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Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

- x the first digit:
 - 1 presented to TSG for information;
 - 2 presented to TSG for approval;
 - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

In the present document, modal verbs have the following meanings:

- shall** indicates a mandatory requirement to do something
- shall not** indicates an interdiction (prohibition) to do something

The constructions "shall" and "shall not" are confined to the context of normative provisions, and do not appear in Technical Reports.

The constructions "must" and "must not" are not used as substitutes for "shall" and "shall not". Their use is avoided insofar as possible, and they are not used in a normative context except in a direct citation from an external, referenced, non-3GPP document, or so as to maintain continuity of style when extending or modifying the provisions of such a referenced document.

- should** indicates a recommendation to do something
- should not** indicates a recommendation not to do something
- may** indicates permission to do something
- need not** indicates permission not to do something

The construction "may not" is ambiguous and is not used in normative elements. The unambiguous constructions "might not" or "shall not" are used instead, depending upon the meaning intended.

- can** indicates that something is possible
- cannot** indicates that something is impossible

The constructions "can" and "cannot" are not substitutes for "may" and "need not".

- will** indicates that something is certain or expected to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document
- will not** indicates that something is certain or expected not to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document
- might** indicates a likelihood that something will happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

might not indicates a likelihood that something will not happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

In addition:

is (or any other verb in the indicative mood) indicates a statement of fact

is not (or any other negative verb in the indicative mood) indicates a statement of fact

The constructions "is" and "is not" do not indicate requirements.

1 Scope

The present document specifies the stage 3 protocol and data model for the SEAL Data Delivery (SEALDD) Server Services, for enabling the support of SEAL Data Delivery (SEALDD) services for vertical applications. It provides stage 3 protocol definitions and message flows, and specifies the API for each service offered by the SEALDD Server.

The stage 2 application layer architecture, functional requirements, procedures and information flows necessary for enabling SEAL Data Delivery (SEALDD) are specified in 3GPP TS 23.433 [7].

The common protocol and interface aspects for API definition are specified in clause 5.2 of 3GPP TS 29.122 [2].

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

- [1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 29.122: "T8 reference point for Northbound Application Programming Interfaces (APIs)".
- [3] 3GPP TS 29.501: "5G System; Principles and Guidelines for Services Definition; Stage 3".
- [4] OpenAPI: "OpenAPI Specification Version 3.0.0", <https://spec.openapis.org/oas/v3.0.0>.
- [5] 3GPP TR 21.900: "Technical Specification Group working methods".
- [6] 3GPP TS 23.434: "Service Enabler Architecture Layer for Verticals (SEAL); Functional architecture and information flows".
- [7] 3GPP TS 23.433: "Service Enabler Architecture Layer for Verticals (SEAL); Data Delivery enabler for vertical applications".
- [8] 3GPP TS 23.222: "Common API Framework for 3GPP Northbound APIs; Stage 2".
- [9] 3GPP TS 29.222: "Common API Framework for 3GPP Northbound APIs; Stage 3".
- [10] 3GPP TS 33.122: "Security aspects of Common API Framework (CAPIF) for 3GPP northbound APIs".
- [11] IETF RFC 6749: "The OAuth 2.0 Authorization Framework".
- [12] Void.
- [13] Void.
- [14] Void.
- [15] 3GPP TS 29.549: "Service Enabler Architecture Layer for Verticals (SEAL); Application Programming Interface (API) specification; Stage 3".
- [16] 3GPP TS 29.508: "5G System; Session Management Event Exposure Service; Stage 3".
- [17] 3GPP TS 29.558: "Enabling Edge Applications; Application Programming Interface (API) specification; Stage 3".
- [18] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces; Stage 3".
- [19] 3GPP TS 29.514: "5G System; Policy Authorization Service; Stage 3".
- [20] 3GPP TS 29.520: "5G System; Network Data Analytics Services; Stage 3".
- [21] IETF RFC 9562: "Universally Unique IDentifier (UUIDs)".
- [22] 3GPP TS 29.572: "5G System; Location Management Services; Stage 3".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [1].

For the purpose of the present document, the terms and definitions specified in clause 3.1 of 3GPP TS 23.433 [7] and clause 3.1 of 3GPP TS 29.549 [15] also apply, including the ones referencing other specifications.

3.2 Symbols

Void.

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

BDT	Background Data Transfer
DD	Data Delivery
E2E	End to End
NSCE	Network Slice Capability Exposure
SEAL	Service Enabler Architecture Layer for Verticals
SEALDD	SEAL Data Delivery
VAL	Vertical Application Layer

4 Overview

The SEAL Data Delivery (SEALDD) Server forms part of the SEAL Enabler Layer defined in 3GPP TS 23.434 [6] and aims to ensure the efficient use and deployment of storage and delivery capabilities for the application content/data of vertical applications. The SEALDD Server supports for this purpose, among other functionalities defined in 3GPP TS 23.433 [7], the following functionalities:

- SEALDD application layer support functions to VAL Servers over the SEALDD-S reference point, i.e.:
 - SEALDD enabled application data transmission management;
 - SEALDD enabled data storage management;
 - SEALDD enabled data transmission quality measurement management;
 - SEALDD policy configuration management; and
 - SEALDD enabled BDT management.
- SEALDD application layer support functions to other SEALDD Servers over the SEALDD-E reference point, i.e.:
 - SEALDD enabled data storage management;
 - SEALDD Server relocation management; and
 - SEALDD enabled data transmission quality measurement management.

Figure 4-1 shows the reference model of the SEALDD Enabler Layer, with a focus on the SEALDD Server:

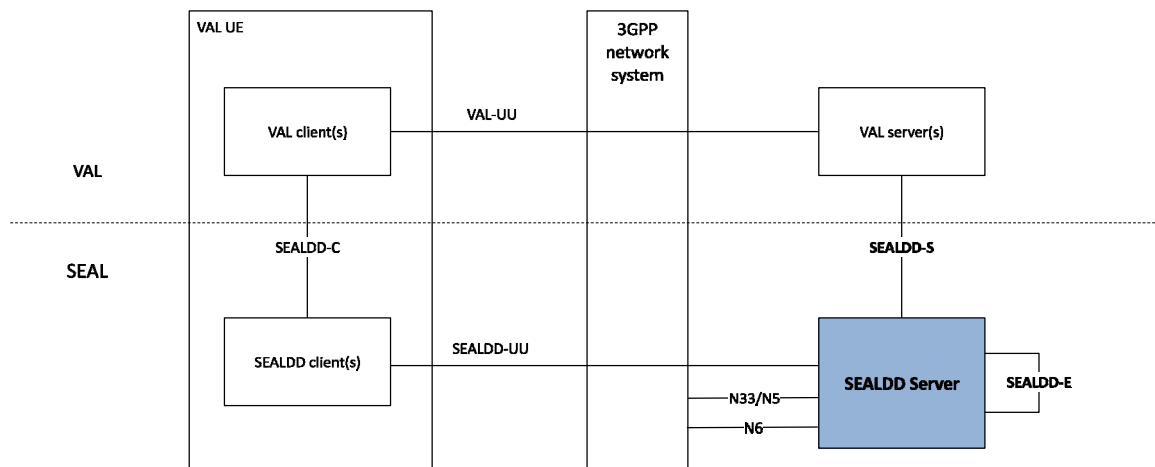


Figure 4-1: SEALDD Enabler Layer functional model

5 Services offered by the SEALDD Server

5.1 Introduction

The SEALDD Server provides the following services:

- SDD_Transmission
- SDD_DataStorage
- SDD_DDContext
- SDD_TransmissionQualityMeasurement
- SDD_PolicyConfiguration
- SDD_BDT

NOTE: The stage 2 Sdd_RegularTransmission and Sdd_URLLCTransmission APIs defined in 3GPP TS 23.433 [7] are defined via the SDD_Transmission API.

Table 5.1-1 summarizes the corresponding APIs defined for this specification.

Table 5.1-1: API Descriptions

Service Name	Clause	Description	OpenAPI Specification File	API Name	Annex
SDD_Transmission	6.1	SEALDD Data Transmission Service	TS29548_SDD_Transmission.yaml	sdd-trans	A.2
SDD_DataStorage	6.2	SEALDD Data Storage Service	TS29548_SDD_DataStorage.yaml	sdd-ds	A.3
SDD_DDContext	6.3	SEALDD Context Relocation Service	TS29548_SDD_DDContext.yaml	sdd-ddc	A.4
SDD_TransmissionQualityMeasurement	6.4	SEALDD Data Transmission Quality Measurement Service	TS29548_SDD_TransmissionQualityMeasurement.yaml	sdd-tqm	A.5
SDD_PolicyConfiguration	6.5	SEALDD Policy Configuration Service	TS29548_SDD_PolicyConfiguration.yaml	sdd-pc	A.6
SDD_BDT	6.6	SEALDD Background Data Transfer Service	TS29548_SDD_BDT.yaml	sdd-bdt	A.7

NOTE: When 3GPP TS 29.122 [2] is referenced for the common protocol and interface aspects for API definition in the clauses under clause 5, the SEALDD Server takes the role of the SCEF and the service consumer takes the role of the SCS/AS.

5.2 SDD_Transmission Service

5.2.1 Service Description

The SDD_Transmission service exposed by the SEALDD Server enables a service consumer to:

- request SEALDD enabled Regular, URLLC, Multi-modal or S&F Satellite application data transmission; and
- subscribe to / receive notifications on SEALDD connection status event(s).

5.2.2 Service Operations

5.2.2.1 Introduction

The service operations defined for the SDD_Transmission service are shown in table 5.2.2.1-1.

Table 5.2.2.1-1: SDD_Transmission Service Operations

Service Operation Name	Description	Initiated by
SDD_Transmission_Request	This service operation enables a service consumer to request SEALDD enabled application data transmission.	e.g., VAL Server
SDD_Transmission_ConnStatusSubscribe	This service operation enables a service consumer to request the creation/update/deletion of a subscription to SEALDD connection status event(s) reporting.	e.g., VAL Server
SDD_Transmission_ConnStatusNotify	This service operation enables a service consumer to receive notifications on SEALDD connection status event(s).	SEALDD Server

5.2.2.2 SDD_Transmission_Request

5.2.2.2.1 General

This service operation is used by a service consumer to request SEALDD enabled application data transmission to the SEALDD Server.

The following procedures are supported by the "SDD_Transmission_Request" service operation:

- SEALDD Transmission Request.

5.2.2.2.2 SEALDD Transmission Request

Figure 5.2.2.2.2-1 depicts a scenario where a service consumer sends a request to the SEALDD Server to request SEALDD enabled application data transmission (see also clauses 9.2, 9.3, 9.12 and 10.2 of 3GPP TS 23.433 [7]).

