST** return an empty list [MEF136.1 R75]

[R54] If unsuccessful, the Seller/Server **MUST NOT** return a list of Test Job Identi-fiers or an empty list. [MEF136.1 R76]

[R55] If errors are encountered, the Seller/Server **MUST** return an indication of the errors. [MEF136.1 R77]

Figure 23 presents entities related to the use case.

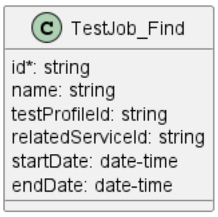


Figure 23. Use Case 8: Retrieve Test Job List - Model

6.9. Use Case 9: Retrieve Test Job by Job Identifier

The Buyer/Client can get detailed information about the Test Job from the Seller/Server by using a `GET /testJob/{{id}}` operation. The payload returned in the response is a full representation of the Test Job and includes all attributes the Buyer/Client has provided while sending a Test Job create request, together with additional attributes set by Seller/Server.

Get List and Get by Identifier operations return different representations of Test Job. Get List returns the `TestJob_Find` object. A response to a Get by ID for a `TestJob` with `id=7cf0981a-0949-11ee-be56-0242ac121234` would return exactly the same response as presented in section 6.6.3.

[R56] The Buyer/Client's Retrieve Test Job by Identifier request **MUST** include the Test Job Identifier and only the Test Job Identifier. [MEF136.1 R78]

[R57] If successful, the Seller/Server **MUST** include all `TestJob` attributes in their response. [MEF136.1 R79]

[R58] If unsuccessful, the Seller/Server **MUST NOT** return any attributes in their response. [MEF136.1 R80]

[R59] If errors are encountered, the Seller/Server **MUST** return an indication of the errors encountered. [MEF136.1 R80]

[R60] In case `id` does not allow finding a `TestJob` in Seller/Server's system, an error response `Error404` **MUST** be returned.

6.10. Use Case 10: Modify Test Job

Due to the need for provisioning and resource reservation on the SOF side, the modification operation associated with Test Job may exhibit prolonged duration. Consequently, this operation is implemented through a separate lifecycle process.

6.9.1. Interaction flow

The flow of this use case is shown in Figure 24.

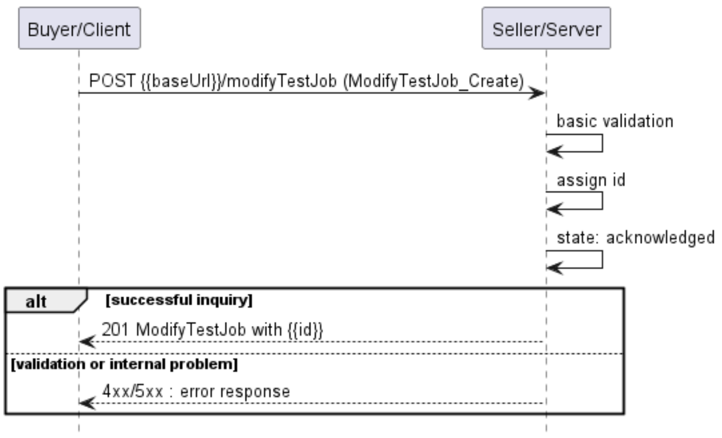
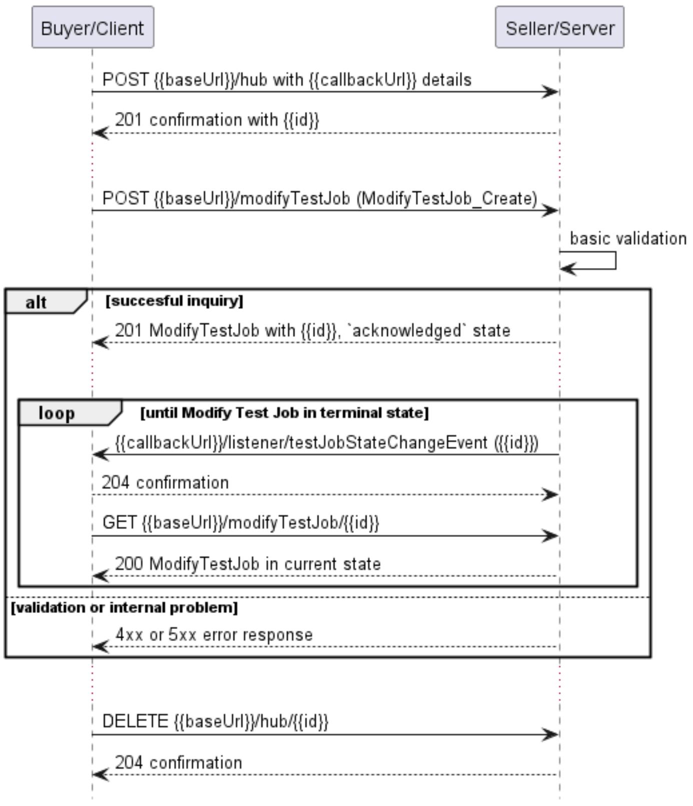


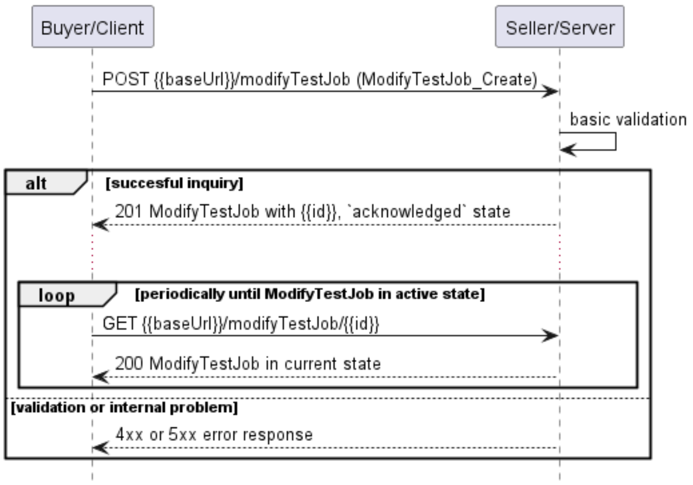
Figure 24. Use Case 10 - Modify Test Job create request flow

The Buyer/Client sends a request with a `ModifyTestJob_Create` type in the body. The Seller/Server performs request validation, assigns an `id`, and returns `ModifyTestJob` type in the response body, with a `state` set to `acknowledged`. Further processing is performed by Seller/Server which will in case of success update Test Job. The Buyer/Client can track the progress of the process either by subscribing for notifications or by periodically polling the `ModifyTestJob`. The two patterns are presented in the following diagrams.



Buyer/Client
Seller/Server
POST {{baseUrl}}/hub with {{callbackUrl}} details
201 confirmation with {{id}}
POST {{baseUrl}}/modifyTestJob (ModifyTestJob_Create)
basic validation
alt
[succesful inquiry]
201 ModifyTestJob with {{id}}, `acknowledged` state
loop
[until Modify Test Job in terminal state]
{{callbackUrl}}/listener/testJobStateChangeEvent ({{id}})
204 confirmation
GET {{baseUrl}}/modifyTestJob/{{id}}
200 ModifyTestJob in current state
[validation or internal problem]
4xx or 5xx error response
DELETE {{baseUrl}}/hub/{{id}}
204 confirmation

Figure 25. Modify Test Job progress tracking - Notifications



Buyer/Client
Seller/Server
POST {{baseUrl}}/modifyTestJob (ModifyTestJob_Create)
basic validation
alt
[succesful inquiry]
201 ModifyTestJob with {{id}}, `acknowledged` state
loop
[periodically until ModifyTestJob in active state]
GET {{baseUrl}}/modifyTestJob/{{id}}
200 ModifyTestJob in current state
[validation or internal problem]
4xx or 5xx error response

Figure 26. Modify Test Job progress tracking - Polling

Note: The context of notifications is not a part of the considered use case itself. It is presented to show the big picture of end-to-end flow. This applies also to all further use case flow diagrams with notifications.

6.9.2. Modify Test Job Request

Figure 27 presents the most important part of the data model used during the Modify Test Job request (`POST /modifyTestJob`) and response. The model of the request message - `ModifyTestJob_Create` is a subset of the `ModifyTestJob` model and contains only attributes that can (or must) be set by the Buyer/Client. The Seller/Server (SOF) then enriches the entity in the response with additional information.

Note: `ModifyTestJob_Create` is an entity used by the Buyer/Client to make a request. `ModifyTestJob` is an entity used by the Seller/Server to provide a response. The request entity has a subset of attributes of the response entity. Thus for visibility of these shared attributes

ModifyTestJob_Common has been introduced (this class is not supposed to be used directly in the exchange).

A ModifyTestJob_Create is a subset that includes only the updateable attributes. It is important to notice that updating the reference to Test Profile must not be possible. In order to change this assignment, existing Test Job must be cancelled and replaced by a new Job that relates to the relevant Profile. Modification of Test Job allows for changing attributes defined directly by TestJob type or Test Profile attributes that are defined by value. These attributes are contained in testProfile group. The TestJobRef section of ModifyTestJob_Create is used to specify which Test Job object is a subject of the modification process (relationship by reference using id of the Job).

Note: Modifying attributes defined by the Test Profile type, when a Job uses a reference to a Test Profile object, cannot modify the Test Profile itself.

Note: Only attributes that should be modified on the Test Job, should be included in the Modify Test Job Request.

TBD: Section servicePayloadSpecificAttributes of the Test Profile request allows for the introduction of service-specific properties of service function test as the API payload. The extension mechanism is described in detail in Section 5.3.

The full list of attributes is available in Section 7 and in the API specification which is an integral part of this standard.

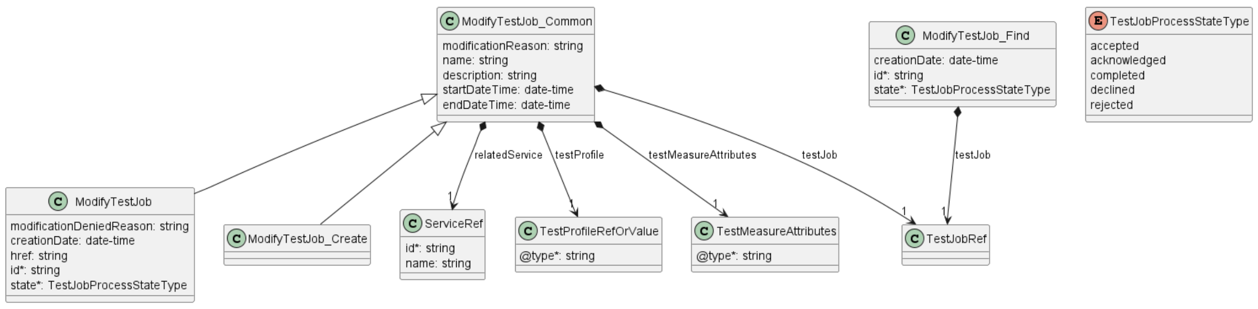


Figure 27. Modify Test Job Key Entities

To send a Modify Test Job request the Buyer/Client uses the modifyTestJob operation from the API: POST /modifyTestJob. Some of the payload's attributes might be omitted to improve examples' readability.

The example below shows a request to create a modification process for TestJob that was created in section 6.6.2.

The request below aims to:

- change testProfile
- change endDateTime
- modify description of the Test Job

```
{
  "name": "ModifyTestJob12345",
  "description": "Exemplary Modified Test Job request",
  "endDateTime": "2024-11-08T16:36:58.354Z",
  "testProfile": {
    "@type": "testProfileRef",
    "id": "8df0981a-0949-11ee-be56-0242ac120066"
  },
  "modificationReason": "Modifying Test Job Profile and Test Job end date",
  "testJob": {
    "@type": "TestJobRef",
    "href": "{{baseUrl}}/serviceFunctionTesting/v1/testJob/755e55e2-72b0-4e3b-af00-693e3beac691",
    "id": "755e55e2-72b0-4e3b-af00-693e3beac691"
  }
}
```

[R61] The Buyer’s Modify Test Job request **MUST** include the Test Job Identifier. [MEF136.1 R58]

[R62] The Buyer's Modify Test Job request **MUST** at least one of the following attributes: [MEF136.1 R59]

- `description`
- `endDateTime`
- `name`
- `startDateTime`
- `relatedService`
- `testProfile`
- `testMeasureAttributes`

[R63] The Test Job **MUST** be in the SUSPENDED or SCHEDULED state for a Buyer/Client to modify it. [MEF136.1 R60]

Note: In case Test Job is running e.g., once a day for a short period of time, it may be difficult to change its state. If action arrives when Test Job is running, it is recommended to run until the end and only afterwards action should be applied.

6.9.3. Modify Test Job Response

Entities used for providing a response to Modify Test Job request are presented in Figure 27. The Seller/Server responds with a `ModifyTestJob` type, which adds some attributes (like `id` or `state`) to the `ModifyTestJob_Create` that was used in the Buyer/Client request.

Note: The term "Response Code" used in the Business Requirements maps to HTTP response code, where `2xx` indicates *Success* and `4xx` or `5xx` indicate *Failure*.

The following snippet presents the Seller/Server response. It has the same structure as in the retrieve by identifier operation.

```
  {
    "name": "ModifyTestJob12345",
    "description": "Exemplary Modified Test Job request",
    "endDateTime": "2024-11-08T16:36:58.354Z",
    "testProfile": {
      "@type": "testProfileRef",
      "id": "8df0981a-0949-11ee-be56-0242ac120066"
    },
    "modificationReason": "Modifying Test Job Profile and Test Job end date",
    "testJob": {
      "@type": "TestJobRef",
      "href": "{{baseUrl}}/serviceFunctionTesting/v1/testJob/755e55e2-72b0-4e3b-af00-693e3beac691",
      "id": "755e55e2-72b0-4e3b-af00-693e3beac691"
    },
    "creationDate": "204-06-19T12:58:17.088Z", << added by SOF >>
     "href": "{{baseUrl}}/serviceFunctionTesting/v1/modifyTestJob/9c51d971-185d-403e-952f-2110f33a9628", << added by
  SOF >>
    "id": "9c51d971-185d-403e-952f-2110f33a9628", << added by SOF >>
    "state": "acknowledged" << added by SOF >>
  }
```

Attributes that are set by the Seller/Server in the response are marked with the `<< added by SOF >>` tag.

[R64] The Seller/Server's response **MUST** include all and unchanged attributes' values as provided by Buyer/Client in the request. [MEF136.1 R61]

[R65] If the request is not successful, the Seller/Server **MUST NOT** echo back all Buyer/Client provided attributes. [MEF136.1 R62]

[R66] The Seller/Server **MUST** specify the following attributes in a response:

- `id`
- `state`
- `creationDate`

[R67] The `id` **MUST** remain the same value for the life of the Modify Test Job.

[R68] If the request is not successful, the Seller/Server **MUST NOT** return a Test Job Identifier or Test Job State. [MEF136.1 R63]

[R69] If the Seller/Server encounters errors, they **MUST** return an error with explanation to the Buyer/Client. [MEF136.1 R64]

In case Seller/Server cannot successfully validate the request, Modify Test Job process fails, which results in setting state to `declined` with a proper explanation in `modificationDeniedReason`. This includes situation when:

- `id` does not allow to find a `TestJob` that is to be updated in Seller/Server's system
- requested attributes cannot be modified
- Test Job is in the state that does not allow for modification.

