



White Paper

TMForum Wxx v0.1

Automated Service Assurance using TMForum APIs

October 2020

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

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List of Contributing Members

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

Member

Lumen Technologies

Telstra

Table 1 - Contributing Member Companies

Abstract

A major component of providing network-based products and services is the ability to configure, monitor and report on their performance and quality of service. Specifically, most service providers will allow or offer a selection to the customer and/or partner to specify the required service level expectations.

The following document will examine how to leverage a set TMForum APIs (Application Programming Interfaces) to create, manage, actively monitor and collect telemetry metrics specific to the operation of a network-based product and/or service.

1. Scope

The scope of this document is to provide normative on the use of a set of TMForum APIs to manage the service assurance aspects of a network-based product or service. Normative is provided with example sequence diagrams that will illustrate how to leverage the following TMForum APIs in the context of the eTOM Framework. eTOM is a business process framework for telecom providers [1].

2. eTOM Performance Management End-to-End Process Flow

The business processes involved in this document include: Customer QoS/SLA Management, Product Performance Management and Service Quality Management. See Figure 1.

In order to automate the service assurance experience for both the customer and the carrier it is necessary to leverage the combination of open standard APIs and microservices. The APIs provide a communication path between functional components developed using microservices.

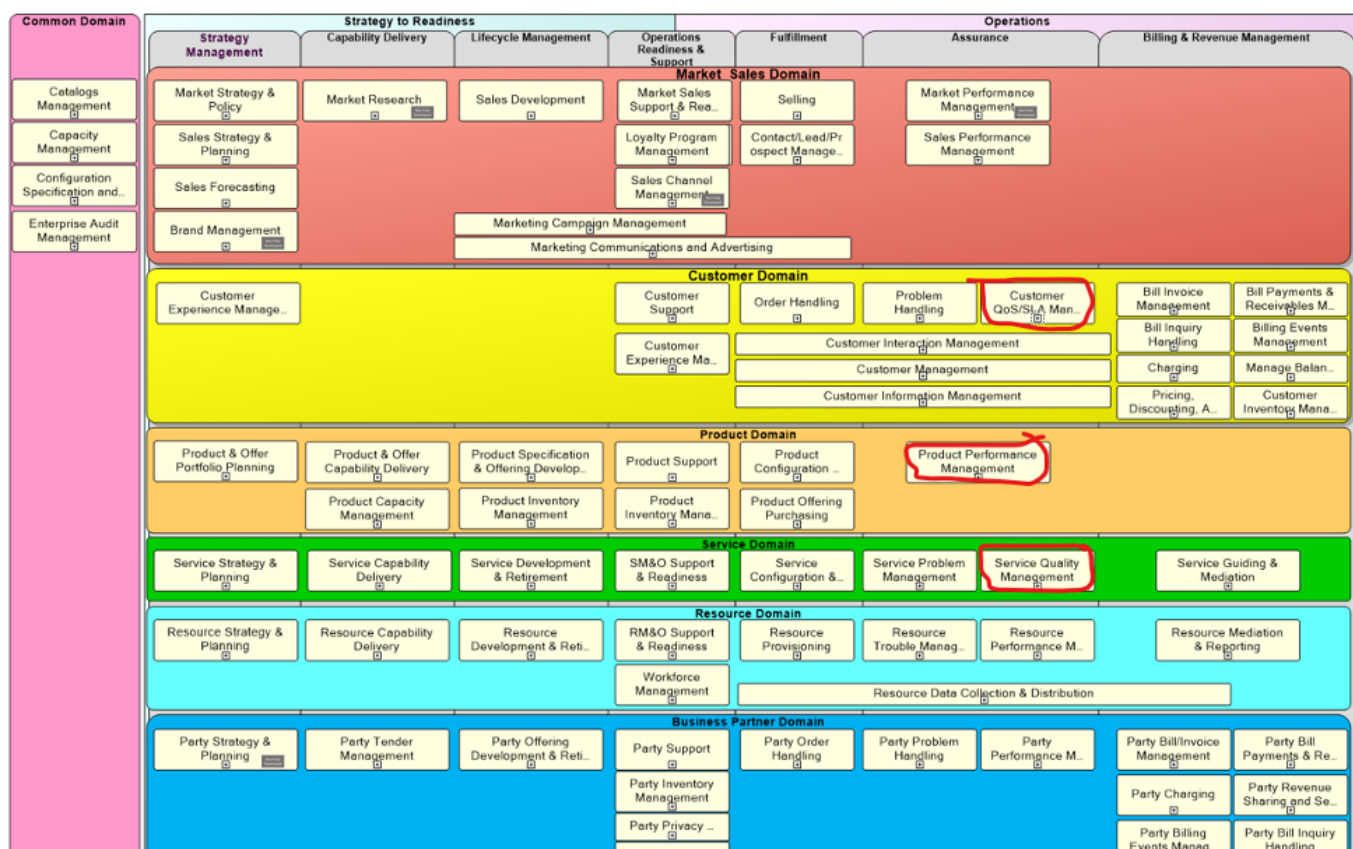


Figure 1 - TMForum Business Process Framework Level 1 (eTOM)