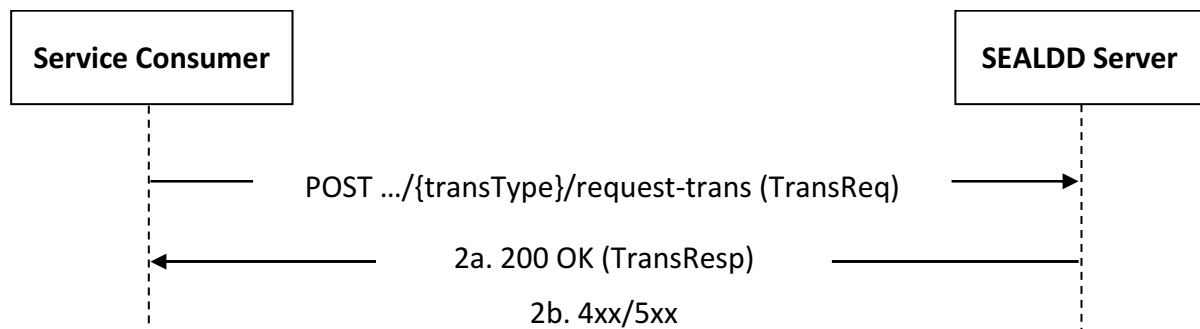


Figure 5.2.2.2.2-1: Procedure for SEALDD Transmission Request

1. In order to request SEALDD enabled application data transmission, the service consumer shall send an HTTP POST request to the SEALDD Server targeting the URI of the corresponding custom operation (i.e., "RequestTrans"), with the request body including the TransReq data structure. The "{transType}" URI variable path segment shall be set to either:
 - "regular", when Regular application data transmission is requested, as defined in clauses 9.2 of 3GPP TS 23.433[7];
 - "urllc", when URLLC application data transmission is requested, as defined in clauses 9.3 of 3GPP TS 23.433[7];
 - "mm", when Multi-modal application data transmission is requested, as defined in clauses 9.12 of 3GPP TS 23.433[7]; or
 - "satellite", when S&F Satellite application data transmission is requested, as defined in clauses 10.2 of 3GPP TS 23.433[7].
- 2a. Upon success, the SEALDD Server shall respond with an HTTP "200 OK" status code to indicate that the SEALDD enabled application data transmission service request is successfully received and processed, with the response body containing SEALDD enabled application data transmission related information within the TransResp data structure.
- 2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body, as specified in clause 6.1.7.

5.2.2.3 SDD_Transmission_ConnStatusSubscribe

5.2.2.3.1 General

This service operation is used by a service consumer to request the creation of a subscription to SEALDD connection status event(s) reporting.

The following procedures are supported by the "SDD_Transmission_ConnStatusSubscribe" service operation:

- SEALDD Connection Status Subscription Creation.
- SEALDD Connection Status Subscription Update.
- SEALDD Connection Status Subscription Deletion.

5.2.2.3.2 SEALDD Connection Status Subscription Creation

Figure 5.2.2.3.2-1 depicts a scenario where a service consumer sends a request to the SEALDD Server to request the creation of a subscription to SEALDD Connection Status event(s) reporting (see also clauses 9.2 and 9.3 of 3GPP TS 23.433[7]).

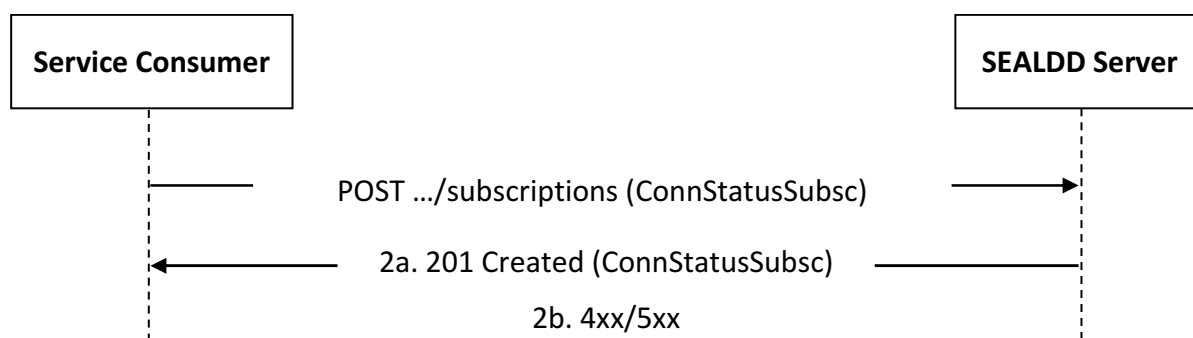


Figure 5.2.2.3.2-1: Procedure for SEALDD Connection Status Subscription Creation

1. In order to subscribe to SEALDD connection status event(s) reporting, the service consumer shall send an HTTP POST request message to the SEALDD Server targeting the URI of the "Connection Status Subscriptions" collection resource with the request body including the ConnStatusSubsc data structure.

- 2a. Upon success, the SEALDD Server shall respond with an HTTP "201 Created" status code with the response body including a representation of the created "Individual Connection Status Subscription" resource within the ConnStatusSubsc data structure, and an HTTP "Location" header field containing the URI of the created resource.
- 2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body, as specified in clause 6.1.7.

5.2.2.3.3 SEALDD Connection Status Subscription Update

Figure 5.2.2.3.3-1 depicts a scenario where a service consumer sends a request to the SEALDD Server to request the update of an existing SEALDD Connection Status Subscription (see also clauses 9.2 and 9.3 of 3GPP TS 23.433 [7]).

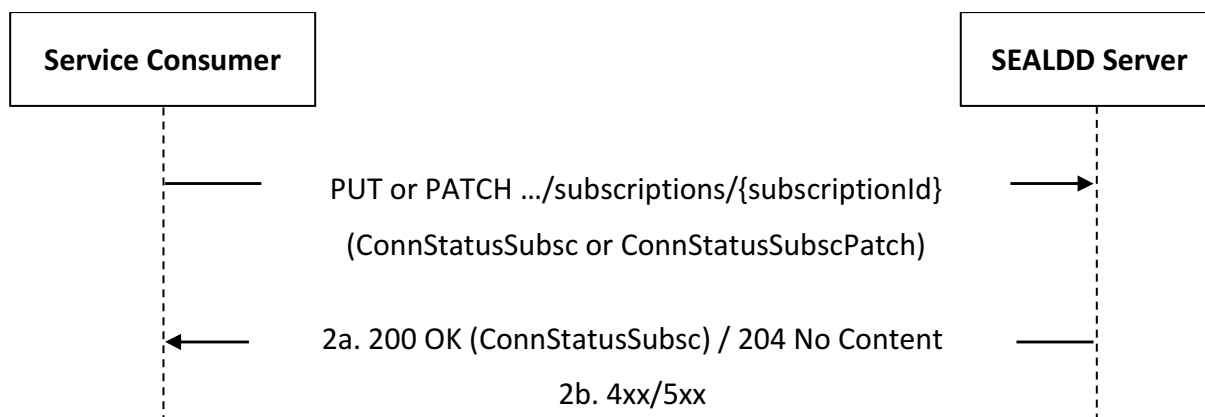


Figure 5.2.2.3.3-1: Procedure for SEALDD Connection Status Subscription Update

1. In order to update an existing SEALDD Connection Status Subscription, the service consumer shall send an HTTP PUT/PATCH request to the SEALDD Server, targeting the URI of the corresponding "Individual Connection Status Subscription" resource, with the request body including either:
 - the updated representation of the resource within the ConnStatusSubsc data structure, in case the HTTP PUT method is used; or
 - the requested modifications to the resource within the ConnStatusSubscPatch data structure, in case the HTTP PATCH method is used.

NOTE: An alternative service consumer (i.e. other than the one that requested the creation of the targeted resource) can initiate this request.

- 2a. Upon success, the SEALDD Server shall update the targeted "Individual Connection Status Subscription" resource accordingly and respond with either:
 - an HTTP "200 OK" status code with the response body containing a representation of the updated "Individual Connection Status Subscription" resource within the ConnStatusSubsc data structure; or
 - an HTTP "204 No Content" status code.
- 2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP PUT/PATCH response body, as specified in clause 6.1.7.

5.2.2.3.4 SEALDD Connection Status Subscription Deletion

Figure 5.2.2.3.4-1 depicts a scenario where a service consumer sends a request to the SEALDD Server to request the deletion of an existing SEALDD Connection Status Subscription (see also clauses 9.2 and 9.3 of 3GPP TS 23.433 [7]).

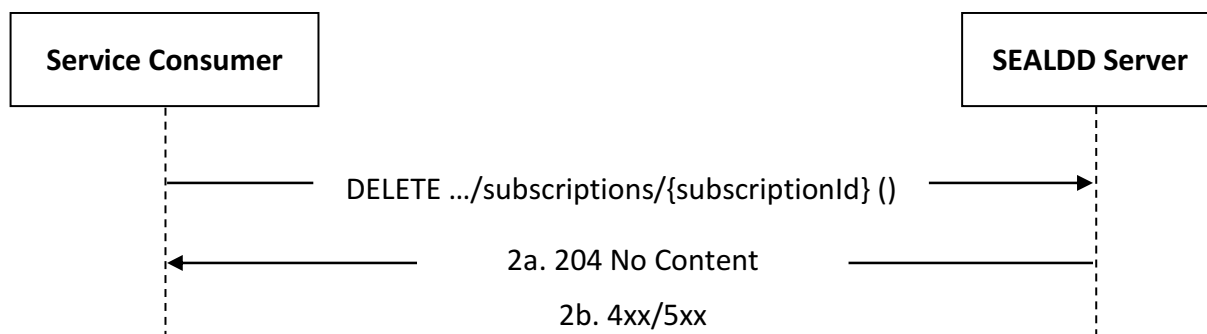


Figure 5.2.2.3.4-1: Procedure for SEALDD Connection Status Subscription Deletion

1. In order to request the deletion of an existing SEALDD Connection Status Subscription, the service consumer shall send an HTTP DELETE request to the SEALDD Server targeting the URI of the corresponding "Individual Connection Status Subscription" resource.

NOTE: An alternative service consumer (i.e. other than the one that requested the creation/update of the targeted resource) can initiate this request.

2a. Upon success, the SEALDD Server shall respond with an HTTP "204 No Content" status code.

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP DELETE response body, as specified in clause 6.1.7.

5.2.2.4 SDD_Transmission_ConnStatusNotify

5.2.2.4.1 General

This service operation is used by a SEALDD Server to notify a previously subscribed service consumer on:

- SEALDD connection status event(s).

The following procedures are supported by the "SDD_Transmission_ConnStatusNotify" service operation:

- SEALDD Connection Status Notification.

5.2.2.4.2 SEALDD Connection Status Notification

Figure 5.2.2.4.2-1 depicts a scenario where the SEALDD Server sends a request to notify a previously subscribed service consumer on SEALDD connection status event(s) (see also clauses 9.2, 9.3 and 10.2 of 3GPP TS 23.433 [7]).

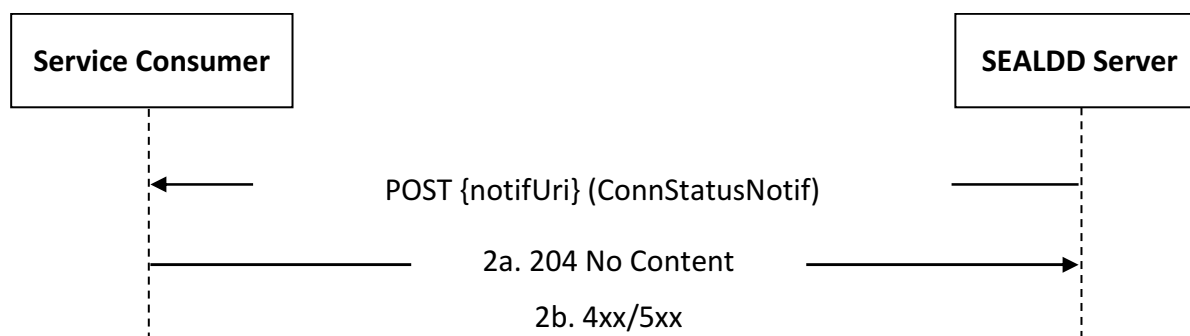


Figure 5.2.2.4.2-1: Procedure for SEALDD Connection Status Notification

1. In order to notify a previously subscribed service consumer on SEALDD Connection Status event(s), the SEALDD Server shall send an HTTP POST request message to the service consumer with the request URI set to "{notifUri}", where the "notifUri" variable is set to the value received from the service consumer during the creation/update of the corresponding SEALDD Connection Status Subscription using the procedures defined in clause 5.2.2.3, and the request body including the ConnStatusNotif data structure.