6.9.4. Modify Test Job State Machine

Figure 28 presents the Modify Test Job state machine:

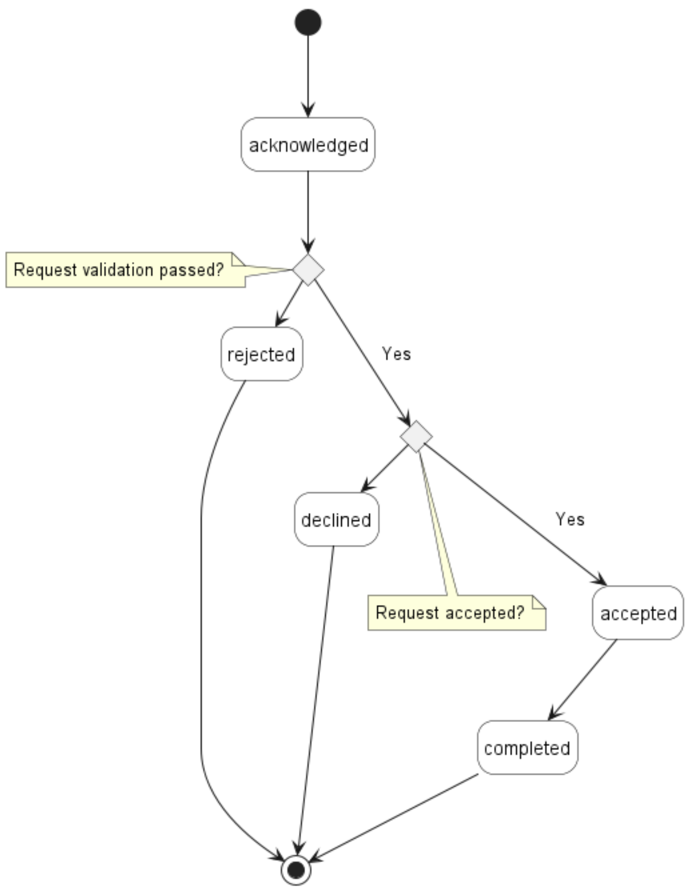


Figure 28. Modify Test Job State Machine

After receiving the request, the Seller/Server (SOF) performs basic checks of the message. If any problem is found an Error response is provided. If the validation passes a response is provided with `ModifyTestJob` in `acknowledged` state. Next, the Seller/Server performs all the remaining business and time-consuming validations. At this point, an Error response cannot be provided anymore, so the profile moves to a `declined` state if some issues are found. The `modifyTestJob.modificationDeniedReason` acts as a placeholder to provide a detailed description of what caused the problem. If validation is successful, `ModifyTestJob` moves to `accepted` state. At this point, related `TestJob` moves to pending state and Seller/Server starts all necessary arrangements to provision modification request. `TestJob` remains in `pending` state until Modify Test Job process is finished and moved to `completed` state. This causes `TestJob` state to change to `scheduled` or `in-progress` depending on the `ScheduleDefinition`.

Table 11 presents the mapping between the API `state` names and the MEF W136.1 naming, together with states description. The list of states is the same for all processes related to Test Job (cancel/modify/resume/suspend).

state	MEF W136.1 name	Description
`accepted`	ACCEPTED	The Cancel/Modify/Resume/Suspend Test Job request has been validated and accepted by the Seller/Server.
`acknowledged`	ACKNOWLEDGED	The Cancel/Modify/Resume/Suspend Test Job request has been received by the Seller/Server and has passed basic validation. Test Job Process Identifier is assigned in the Acknowledged state. The request remains in the Acknowledged state until all validations as applicable are completed. If the attributes are validated, the request moves to the Accepted state. If not all attributes are validated, the request moves to the Declined state.

state	MEF W136.1 name	Description
`completed`	COMPLETED	The Cancel/Modify/Resume/Suspend Test Job request has been completed by the Seller/Server.
`declined`	DECLINED	The Cancel/Modify/Resume/Suspend Test Job request has failed validation and been declined by the Seller/Server.
`rejected`	REJECTED	The Cancel/Modify/Resume/Suspend Test Job request has been rejected by the Seller/Server.

Table 11. Test Job Process State Machine states

[R70] The Seller/Server **MUST** support all Modify Test Job states and their associated transitions as described in Figure 28 and Table 11.

6.11. Use Case 11: Retrieve Modify Test Job List

The Buyer/Client can retrieve a list of Modify Test Job objects by using a `GET /modifyTestJob` operation with desired filtering criteria.

[O9] The Buyer/Client Retrieve List of Modify Test Jobs request **MAY** contain none or more of the following attributes:

- `testJobId`
- `state`
- `creationDate.gt`
- `creationDate.lt`

```
https://serverRoot/mefApi/legato/serviceFunctionTesting/v1/modifyTestJob?state=acknowledged&limit=10&offset=0
```

The example above shows a Buyer/Client's request to get all Modify Test Job objects that are in the `acknowledged` state. Additionally, the Buyer/Client asks only for a first (`offset=0`) pack of 10 results (`limit=10`) to be returned. The correct response (HTTP code `200`) in the response body contains a list of `ModifyTestJob_Find` objects matching the criteria. Details related to pagination are described in section 7.1.2.

[R71] The Seller **MUST** include following attributes in the `ModifyTestJob_Find` object in the response:

- `id`
- `testJobId`
- `state`

[R72] In case no items matching the criteria are found, the Seller/Server **MUST** return a valid response with an empty list.

Figure 29 presents entities related to the use case.

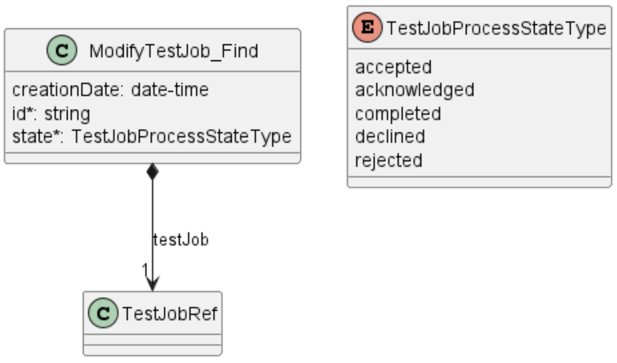


Figure 29. Use Case 11: Retrieve Modify Test Job List - Model

6.12. Use Case 12: Retrieve Modify Test Job by Identifier

The Buyer/Client can get detailed information about the Modify Test Job from the Seller/Server by using a `GET /modifyTestJob/{{id}}` operation. The payload returned in the response is a full representation of the Modify Test Job and includes all attributes the Buyer/Client has provided while sending a Modify Test Job create request, together with additional attributes set by Seller/Server.

Get List and Get by Identifier operations return different representations of Modify Test Job. Get List returns the `ModifyTestJob_Find` object which is a subset of the `ModifyTestJob` returned by the Get by Identifier operation. A response to a Get by Id for a `ModifyTestJob` with `id=755e55e2-72b0-4e3b-af00-693e3beac691` would return exactly the same response as presented in section 6.12.3.

[R73] In case `id` does not allow finding a `ModifyTestJob` in Seller/Server's system, an error response `Error404` **MUST** be returned.

[R74] The Seller/Server **MUST** include following attributes in the `ModifyTestJob` object in the response:

- `id`
- `testJob`
- `state`

[R75] The Seller **MUST** provide all remaining optional attributes if they were previously set by the Buyer or the Seller.

6.13. Use Case 13: Cancel Test Job

Due to the need for deprovisioning of the Test Job on the SOF side, the cancel operation associated with the Test Job may exhibit a prolonged duration. Consequently, this operation is implemented through a separate lifecycle process.

6.13.1. Interaction flow

The flow of this use case is shown in Figure 30.

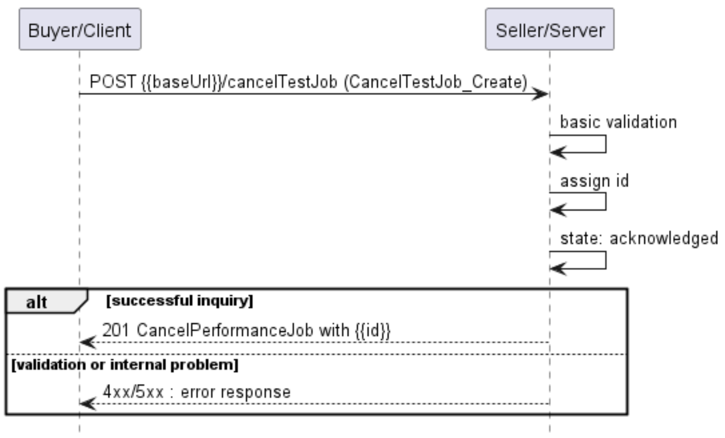

Buyer/Client
Seller/Server
POST {{baseUrl}}/cancelTestJob (CancelTestJob_Create)
basic validation
assign id
state: acknowledged
alt
[successful inquiry]
201 CancelPerformanceJob with {{id}}
[validation or internal problem]
4xx/5xx : error response

Figure 30. Use Case 13 - Cancel Test Job create request flow

The Buyer/Client sends a request with a `CancelTestJob_Create` type in the body. The Seller/Server performs request validation, assigns an `id`, and returns the `CancelTestJob` type in the response body, with a `state` set to `acknowledged`. Further processing is performed by Seller/Server which will in case of success update the Test Job. The Buyer/Client can track the progress of the process either by subscribing for notifications or by periodically polling the `CancelTestJob`. The two patterns are presented in the following diagrams.

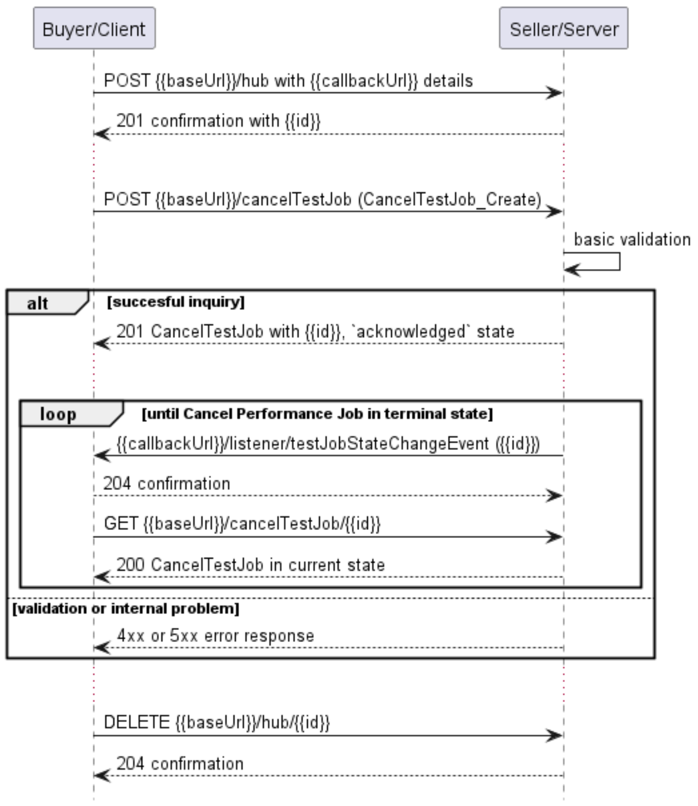

Buyer/Client
Seller/Server
POST {{baseUrl}}/hub with {{callbackUrl}} details
201 confirmation with {{id}}
POST {{baseUrl}}/cancelTestJob (CancelTestJob_Create)
basic validation
alt
[succesful inquiry]
201 CancelTestJob with {{id}}, `acknowledged` state
loop
[until Cancel Performance Job in terminal state]
{{callbackUrl}}/listener/testJobStateChangeEvent ({{id}})
204 confirmation
GET {{baseUrl}}/cancelTestJob/{{id}}
200 CancelTestJob in current state
[validation or internal problem]
4xx or 5xx error response
DELETE {{baseUrl}}/hub/{{id}}
204 confirmation

Figure 31. Cancel Test Job progress tracking - Notifications

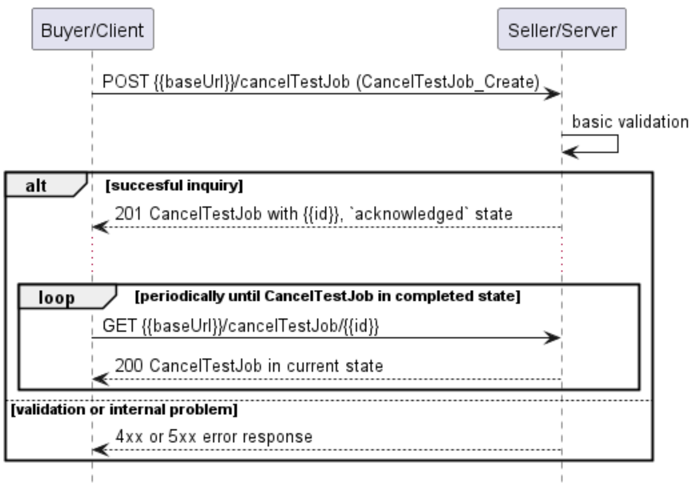

Buyer/Client
Seller/Server
POST {{baseUrl}}/cancelTestJob (CancelTestJob_Create)
basic validation
alt
[succesful inquiry]
201 CancelTestJob with {{id}}, `acknowledged` state
loop
[periodically until CancelTestJob in completed state]
GET {{baseUrl}}/cancelTestJob/{{id}}
200 CancelTestJob in current state
[validation or internal problem]
4xx or 5xx error response

Figure 32. Cancel Test Job progress tracking - Polling

Note: The Cancel Test Job process is altering the state of the job itself. It is important to note that notifications resulting from changes in the state of the Test Job are not represented in Figures 31 and 32.

Note: The context of notifications is not a part of the considered use case itself. It is presented to show the big picture of end-to-end flow. This applies also to all further use case flow diagrams with notifications.

6.13.2. Cancel Test Job Request

Figure 33 presents the most important part of the data model used during the Cancel Test Job request (`POST /cancelTestJob`) and response. The model of the request message - `CancelTestJob_Create` is a subset of the `CancelTestJob` model and contains only attributes that can (or must) be set by the Buyer/Client. The Seller/Server (SOF) then enriches the entity in the response with additional information.

Note: `CancelTestJob_Create` is an entity used by the Buyer/Client to make a request. `CancelTestJob` is an entity used by the Seller/Server to provide a response. The request entity has a subset of attributes of the response entity. Thus for visibility of these shared attributes `CancelTestJob_Common` has been introduced (this class is not supposed to be used directly in the exchange).

The `testJob` section of `CancelTestJob_Create` is used to specify which Test Job object is a subject of the cancellation process (relationship by reference using `id` of the Job).

The full list of attributes is available in Section 7 and in the API specification which is an integral part of this standard.

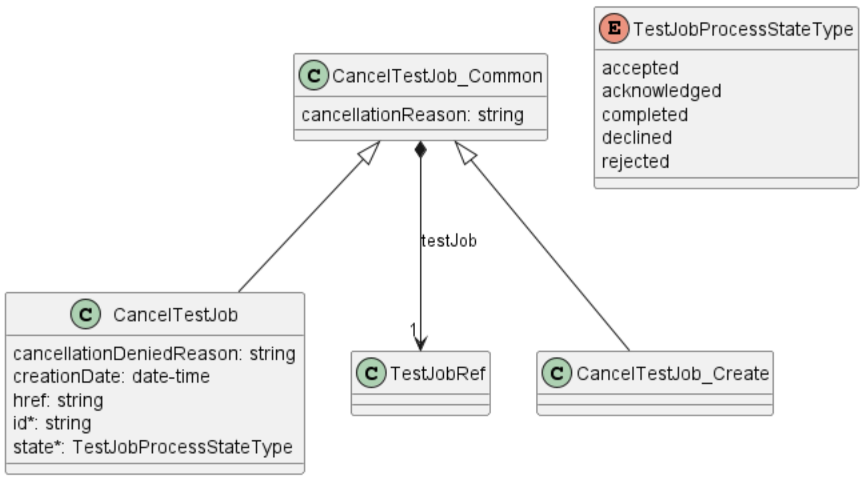


Figure 33. Cancel Test Job Key Entities

To send a Cancel Test Job request the Buyer/Client uses the `cancelTestJob` operation from the API: `POST /cancelTestJob`.

The example below shows a request to create a cancellation process for `TestJob` that was created in section 6.6.2.

```
{
  "cancellationReason": "Cancel Test Job sample",
  "testJob": {
    "href": "{{baseUrl}}/serviceFunctionTesting/v1/testJob/755e55e2-72b0-4e3b-af00-693e3beac691",
    "id": "755e55e2-72b0-4e3b-af00-693e3beac691"
  }
}
```

[R76] The Buyer's/Client's Cancel Test Job request **MUST** include the following attributes: [MEF133.1 R57]

- `testJob`

Note: If action arrives when Test Job is running, it is recommended to run until the end and only afterward action should be applied. [MEF133.1 O16, O26]

6.13.3. Cancel Test Job Response

Entities used for providing a response to Cancel Test Job requests are presented in Figure 33. The Seller/Server responds with a `CancelTestJob` type, which adds some attributes (like `id` or `state`) to the `CancelTestJob_Create` that was used in the Buyer/Client request.

Note: The term "Response Code" used in the Business Requirements maps to HTTP response code, where `2xx` indicates *Success* and `4xx` or `5xx` indicate *Failure*.