Decomposing each of these process provides more details on the next steps and actions that can be used to deliver automation. The figures below describe business processes level 2 for the Customer, Product and

Service levels.

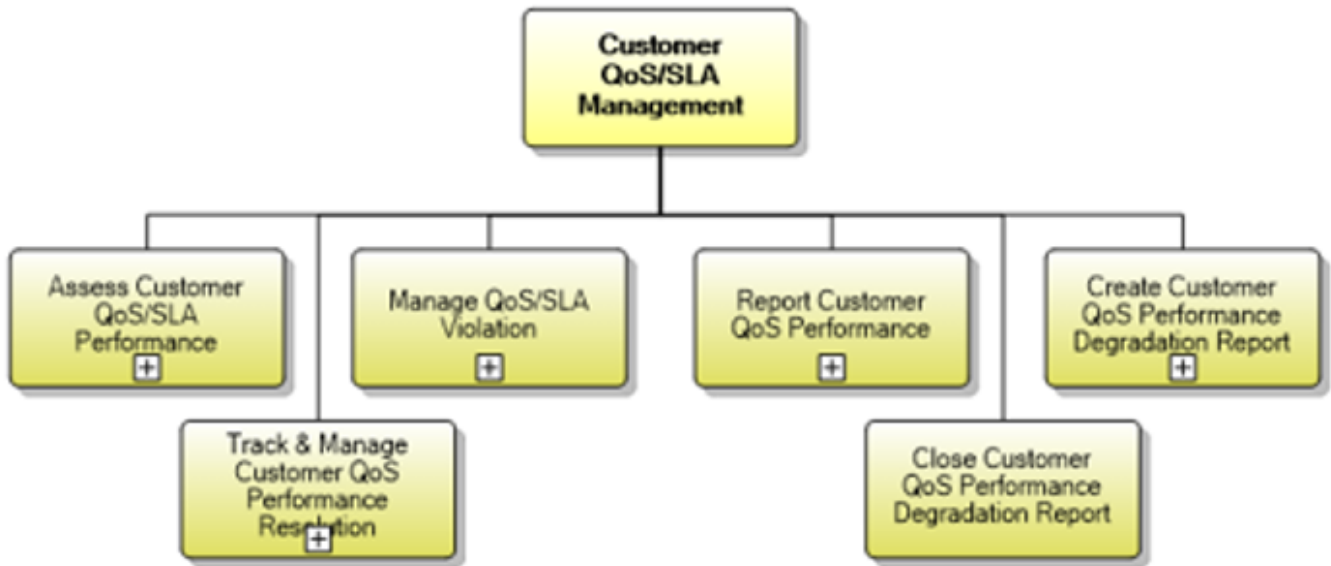


Figure 2 - Customer QoS/SLA Management Level 2 Processes



Figure 3 - Product Performance Management Level 2 Processes

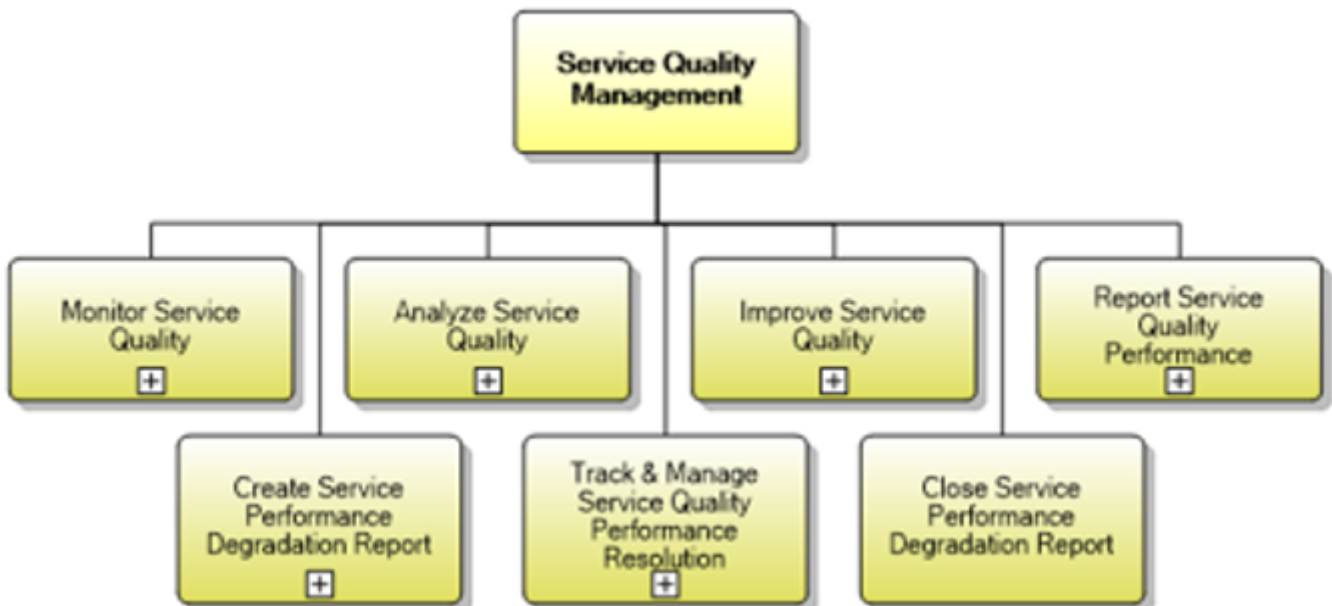


Figure 4 - Service Quality Management Level 2 Processes

In order to enhance the service assurance experience for both the customer and the service provider it is necessary to leverage the combination of open standard APIs and microservices to automate the business processes. The APIs provide a communication path between functional components developed using microservices.

2.1 Carrier Ethernet Service Level Specification

The TMForum APIs are designed to provide product and service agnostic functionality. This allows for product and service payloads to be used. For the purpose of this document the MEF Service Level Specification defined for Carrier Ethernet Services will be used.