- 2a. Upon success, the service consumer shall respond to the SEALDD Server with an HTTP "204 No Content" status code.
- 2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body, as specified in clause 6.1.7.

5.3 SDD_DataStorage Service

5.3.1 Service Description

The SDD_DataStorage service exposed by the SEALDD Server enables a service consumer to:

- create/update/delete/query a SEALDD Data Storage;
- receive SEALDD Data Management and/or Status Information Notifications;
- create/update/delete a SEALDD Data Storage Delivery Subscription;
- receive SEALDD Data Storage Delivery Notifications; and
- request for one-time SEALDD Data Storage delivery.

5.3.2 Service Operations

5.3.2.1 Introduction

The service operations defined for the SDD_DataStorage service are shown in table 5.3.2.1-1.

Table 5.3.2.1-1: SDD_DataStorage Service Operations

Service Operation Name	Description	Initiated by
SDD_DataStorage_Create	This service operation enables a service consumer to request the creation of a SEALDD Data Storage and receive notifications on SEALDD Data Management and/or Status Information event(s).	e.g., VAL Server, SEALDD Server
SDD_DataStorage_Manage	This service operation enables a service consumer to request the update/modification/deletion of an existing SEALDD Data Storage.	e.g., VAL Server
SDD_DataStorage_Query	This service operation enables a service consumer to request the retrieval of one or several existing SEALDD Data Storage(s).	e.g., VAL Server, SEALDD Server
SDD_DataStorage_DelRequest	This service operation enables a service consumer to request for one-time SEALDD Data Storage Delivery.	e.g., VAL Server
SDD_DataStorage_EstablishDelConn	This service operation enables a service consumer to request for one-time SEALDD Data Storage Delivery connection establishment.	e.g., SEALDD Server
SDD_DataStorage_DelSubscribe	This service operation enables a service consumer to request the creation/update/deletion of a SEALDD Data Storage Delivery Subscription.	e.g., VAL Server
SDD_DataStorage_DelNotify	This service operation enables a service consumer to receive SEALDD Data Storage Delivery Notifications.	SEALDD Server
NOTE: The names of the service operations in this table are not always identical to the corresponding names in 3GPP TS 23.433 [7], e.g., SDD_DataStorage_Query vs SDD_DataStorage_Fetch, SDD_DataStorage_DelSubscribe vs SDD_DataStorage_Delivery_Subscription, etc.		

5.3.2.2 SDD_DataStorage_Create

5.3.2.2.1 General

This service operation is used by a service consumer to request the creation of a SEALDD Data Storage at the SEALDD Server.

The following procedures are supported by the "SDD_DataStorage_Create" service operation:

- Data Storage Creation.
- Data Management and/or Status Information Notification.

5.3.2.2.2 Data Storage Creation

Figure 5.3.2.2.2-1 depicts a scenario where a service consumer sends a request to the SEALDD Server to request the creation of a SEALDD Data Storage (see also clause 9.5 of 3GPP TS 23.433[7]).

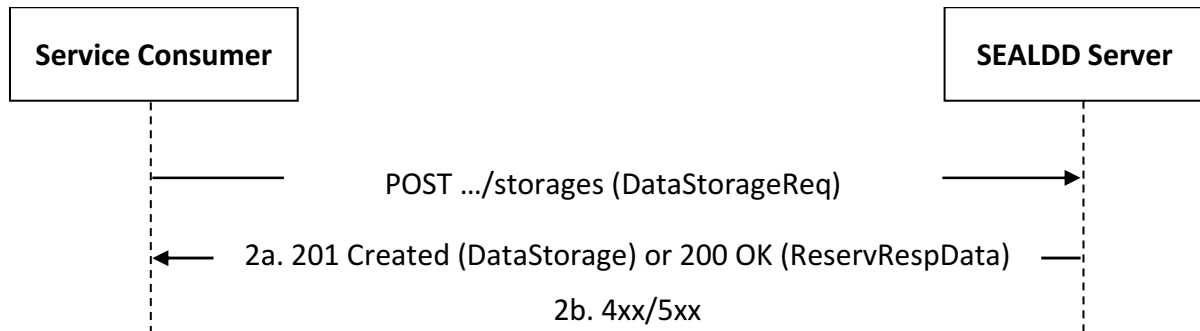


Figure 5.3.2.2.2-1: Procedure for Data Storage Creation

1. In order to create or reserve a new SEALDD Data Storage, the service consumer shall send an HTTP POST request to the SEALDD Server targeting the URI of the "Data Storages" collection resource, with the request body including the DataStorageReq data structure that shall be set to either:
 - the DataStorage data structure for a Data Storage Creation request; or
 - the ReservReqData data structure for a Data Storage Reservation request.
- 2a. Upon success, the SEALDD Server shall respond with either:
 - an HTTP "201 Created" status code, with the response body containing a representation of the created "Individual Data Storage" resource within the DataStorage data structure, and an HTTP "Location" header field containing the URI of the created resource, for the case of Data Storage Creation; or
 - an HTTP "200 OK" status code with the response body containing the ReservRespData data structure including Data Storage reservation related information, for the case of Data Storage Reservation.
- 2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body, as specified in clause 6.2.7.

5.3.2.2.3 Data Management and/or Status Information Notification

Figure 5.3.2.2.3-1 depicts a scenario where the SEALDD Server sends a request to notify a previously subscribed service consumer on SEALDD Data Management and/or Status Information event(s) (see also clause 9.5 of 3GPP TS 23.433[7]).

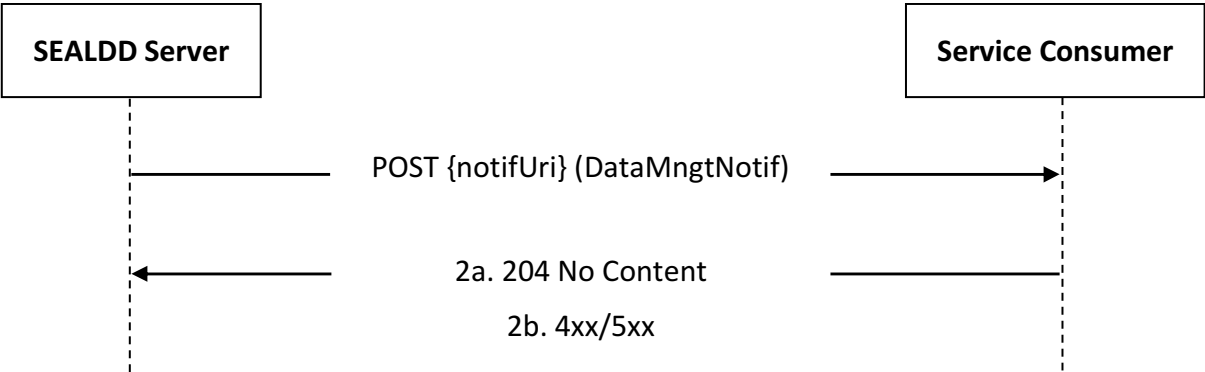


Figure 5.3.2.2.3-1: Data Storage Delivery Notification

1. In order to notify a previously subscribed service consumer on SEALDD Data Management and/or Status Information event(s), the SEALDD Server shall send an HTTP POST request to the service consumer with the request URI set to "{notifUri}", where the "notifUri" variable is set to the value received from the service consumer during the creation/update of the corresponding SEALDD Data Storage using the procedures defined in clauses 5.3.2.2.2 and 5.3.2.3.2, and the request body including the DataMngtNotif data structure.
- 2a. Upon success, the service consumer shall respond to the SEALDD Server with an HTTP "204 No Content" status code to acknowledge the reception of the notification.
- 2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body, as specified in clause 6.2.7.

5.3.2.3 SDD_DataStorage_Manage

5.3.2.3.1 General

This service operation is used by a service consumer to manage (e.g., update, delete) an existing SEALDD Data Storage at the SEALDD Server.

The following procedures are supported by the "SDD_DataStorage_Manage" service operation:

- Data Storage Update.
- Data Storage Deletion.

5.3.2.3.2 Data Storage Update

Figure 5.3.2.3.2-1 depicts a scenario where a service consumer sends a request to the SEALDD Server to request the update of an existing SEALDD Data Storage (see also clause 9.5 of 3GPP°TS°23.433°[7]).

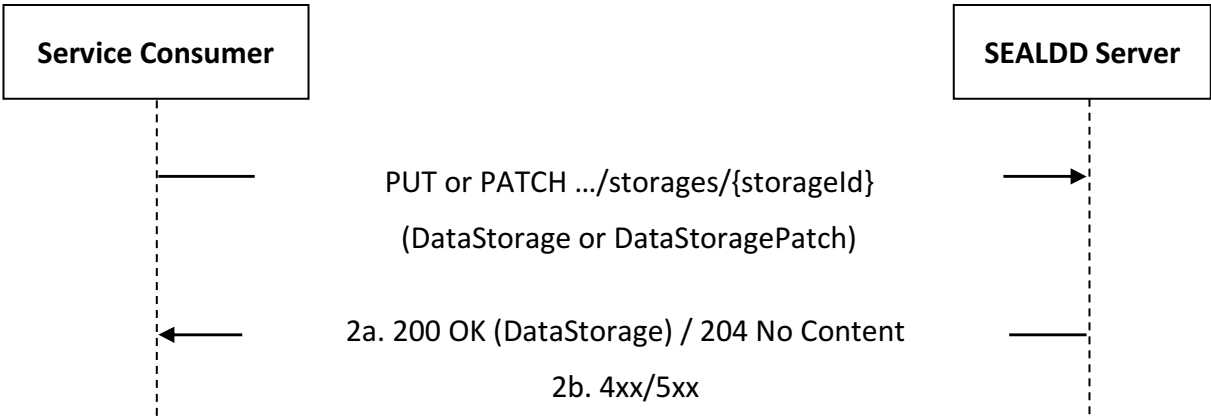


Figure 5.3.2.3.2-1: Procedure for Data Storage Update

1. In order to update an existing SEALDD Data Storage, the service consumer shall send an HTTP PUT/PATCH request to the SEALDD Server, targeting the URI of the corresponding "Individual Data Storage" resource, with the request body including either:

- the updated representation of the resource within the DataStorage data structure, in case the HTTP PUT method is used; or
- the requested modifications to the resource within the DataStoragePatch data structure, in case the HTTP PATCH method is used.

NOTE: An alternative service consumer (i.e. other than the one that requested the creation of the targeted resource) can initiate this request.

2a. Upon success, the SEALDD Server shall update the targeted "Individual Data Storage" resource accordingly and respond with either:

- an HTTP "200 OK" status code with the response body containing a representation of the updated "Individual Data Storage" resource within the DataStorage data structure; or
- an HTTP "204 No Content" status code.

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP PUT/PATCH response body, as specified in clause 6.2.7.

5.3.2.3.3 Data Storage Deletion

Figure 5.3.2.3.3-1 depicts a scenario where a service consumer sends a request to the SEALDD Server to request the deletion of an existing SEALDD Data Storage (see also clause 9.5 of 3GPP TS 23.433[7]).