The following snippet presents the Seller/Server response. It has the same structure as in the retrieve by identifier operation.

```
{
  "cancellationReason": "Cancel Test Job sample",
  "testJob": {
    "href": "{{baseUrl}}/serviceFunctionTesting/v1/testJob/755e55e2-72b0-4e3b-af00-693e3beac691",
    "id": "755e55e2-72b0-4e3b-af00-693e3beac691"
  },
  "creationDate": "204-06-19T12:58:17.088Z", << added by SOF >>
   "href": "{{baseUrl}}/serviceFunctionTesting/v1/CancelTestJob/aea2769a-23f3-4ddc-b095-542a63b12481", << added by
SOF >>
  "id": "aea2769a-23f3-4ddc-b095-542a63b12481", << added by SOF >>
  "state": "acknowledged" << added by SOF >>
}
```

Attributes that are set by the Seller/Server in the response are marked with the `<< added by SOF >>` tag.

[R77] The Seller/Server's response **MUST** include all and unchanged attributes' values as provided by the Buyer/Client in the request.

[R78] The Seller/Server **MUST** specify the following attributes in a response:

- `id`
- `state`
- `creationDate`

[R79] The `id` **MUST** remain the same value for the life of the Cancel Test Job.

In case Seller/Server cannot successfully validate the request, Cancel Test Job process fails, which results in setting the state to `rejected` with a proper explanation in `cancellationDeniedReason`. This includes situation when:

- `id` does not allow to find a `TestJob` that is to be cancelled in Seller/Server's system
- Test Job is in a state that does not allow for cancellation.

6.13.4. Cancel Test Job State Machine

Figure 34 presents the Cancel Test Job state machine:

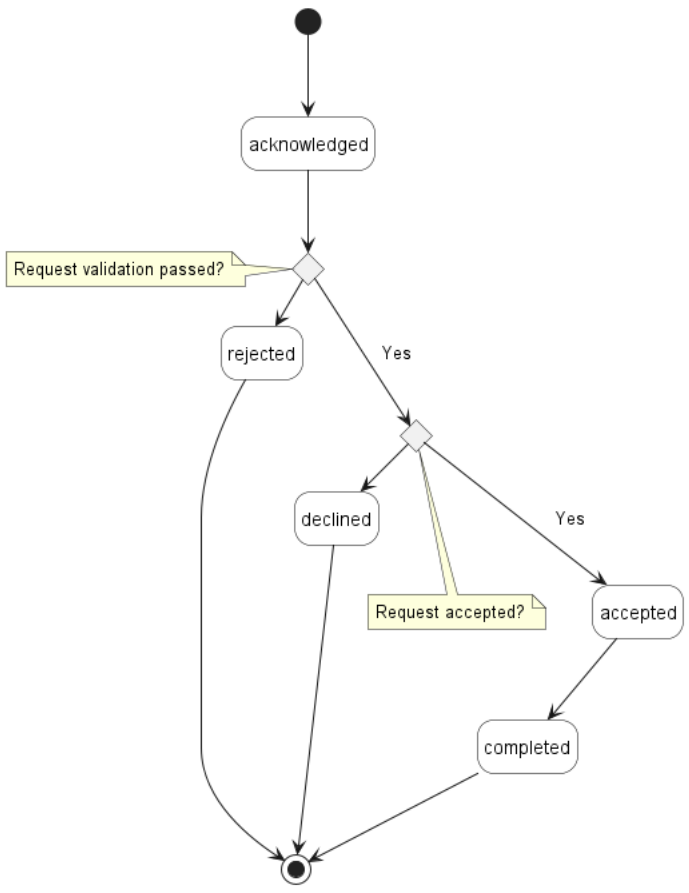


Figure 34. Cancel Test Job State Machine

After receiving the request, the Seller/Server (SOF) has assigned a `CancelTestJob` Identifier to it. If the request attributes fail validation, the `CancelTestJob` request moves to the `rejected` state. Next, the Seller/Server performs all the remaining business and time-consuming validations. At this point, an Error response cannot be provided anymore, so the job moves to a `declined` state if some issues are found. The `cancelTestJob.cancellationDeniedReason` acts as a placeholder to provide a detailed description of what caused the problem. If validation is successful, `CancelTestJob` moves to the `accepted` state. When the Cancel Test Job process is finished, it moves to the `completed` state. This causes the `TestJob` state to change to `cancelled`.

Description and mapping of the Cancel Test Job States are the same as in table 10.

6.14. Use Case 14: Retrieve Cancel Test Job List

The Buyer/Client can retrieve a list of Cancel Test Job objects by using a `GET /cancelTestJob` operation with desired filtering criteria.

[O10] The Buyer/Client Retrieve List of Cancel Test Jobs request **MAY** contain none or more of the following attributes:

- `testJobId`
- `state`
- `creationDate.gt`
- `creationDate.lt`

```
https://serverRoot/mefApi/legato/serviceFunctionTesting/v1/cancelTestJob?state=acknowledged&limit=10&offset=0
```

The example above shows a Buyer/Client's request to get all Cancel Test Job objects that are in the `acknowledged` state. Additionally, the Buyer/Client asks only for a first (`offset=0`) pack of 10 results (`limit=10`) to be returned. The correct response (HTTP code `200`) in the response body contains a list of `CancelTestJob_Find` objects matching the criteria. Details related to pagination are described in section 7.1.2.

[R80] The Seller **MUST** include following attributes in the `CancelTestJob_Find` object in the response:

- `id`
- `testJobId`
- `state`

[R81] In case no items matching the criteria are found, the Seller/Server **MUST** return a valid response with an empty list.

Figure 35 presents entities related to the use case.

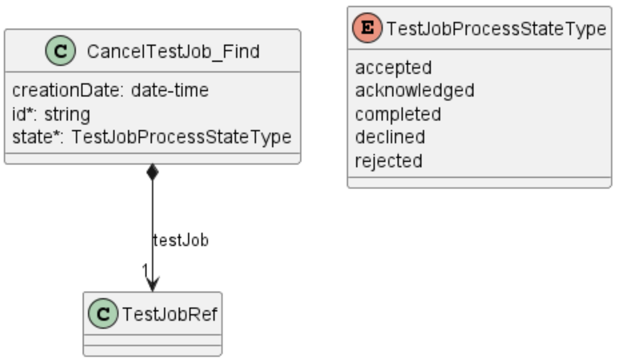


Figure 35. Use Case 14: Retrieve Cancel Test Job List - Model

6.15. Use Case 15: Retrieve Cancel Test Job by Identifier

The Buyer/Client can get detailed information about the Cancel Test Job from the Seller/Server by using a `GET /cancelTestJob/{{id}}` operation. The payload returned in the response is a full representation of the Cancel Test Job and includes all attributes the Buyer/Client has provided while sending a Cancel Test Job create request, together with additional attributes set by Seller/Server.

Get List and Get by Identifier operations return different representations of Cancel Test Job. Get List returns the `CancelTestJob_Find` object which is a subset of the `CancelTestJob` returned by the Get by Identifier operation. A response to a Get by Id for a `CancelTestJob` with `id=755e55e2-72b0-4e3b-af00-693e3beac691` would return exactly the same response as presented in section 6.12.3.

[R82] In case `id` does not allow finding a `CancelTestJob` in Seller/Server's system, an error response `Error404` **MUST** be returned.

[R83] The Seller/Server **MUST** include following attributes in the `CancelTestJob` object in the response:

- `id`
- `testJob`
- `state`

[R84] The Seller **MUST** provide all remaining optional attributes if they were previously set by the Buyer or the Seller.

6.16. Use Case 16: Suspend Test Job

Due to the need to release resources on the SOF side, the suspend operation associated with the Test Job may exhibit a prolonged duration. Consequently, this operation is implemented through a separate lifecycle process.

When the Test Job is suspended, it does not perform any tests nor collects test measures.

6.16.1. Interaction flow

The flow of this use case is shown in Figure 36.

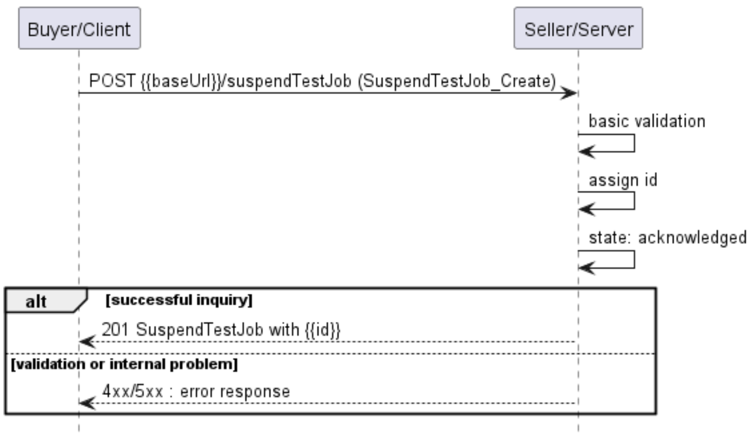

Buyer/Client
Seller/Server
POST {{baseUrl}}/suspendTestJob (SuspendTestJob_Create)
basic validation
assign id
state: acknowledged
alt
[successful inquiry]
201 SuspendTestJob with {{id}}
[validation or internal problem]
4xx/5xx : error response

Figure 36. Use Case 16 - Suspend Test Job create request flow

The Buyer/Client sends a request with a `SuspendTestJob_Create` type in the body. The Seller/Server performs request validation, assigns an `id`, and returns the `SuspendTestJob` type in the response body, with a `state` set to `acknowledged`. Further processing is performed by Seller/Server which will in case of success update the Test Job. The Buyer/Client can track the progress of the process either by subscribing for notifications or by periodically polling the `SuspendTestJob`. The two patterns are presented in the following diagrams.

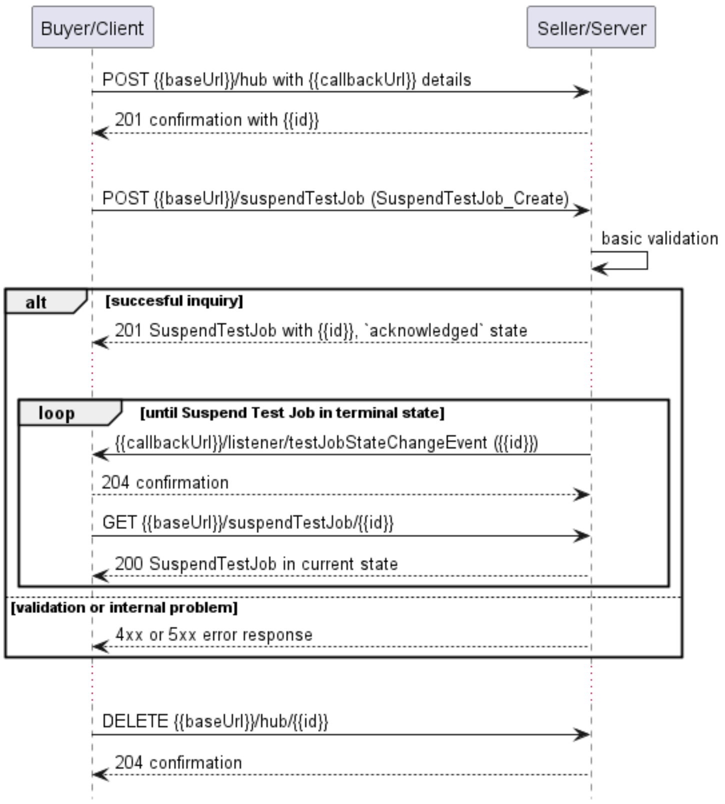

Buyer/Client
Seller/Server
POST {{baseUrl}}/hub with {{callbackUrl}} details
201 confirmation with {{id}}
POST {{baseUrl}}/suspendTestJob (SuspendTestJob_Create)
basic validation
alt
[succesful inquiry]
201 SuspendTestJob with {{id}}, `acknowledged` state
loop
[until Suspend Test Job in terminal state]
{{callbackUrl}}/listener/testJobStateChangeEvent ({{id}})
204 confirmation
GET {{baseUrl}}/suspendTestJob/{{id}}
200 SuspendTestJob in current state
[validation or internal problem]
4xx or 5xx error response
DELETE {{baseUrl}}/hub/{{id}}
204 confirmation

Figure 37. Suspend Test Job progress tracking - Notifications

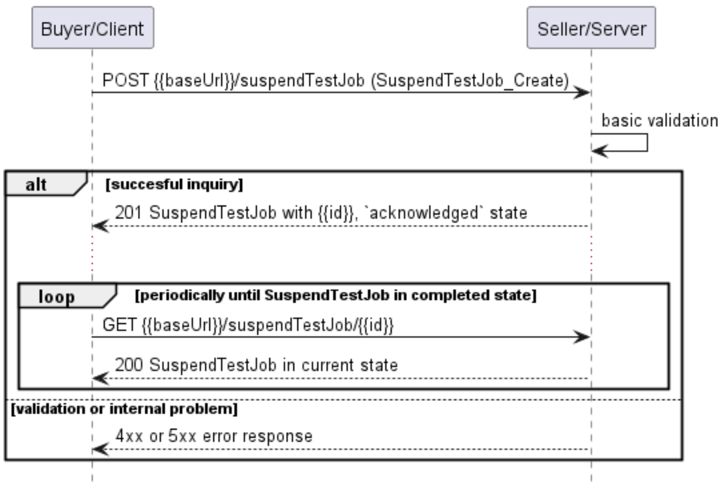

Buyer/Client
Seller/Server
POST {{baseUrl}}/suspendTestJob (SuspendTestJob_Create)
basic validation
alt
[succesful inquiry]
201 SuspendTestJob with {{id}}, `acknowledged` state
loop
[periodically until SuspendTestJob in completed state]
GET {{baseUrl}}/suspendTestJob/{{id}}
200 SuspendTestJob in current state
[validation or internal problem]
4xx or 5xx error response

Figure 38. Suspend Test Job progress tracking - Polling

Note: The Suspend Test Job process is altering the state of the job itself. It is important to note that notifications resulting from changes in the state of the Test Job are not represented in Figures 37 and 38.

Note: The context of notifications is not a part of the considered use case itself. It is presented to show the big picture of end-to-end flow. This applies also to all further use case flow diagrams with notifications.

6.16.2. Suspend Test Job Request

Figure 39 presents the most important part of the data model used during the Suspend Test Job request (`POST /suspendTestJob`) and response. The model of the request message - `SuspendTestJob_Create` is a subset of the `SuspendTestJob` model and contains only attributes that can (or must) be set by the Buyer/Client. The Seller/Server (SOF) then enriches the entity in the response with additional information.

Note: `SuspendTestJob_Create` is an entity used by the Buyer/Client to make a request. `SuspendTestJob` is an entity used by the Seller/Server to provide a response. The request entity has a subset of attributes of the response entity. Thus for visibility of these shared attributes `SuspendTestJob_Common` has been introduced (this class is not supposed to be used directly in the exchange).

The `testJob` section of `SuspendTestJob_Create` is used to specify which Test Job object is a subject of the suspension process (relationship by reference using `id` of the Job).

The full list of attributes is available in Section 7 and in the API specification which is an integral part of this standard.

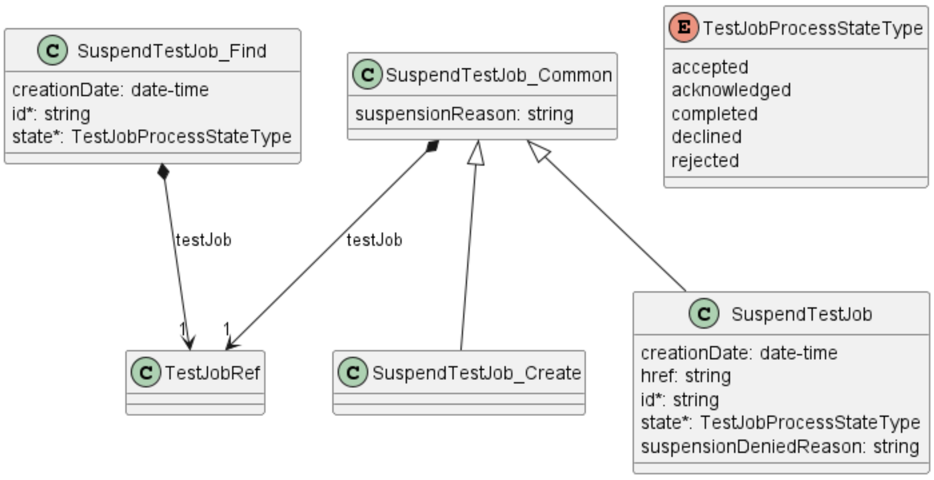


Figure 39. Suspend Test Job Key Entities

To send a Suspend Test Job request the Buyer/Client uses the `suspendTestJob` operation from the API: `POST /suspendTestJob`.