The implementation of an API to support SLS activation and collection for MEF needs to consider that the SLS activation occurs during the MEF Service Order/Activation process. Specifically, the MEF SLS is an attribute of the Carrier Ethernet EVC (Ethernet Virtual Circuit) or OVC (Operator Virtual Circuit). Therefore, there is not a need for explicit provisioning/activation of SLS. There is still the need for the collection of the telemetry information set during the activation process.

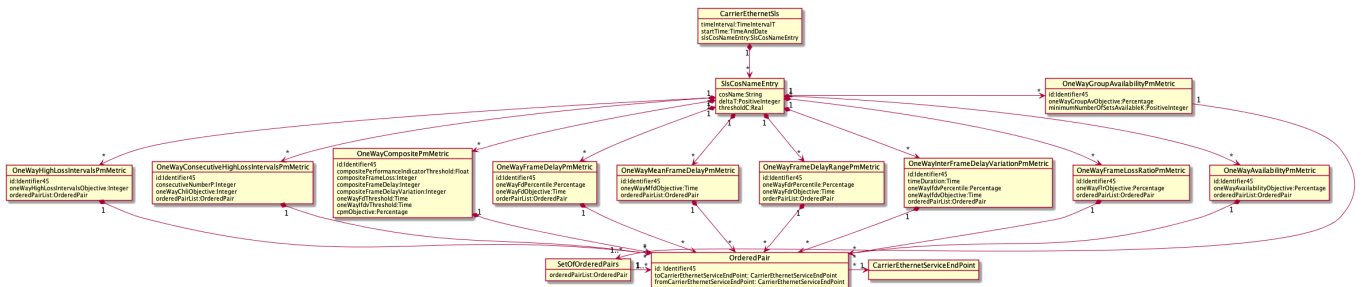


Figure 5 - MEF Carrier Ethernet SLS

3. Performance Management Use Cases

The following section defines the general use cases necessary for performance management support. The use cases include Service Level Agreement, Service Level Specification, Service Level Objectives, Thresholds setting and notifications. The set of TM Forum APIs used to meet the described use cases are:

- TMF623 Service Level Management
- TMF628 Performance Management
- TMF649 Performance Thresholding
- TMF657 Service Quality Management