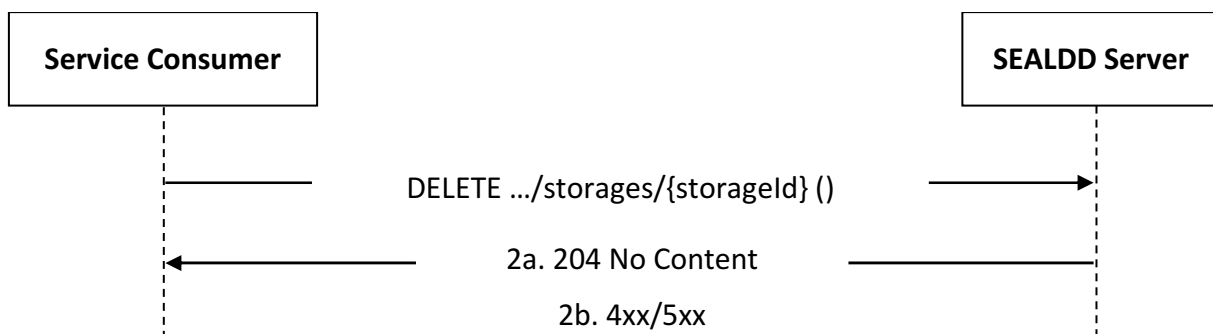


Figure 5.3.2.3.3-1: Procedure for Data Storage Deletion

1. In order to request the deletion of an existing SEALDD Data Storage, the service consumer shall send an HTTP DELETE request to the SEALDD Server targeting the corresponding "Individual Data Storage" resource.

NOTE: An alternative service consumer (i.e. other than the one that requested the creation of the targeted resource) can initiate this request.

2a. Upon success, the SEALDD Server shall respond with an HTTP "204 No Content" status code.

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP DELETE response body, as specified in clause 6.2.7.

5.3.2.4 SDD_DataStorage_Query

5.3.2.4.1 General

This service operation is used by a service consumer to request the retrieval of one or several existing SEALDD Data Storage(s) at the SEALDD Server.

The following procedures are supported by the "SDD_DataStorage_Query" service operation:

- Data Storage(s) Query.

5.3.2.4.2 Data Storage(s) Query

Figure 5.3.2.2-1 depicts a scenario where a service consumer sends a request to the SEALDD Server to request the retrieval of one or several existing SEALDD Data Storage(s) (see also clause 9.5 of 3GPP TS 23.433 [7]).

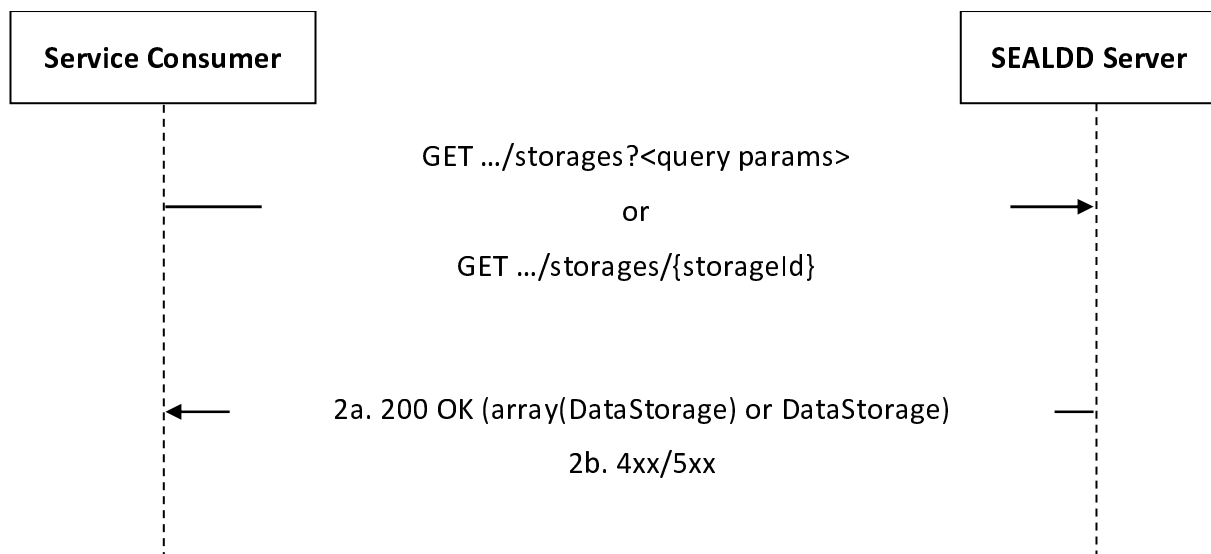


Figure 5.3.2.4.2-1: Procedure for Data Storage(s) Query

1. In order to request the retrieval of one or several existing SEALDD Data Storage(s), the service consumer shall send an HTTP GET request to the SEALDD Server targeting either:
 - the URI of the "Data Storages" collection resource, with query parameters to filter the targeted Data Storage(s), if one or several Data Storage(s) are to be retrieved; or
 - the URI of the targeted "Individual Data Storage" resource, if a single Data Storage is to be retrieved.
- 2a. Upon success, the SEALDD Server shall respond with an HTTP "200 OK" status code with the response body containing either:
 - the targeted "Individual Data Storage" resource(s) within one or several instance(s) of the DataStorage data structure, for the case of a response to a request to retrieve one or several Data Storage(s);
 - the targeted "Individual Data Storage" resource within the DataStorage data structure, for the case of a response to a request to retrieve a single Data Storage;
- 2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP GET response body, as specified in clause 6.2.7.

5.3.2.5 SDD_DataStorage_DelRequest

5.3.2.5.1 General

This service operation is used by a service consumer to request SEALDD Data Storage Delivery to the SEALDD Server.

The following procedures are supported by the "SDD_DataStorage_DelRequest" service operation:

- SEALDD Data Storage Delivery Request.

5.3.2.5.2 SEALDD Data Storage Delivery Request

Figure 5.3.2.5.2-1 depicts a scenario where a service consumer sends a request to the SEALDD Server to request SEALDD Data Storage Delivery (see also clauses 9.5 of 3GPP TS 23.433 [7]).

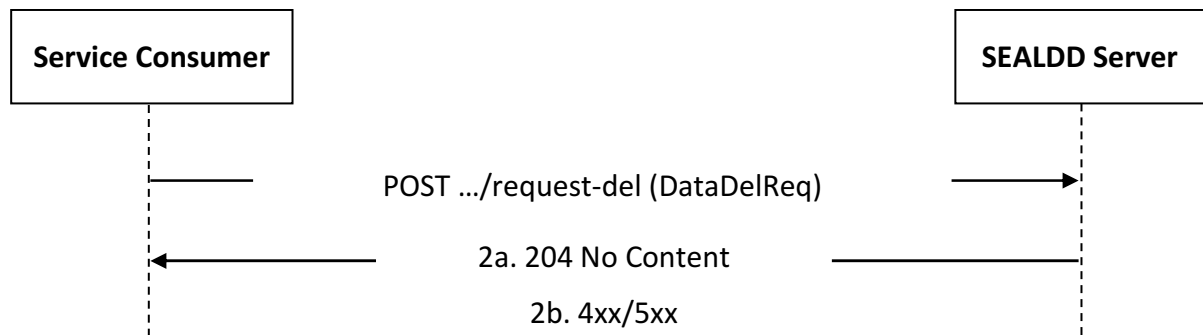


Figure 5.3.2.5.2-1: Procedure for SEALDD Data Storage Delivery Request

1. In order to request SEALDD Data Storage Delivery, the service consumer shall send an HTTP POST request to the SEALDD Server targeting the URI of the corresponding custom operation (i.e., "DataDeliveryRequest"), with the request body including the DataDelReq data structure.
- 2a. Upon success, the SEALDD Server shall respond with an HTTP "204 No Content" status code.
- 2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body, as specified in clause 6.2.7.

5.3.2.6 SDD_DataStorage_EstablishDelConn

5.3.2.6.1 General

This service operation is used by a service consumer to request SEALDD Data Storage Delivery connection establishment to the SEALDD Server.

The following procedures are supported by the "SDD_DataStorage_EstablishDelConn" service operation:

- SEALDD Data Storage Delivery Connection Establishment Request.

5.3.2.6.2 SEALDD Data Storage Delivery Connection Establishment Request

Figure 5.3.2.6.2-1 depicts a scenario where a service consumer sends a request to the SEALDD Server to request SEALDD Data Storage Delivery connection establishment (see also clauses 9.5 of 3GPP TS 23.433 [7]).

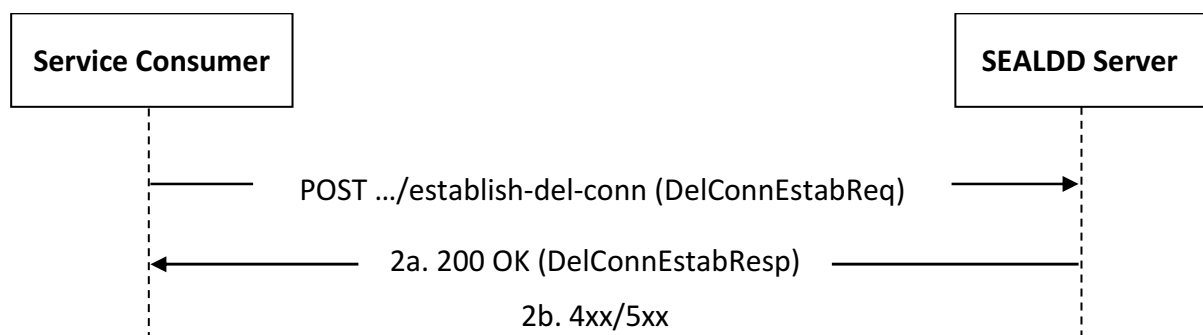


Figure 5.3.2.6.2-1: Procedure for SEALDD Data Storage Delivery Connection Establishment Request

1. In order to request SEALDD Data Storage Delivery connection establishment, the service consumer shall send an HTTP POST request to the SEALDD Server targeting the URI of the corresponding custom operation (i.e., "EstablishDelConn"), with the request body including the DelConnEstabReq data structure.
- 2a. Upon success, the SEALDD Server shall respond with either:
 - an HTTP "200 OK" status code to indicate that the SEALDD Data Storage Delivery connection establishment request is successfully received and processed, with the response body containing SEALDD

Data Storage Delivery connection establishment related information within the DelConnEstabResp data structure; or

- an HTTP "204 No Content" status code to indicate that the SEALDD Data Storage Delivery connection establishment request is successfully received and processed.

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body, as specified in clause 6.2.7.

5.3.2.7 SDD_DataStorage_DelSubscribe

5.3.2.7.1 General

This service operation is used by a service consumer to request the creation/update/deletion of a SEALDD Data Storage Delivery Subscription at the SEALDD Server.

The following procedures are supported by the "SDD_DataStorage_DelSubscribe" service operation:

- Data Storage Delivery Subscription Creation.
- Data Storage Delivery Subscription Update.
- Data Storage Delivery Subscription Deletion.

5.3.2.7.2 Data Storage Delivery Subscription Creation

Figure 5.3.2.7.2-1 depicts a scenario where a service consumer sends a request to the SEALDD Server to request the creation of a SEALDD Data Storage Delivery Subscription (see also clause 9.5 of 3GPP TS 23.433 [7]).