The example below shows a request to create a suspension process for `TestJob` that was created in section 6.6.2.

```
{
  "testJob": {
    "href": "{{baseUrl}}/serviceFunctionTesting/v1/testJob/755e55e2-72b0-4e3b-af00-693e3beac691",
    "id": "755e55e2-72b0-4e3b-af00-693e3beac691"
  },
  "suspensionReason": "Suspend Test Job sample"
}
```

[R85] The Buyer/Client Suspend Test Job request **MUST** include the following attributes: [MEF136.1 R40]

- `testJob.id`

[R86] The Test Job **MUST** be in the In-Progress state to be suspended. [MEF136.1 R41]

[O11] In case the Test Job is running e.g., once a day for a short period of time, it may be difficult to change its state. If action arrives when Test Job is running, it is recommended to run until the end and only afterwards action should be applied.

6.16.3. Suspend Test Job Response

Entities used for providing a response to Suspend Test Job requests are presented in Figure 39. The Seller/Server responds with a `SuspendTestJob` type, which adds some attributes (like `id` or `state`) to the `SuspendTestJob_Create` that was used in the Buyer/Client request.

Note: The term "Response Code" used in the Business Requirements maps to HTTP response code, where `2xx` indicates *Success* and `4xx` or `5xx` indicate *Failure*.

The following snippet presents the Seller/Server response. It has the same structure as in the retrieve by identifier operation.

```
{
  "testJob": {
    "href": "{{baseUrl}}/serviceFunctionTesting/v1/testJob/755e55e2-72b0-4e3b-af00-693e3beac691",
    "id": "755e55e2-72b0-4e3b-af00-693e3beac691"
  },
  "suspensionReason": "Suspend Test Job sample",
  "creationDate": "204-06-19T12:58:17.088Z", << added by SOF >>
   "href": "{{baseUrl}}/serviceFunctionTesting/v1/suspendTestJob/aea2769a-23f3-4ddc-b095-542a63b12481", << added by
SOF >>
  "id": "aea2769a-23f3-4ddc-b095-542a63b12481", << added by SOF >>
  "state": "acknowledged" << added by SOF >>
}
```

Attributes that are set by the Seller/Server in the response are marked with the `<< added by SOF >>` tag.

[R87] If the request is successful, the Seller/Server **MUST** suspend all testing and measurements being performed on the Test Job and place the Test Job in the SUSPENDED state when they receive a Suspend Test Job request from the Buyer/Client [MEF136.1 R42]

[R88] While in the SUSPENDED state, the Test Job **MUST NOT** perform any testing or measurements. [MEF136.1 R43]

[R89] If the request is not successful, the Seller/Server **MUST NOT** suspend the Test Job [MEF136.1 R44]

[R90] If the Seller/Server encounters errors, they **MUST** return an error with explanation to the Buyer/Client [MEF136.1 R45]

[R91] The Seller/Server's response **MUST** include all and unchanged attributes' values as provided by the Buyer/Client in the request.

[R92] The Seller/Server **MUST** specify the following attributes in a response:

- `id`
- `state`
- `creationDate`

[R93] The `id` **MUST** remain the same value for the life of the Suspend Test Job.

In case Seller/Server cannot successfully validate the request, Suspend Test Job process fails, which results in setting the state to `rejected` or `declined` with a proper explanation in suspensionDeniedReason. This includes situations when:

- id does not allow to find a TestJob that is to be suspended in Seller/Server's system
- Test Job is in a state that does not allow for suspension.

6.16.4. Suspend Test Job State Machine

Figure 40 presents the Suspend Test Job state machine:

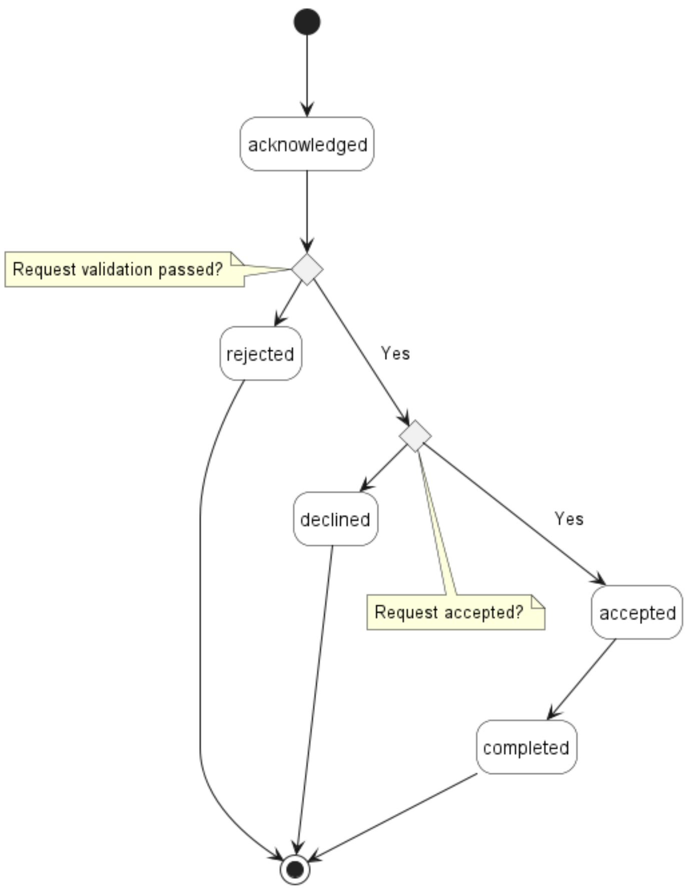


Figure 40. Suspend Test Job State Machine

After receiving the request, the Seller/Server (SOF) has assigned a SuspendTestJob Identifier to it. If the request attributes fail validation, the SuspendTestJob request moves to the rejected state. Next, the Seller/Server performs all the remaining business and time-consuming validations. At this point, an Error response cannot be provided anymore, so the job moves to a declined state if some issues are found. The suspendTestJob.suspendlationDeniedReason acts as a placeholder to provide a detailed description of what caused the problem. If validation is successful, SuspendTestJob moves to the accepted state. When the Suspend Test Job process is finished, it moves to the completed state. This causes the TestJob state to change to suspended.

Description and mapping of the Suspend Test Job States are the same as in table 10.

6.17. Use Case 17: Retrieve Suspend Test Job List

The Buyer/Client can retrieve a list of Suspend Test Job objects by using a GET /suspendTestJob operation with desired filtering criteria.

[O12] The Buyer/Client Retrieve List of Suspend Test Jobs request **MAY** contain none or more of the following attributes:

- testJobId

- state
- creationDate.gt
- creationDate.lt

```
https://serverRoot/mefApi/legato/serviceFunctionTesting/v1/suspendTestJob?state=acknowledged&limit=10&offset=0
```

The example above shows a Buyer/Client's request to get all Suspend Test Job objects that are in the acknowledged state. Additionally, the Buyer/Client asks only for a first (offset=0) pack of 10 results (limit=10) to be returned. The correct response (HTTP code 200) in the response body contains a list of SuspendTestJob_Find objects matching the criteria. Details related to pagination are described in section 7.1.2.

[R94] The Seller **MUST** include following attributes in the SuspendTestJob_Find object in the response:

- id
- testJobId
- state

[R95] In case no items matching the criteria are found, the Seller/Server **MUST** return a valid response with an empty list.

Figure 41 presents entities related to the use case.

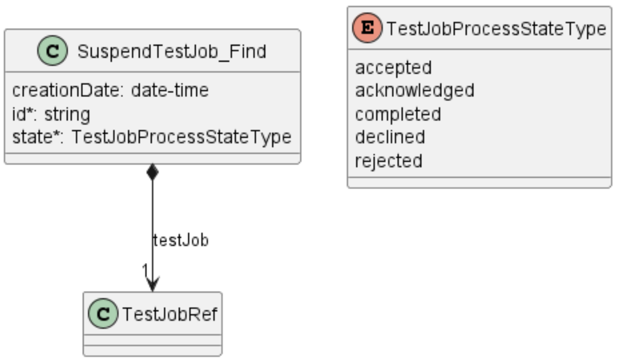


Figure 41. Use Case 17: Retrieve Suspend Test Job List - Model

6.18. Use Case 18: Retrieve Suspend Test Job by Identifier

The Buyer/Client can get detailed information about the Suspend Test Job from the Seller/Server by using a GET /suspendTestJob/{{id}} operation. The payload returned in the response is a full representation of Suspend Test Job and includes all attributes the Buyer/Client has provided while sending a Suspend Test Job create request, together with additional attributes set by Seller/Server.

Get List and Get by Identifier operations return different representations of Suspend Test Job. Get List returns the SuspendTestJob_Find object which is a subset of the SuspendTestJob returned by the Get by Identifier operation. A response to a Get by Identifier for a SuspendTestJob with id=aea2769a-23f3-4ddc-b095-542a63b12481 would return exactly the same response as presented in section 6.15.3.

[R96] In case id does not allow finding a SuspendTestJob in Seller/Server's system, an error response Error404 **MUST** be returned.

[R97] The Seller/Server **MUST** include following attributes in the SuspendTestJob object in the response:

- id
- testJob
- state

[R98] The Seller **MUST** provide all remaining optional attributes if they were previously set by the Buyer or the Seller.

6.19. Use Case 19: Resume Test Job

Due to the need for reserving resources on the SOF side, the resume operation associated with Test Job may exhibit prolonged duration. Consequently, this operation is implemented through a separate lifecycle process.

6.19.1. Interaction flow

The flow of this use case is shown in Figure 42.

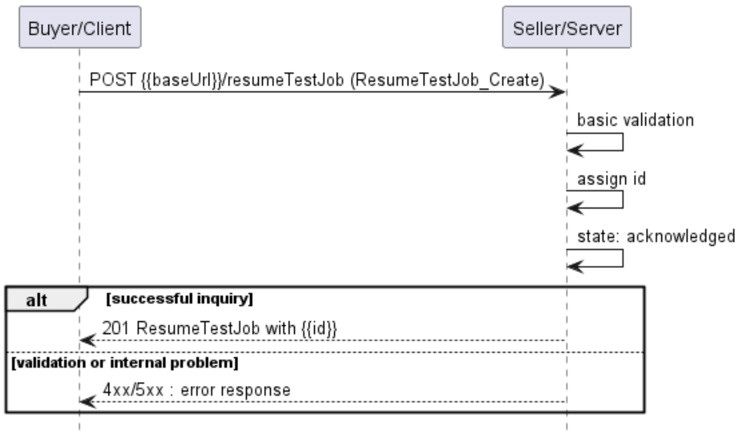


Figure 42. Use Case 19 - Resume Test Job create request flow

The Buyer/Client sends a request with a ResumeTestJob_Create type in the body. The Seller/Server performs request validation, assigns an id, and returns the ResumeTestJob type in the response body, with a state set to acknowledged. Further processing is performed by Seller/Server which will in case of success resume the Test Job. The Buyer/Client can track the progress of the process either by subscribing for notifications or by periodically polling the ResumeTestJob. The two patterns are presented in the following diagrams.

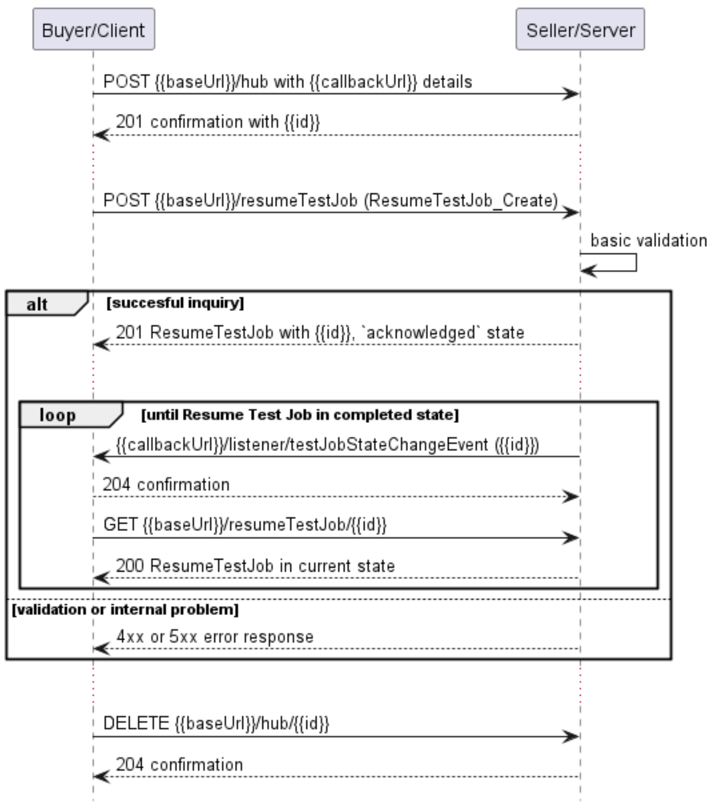

Buyer/Client
Seller/Server
POST {{baseUrl}}/hub with {{callbackUrl}} details
201 confirmation with {{id}}
POST {{baseUrl}}/resumeTestJob (ResumeTestJob_Create)
basic validation
alt
[succesful inquiry]
201 ResumeTestJob with {{id}}, `acknowledged` state
loop
[until Resume Test Job in completed state]
{{callbackUrl}}/listener/testJobStateChangeEvent ({{id}})
204 confirmation
GET {{baseUrl}}/resumeTestJob/{{id}}
200 ResumeTestJob in current state
[validation or internal problem]
4xx or 5xx error response
DELETE {{baseUrl}}/hub/{{id}}
204 confirmation

Figure 43. Resume Test Job progress tracking - Notifications

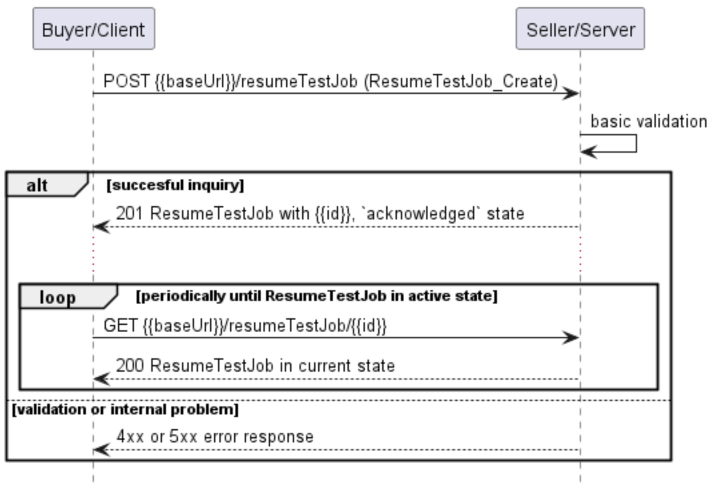

Buyer/Client
Seller/Server
POST {{baseUrl}}/resumeTestJob (ResumeTestJob_Create)
basic validation
alt
[succesful inquiry]
201 ResumeTestJob with {{id}}, `acknowledged` state
loop
[periodically until ResumeTestJob in active state]
GET {{baseUrl}}/resumeTestJob/{{id}}
200 ResumeTestJob in current state
[validation or internal problem]
4xx or 5xx error response

Figure 44. Resume Test Job progress tracking - Polling

Note: The Resume Test Job process is altering the state of the job itself. It is important to note that notifications resulting from changes in the state of the Test Job are not represented in Figures 43 and 44.

Note: The context of notifications is not a part of the considered use case itself. It is presented to show the big picture of end-to-end flow. This applies also to all further use case flow diagrams with notifications.

6.19.2. Resume Test Job Request

Figure 45 presents the most important part of the data model used during the Resume Test Job request (`POST /resumeTestJob`) and response. The model of the request message - `ResumeTestJob_Create` is a subset of the `ResumeTestJob` model and contains only attributes that can (or must) be set by the Buyer/Client. The Seller/Server (SOF) then enriches the entity in the response with additional information.

Note: `ResumeTestJob_Create` is an entity used by the Buyer/Client to make a request. `ResumeTestJob` is an entity used by the Seller/Server to provide a response. The request entity has a subset of attributes of the response entity. Thus for visibility of these shared attributes `ResumeTestJob_Common` has been introduced (this class is not supposed to be used directly in the exchange).