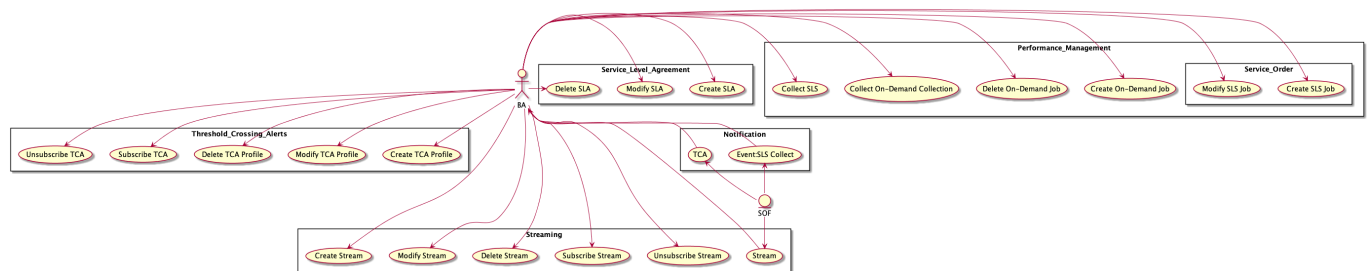


Figure 6 - Performance Management Use Cases

3.1 TMF657 Service Quality Management

The TMF657 API enables access to a Service Quality Management application to extract Service Level Specifications and associated Service Level Objectives (SLO) and their thresholds.

The API provides the client with the ability to create, retrieve, modify and delete Service Level Objectives (i.e., Frame/Packet Delay). The Service Level Objectives are bundled into a Service Level Specification which can be created, retrieved, modified and deleted. The client can subscribe to Service Level Objective notifications.

NOTE: The current version of TMF657 only supports the subscription (using Hub) for notifications. Further specification of the notification publishing is required to be defined.

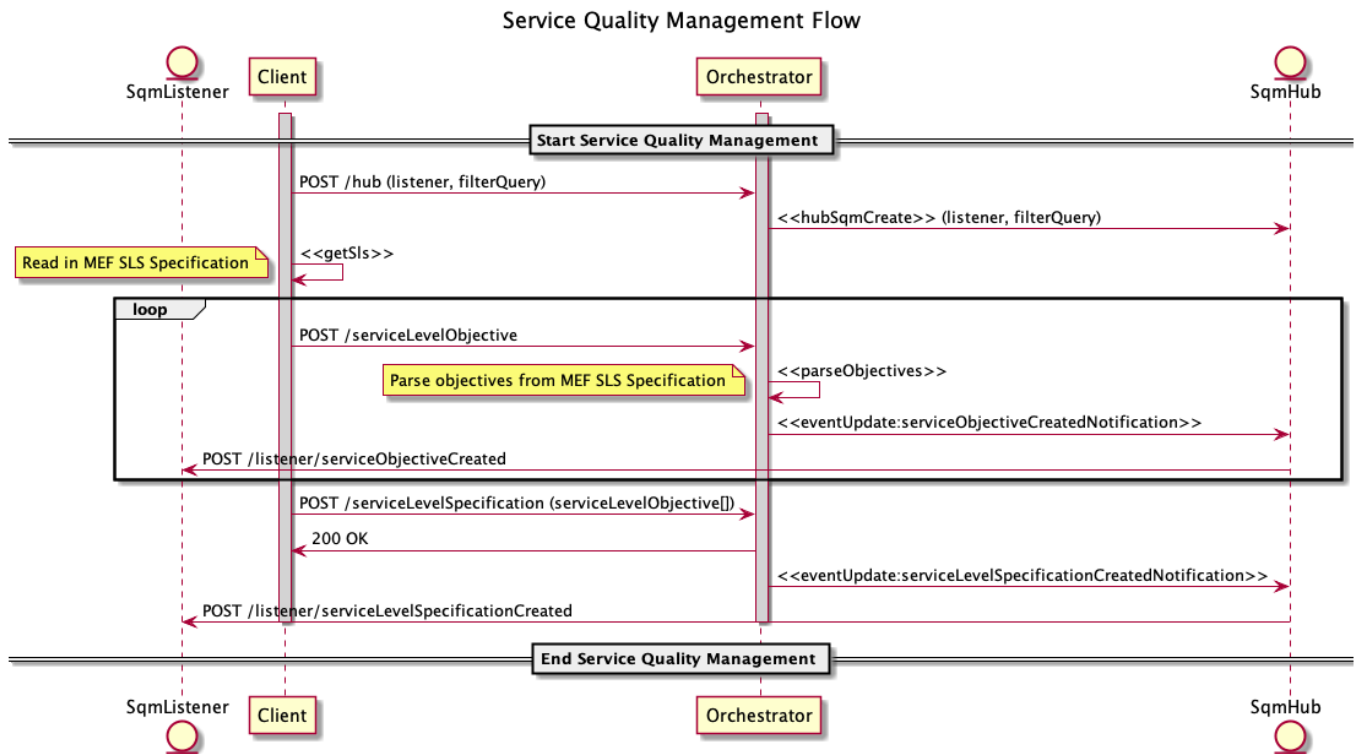


Figure 7 - SQM Sequence Diagram

3.2 TMF649 Performance Thresholding

The TMF649 API provides the client with the ability to create, retrieve, modify and delete thresholds. Thresholds have associated threshold rules. Threshold jobs can be initiated, suspended, retrieved and deleted. In addition, the API supports the ability to subscribe to notification and receive notifications asynchronously. The set of notifications supported are:

The Performance Thresholding API could be invoked by the client after the SLS objectives have been set. The threshold could be based on logic that set the objective thresholds at a specific percentage of the objective.