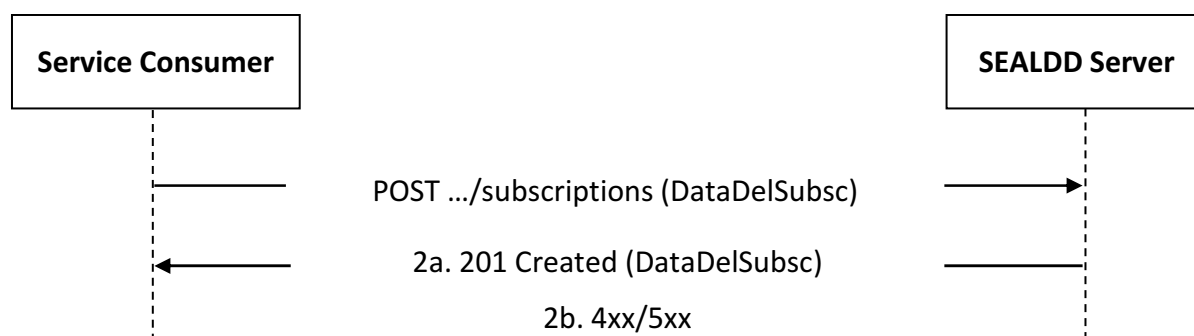


Figure 5.3.2.7.2-1: Procedure for Data Storage Delivery Subscription Creation

1. In order to request the creation of a new SEALDD Data Storage Delivery Subscription, the service consumer shall send an HTTP POST request to the SEALDD Server targeting the URI of the "Data Storage Delivery Subscriptions" collection resource, with the request body including the DataDelSubsc data structure.
- 2a. Upon success, the SEALDD Server shall respond with an HTTP "201 Created" status code, with the response body containing a representation of the created "Individual Data Storage Delivery Subscription" resource within the DataDelSubsc data structure, and an HTTP "Location" header field containing the URI of the created resource.
- 2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body, as specified in clause 6.2.7.

5.3.2.7.3 Data Storage Delivery Subscription Update

Figure 5.3.2.7.3-1 depicts a scenario where a service consumer sends a request to the SEALDD Server to request the update of an existing SEALDD Data Storage Delivery Subscription (see also clause 9.5 of 3GPP TS 23.433 [7]).

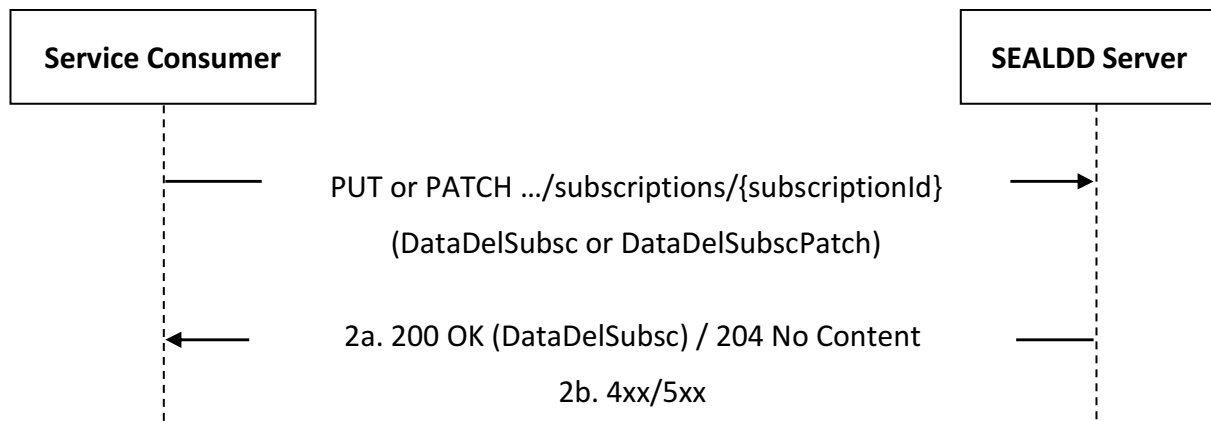


Figure 5.3.2.7.3-1: Procedure for Data Storage Delivery Subscription Update

1. In order to update an existing SEALDD Data Storage Delivery Subscription, the service consumer shall send an HTTP PUT/PATCH request to the SEALDD Server, targeting the URI of the corresponding "Individual Data Storage Delivery Subscription" resource, with the request body including either:

- the updated representation of the resource within the DataDelSubsc data structure, in case the HTTP PUT method is used; or
- the requested modifications to the resource within the DataDelSubscPatch data structure, in case the HTTP PATCH method is used.

NOTE: An alternative service consumer (i.e. other than the one that requested the creation of the targeted resource) can initiate this request.

- 2a. Upon success, the SEALDD Server shall update the targeted "Individual Data Storage Delivery Subscription" resource accordingly and respond with either:

- an HTTP "200 OK" status code with the response body containing a representation of the updated "Individual Data Storage Delivery Subscription" resource within the DataDelSubsc data structure; or
- an HTTP "204 No Content" status code.

- 2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP PUT/PATCH response body, as specified in clause 6.2.7.

5.3.2.7.4 Data Storage Delivery Subscription Deletion

Figure 5.3.2.7.4-1 depicts a scenario where a service consumer sends a request to the SEALDD Server to request the deletion of an existing SEALDD Data Storage Delivery Subscription (see also clause 9.5 of 3GPP TS 23.433[7]).

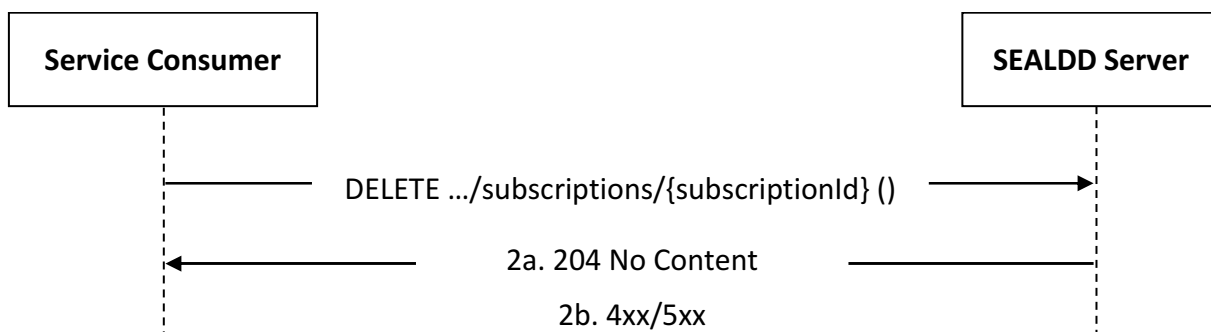


Figure 5.3.2.7.4-1: Procedure for Data Storage Delivery Subscription Deletion

1. In order to request the deletion of an existing SEALDD Data Storage Delivery Subscription, the service consumer shall send an HTTP DELETE request to the SEALDD Server targeting the URI of the corresponding "Individual Data Storage Delivery Subscription" resource.

NOTE: An alternative service consumer (i.e. other than the one that requested the creation/update of the targeted resource) can initiate this request.

2a. Upon success, the SEALDD Server shall respond with an HTTP "204 No Content" status code.

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP DELETE response body, as specified in clause 6.2.7.

5.3.2.8 SDD_DataStorage_DelNotify

5.3.2.8.1 General

This service operation is used by a SEALDD Server to notify a previously subscribed service consumer on:

- SEALDD Data Storage Delivery.

The following procedures are supported by the "SDD_DataStorage_DelNotify" service operation:

- Data Storage Delivery Notification.

5.3.2.8.2 Data Storage Delivery Notification

Figure 5.3.2.8.2-1 depicts a scenario where the SEALDD Server sends a request to notify a previously subscribed service consumer on SEALDD Data Storage Delivery (see also clause 9.5 of 3GPP TS 23.433[7]).

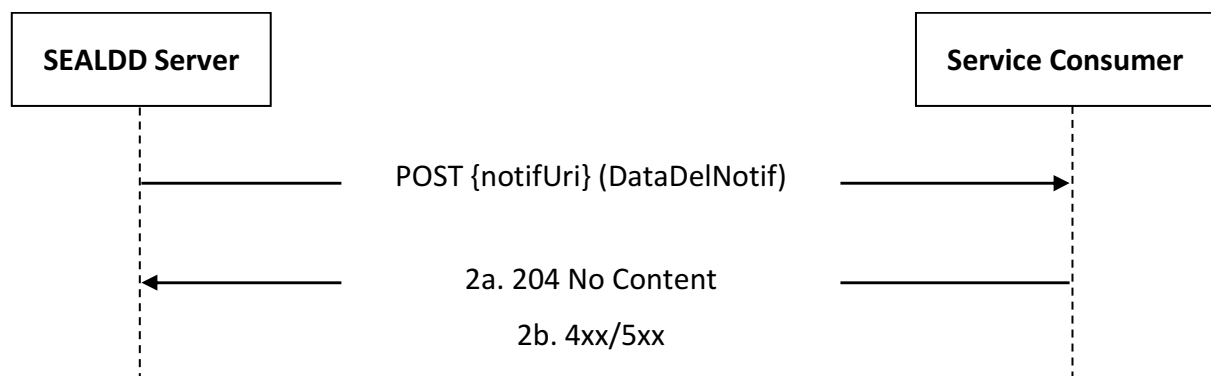


Figure 5.3.2.8.2-1: Procedure for Data Storage Delivery Notification

1. In order to notify a previously subscribed service consumer on SEALDD Data Storage Delivery, the SEALDD Server shall send an HTTP POST request to the service consumer with the request URI set to "{notifUri}", where the "notifUri" variable is set to the value received from the service consumer during the creation/update of the corresponding SEALDD Data Storage Delivery Subscription using the procedures defined in clause 5.3.2.7, and the request body including the DataDelNotif data structure.
- 2a. Upon success, the service consumer shall respond to the SEALDD Server with an HTTP "204 No Content" status code to acknowledge the reception of the notification.
- 2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body, as specified in clause 6.2.7.

5.4 SDD_DDContext Service

5.4.1 Service Description

The SDD_DDContext service exposed by the SEALDD Server enables a service consumer to:

- push the DD context to the SEALDD Server;
- pull the DD context from the SEALDD Server;
- inform the SEALDD Server about ACR event(s); and
- receive DD related event(s) reporting.

5.4.2 Service Operations

5.4.2.1 Introduction

The service operations defined for the SDD_DDContext API are shown in the table 5.4.2.1-1.

Table 5.4.2.1-1: SDD_DDContext Service Operations

Service operation name	Description	Initiated by
SDD_DDContext_Push	This service operation is used by a service consumer to push a DD context to the SEALDD Server.	e.g., SEALDD Server
SDD_DDContext_Pull	This service operation is used by a service consumer to pull a DD context from the SEALDD Server.	e.g., SEALDD Server
SDD_DDContext_InformACREvent	This service operation is used by a service consumer to inform the SEALDD Server on ACR event(s).	e.g., VAL Server
SDD_DDContext_Notify	This service operation is used by the SEALDD Server to notify the service consumer on DD related event(s).	SEALDD Server

5.4.2.2 SDD_DDContext_Push

5.4.2.2.1 General

This service operation is used by a service consumer to push a DD Context to the SEALDD Server.

The following procedures are supported by the "SDD_DDContext_Push" service operation:

- DD Context Push.

5.4.2.2.2 DD Context Push

Figure 5.4.2.2.2-1 depicts a scenario where a service consumer sends a request to the SEALDD Server to push a DD Context (see also clause 9.6 of 3GPP TS 23.433[7]).