The `testJob` section of `ResumeTestJob_Common` is used to specify which Test Job object is a subject of the resume process (relationship by reference using the `id` of the Job).

The full list of attributes is available in Section 7 and in the API specification which is an integral part of this standard.

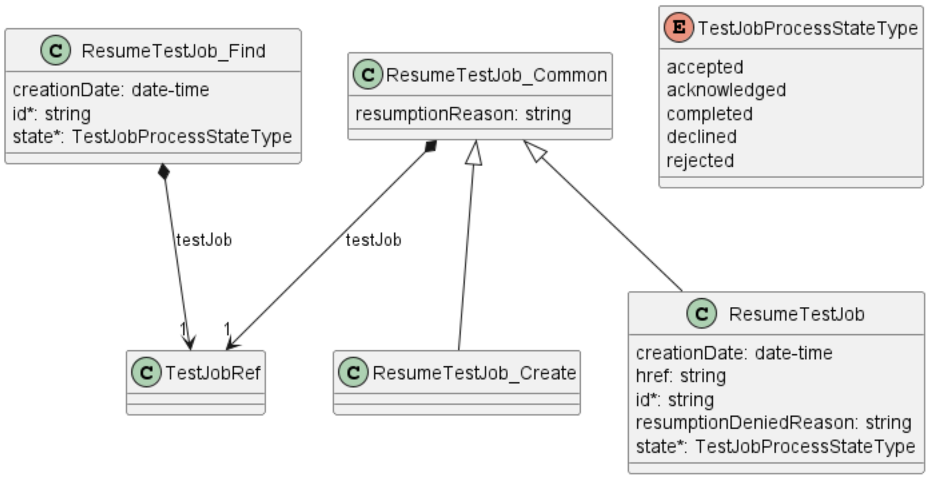


Figure 45. Resume Test Job Key Entities

To send a Resume Test Job request the Buyer/Client uses the `resumeTestJob` operation from the API: `POST /resumeTestJob`.

The example below shows a request to create a resumption process for `TestJob` that was created in section 6.6.2.

```
{
  "testJob": {
    "href": "{{baseUrl}}/serviceFunctionTesting/v1/testJob/755e55e2-72b0-4e3b-af00-693e3beac691",
    "id": "755e55e2-72b0-4e3b-af00-693e3beac691"
  },
  "resumptionReason": "Resume Test Job sample"
}
```

[R99] The Buyer/Client Resume Test Job request **MUST** include the following attributes: [MEF136.1 R46]

- `testJob.id`

[R100] The Test Job **MUST** be in the Suspended state in order to be resumed. [MEF136.1 R47]

6.19.3. Resume Test Job Response

Entities used for providing a response to Resume Test Job requests are presented in Figure 45. The Seller/Server responds with a `ResumeTestJob` type, which adds some attributes (like `id` or `state`) to the `ResumeTestJob_Create` that was used in the Buyer/Client request.

Note: The term "Response Code" used in the Business Requirements maps to HTTP response code, where `2xx` indicates *Success* and `4xx` or `5xx` indicate *Failure*.

The following snippet presents the Seller/Server response. It has the same structure as in the retrieve by identifier operation.

```
{
  "testJob": {
    "href": "{{baseUrl}}/serviceFunctionTesting/v1/testJob/755e55e2-72b0-4e3b-af00-693e3beac691",
    "id": "755e55e2-72b0-4e3b-af00-693e3beac691"
  },
  "resumptionReason": "Resume Test Job sample",
  "creationDate": "204-06-19T12:58:17.088Z", << added by SOF >>
   "href": "{{baseUrl}}/serviceFunctionTesting/v1/resumeTestJob/aea2769a-23f3-4ddc-b095-542a63b12481", << added by
SOF >>
  "id": "aea2769a-23f3-4ddc-b095-542a63b12481", << added by SOF >>
  "state": "acknowledged" << added by SOF >>
}
```

Attributes that are set by the Seller/Server in the response are marked with the `<< added by SOF >>` tag.

[R101] If the request is successful, the Seller/Server **MUST** resume all testing and measurement being performed on the Test Job and place the Test Job in the `inProgress` state when they receive a Resume Test Job request from the Buyer/Client [MEF136.1 R48]

[R102] If the request is not successful, the Seller/Server **MUST NOT** resume the Test Job, and the Test Job remains in the `suspended` state. [MEF136.1 R49]

[R103] If the Seller/Server encounters errors, they **MUST** return an error with explanation to the Buyer/Client. [MEF136.1 R50]

[R104] The Seller/Server's response **MUST** include all and unchanged attributes' values as provided by the Buyer/Client in the request.

[R105] The Seller/Server **MUST** specify the following attributes in a response:

- `id`
- `state`
- `creationDate`

[100] The `id` **MUST** remain the same value for the life of the Test Job.

In case the Seller/Server cannot successfully validate the request, the Resume Test Job process fails, which results in setting the state to `declined` with a proper explanation in `resumptionDeniedReason`. This includes situations when:

- `id` does not allow to find a `TestJob` that is to be resumed in Seller/Server's system
- Test Job is in a state that does not allow for resumption.

6.19.4. Resume Test Job State Machine

Figure 46 presents the Resume Test Job state machine:

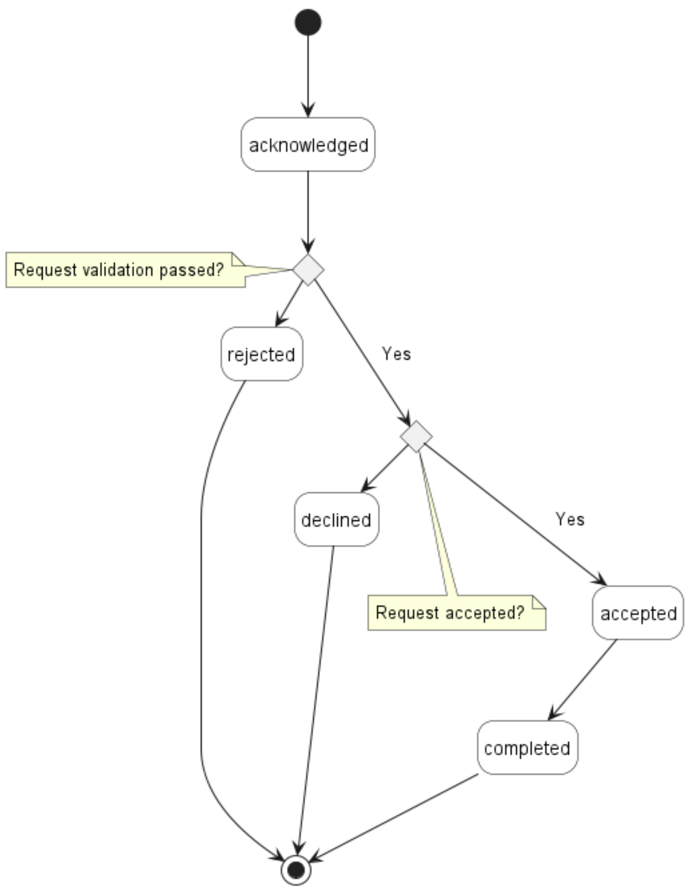


Figure 46. Resume Test Job State Machine

After receiving the request, the Seller/Server (SOF) has assigned a `ResumeTestJob` Identifier to it. If the request attributes fail validation, the `ResumeTestJob` request moves to the `rejected` state. Next, the Seller/Server performs all the remaining business and time-consuming validations. At this point, an Error response cannot be provided anymore, so the job moves to a `declined` state if some issues are found. The `resumeTestJob.resumptionDeniedReason` acts as a placeholder to provide a detailed description of what caused the problem. If validation is successful, `ResumeTestJob` moves to the `accepted` state. When the Resume Test Job process is finished, it moves to the `completed` state. This causes the `TestJob` state to change to `inProgress`.

Description and mapping of the Resume Test Job States are the same as in table 10.

6.20. Use Case 20: Retrieve Resume Test Job List

The Buyer/Client can retrieve a list of Resume Test Job objects by using a `GET /resumeTestJob` operation with desired filtering criteria.

[O13] The Buyer/Client Retrieve List of Resume Test Jobs request **MAY** contain none or more of the following attributes:

- `testJobId`
- `state`
- `creationDate.gt`
- `creationDate.lt`

```
https://serverRoot/mefApi/legato/serviceFunctionTesting/v1/resumeTestJob?state=acknowledged&limit=10&offset=0
```

The example above shows a Buyer/Client's request to get all Resume Test Job objects that are in the `acknowledged` state. Additionally, the Buyer/Client asks only for a first (`offset=0`) pack of 10 results (`limit=10`) to be returned. The correct response (HTTP code `200`) in the response body contains a list of `ResumeTestJob_Find` objects matching the criteria. Details related to pagination are described in section 7.1.2.

[R106] The Seller **MUST** include following attributes in the `ResumeTestJob_Find` object in the response:

- `id`
- `testJobId`
- `state`

[R107] In case no items matching the criteria are found, the Seller/Server **MUST** return a valid response with an empty list.

Figure 47 presents entities related to the use case.

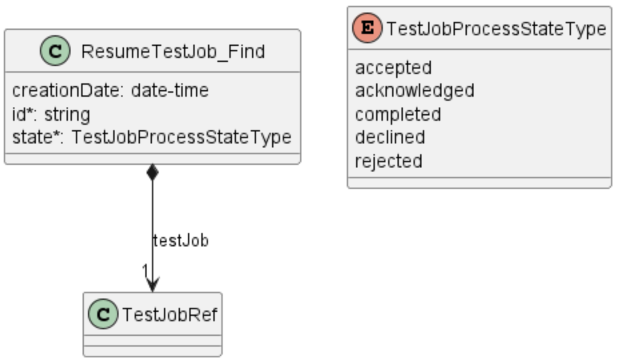


Figure 47. Use Case 20: Retrieve Resume Test Job List - Model

6.21. Use Case 21: Retrieve Resume Test Job by Identifier

The Buyer/Client can get detailed information about the Resume Test Job from the Seller/Server by using a `GET /resumeTestJob/{{id}}` operation. The payload returned in the response is a full representation of the Resume Test Job and includes all attributes the Buyer/Client has provided while sending a Resume Test Job create request, together with additional attributes set by Seller/Server.

Get List and Get by Identifier operations return different representations of Resume Test Job. Get List returns the `ResumeTestJob_Find` object which is a subset of the `ResumeTestJob` returned by the Get by Identifier operation. A response to a Get by Identifier for a `ResumeTestJob` with `id=aea2769a-23f3-4ddc-b095-542a63b12481` would return exactly the same response as presented in section 6.18.3.

[R108] In case `id` does not allow finding a `ResumeTestJob` in Seller/Server's system, an error response `Error404` **MUST** be returned.

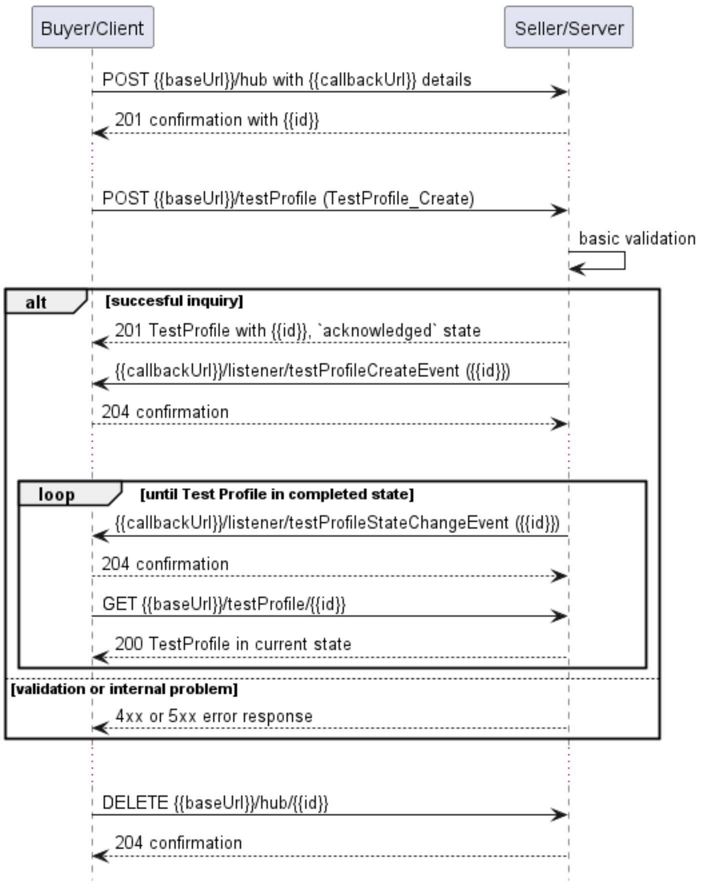
[R109] The Seller/Server **MUST** include following attributes in the `ResumeTestJob` object in the response:

- `id`
- `testJob`
- `state`

[R110] The Seller **MUST** provide all remaining optional attributes if they were previously set by the Buyer or the Seller.

6.22. Use Case 22: Register for Notifications

The Buyer/Client can track the lifecycle of the Test objects by subscribing to notifications. An exemplary use case for exchanging notifications is presented in Figure 48.



Buyer/Client
Seller/Server
POST {{baseUrl}}/hub with {{callbackUrl}} details
201 confirmation with {{id}}
POST {{baseUrl}}/testProfile (TestProfile_Create)
basic validation
alt
[succesful inquiry]
201 TestProfile with {{id}}, `acknowledged` state
{{callbackUrl}}/listener/testProfileCreateEvent ({{id}})
204 confirmation
loop
[until Test Profile in completed state]
{{callbackUrl}}/listener/testProfileStateChangeEvent ({{id}})
204 confirmation
GET {{baseUrl}}/testProfile/{{id}}
200 TestProfile in current state
[validation or internal problem]
4xx or 5xx error response
DELETE {{baseUrl}}/hub/{{id}}
204 confirmation

Figure 48. Testing Notification Example

The Seller/Server communicates with the Buyer/Client with Notifications provided that:

- Buyer/Client supports a notification mechanism
- Buyer/Client has registered to receive notifications from the Seller/Server

To register for notifications the Buyer/Client uses the `registerListener` operation from the API: `POST /hub`. The request contains only 2 attributes:

- `callback` - mandatory, to provide the callback address the events will be notified to,
- `query` - optional, to provide the required types of event.

Figure 49 shows all entities involved in the Notification use cases.

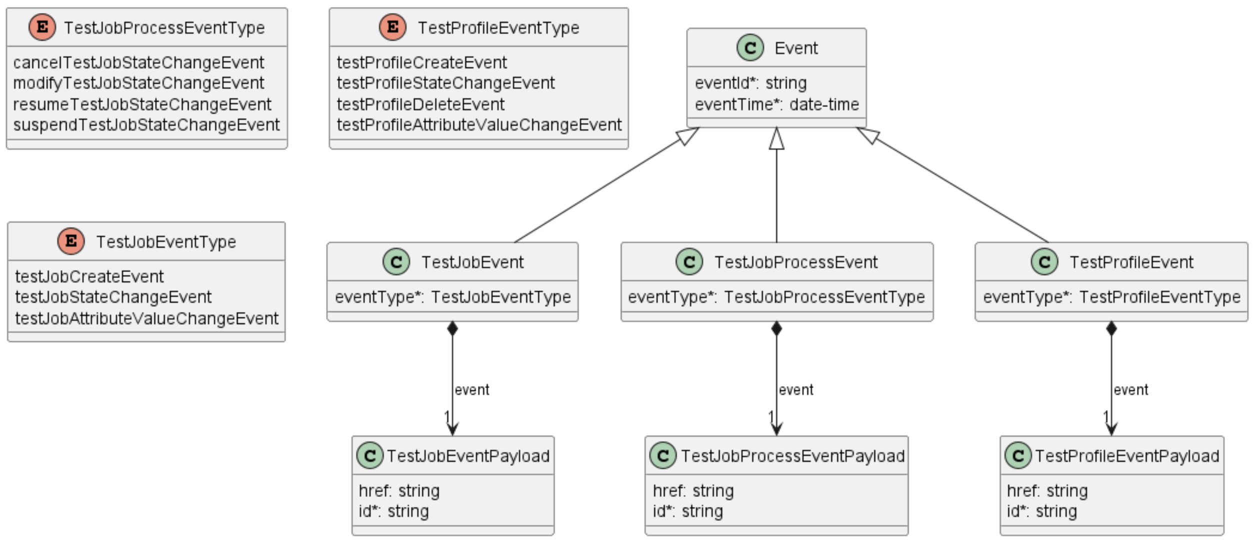


Figure 49. Service Function Testing Notification Data Model

By using a request in the following snippet, the Buyer/Client subscribes for notification of all types of events. Those are:

- `testJobCreateEvent`
- `testJobStateChangeEvent`
- `testJobAttributeValueChangeEvent`
- `testProfileCreateEvent`
- `testProfileStateChangeEvent`
- `testProfileAttributeValueChangeEvent`
- `testProfileDeleteEvent`

```
{
  "callback": "https://bus.com/listenerEndpoint"
}
```

[O14] The Seller/Server **MAY** support subscription to Test Job Notifications Use Case.