Performance Management Threshold Flow

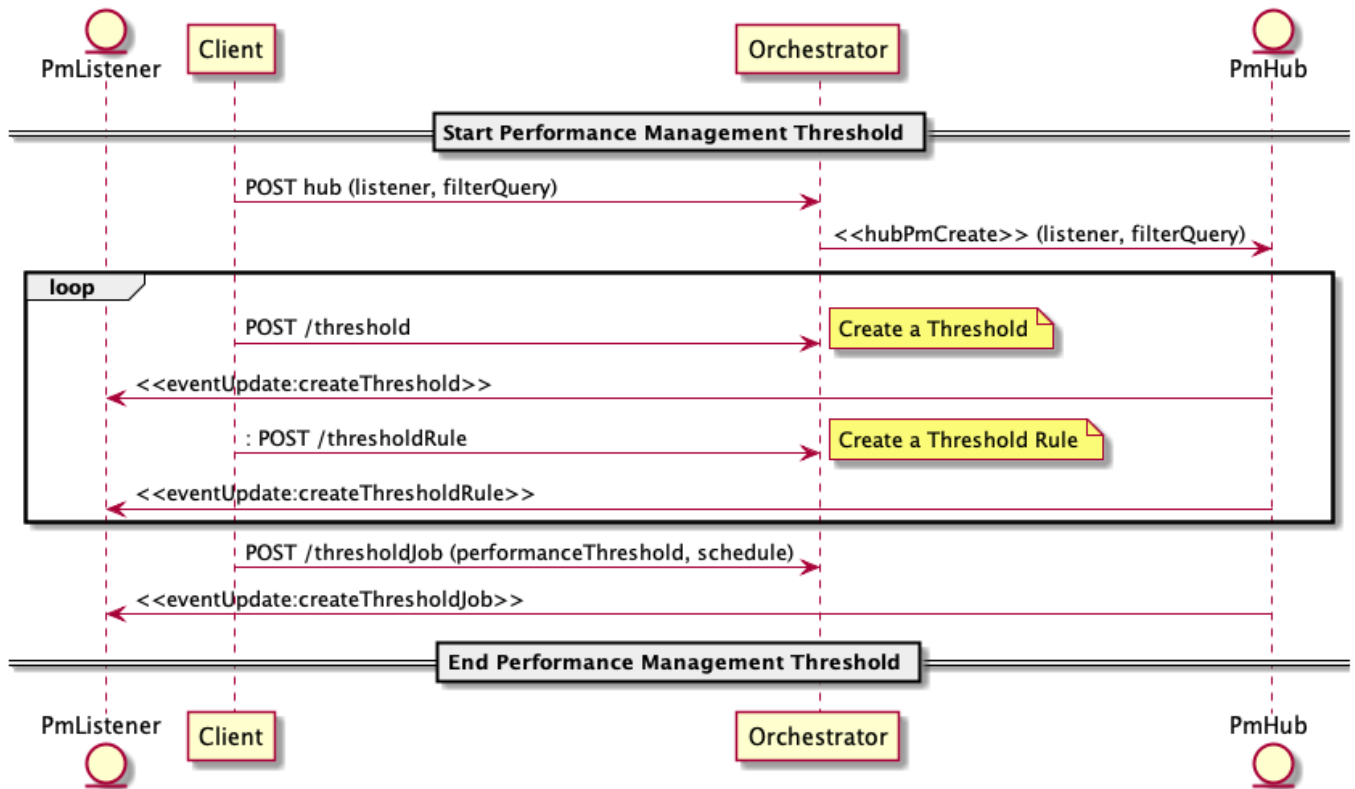


Figure 8 - Performance Management Thresholds Sequence Diagram

3.3 TMF623 Service Level Agreement

The TMF623 API provides a standardized interface for Service Level Agreement (SLA) lifecycle management, SLA Negotiation, SLA Configuration, SLA Activation/Enforcement, SLA Operations, SLA Violation/Consequence handling and SLA reporting between a Customer and Service Provider which provides offers (product with attached SLA in its catalog) the customer can discover, browse, trigger and order.