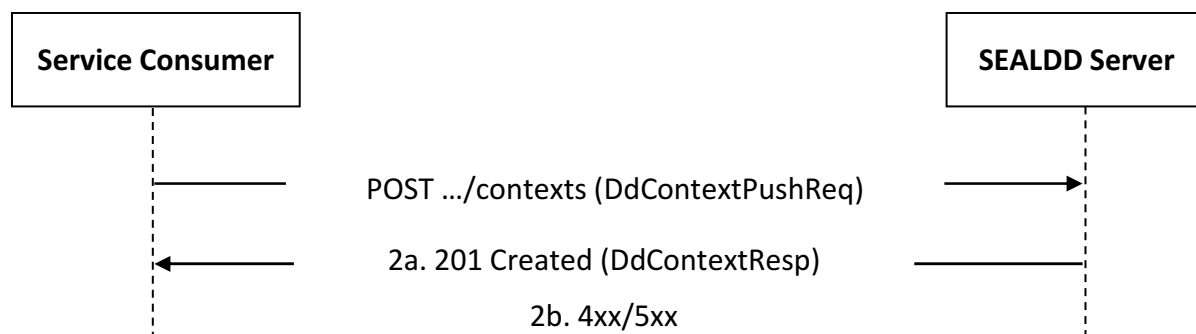


Figure 5.4.2.2.2-1: Procedure for DD Context Push

1. In order to push a DD context to the SEALDD Server, the service consumer shall send an HTTP POST request targeting the URI of the "DD Contexts" collection resource, with the request body including the DdContextPushReq data structure.
- 2a. Upon success, the SEALDD Server shall respond with an HTTP "200 OK" status code with the response body containing the DdContextResp data structure.
- 2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body, as specified in clause 6.3.7.

5.4.2.3 SDD_DDContext_Pull

5.4.2.3.1 General

This service operation is used by a service consumer to pull a DD context from the SEALDD Server.

The following procedures are supported by the "SDD_DDContext_Pull" service operation:

- DD Context Pull.

5.4.2.3.2 DD Context Pull

Figure 5.4.2.3.2-1 depicts a scenario where a service consumer sends a request to the SEALDD Server to pull a DD Context (see also clause 9.6 of 3GPP TS 23.433 [7]).

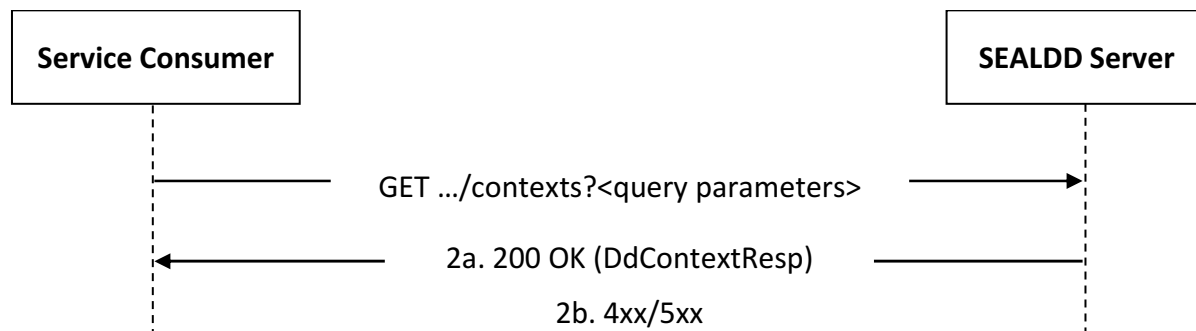


Figure 5.4.2.3.2-1: Procedure for DD Context Pull

1. In order to pull a DD context from the SEALDD Server, the service consumer shall send an HTTP GET request message targeting the URI of the "DD Contexts" collection resource, with query parameters to filter the targeted DD context and its content, if needed.
- 2a. Upon success, the SEALDD Server shall respond with an HTTP "200 OK" status code with the response body containing the DdContextResp data structure.

NOTE: The content of the "ddContext" attribute of the DdContextResp data structure in step 2a is determined by the SEALDD Server based on the service consumer's identity.

- 2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP GET response body, as specified in clause 6.3.7.

5.4.2.4 SDD_DDContext_InformACREvent

5.4.2.4.1 General

This service operation is used by a service consumer to inform the SEALDD Server on ACR event(s).

The following procedures are supported by the "SDD_DDContext_InformACREvent" service operation:

- Inform ACR Events Request.

5.4.2.4.2 Inform ACR Events Request

Figure 5.4.2.4.2-1 depicts a scenario where a service consumer sends a request to the SEALDD Server to inform on ACR event(s) (see also clause 9.6 of 3GPP TS 23.433[7]).

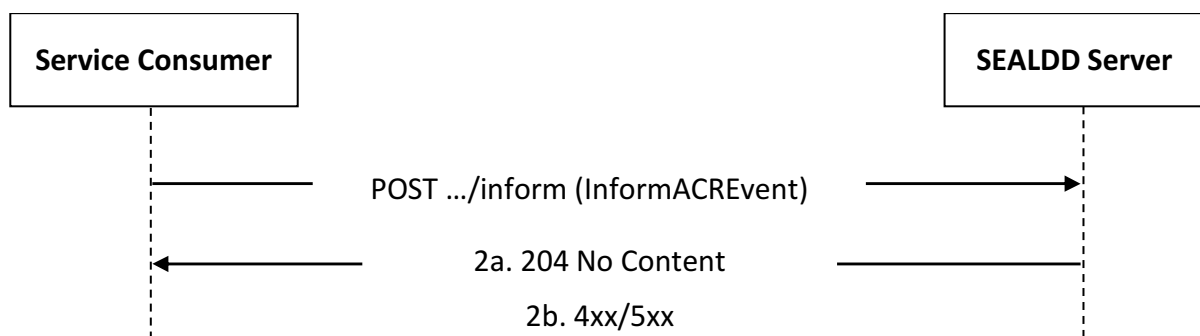


Figure 5.4.2.4.2-1: Procedure for Inform ACR Event Request

1. In order to inform on ACR event(s), the service consumer shall send an HTTP POST request targeting the URI of the corresponding custom operation (i.e., "InformACREvent"), with the request body including the InformACREvent data structure.
- 2a. Upon success, the SEALDD Server shall respond with an HTTP "204 No Content" status code.
- 2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body, as specified in clause 6.3.7.

5.4.2.5 SDD_DDContext_Notify

5.4.2.5.1 General

This service operation is used by a SEALDD Server to notify a service consumer on DD related event(s).

The following procedures are supported by the "SDD_DDContext_Notify" service operation:

- ACR Event Notification.

5.4.2.5.2 ACR Event Notification

Figure 5.4.2.5.2-1 depicts a scenario where the SEALDD Server sends a request to notify a previously subscribed service consumer on ACR event status (see also clause 9.6 of 3GPP TS 23.433[7]).

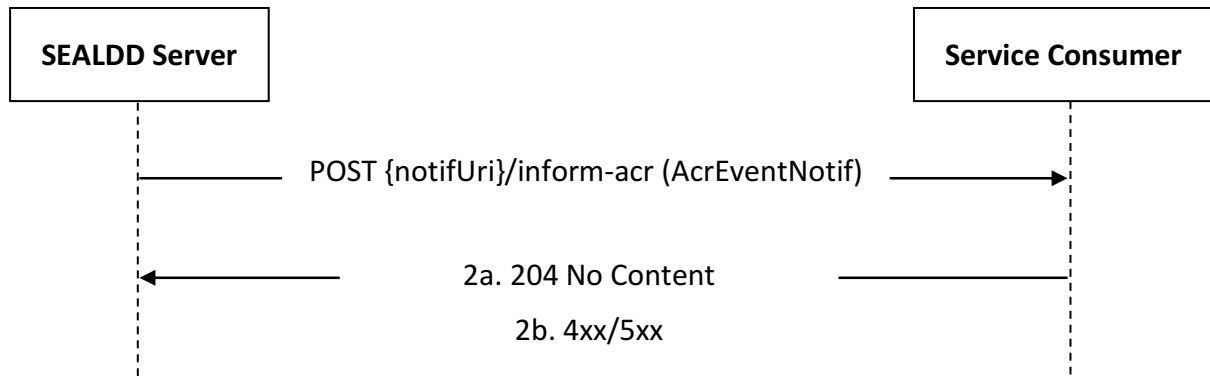


Figure 5.4.2.5.2-1: Procedure for ACR Event Notification

1. In order to notify a previously subscribed service consumer on ACR event status, the SEALDD Server shall send an HTTP POST request to the service consumer with the request URI set to "{notifUri}/inform-acr", where the "notifUri" variable is set to the value received from the service consumer during the corresponding Inform ACR Event request defined in clause 5.4.2.4, and the request body including the AcrEventNotif data structure.
- 2a. Upon success, the service consumer shall respond to the SEALDD Server with an HTTP "204 No Content" status code to acknowledge the reception of the notification.
- 2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body, as specified in clause 6.3.7.

5.5 SDD_TransmissionQualityMeasurement

5.5.1 Service Description

The SDD_TransmissionQualityMeasurement service exposed by the SEALDD Server enables a service consumer to:

- create/update/delete a Transmission Quality Measurement Subscription;
- receive Transmission Quality Measurement notifications; and
- request historical Transmission Quality Measurement reports.

5.5.2 Service Operations

5.5.2.1 Introduction

The service operations defined for the SDD_TransmissionQualityMeasurement service are shown in table 5.5.2.1-1.

Table 5.5.2.1-1: SDD_TransmissionQualityMeasurement Service Operations

Service Operation Name	Description	Initiated by
SDD_TransmissionQualityMeasurement_Subscribe	This service operation enables a service consumer to create a Transmission Quality Measurement Subscription.	e.g. VAL Server
SDD_TransmissionQualityMeasurement_Update	This service operation enables a service consumer to update an existing Transmission Quality Measurement Subscription.	e.g. VAL Server
SDD_TransmissionQualityMeasurement_Unsubscribe	This service operation enables a service consumer to delete an existing Transmission Quality Measurement Subscription.	e.g. VAL Server
SDD_TransmissionQualityMeasurement_Notify	This service operation enables a service consumer to receive Transmission Quality Measurement notifications.	SEALDD Server
SDD_TransmissionQualityMeasurement_Query	This service operation enables a service consumer to request historical Transmission Quality Measurement reports.	e.g., VAL Server, SEALDD Server, NSCE Server, ADAE Server

5.5.2.2 SDD_TransmissionQualityMeasurement_Subscribe

5.5.2.2.1 General

This service operation is used by a service consumer to request the creation of a Transmission Quality Measurement Subscription at the SEALDD Server.

The following procedures are supported by the "SDD_TransmissionQualityMeasurement_Subscribe" service operation:

- Transmission Quality Measurement Subscription Creation.

5.5.2.2.2 Transmission Quality Measurement Subscription Creation

Figure 5.5.2.2.2-1 depicts a scenario where a service consumer sends a request to the SEALDD Server to request the creation of a Transmission Quality Measurement Subscription (see also clause 9.7 of 3GPP TS 23.433 [7]).