[O15] The Buyer/Client **MAY** support subscription to Test Profile Notifications Use Case.

[O16] The Seller/Server **MAY** support unsubscribing from Test Job Notifications Use Case.

[O17] The Buyer/Client **MAY** support unsubscribing from Test Profile Notifications Use Case.

If the Buyer/Client wishes to receive only notifications of a certain type, a `query` must be added:

```
{
  "callback": "https://bus.com/listenerEndpoint",
  "query": "eventType=testJobStateChangeEvent"
}
```

[R111] The Buyer/Client's Subscribe to Test Job Notifications request **MUST** include: [MEF136.1 R82]

- Callback address
- Zero or more notification types

If the Buyer/Client wishes to subscribe to 2 different types of events, there are 2 possible syntax variants [TMF630]:

```
eventType=testJobStateChangeEvent,testJobAttributeValueChangeEvent
```

or

```
eventType=testJobStateChangeEvent&eventType=testJobAttributeValueChangeEvent
```

The `query` formatting complies with RFC3986 RFC3986. According to it, every attribute defined in the Event model (from notification API) can be used in the `query`. However, this standard requires only `eventType` attribute to be supported.

The Seller/Server responds to the subscription request by adding the `id` of the subscription to the message that must be further used for unsubscribing.

```
{
  "id": "00000000-0000-0000-0000-000000000678",
  "callback": "https://bus.com/listenerEndpoint",
  "query": "eventType=testJobStateChangeEvent"
}
```

Example of a final address that the Notifications will be sent to (for `testJobStateChangeEvent`):

- `https://bus.com/listenerEndpoint/mefApi/legato/serviceFunctionTestingNotification/v1/listener/testJobStateChangeEvent`

[R112] If successful, the Seller/Server response **MUST** indicate success and include the Register Notification Identifier and echo back all Buyer/Client provided attributes [MEF136.1 R83]

[R113] If successful, the Seller/Server **MUST** begin sending the appropriate notifications to the Buyer/Client. [MEF136.1 R84]

[R114] The Seller/Server **MUST NOT** send notifications if the Buyer/Client has not registered for them. [MEF136.1 R85]

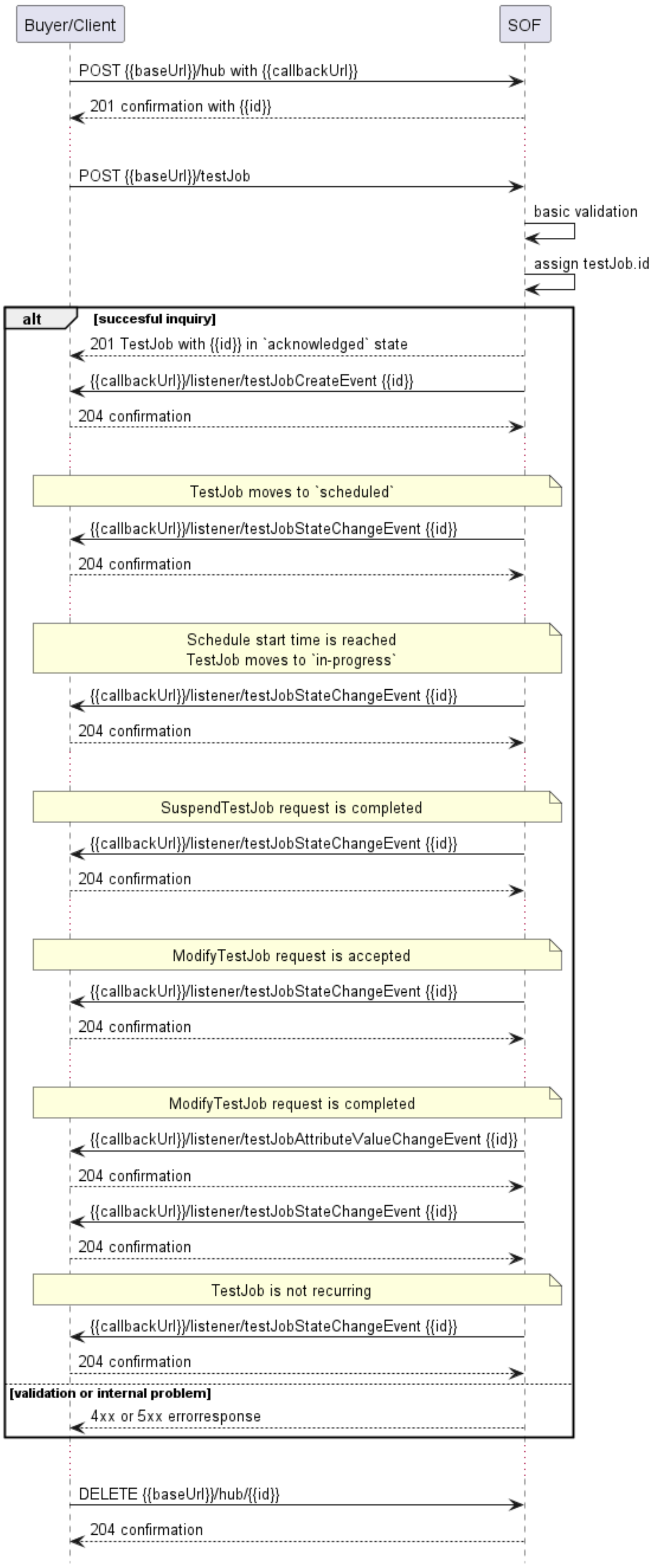
[R115] If unsuccessful, the Seller/Server **MUST NOT** return a Register Notification Identifier. [MEF136.1 R86]

[R116] If the Seller/Server experiences any errors, they **MUST** return an error indication to the Buyer/Client. [MEF136.1 R87]

6.23. Use Case 23: Send Notification

Notifications are used to asynchronously inform the Buyer/Client about the respective objects and attributes changes.

Figure 50 presents notifications produced by Seller/Server for the whole lifecycle of `TestJob` assuming that Buyer/Client subscribed to all event types.



Buyer/Client
SOF
POST {{baseUrl}}/hub with {{callbackUrl}}
201 confirmation with {{id}}
POST {{baseUrl}}/testJob
basic validation
assign testJob.id
alt
[succesful inquiry]
201 TestJob with {{id}} in `acknowledged` state
{{callbackUrl}}/listener/testJobCreateEvent {{id}}
204 confirmation
TestJob moves to `scheduled`
{{callbackUrl}}/listener/testJobStateChangeEvent {{id}}
204 confirmation
Schedule start time is reached
TestJob moves to `in-progress`
{{callbackUrl}}/listener/testJobStateChangeEvent {{id}}
204 confirmation
SuspendTestJob request is completed
{{callbackUrl}}/listener/testJobStateChangeEvent {{id}}
204 confirmation
ModifyTestJob request is accepted
{{callbackUrl}}/listener/testJobStateChangeEvent {{id}}
204 confirmation
ModifyTestJob request is completed
{{callbackUrl}}/listener/testJobAttributeValueChangeEvent {{id}}
204 confirmation
{{callbackUrl}}/listener/testJobStateChangeEvent {{id}}
204 confirmation
TestJob is not recurring
{{callbackUrl}}/listener/testJobStateChangeEvent {{id}}
204 confirmation
[validation or internal problem]
4xx or 5xx errorresponse
DELETE {{baseUrl}}/hub/{{id}}
204 confirmation

Figure 50. Test Job lifecycle with all Notifications

After a successful Notification subscription, the Seller/Server sends a `TestJob` create request. The SOF responds with `TestJob` in an `acknowledged` state. Creation of `TestJob` is notified with a `testJobCreateEvent`. When the validation is successful and the Test Job is not immediate, it moves to `scheduled` and a `testJobStateChangeEvent` is sent. When the scheduled start time is reached, `TestJob` moves to `inProgress` state and the `testJobStateChangeEvent` is sent. Additional actions, like suspension or modification trigger `testJobStateChangeEvent`. In addition, in the case of `TestJob` modification, Seller/Server produces `testJobAttributeValueChangeEvent` notification.

The following snippets present an example of `testJobCreateEvent` and `testJobStateChangeEvent`.

```
{
  "eventId": "event-001",
  "eventTime": "2021-06-03T15:56:08.559Z",
  "eventType": "testJobCreateEvent",
  "event": {
    "id": "00000000-4444-5555-6666-000000000987"
  }
}
```

```
{
  "eventId": "event-002",
  "eventType": "testJobStateChangeEvent",
  "eventTime": "204-01-15T20:45:24.796Z",
  "event": {
    "id": "00000000-3333-4444-5555-000000004567",
    "href": "{{baseUrl}}/serviceFunctionTesting/v1/00000000-3333-4444-5555-000000004567"
  }
}
```

Note: the body of the event carries only the source object's `id`. The Buyer/Client needs to query it later by `id` to get details.

Note: The state change notification is sent only when the state attribute changes its value. There are no state change notifications sent upon Test Job creation.

[R117] The Seller/Server **MUST** include the following attributes in the Notification: [MEF136.1 R93]

- Event indentifier
- Notification type
- Event time

[R118] The Seller/Server **MUST** send Notifications to the Buyer/Client that have registered for them.

[R119] The Seller/Server **MUST NOT** send Notifications to Buyer/Client that have not registered for them.

6.24. Use Case 24: Unregister for Notifications

To stop receiving events, the Buyer/Client has to use the `unregisterListener` operation from the `DELETE /hub/{id}` endpoint. The `id` is the identifier received from the Seller/Server during the listener registration.

[R120] If successful, the Seller/Server response **MUST** indicate success [MEF136.1 R89]

[R121] If successful, the Seller/Server **MUST** stop sending the appropriate notifications to the Buyer/Client. [MEF136.1 R90]

[R122] If unsuccessful, the Seller/Server **MUST NOT** stop sending the appropriate notifications to the Buyer/Client. [MEF136.1 R91]

[R123] If the Seller/Server experiences any errors, they **MUST** return an error indication to the Buyer/Client. [MEF136.1 R92]

7. API Details

7.1. API patterns

7.1.1. Indicating errors

Erroneous situations are indicated by appropriate HTTP responses. An error response is indicated by HTTP status 4xx (for client errors) or 5xx (for server errors) and the appropriate response payload. The Service Function Testing API uses the error responses as depicted and described below.

Implementations can use HTTP error codes not specified in this standard in compliance with rules defined in RFC 7231 [RFC7231]. In such a case, the error message body structure might be aligned with the `Error`.

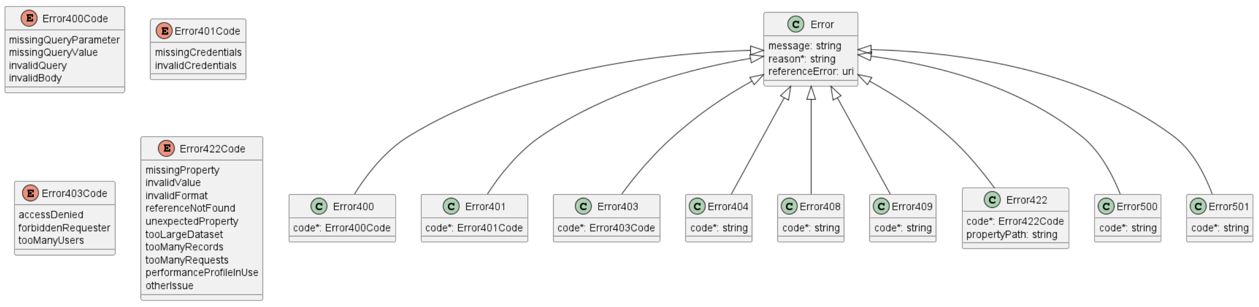


Figure 51. Data model types to represent an erroneous response

7.1.1.1. Type Error

Description: Standard Class used to describe API response error Not intended to be used directly. The `code` in the HTTP header is used as a discriminator for the type of error returned in runtime.

Name	Type	Description
message	string	Text that provides mode details and corrective actions related to the error. This can be shown to a client user.
reason*	string	Text that explains the reason for the error. This can be shown to a client user.
referenceError	uri	URL pointing to documentation describing the error.

7.1.1.2. Type Error400

Description: 'Bad Request. (https://tools.ietf.org/html/rfc7231#section-6.5.1)'

Inherits from:

- Error

Name	Type	Description
code*	Error400Code	

7.1.1.3. `enum` Error400Code

Description: One of the following error codes:

- missingQueryParameter: The URI is missing a required query-string parameter
- missingQueryValue: The URI is missing a required query-string parameter value
- invalidQuery: The query section of the URI is invalid
- invalidBody: The request has an invalid body.

7.1.1.4. Type Error401

Description: 'Unauthorized. (https://tools.ietf.org/html/rfc7235#section-3.1)'

Inherits from:

- Error

Name	Type	Description
code*	Error401Code	

7.1.1.5. enum Error401Code

Description: One of the following error codes:

- missingCredentials: No credentials provided
- invalidCredentials: Provided credentials are invalid or expired.

7.1.1.6. Type Error403

Description: Forbidden. This code indicates that the server understood the request but refused to authorize it. (https://tools.ietf.org/html/rfc7231#section-6.5.3)

Inherits from:

- Error

Name	Type	Description
code*	Error403Code	

7.1.1.7. enum Error403Code

Description: This code indicates that the server understood the request but refuses to authorize it because of one of the following error codes:

- accessDenied: Access denied
- forbiddenRequester: Forbidden requester
- tooManyUsers: Too many users.

7.1.1.8. Type Error404

Description: Resource for the requested path not found. (https://tools.ietf.org/html/rfc7231#section-6.5.4)

Inherits from:

- Error

Name	Type	Description
code*	string	The following error code: - notFound: A current representation of the target resource not found.

7.1.1.9. Type Error408

Description: Request Time-out (https://tools.ietf.org/html/rfc7231#section-6.5.7)

Inherits from:

- Error

Name	Type	Description
code*	string	List of supported error codes: - timeOut: Request Time-out - indicates that the server did not receive a complete request message within the time that it was prepared to wait.

7.1.1.10. Type Error409

Description: Conflict (https://datatracker.ietf.org/doc/html/rfc7231#section-6.5.8)

Inherits from:

- Error

Name	Type	Description
code*	string	The following error code: - conflict: The client has provided a value whose semantics are not appropriate for the property.

7.1.1.11. Type Error422

Description: Unprocessable entity due to a business validation problem. (https://datatracker.ietf.org/doc/html/rfc4918#section-11.2)

Inherits from:

- Error

Name	Type	Description
code*	Error422Code	
propertyPath	string	A pointer to a particular property of the payload that caused the validation issue. It is highly recommended that this property should be used. Defined using JavaScript Object Notation (JSON) Pointer (https://tools.ietf.org/html/rfc6901).

7.1.1.12. `enum` Error422Code

Description: One of the following error codes:

- missingProperty: The property that was expected is not present in the payload
- invalidValue: The property has an incorrect value
- invalidFormat: The property value does not comply with the expected value format
- referenceNotFound: The object referenced by the property cannot be identified in the target system
- unexpectedProperty: Additional, not expected property has been provided
- tooManyRecords: The number of records to be provided in the response exceeds the threshold
- otherIssue: Other problem was identified (detailed information provided in a reason).

7.1.1.13. Type Error500

Description: Internal Server Error. (https://tools.ietf.org/html/rfc7231#section-6.6.1)

Inherits from:

- Error

Name	Type	Description
code*	string	The following error code: - internalError: Internal server error - the server encountered an unexpected condition that prevented it from fulfilling the request.

7.1.1.14. Type Error501

Description: Not Implemented. Used in case Seller is not supporting an optional operation (https://tools.ietf.org/html/rfc7231#section-6.6.2)

Inherits from:

- Error

Name	Type	Description
code*	string	The following error code: - notImplemented: Method not supported by the server.