Performance Management Threshold Flow

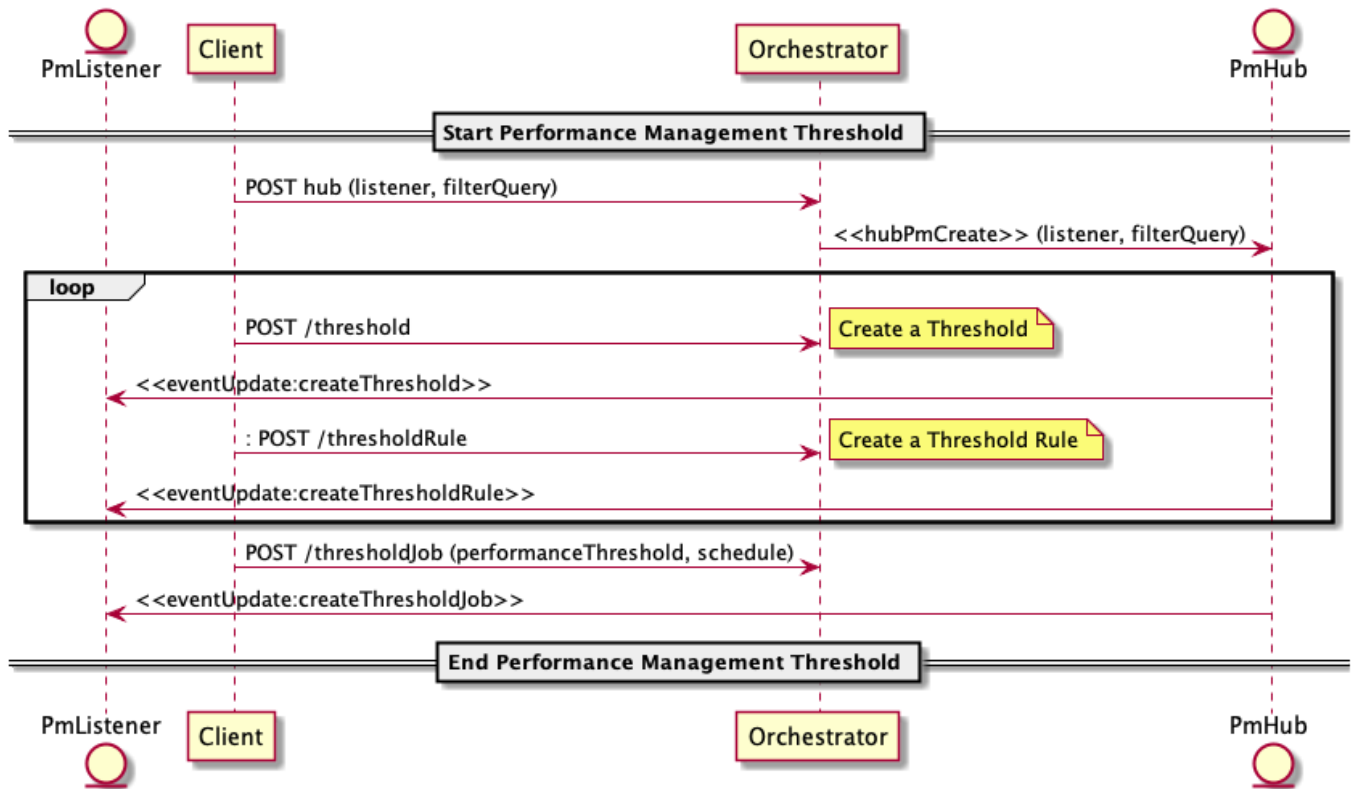


Figure 9 - Service Level Agreement Sequence Diagram

3.4 TMF628 Performance Management

The TMF628 API provides a standardized mechanism for performance management such as the creation, partial or full update and retrieval of resources involved in performance management (Measurement Collection Job, OnDemand Collection Job). It also allows notification of events related to performance.

The API provides the API client with the ability to create historical and on-demand measurements of Service Level Specifications. The API also provides a mechanism for the collection of these SLS. Currently, the API only supports a file collection mechanism. Future versions of this API will support REST-based collection and streaming.