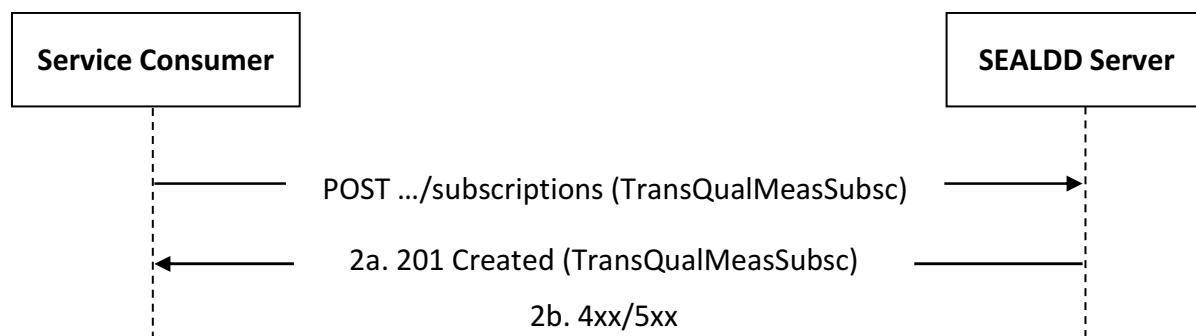


Figure 5.5.2.2.2-1: Procedure for Transmission Quality Measurement Subscription Creation

1. In order to subscribe to transmission quality measurement reporting, the service consumer shall send an HTTP POST request to the SEALDD Server targeting the URI of the "Transmission Quality Measurement Subscriptions" collection resource, with the request body including the TransQualMeasSubsc data structure.
- 2a. Upon success, the SEALDD Server shall respond with an HTTP "201 Created" status code with the response body containing a representation of the created "Individual Transmission Quality Measurement Subscription" resource within the TransQualMeasSubsc data structure, and an HTTP "Location" header field containing the URI of the created resource.
- 2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body, as specified in clause 6.4.7.

5.5.2.3 SDD_TransmissionQualityMeasurement_Update

5.5.2.3.1 General

This service operation is used by a service consumer to request the update of a Transmission Quality Measurement Subscription at the SEALDD Server.

The following procedures are supported by the "SDD_TransmissionQualityMeasurement_Update" service operation:

- Transmission Quality Measurement Subscription Update.

5.5.2.3.2 Transmission Quality Measurement Subscription Update

Figure 5.5.2.3.2-1 depicts a scenario where a service consumer sends a request to the SEALDD Server to request the update of an existing Transmission Quality Measurement Subscription (see also clause 9.7 of 3GPP TS 23.433 [7]).

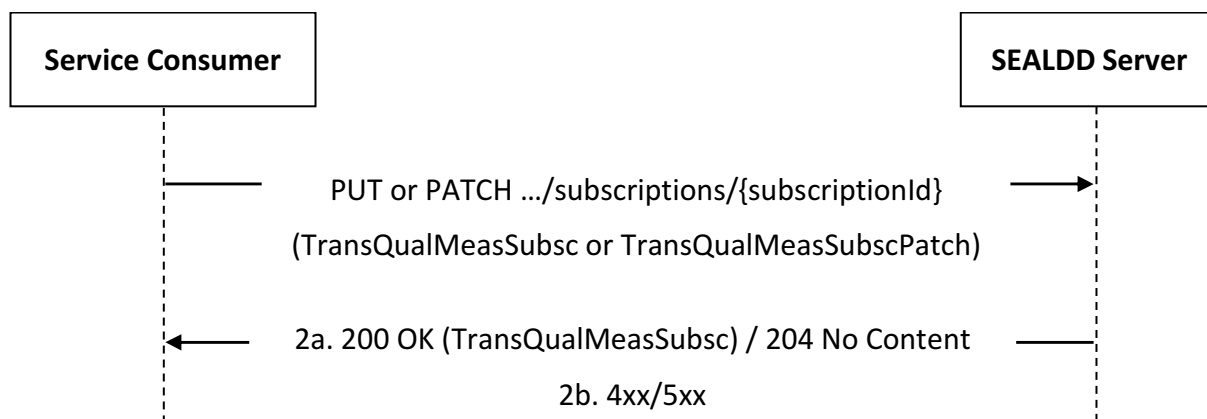


Figure 5.5.2.3.2-1: Procedure for Transmission Quality Measurement Subscription Update

1. In order to request the update of an existing transmission quality measurement subscription, the service consumer shall send an HTTP PUT/PATCH request to the SEALDD Server, targeting the URI of the corresponding "Individual Transmission Quality Measurement Subscription" resource, with the request body including either:

- the updated representation of the resource within the TransQualMeasSubsc data structure, in case the HTTP PUT method is used; or
- the requested modifications to the resource within the TransQualMeasSubscPatch data structure, in case the HTTP PATCH method is used.

NOTE: An alternative service consumer (i.e. other than the one that requested the creation of the targeted resource) can initiate this request.

2a. Upon success, the SEALDD Server shall update the targeted "Individual Transmission Quality Measurement Subscription" resource accordingly and respond with either:

- an HTTP "200 OK" status code with the response body containing a representation of the updated "Individual Transmission Quality Measurement Subscription" resource within the TransQualMeasSubsc data structure; or
- an HTTP "204 No Content" status code.

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP PUT/PATCH response body, as specified in clause 6.4.7.

5.5.2.4 SDD_TransmissionQualityMeasurement_Unsubscribe

5.5.2.4.1 General

This service operation is used by a service consumer to request the deletion of a Transmission Quality Measurement Subscription at the SEALDD Server.

The following procedures are supported by the "SDD_TransmissionQualityMeasurement_Unsubscribe" service operation:

- Transmission Quality Measurement Subscription Deletion.

5.5.2.4.2 Transmission Quality Measurement Subscription Deletion

Figure 5.5.2.4.2-1 depicts a scenario where a service consumer sends a request to the SEALDD Server to delete an existing Transmission Quality Measurement Subscription (see also clause 9.7 of 3GPP TS 23.433 [7]).

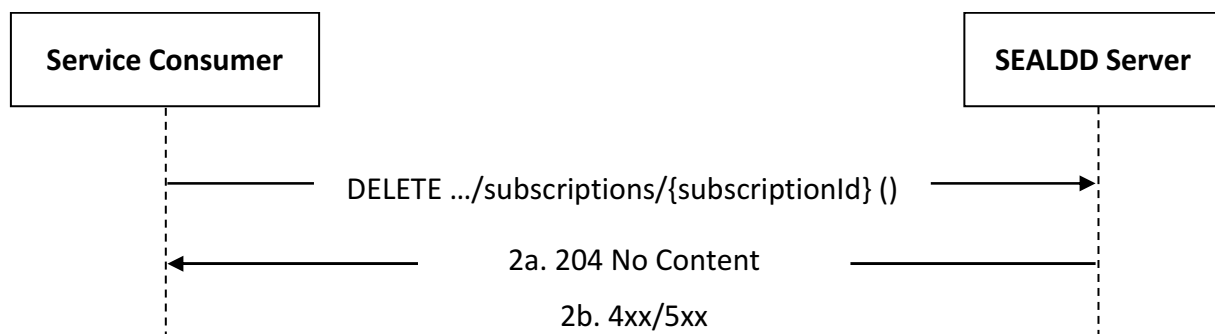


Figure 5.5.2.4.2-1: Procedure for Transmission Quality Measurement Subscription Deletion

1. In order to request the deletion of an existing transmission quality measurement subscription, the service consumer shall send an HTTP DELETE request to the SEALDD Server targeting the URI of the corresponding "Individual Transmission Quality Measurement Subscription" resource.

NOTE: An alternative service consumer (i.e. other than the one that requested the creation/update of the targeted resource) can initiate this request.

2a. Upon success, the SEALDD Server shall respond with an HTTP "204 No Content" status code.

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP DELETE response body, as specified in clause 6.4.7.

5.5.2.5 SDD_TransmissionQualityMeasurement_Notify

5.5.2.5.1 General

This service operation is used by a SEALDD Server to notify a previously subscribed service consumer on:

- transmission Quality Measurement report(s).

The following procedures are supported by the "SDD_TransmissionQualityMeasurement_Notify" service operation:

- Transmission Quality Measurement Notification.

5.5.2.5.2 Transmission Quality Measurement Notification

Figure 5.5.2.5.2-1 depicts a scenario where the SEALDD Server sends a request to notify a previously subscribed service consumer on Transmission Quality Measurement report(s) (see also clause 9.7 of 3GPP°TS°23.433°[7]).

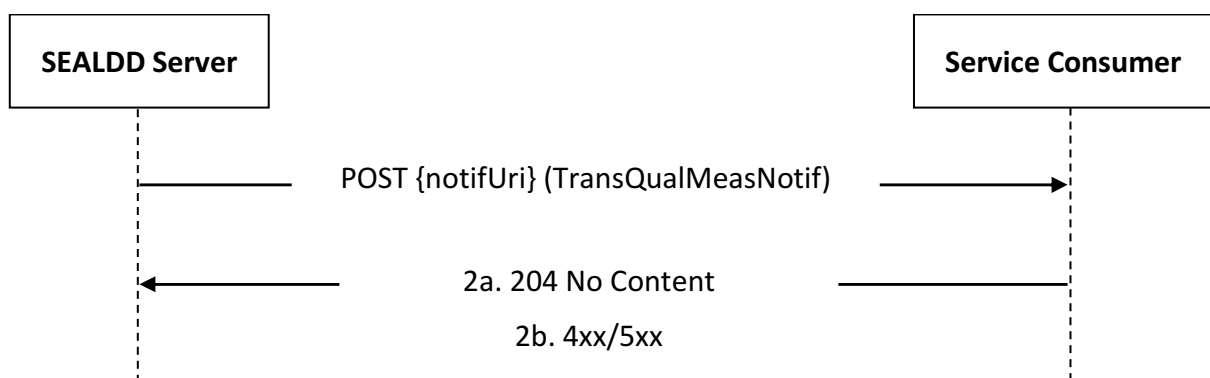


Figure 5.5.2.5.2-1: Procedure for Transmission Quality Measurement Notification

1. In order to notify a previously subscribed service consumer on Transmission Quality Measurement report(s), the SEALDD Server shall send an HTTP POST request to the service consumer with the request URI set to "{notifUri}", where the "notifUri" variable is set to the value received from the service consumer during the creation/update of the corresponding Transmission Quality Measurement Subscription using the procedures defined in clauses 5.5.2.2 and 5.5.2.3, and the request body including the TransQualMeasNotif data structure.
- 2a. Upon success, the service consumer shall respond to the SEALDD Server with an HTTP "204 No Content" status code to acknowledge the reception of the notification.
- 2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body, as specified in clause 6.4.7.

5.5.2.6 SDD_TransmissionQualityMeasurement_Query

5.5.2.6.1 General

This service operation is used by a service consumer to retrieve Historical Transmission Quality Measurement Report(s) from the SEALDD Server.

The following procedures are supported by the "SDD_TransmissionQualityMeasurement_Query" service operation:

- Historical Transmission Quality Measurement Report(s) Retrieval.

5.5.2.6.2 Historical Transmission Quality Measurement Report(s) Retrieval

Figure 5.5.2.6.2-1 depicts a scenario where a service consumer sends a request to the SEALDD Server to retrieve Historical Transmission Quality Measurement Report(s) (see also clause 9.7 of 3GPP°TS°23.433°[7]).

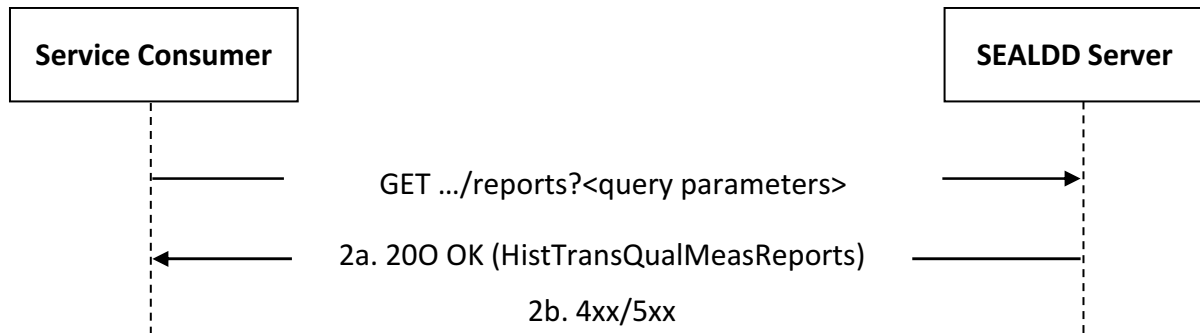


Figure 5.5.2.6.2-1: Procedure for Historical Transmission Quality Measurement Report(s) Retrieval

1. In order to retrieve Historical Transmission Quality Measurement Report(s), the service consumer shall send an HTTP GET request to the SEALDD Server targeting the URI of the "Historical Transmission Quality Measurement Reports" collection resource, with the request URI containing query parameter(s) to filter the responses from the SEALDD Server.
- 2a. Upon success, the SEALDD Server shall respond with an HTTP "200 OK" status code with the response body containing the requested Historical Transmission Quality Measurement Report(s) within the HistTransQualMeasReports data structure.
- 2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP GET response body, as specified in clause 6.4.7.