7.1.2. Response pagination

A response to retrieve a list of results (e.g. `GET /testJob`) can be paginated. The Buyer/Client can specify the following query attributes related to pagination:

- `limit` - number of expected list items
- `offset` - offset of the first element in the result list

The filtering and pagination attributes must be specified in URI query format RFC3986.The Seller/Server returns a list of elements that comply with the requested `limit`. If the requested `limit` is higher than the supported list size the smaller list result is returned. In that case, the size of the result is returned in the header attribute `X-Result-Count`. The Seller can indicate that there are additional results available using:

- `X-Total-Count` header attribute with the total number of available results
- `X-Pagination-Throttled` header set to `true`

[R124] Seller **MUST** use either `X-Total-Count` or `X-Pagination-Throttled` to indicate that the page was truncated and additional results are available.

7.2. API Data model

Figure 52 presents the whole Service Function Testing data model. The data types, requirements related to them, and mapping to MEF W136.1 specification are discussed later in this section.

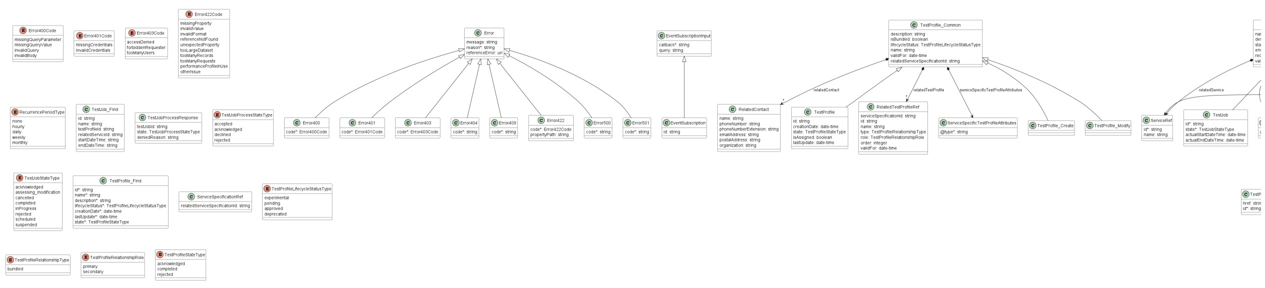


Figure 52. Service Function Testing Data Model

7.2.1 Test Job

7.2.1.1 Type TestJob

Description: A definition of Test Job for a specific Service Identifier.

Inherits from:

- TestJob_Common

Name	Type	M/O	Description	MEF W136.1
id	string	M	The identifier of the Test Job.	Test Job Identifier
state	TestJobStateType	M		Test Job State
actualStartDateTime	date-time *format = date-time*	O	The actual start date and time that a test job started.	Actual Start Date Time
actualEndDateTime	date-time *format = date-time*	O	The actual end date and time of the test job.	Actual End Date Time

7.2.1.2 Type TestJob_Common

Description: A definition of Test Job for a specific Service Identifier.

Name	Type	M/O	Description	MEF W136.1
name	string	O	The name of the Test Job.	Test Job Name
description	string	O	A description of the Test Job.	Test Job Description

Name	Type	M/O	Description	MEF W136.1
startDateTime	date-time *format = date-time*	O	The start date and time of the test job. If the attribute is empty the test jobs starts immediately.	Start Date Time
endDateTime	date-time *format = date-time*	O	The end date and time of the Test Job. If the attribute is empty the test job runs forever.	End Date Time
recurrencePeriod	RecurrencePeriodType	O		Recurrence Period
testProfile	TestProfileRefOrValue	O		Test Profile Identifier
validFor	date-time *format = date-time*	O	The last date that the Test Job is valid.	Valid For
relatedService	ServiceRef	O		Related Service
testMeasureAttributes	TestMeasureAttributes	O		Test Specific Attributes

7.2.1.3 Type TestJob_Create

Description: A definition of Test Job for a specific Service Identifier.

Inherits from:

- TestJob_Common

7.2.1.4 Type TestJob_Find

Description: This class represents a single list item for the response of `listTestJob`

Name	Type	M/O	Description	MEF W136.1
id	string	O	A unique identifier for the Test Job assigned by the Seller/Server.	Test Job Identifier
name	string	O	The name of the Test Job..	Test Job Name
testProfileId	string	O	A unique identifier of the referenced Test Profile.	Test Profile Identifier
relatedServiceId	string	O	A unique identifier of the service to be tested	Related Service
startDateTime	string	O	The start date and time of the test job.	Start Date Time

Name	Type	M/O	Description	MEF W136.1
endDateTime	string	O	The end date and time of the test job.	End Date Time

7.2.1.5 Type TestJobProcessResponse

Description:

Name	Type	M/O	Description	MEF W136.1
testJobId	string	O	The identifier of the Test Job.	Test Job Identifier
state	TestJobProcessStateType	O		Test Job State
deniedReason	string	O	If the request is denied by the Seller/Server, the Seller/Server provides a reason to the Buyer/Client using this attribute.	

7.2.1.6 Type TestJobRef

Description: A reference to a Test Job resource

Name	Type	M/O	Description	MEF W136.1
href	string	O	Hyperlink to the referenced Test Job	
id	string	M	Identifier of the referenced Test Job	Test Job Identifier

7.2.1.7 `enum` TestJobStateType

Description: The state of the Test Job.

State	MEF W136.1 name	Description

State	MEF W136.1 name	Description
`acknowledged`	ACKNOWLEDGED	The Create Test Job request has been received from the Buyer/Client and the Seller/Server has assigned a Test Job Identifier to it. If the request attributes fail validation, the Create Test Job moves to the REJECTED state. If the attributes pass validation, it is then determined if the Create Test Job Start Date Time is immediate or if the Create Test Job Start Date Time indicates that the Test Job is to be scheduled for a later date time. If the Test Job is to be scheduled the Test Job moves to the SCHEDULED state and awaits the scheduled date and time. If the Test Job is to be performed immediately, the Test Job moves to the IN_PROGRESS state and Test Results begin.
`assessing_modification`	ASSESSING_MODIFICATION	A Modify Test Job request while the Test Job is in the SUSPEND or SCHEDULED state. If the Modify Test Job is accepted, the Test Job is updated. If the Modify Test Job is declined, the Test Job is not updated and returns to the SUSPEND or SCHEDULED state.
`cancelled`	CANCELLED	A Cancel Test Job request is received from the Buyer/Client. If the request is accepted, the Test Job moves to the CANCELLED state. The Test Job must be in the IN_PROGRESS, SCHEDULED, or SUSPEND, state.
`completed`	COMPLETED	The Test Job has reached the End Date Time or has completed all Test Measurements and provided Test Results.

State	MEF W136.1 name	Description
inProgress	IN-PROGRESS	Whether an immediate request or a scheduled request, the Test Job moves to the IN_PROGRESS state when it begins performing Test Results. If a Cancel Test Job request is received and accepted, the Test Job moves to the CANCELLED state. If the Cancel Test Job request is declined, the Test Job returns to the IN_PROGRESS state and continues Test Results until they are completed. If a Suspend Test Job request is received, the Test Job moves to the SUSPEND state.
rejected	REJECTED	The Create Test Job request fails validation and is rejected.
scheduled	SCHEDULED	The Test Job is scheduled to start at a later time. The Test Job stays in the SCHEDULED state until the Start Date and Time is reached. The Test Job moves to IN_PROGRESS when the Start Date and Time is reached. A Test Job with the state SCHEDULED can be moved to the SUSPEND or CANCELLED state.
suspended	SUSPENDED	A Test Job in the IN_PROGRESS or SCHEDULED state receives a Suspend Test Job request. The Test Job moves to the SUSPEND state. A Test Job cannot be modified unless it is in the SUSPEND state.

Value	MEF W136.1
acknowledged	ACKNOWLEDGED
assessing_modification	ASSESSING_MODIFICATION
cancelled	CANCELLED
completed	COMPLETED
inProgress	IN_PROGRESS
rejected	REJECTED
scheduled	SCHEDULED
suspended	SUSPENDED

7.2.1.8 `enum` TestJobProcessStateType

Description: The state of process related to Test Job

state	MEF W136.1 name	Description
`accepted`	ACCEPTED	The Modify/Cancel/Resume/Suspend Test Job request has been accepted and processed by the Seller/Server.
`acknowledged`	ACKNOWLEDGED	The Modify/Cancel/Resume/Suspend Test Job request has been received by the Seller/Server and has passed basic validation. Test Job Process Identifier is assigned in the Acknowledged state. The request remains in the Acknowledged state until all validations as applicable are completed. If the attributes are validated, the request moves to the Accepted state. If not all attributes are validated, the request moves to the Declined state.
`completed`	COMPLETED	The Modify/Cancel/Resume/Suspend Test Job request has been completed by the Seller/Server
`declined`	DECLINED	The Modify/Cancel/Resume/Suspend Test Job request has been declined by the Seller/Server.
`rejected`	REJECTED	The Modify/Cancel/Resume/Suspend Test Job request has been rejected by the Seller/Server.

Value	MEF W136.1
accepted	ACCEPTED
acknowledged	ACKNOWLEDGED
declined	DECLINED
rejected	REJECTED

7.2.1.9 Type TestMeasureAttributes

Description: TestMeasureAttributes is used as an extension point for schema to be used that defines the Test Result attributes. The `@type` attribute is used as a discriminator.

Name	Type	M/O	Description	MEF W136.1
@type	string	M	The named type must be a subclass of TestMeasureAttributes.	

7.2.1.10 Type CancelTestJob

Description: Request for cancellation of an existing Test job

Inherits from:

- CancelTestJob_Common

Test Job Identifier

Name	Type	M/O	Description	MEF W136.1

Name	Type	M/O	Description	MEF W136.1
cancellationDeniedReason	string	O	If the Cancel Test Job request is denied by the Seller/Server, the Seller/Server provides a reason to the Buyer/Client using this attribute.	
creationDate	date-time *format = date-time*	O	Date when Cancel Test Job was created.	
href	string	O	Hyperlink to the Cancel Test Job entity	
id	string	M	Unique identifier for the Cancel Test Job that is generated by the Seller/Server when the Cancel Test Job request `state` is set to `acknowledged`.	
state	TestJobProcessStateType	M		Test Job State

7.2.1.11 Type CancelTestJob_Common

Description: Request for cancellation of an existing Test Job

Name	Type	M/O	Description	MEF W136.1
cancellationReason	string	O	An optional attribute that allows the Buyer/Client to provide additional detail to the Seller/Server on the reason for cancelling Test Job.	
testJob	TestJobRef	O		

7.2.1.12 Type CancelTestJob_Create

Description: Request for cancellation of an existing Test Job

Inherits from:

- CancelTestJob_Common

7.2.1.13 Type CancelTestJob_Find

Description: This class represents a single list item for the response of `listCancelTestJob`

Name	Type	M/O	Description	MEF W136.1

Name	Type	M/O	Description	MEF W136.1
creationDate	date-time *format = date-time*	O	Date when Cancel Test Job was created.	
id	string	M	Unique identifier for the Cancel Test Job that is generated by the Seller/Server when the Cancel Test Job request \`state\` is set to \`acknowledged\`.	
testJob	TestJobRef	O		
state	TestJobProcessStateType	M		Test Job State

7.2.1.14 Type ModifyTestJob

Description: Request for modification of an existing Test job

Inherits from:

- ModifyTestJob_Common

Name	Type	M/O	Description	MEF W136.1
modificationDeniedReason	string	O	If the Modify Test Job request is denied by the Seller/Server, the Seller/Server provides a reason to the Buyer/Client using this attribute.	
creationDate	date-time *format = date-time*	O	Date when Modify Test Job was created.	
href	string	O	Hyperlink to the Modify Test Job entity	
id	string	M	Unique identifier for the Modify Test Job that is generated by the Seller/Server when the Modify Test Job request \`state\` is set to \`acknowledged\`.	
state	TestJobProcessStateType	M		Test Job State

7.2.1.15 Type ModifyTestJob_Common

Description: Request for modification of an existing Test Job

Name	Type	M/O	Description	MEF W136.1
modificationReason	string	O	An optional attribute that allows the Buyer/Client to provide additional detail to the Seller/Server on the reason for cancelling Test Job.	
testJob	TestJobRef	O		
name	string	O	The name of the Test Job.	
description	string	O	A description of the Test Job.	
startDateTime	date-time *format = date-time*	O	The start date and time of the test job. If the attribute is empty the test jobs starts immediately.	
endDateTime	date-time *format = date-time*	O	The end date and time of the Test Job. If the attribute is empty the test job runs forever.	
testProfile	TestProfileRefOrValue	O		
relatedService	ServiceRef	O		
testMeasureAttributes	TestMeasureAttributes	O		

7.2.1.16 Type ModifyTestJob_Create

Description: Request for modification of an existing Test Job

Inherits from:

- ModifyTestJob_Common

7.2.1.17 Type ModifyTestJob_Find

Description: This class represents a single list item for the response of `listModifyTestJob`

Name	Type	M/O	Description	MEF W136.1
creationDate	date-time *format = date-time*	O	Date when Modify Test Job was created.	
id	string	M	Unique identifier for the Modify Test Job that is generated by the Seller/Server when the Modify Test Job request \`state\` is set to \`acknowledged\`.	
testJob	TestJobRef	O		

Name	Type	M/O	Description	MEF W136.1
state	TestJobProcessStateType	M		Test Job State

7.2.1.18 Type ResumeTestJob

Description: Request for resumption of an existing Test job

Inherits from:

- ResumeTestJob_Common

Name	Type	M/O	Description	MEF W136.1
resumptionDeniedReason	string	O	If the Resume Test Job request is denied by the Seller/Server, the Seller/Server provides a reason to the Buyer/Client using this attribute.	
creationDate	date-time *format = date-time*	O	Date when Resume Test Job was created.	
href	string	O	Hyperlink to the Resume Test Job entity	
id	string	M	Unique identifier for the Resume Test Job that is generated by the Seller/Server when the Resume Test Job request `state` is set to `acknowledged`.	
state	TestJobProcessStateType	M		Test Job State

7.2.1.19 Type ResumeTestJob_Common

Description: Request for resumption of an existing Test Job

Name	Type	M/O	Description	MEF W136.1
resumptionReason	string	O	An optional attribute that allows the Buyer/Client to provide additional detail to the Seller/Server on the reason for cancelling Test Job.	
testJob	TestJobRef	O		

7.2.1.20 Type ResumeTestJob_Create

Description: Request for resumption of an existing Test Job

Inherits from:

- ResumeTestJob_Common

7.2.1.21 Type ResumeTestJob_Find

Description: This class represents a single list item for the response of `listResumeTestJob`

Name	Type	M/O	Description	MEF W136.1
creationDate	date-time *format = date-time*	O	Date when Resume Test Job was created.	
id	string	M	Unique identifier for the Resume Test Job that is generated by the Seller/Server when the Resume Test Job request \`state\` is set to \`acknowledged\`.	
testJob	TestJobRef	O		
state	TestJobProcessStateType	M		Test Job State

7.2.1.22 Type SuspendTestJob

Description: Request for suspension of an existing Test job

Inherits from:

- SuspendTestJob_Common

Name	Type	M/O	Description	MEF W136.1
suspensionDeniedReason	string	O	If the Suspend Test Job request is denied by the Seller/Server, the Seller/Server provides a reason to the Buyer/Client using this attribute.	
creationDate	date-time *format = date-time*	O	Date when Suspend Test Job was created.	
href	string	O	Hyperlink to the Suspend Test Job entity	

Name	Type	M/O	Description	MEF W136.1
id	string	M	Unique identifier for the Suspend Test Job that is generated by the Seller/Server when the Suspend Test Job request `state` is set to `acknowledged`.	
state	TestJobProcessStateType	M		Test Job State

7.2.1.23 Type SuspendTestJob_Common

Description: Request for suspension of an existing Test Job

Name	Type	M/O	Description	MEF W136.1
suspensionReason	string	O	An optional attribute that allows the Buyer/Client to provide additional detail to the Seller/Server on the reason for suspending Test Job.	
testJob	TestJobRef	O		

7.2.1.24 Type SuspendTestJob_Create

Description: Request for suspension of an existing Test Job

Inherits from:

- SuspendTestJob_Common

7.2.1.25 Type SuspendTestJob_Find

Description: This class represents a single list item for the response of `listSuspendTestJob`

Name	Type	M/O	Description	MEF W136.1
creationDate	date-time *format = date-time*	O	Date when Suspend Test Job was created.	
id	string	M	Unique identifier for the Suspend Test Job that is generated by the Seller/Server when the Suspend Test Job request `state` is set to `acknowledged`.	
testJob	TestJobRef	O		

Name	Type	M/O	Description	MEF W136.1
state	TestJobProcessStateType	M		Test Job State

7.2.1.26 enum RecurrencePeriodType

Description: The date/time that the Test Job is repeated

state	MEF W136.1 name	Description
none	NONE	Test Job is not repeted after it's been executed.
hourly	HOURLY	Test Job is repted once every hour.
daily	DAILY	Test Job is repted once every 24 hours.
weekly	WEEKLY	Test Job is repted once every 7 days.
monthly	MONTHLY	Test Job is repted once every 30 days.