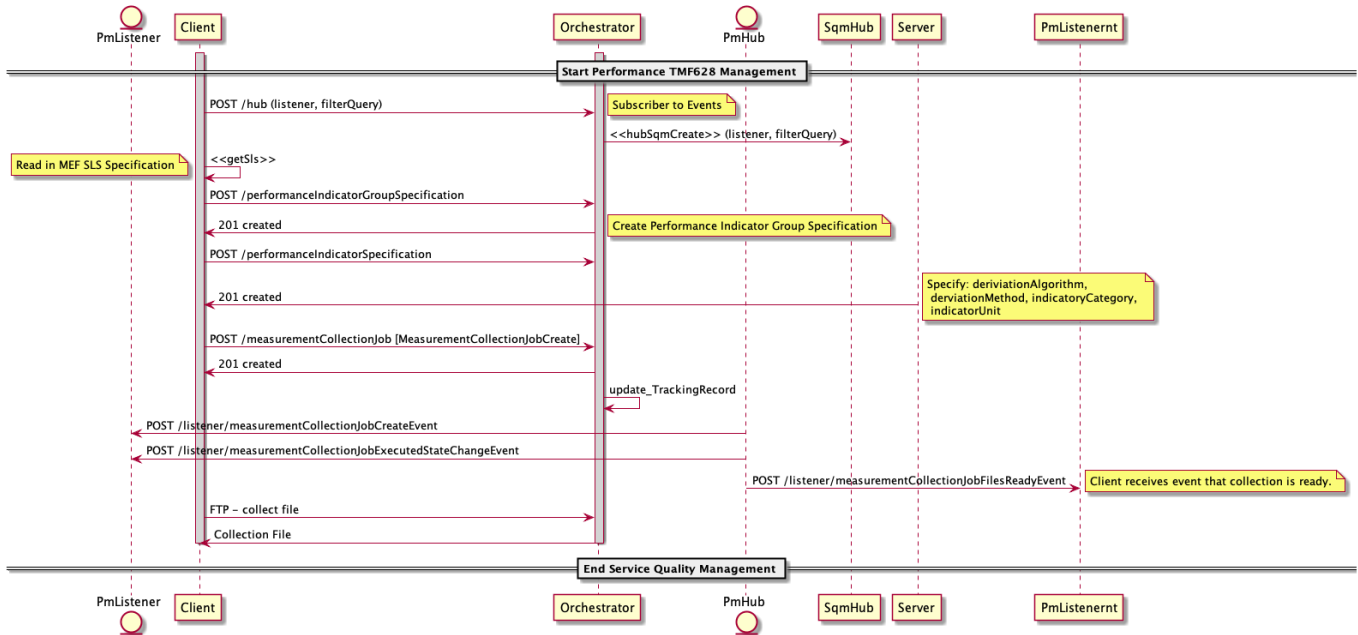


Figure 10 - Performance Management Sequence Diagram

4. Future Performance Management API Development

The current version of TMForum 628 Performance Management API is limited in the collection mechanisms. Specifically, the only collection mechanism is using file transfer. The modernization of the TMForum 628 must include additional collection mechanisms including REST operations and streaming.

4.1 Streaming Use Cases

The extension of TMF628 will include support for streaming of telemetry. Telemetry streaming provides the client with real-time (or pseudo real-time) collection of a specified metric or set of metric collected at a short load interval. The set of use cases need to support streaming are show in the figure below.

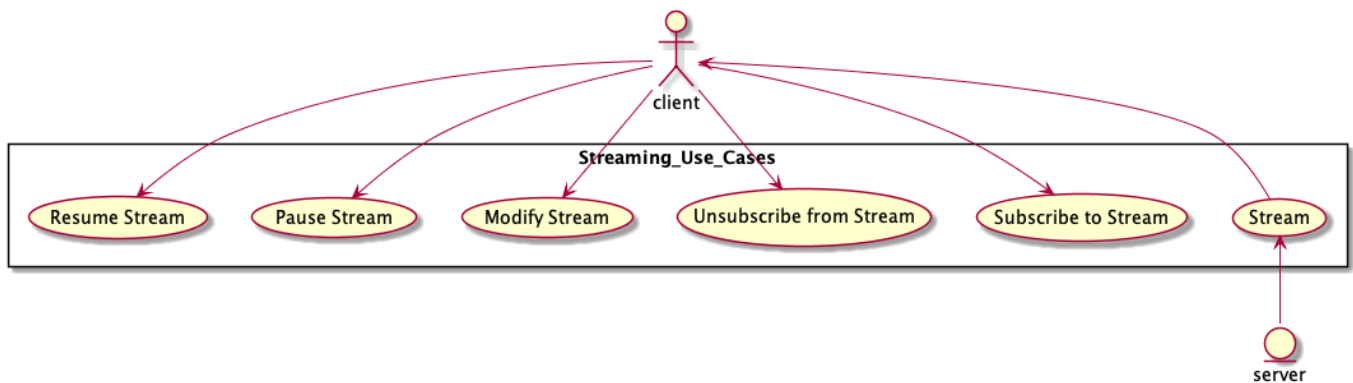


Figure 11 - Streaming Use Cases

5. Service Level Agreement (SLA) and Service Level Specification (SLS)

The following section details the definitions and relationships between Service Level Agreements and Service Level Specifications with Service Level Objectives.