Value	MEF W136.1
none	NONE
hourly	HOURLY
daily	DAILY
weekly	WEEKLY
monthly	MONTHLY

7.2.1.27 Type RelatedContact

Description:

Name	Type	M/O	Description	MEF W136.1
name	string	O	The name of person or organization to be contacted.	Contact Name
phoneNumber	string	O	The telephone number for this contact.	Contact Phone Number
phoneNumberExtension	string	O	The telephone number extension for this contact.	Contact Phone Number Extension
emailAddress	string	O	The email address for this contact.	Contact Email Address
postalAddress	string	O	The postal address for this contact.	Contact Postal Address
organization	string	O	The organization of this contact.	Contact Organization

7.2.1.28 Type RelatedTestProfileRef

Description:

Related Service Specification IdentifierTest Profile Relationship Name

Name	Type	M/O	Description	MEF W136.1
serviceSpecificationId	string	O	The unique identifier of the related Service Specification that this Test Profile can be used to test	
id	string	O	The unique identifier for a related Test Profile	Test Profile Relationship Identifier
name	string	O	The unique name for a related Test Profile	
type	TestProfileRelationshipType	O		Test Profile Relationship Type
role	TestProfileRelationshipRole	O		Related Test Profile Role
order	integer	O	The order which the related Test Jobs are run during a Test Job	Test Profile Relationship Order
validFor	date-time *format = date-time*	O	The last date that the Test Profile is valid.	Test Profile Relationship Valid For

7.2.1.29 Type ServiceRef

Description:

Name	Type	M/O	Description	MEF W136.1
id	string	M	unique identifier of the service to be tested	
name	string	O	The name of the test job to be tested	

7.2.1.30 Type ServiceSpecificationRef

Description:

Name	Type	M/O	Description	MEF W136.1
relatedServiceSpecificationId	string	O	The unique identifier of the related Service Specification that this Test Profile can be used to test	

7.2.1.31 Type ServiceSpecificTestProfileAttributes

Description: ServiceSpecificTestProfileAttributes is used as an extension point for MEF service specific test profile configuration. It includes definition of service/entity and applicable test job objectives. The `@type` attribute is used as a discriminator.

Name	Type	M/O	Description	MEF W136.1
@type	string	M	The named type must be a subclass of ServiceSpecificTestProfileAttributes.	

7.2.2 Test Profile

7.2.2.1 Type TestProfile

Description: The test profile describes the test job in terms of parameters to be configured and measures to be taken.

Inherits from:

- TestProfile_Common

Name	Type	M/O	Description	MEF W136.1
id	string	O	A unique identifier for the Test Profile assigned by the Seller/Server.	Test Profile Identifier
creationDate	date-time *format = date-time*	O	Date when test profile was created.	Creation Date
state	TestProfileStateType	O		Test Profile State
isAssigned	boolean	O	Indicates if Test Profile is assigned to a Test Job.	Test Profile Assigned
lastUpdate	date-time *format = date-time*	O	Date and time of the last update of the test profile	Last Update

7.2.2.2 Type TestProfile_Common

Description: The common test profile specifies the common parameters that can be re-used by multiple test profiles.

Name	Type	M/O	Description	MEI W13
description	string	O	A free-text description of the Test Profile	Desc

Name	Type	M/O	Description	MEI W13
isBundled	boolean	O	Determines whether test profile represents a single test profile (false), or a bundle of test profiles (true).	Is Bu
lifecycleStatus	TestProfileLifecycleStatusType	O		Lifec Statu
name	string	O	The name of the test profile	Test Nam
validFor	date-time *format = date-time*	O	Last date that the test profile is valid	Valic
relatedTestProfile	RelatedTestProfileRef[]	O	Test profile may relate to more than one sub test profiles.	Test Relat
serviceSpecificTestProfileAttributes	ServiceSpecificTestProfileAttributes	O		Servi Spec Test Attri
relatedServiceSpecificationId	string	O	The unique identifier of the related Service Specification that this Test Profile can be used to test	Relat Servi Offer
relatedContact	RelatedContact[]	O	Contacts who manage or otherwise have an interest in this test profile	Relat Cont Infor

7.2.2.3 Type TestProfile_Create

Description: The test profile describes the test job in terms of parameters to be configured and measures to be taken.

Inherits from:

- TestProfile_Common

7.2.2.4 Type TestProfile_Find

Description: This class represents a single list item for the response of `listTestProfile`

Name	Type	M/O	Description	MEF W136.1
id	string	M	A unique identifier for the Test Profile assigned by the Seller/Server.	Test Profile Identifier
name	string	M	The name of the test profile	Test Profile Name
description	string	M	A free-text description of the Test Profile	Description
lifecycleStatus	TestProfileLifecycleStatusType	M		Lifecycle Status
creationDate	date-time *format = date-time*	M	Date when test profile was created.	Creation Date
lastUpdate	date-time *format = date-time*	M	Date and time of the last update of the test profile	Last Update
state	TestProfileStateType	M		Test Profile State

7.2.2.5 Type TestProfile_Modify

Description: The test profile describes the test job in terms of parameters to be configured and measures to be taken.

Inherits from:

- TestProfile_Common

7.2.2.6 `enum` TestProfileLifecycleStatusType

Description: Current lifecycle status of the test profile.

State	MEF W136.1 name	Description
`experimental`	EXPERIMENTAL	Test Profile use may be limited to a small number of users.
`pending`	PENDING	Test Profile is waiting to be Approved
`approved`	APPROVED	Test Profile has been Approved for general use.
`deprecated`	DEPRECATED	Test Profile has been replaced by another Test Profile.

Value	MEF W136.1
experimental	EXPERIMENTAL

Value	MEF W136.1
pending	PENDING
approved	APPROVED
deprecated	DEPRECATED

7.2.2.7 `enum` TestProfileStateType

Description: Current lifecycle status of the test profile.

State	MEF W136.1 name	Description
`acknowledged`	ACKNOWLEDGED	The Create Test Profile request has been received from the Buyer/Client and the Sell-er/Server has assigned a Test Profile Identifier to it.
`completed`	COMPLETED	The Test Profile has been created and is ready for use by the Buyer/Client.
`rejected`	REJECTED	The Create Test Profile does not pass attribute validation and the Create Test Profile is rejected.

Value	MEF W136.1
acknowledged	ACKNOWLEDGED
completed	COMPLETED
rejected	REJECTED

7.2.2.8 Type TestProfileRef

Description: A reference to a Test Profile resource

Inherits from:

- TestProfileRefOrValue

Name	Type	M/O	Description	MEF W136.1
href	string	O	Hyperlink to the referenced Test Profile	
id	string	M	Identifier of the referenced Test Profile	Test Profile Relationship Identifier

7.2.2.9 Type TestProfileRefOrValue

Description: Defines the reference to Test Profile or defines values from TestProfile type.

Name	Type	M/O	Description	MEF W136.1
@type	string	M	This field is used as a discriminator to differentiate if object relates directly to Test Profile entity or defines values from TestProfile type.	

7.2.2.10 `enum` TestProfileRelationshipRole

Description: Role of the relationship.

role	MEF W136.1 name	Description
`primary`	PRIMARY	Test Profile to be started first.
`secondary`	SECONDARY	Test Profile to be started after Primary Test Profile is completed.

Value	MEF W136.1
primary	PRIMARY
secondary	SECONDARY

7.2.2.11 `enum` TestProfileRelationshipType

Description: Type of relationship.

state	MEF W136.1 name	Description
`bundled`	BUNDLED	Two or more Test Profiles are related together in a bundle.

Value	MEF W136.1
bundled	BUNDLED

7.2.2.12 `enum` TestProfileRelationshipType

Description: Type of relationship.

state	MEF W136.1 name	Description
`bundled`	BUNDLED	Two or more Test Profiles are related together in a bundle.

Value	MEF W136.1
bundled	BUNDLED

7.2.2.13 Type TestProfileValue

Description:

Inherits from:

- TestProfileRefOrValue

7.2.3. Notification registration

Notification registration and management are done through `/hub` API endpoint. The below sections describe data models related to this endpoint.

7.2.3.1. Type EventSubscriptionInput

Description: This class is used to register for Notifications.

Name	Type	M/O	Description

Name	Type	M/O	Description
callback	string	M	This callback value must be set to *host* property from SFT Not (serviceFunctionTestNotification.api.yaml). This property is appended with and notification resource path specified in that API to construct an U notification is sent. E.g. for 'callback': "https://buyer.co/listenerEndpoint", tl notification will be sent `https://buyer.co/listenerEndpoint/mefApi/legato/serviceFuctionTestNotificatio
query	string	O	This attribute is used to define to which type of events to register 'query':'eventType = testJobCreateEvent'. To subscribe for more than one even values separated by `eventType=testJobCreateEvent,testProfileAttributeValueChangeEvent`. The p are enumerated by 'TestProfileEventType' and TestJobEve serviceFunctionTestNotification.api.yaml. An empty query is treated as specif - ending in subscription for all event types.

7.2.3.2. Type EventSubscription

Description: This resource is used to respond to notification subscriptions.

Inherits from:

- EventSubscriptionInput

Name	Type	M/O	Description	MEF W136.1
id	string	O	An identifier of this Event Subscription assigned when a resource is created.	

7.3. Notification API Data model

Figure 53 presents the Service Function Testing Notification data model.

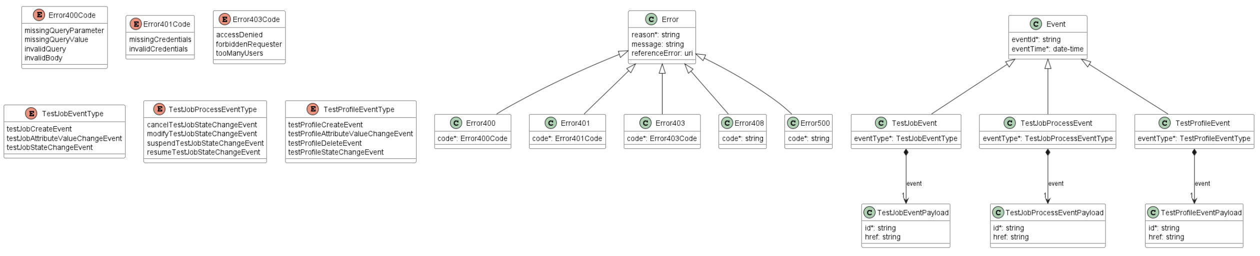


Figure 53. Service Function Testing Notification Data Model

This data model is used to construct requests and responses of the API endpoints described in 5.2.2. Buyer/Client (CUS, BUS, SOF) side Service Function Testing API Endpoints

7.3.1. Type Event

Description: Event class is used to describe information structure used for notification.

Name	Type	M/O	Description	MEF W136.1
eventId	string	M	Id of the event	

Name	Type	M/O	Description	MEF W136.1
eventTime	date-time *format = date-time*	M	Date-time when the event occurred	

7.3.2. Type TestJobEvent

Description:

Inherits from:

- Event

Name	Type	M/O	Description	MEF W136.1
eventType	TestJobEventType	M	Indicates the type of the event.	
event	TestJobEventPayload	M	A reference to the object that is source of the notification.	

7.3.3. Type TestJobEventPayload

Description: The identifier of the Test Job being subject of this event.

Name	Type	M/O	Description	MEF W136.1
id	string	M	ID of the Test Job	
href	string	O	Hyperlink to access the Test Job	

7.3.4. `enum` TestJobEventType

Description: Indicates the type of Test Job event.

Value	MEF W136.1
testJobCreateEvent	TEST_JOB_CREATE_EVENT
testJobAttributeValueChangeEvent	TEST_JOB_ATTRIBUTE_VALUE_CHANGE_EVENT
testJobStateChangeEvent	TEST_JOB_STATE_CHANGE_EVENT

7.3.5. Type TestJobProcessEvent

Description:

Inherits from:

- Event

Name	Type	M/O	Description	MEF 136.1
eventType	TestJobProcessEventType	M	Indicates the type of the event.	
event	TestJobProcessEventPayload	M	A reference to the object that is source of the notification.	

7.3.6. Type TestJobProcessEventPayload

Description: The identifier of the Test Job Process being subject of this event.

Name	Type	M/O	Description	MEF 136.1
id	string	M	ID of the Test Job Process	
href	string	O	Hyperlink to access the Test Job Process	

7.3.7. enum TestJobProcessEventType

Description: Indicates the type of Test Job Process Event.

Value	MEF 136.1
cancelTestJobStateChangeEvent	CANCEL_TEST_JOB_STATE_CHANGE_EVENT
modifyTestJobStateChangeEvent	MODIFY_TEST_JOB_STATE_CHANGE_EVENT
suspendTestJobStateChangeEvent	SUSPEND_TEST_JOB_STATE_CHANGE_EVENT
resumeTestJobStateChangeEvent	RESUME_TEST_JOB_STATE_CHANGE_EVENT

7.3.8. Type TestProfileEvent

Description:

Inherits from:

- Event

Name	Type	M/O	Description	MEF W136.1
eventType	TestProfileEventType	M	Indicates the type of the event.	
event	TestProfileEventPayload	M	A reference to the object that is source of the notification.	

7.3.9. Type TestProfileEventPayload

Description: The identifier of the Test Profile being subject of this event.

Name	Type	M/O	Description	MEF W136.1
id	string	M	ID of the Test Profile	
href	string	O	Hyperlink to access the Test Profile	

7.3.10. enum TestProfileEventType

Description: Indicates the type of Test Profile event.

Value	MEF W136.1
testProfileCreateEvent	TEST_PROFILE_CREATE_EVENT
testProfileAttributeValueChangeEvent	TEST_PROFILE_ATTRIBUTE_VALUE_CHANGE_EVENT
testProfileDeleteEvent	TEST_PROFILE_DELETE_EVENT
testProfileStateChangeEvent	TEST_PROFILE_STATE_CHANGE_EVENT

8. References

- JSON Schema draft 7, JSON Schema: A Media Type for Describing JSON Documents and associated documents, by Austin Wright and Henry Andrews, March 2018. Copyright © 2018 IETF Trust and the persons identified as the document authors. All rights reserved.
- [MEF55.1] MEF 55.1, Lifecycle Service Orchestration (LSO): Reference Architecture and Framework, February 2021
- [MEF128.1] MEF 128.1, LSO API Security Profile, April 2024
- MEFW136.1 Allegro, Interlude and Legato Fault Management and Service Function Testing BR&UC, January 2023
- [MEF152] [MEF 152] Carrier Ethernet Payload Schema/Guide for SOAM
- [MEF153] [MEF 153] IP/IPVPN Schema/Guide for SOAM
- [MEF154] [MEF 154] SD-WAN Schema/Guide for SOAM
- [OAS-v3] Open API 3.0, February 2020
- [REST] Chapter 5: Representational State Transfer (REST) Fielding, Roy Thomas, Architectural Styles and the Design of Network-based Software Architectures (Ph.D.).
- [RFC2119] RFC 2119, Key words for use in RFCs to Indicate Requirement Levels, by S. Bradner, March 1997
- [RFC3986] RFC 3986 Uniform Resource Identifier (URI): Generic Syntax, January 2005
- [RFC8174] RFC 8174, Ambiguity of Uppercase vs Lowercase in RFC 2119 Key Words, by B. Leiba, May 2017, Copyright © 2017 IETF Trust and the persons identified as the document authors. All rights reserved.
- [TMF630] TMF 630 TMF630 API Design Guidelines 4.2.0
- [TMF653] TMF 653, TMF653 Service Test Management API User Guide v4.1.0, July 2021