6. End-to-End Performance Management Applied

The following section details how to leverage the set of APIs described above to perform a service assurance solution specific to performance management.

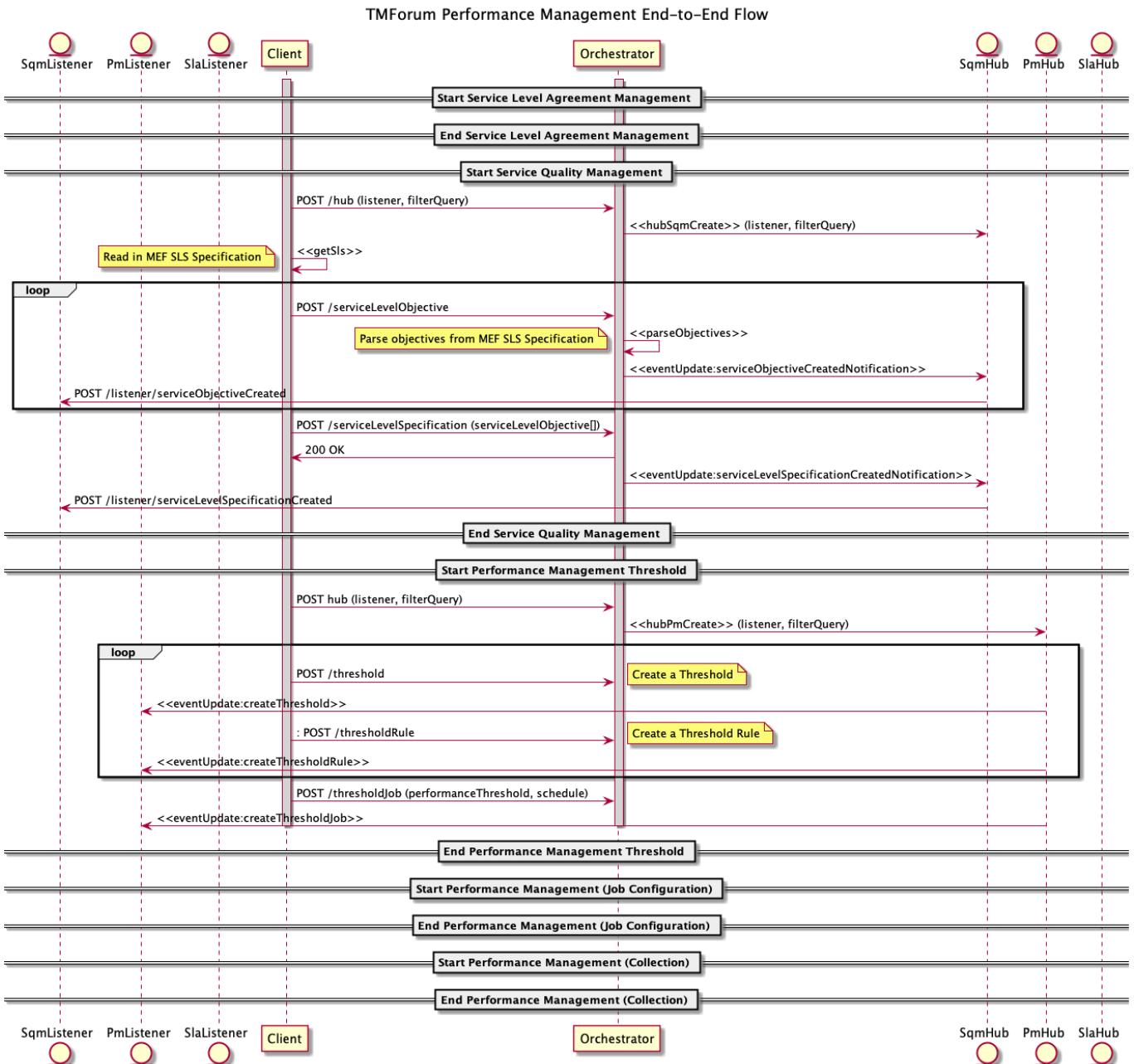


Figure 12 - End-to-End Performance Management

7. References

[1] <https://www.tmforum.org/business-process-framework>