5.6 SDD_PolicyConfiguration

5.6.1 Service Description

The SDD_PolicyConfiguration service exposed by the SEALDD Server enables a service consumer to:

- create/update/delete a SEALDD Policy Configuration.

5.6.2 Service Operations

5.6.2.1 Introduction

The service operations defined for the SDD_PolicyConfiguration service are shown in table 5.6.2.1-1.

Table 5.6.2.1-1: SDD_PolicyConfiguration Service Operations

Service Operation Name	Description	Initiated by
SDD_PolicyConfiguration_Create	This service operation enables a service consumer to request the creation of a SEALDD Policy Configuration.	e.g., VAL Server, NSCE Server
SDD_PolicyConfiguration_Update	This service operation enables a service consumer to request the update of an existing SEALDD Policy Configuration.	e.g., VAL Server, NSCE Server
SDD_PolicyConfiguration_Delete	This service operation enables a service consumer to request the deletion of an existing SEALDD Policy Configuration.	e.g., VAL Server, NSCE Server

5.6.2.2 SDD_PolicyConfiguration_Create

5.6.2.2.1 General

This service operation is used by a service consumer to request the creation of a SEALDD Policy Configuration at the SEALDD Server.

The following procedures are supported by the "SDD_PolicyConfiguration_Create" service operation:

- Policy Configuration Creation.

5.6.2.2.2 Policy Configuration Creation

Figure 5.6.2.2.2-1 depicts a scenario where a service consumer sends a request to the SEALDD Server to request the creation of a SEALDD Policy Configuration (see also clause 9.10 of 3GPP TS 23.433 [7]).

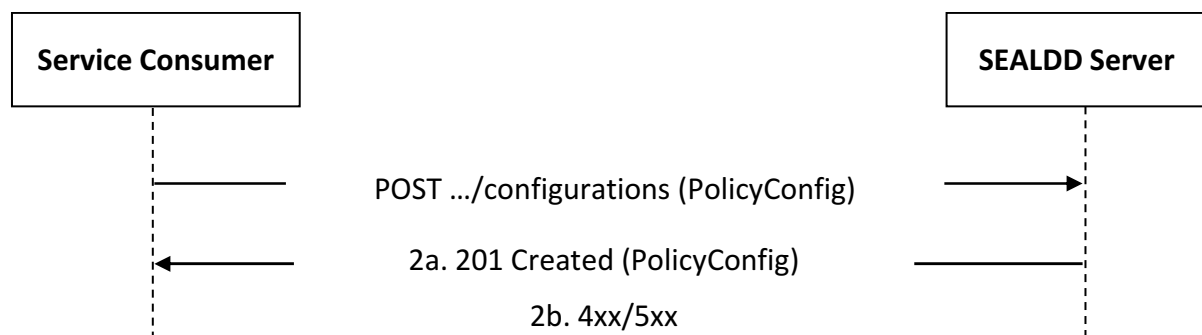


Figure 5.6.2.2.2-1: Procedure for Policy Configuration Creation

1. In order to create a new SEALDD Policy Configuration, the service consumer shall send an HTTP POST request to the SEALDD Server targeting the URI of the "Policy Configurations" collection resource, with the request body including the PolicyConfig data structure.
- 2a. Upon success, the SEALDD Server shall respond with an HTTP "201 Created" status code with the response body containing a representation of the created "Individual Policy Configuration" resource within the PolicyConfig data structure, and an HTTP "Location" header field containing the URI of the created resource.
- 2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body, as specified in clause 6.5.7.

5.6.2.3 SDD_PolicyConfiguration_Update

5.6.2.3.1 General

This service operation is used by a service consumer to request the update of an existing SEALDD Policy Configuration at the SEALDD Server.

The following procedures are supported by the "SDD_PolicyConfiguration_Update" service operation:

- Policy Configuration Update.

5.6.2.3.2 Policy Configuration Update

Figure 5.6.2.3.2-1 depicts a scenario where a service consumer sends a request to the SEALDD Server to request the update of an existing SEALDD Policy Configuration (see also clause 9.10 of 3GPP TS 23.433 [7]).

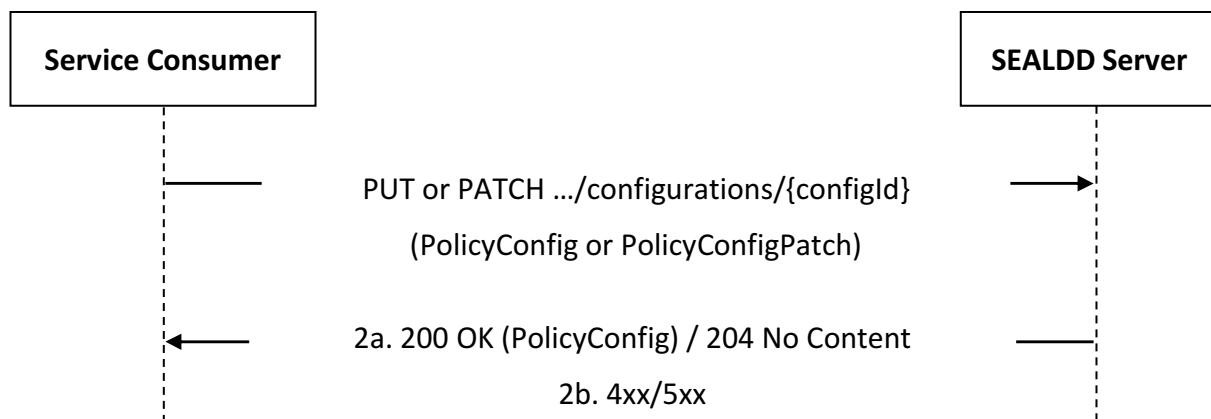


Figure 5.6.2.3.2-1: Procedure for Policy Configuration Update

1. In order to update an existing SEALDD Policy Configuration, the service consumer shall send an HTTP PUT/PATCH request to the SEALDD Server, targeting the URI of the corresponding "Individual Policy Configuration" resource, with the request body including either:
 - the updated representation of the resource within the PolicyConfig data structure, in case the HTTP PUT method is used; or
 - the requested modifications to the resource within the PolicyConfigPatch data structure, in case the HTTP PATCH method is used.

NOTE: An alternative service consumer (i.e. other than the one that requested the creation of the targeted resource) can initiate this request.

- 2a. Upon success, the SEALDD Server shall update the targeted "Individual Policy Configuration" resource accordingly and respond with either:

- an HTTP "200 OK" status code with the response body containing a representation of the updated "Individual Policy Configuration" resource within the PolicyConfig data structure; or

- an HTTP "204 No Content" status code.

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP PUT/PATCH response body, as specified in clause 6.5.7.

5.6.2.4 SDD_PolicyConfiguration_Delete

5.6.2.4.1 General

This service operation is used by a service consumer to request the deletion of an existing SEALDD Policy Configuration at the SEALDD Server.

The following procedures are supported by the "SDD_PolicyConfiguration_Delete" service operation:

- Policy Configuration Deletion.

5.6.2.4.2 Policy Configuration Deletion

Figure 5.6.2.4.2-1 depicts a scenario where a service consumer sends a request to the SEALDD Server to request the deletion of an existing SEALDD Policy Configuration (see also clause 9.10 of 3GPP TS 23.433[7]).

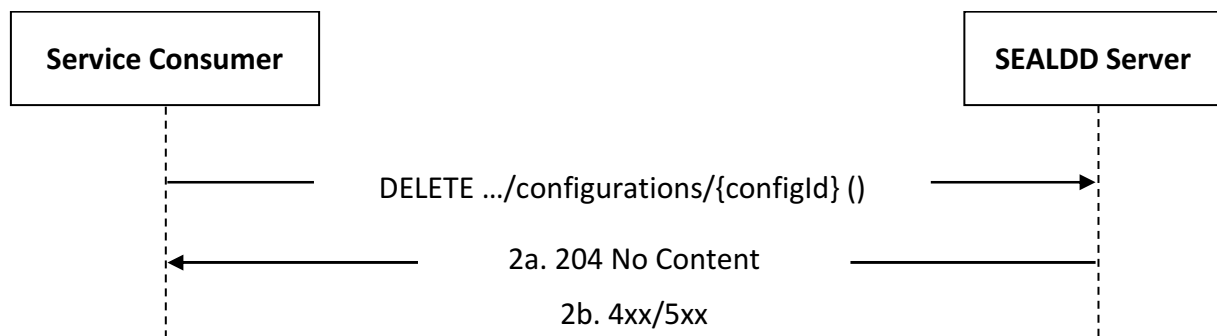


Figure 5.6.2.4.2-1: Procedure for Policy Configuration Deletion

1. In order to request the deletion of an existing SEALDD Policy Configuration, the service consumer shall send an HTTP DELETE request to the SEALDD Server targeting the URI of the corresponding "Individual Policy Configuration" resource.

NOTE: An alternative service consumer (i.e. other than the one that requested the creation of the targeted resource) can initiate this request.

2a. Upon success, the SEALDD Server shall respond with an HTTP "204 No Content" status code.

2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP DELETE response body, as specified in clause 6.5.7.

5.7 SDD_BDT

5.7.1 Service Description

The SDD_BDT service exposed by the SEALDD Server enables a service consumer to:

- subscribe/update/delete a SEALDD BDT Subscription; and
- receive BDT related event(s) notifications.

5.7.2 Service Operations

5.7.2.1 Introduction

The service operations defined for the SDD_BDT service are shown in table 5.7.2.1-1.

Table 5.7.2.1-1: SDD_BDT Service Operations

Service Operation Name	Description	Initiated by
SDD_BDT_Subscribe	This service operation enables a service consumer to request the creation of a SEALDD BDT Subscription.	e.g., VAL Server
SDD_BDT_Update	This service operation enables a service consumer to request the update of an existing SEALDD BDT Subscription.	e.g., VAL Server
SDD_BDT_Delete	This service operation enables a service consumer to request the deletion of an existing SEALDD BDT Subscription.	e.g., VAL Server
SDD_BDT_Notify	This service operation enables a service consumer to receive BDT related event(s) notifications.	SEALDD Server

5.7.2.2 SDD_BDT_Subscribe

5.7.2.2.1 General

This service operation is used by a service consumer to request the creation of a SEALDD BDT Subscription at the SEALDD Server.

The following procedures are supported by the "SDD_BDT_Subscribe" service operation:

- BDT Subscription Creation.

5.7.2.2.2 BDT Subscription Creation

Figure 5.7.2.2.2-1 depicts a scenario where a service consumer sends a request to the SEALDD Server to request the creation of a SEALDD BDT Subscription (see also clause 9.11 of 3GPP°TS°23.433°[7]).

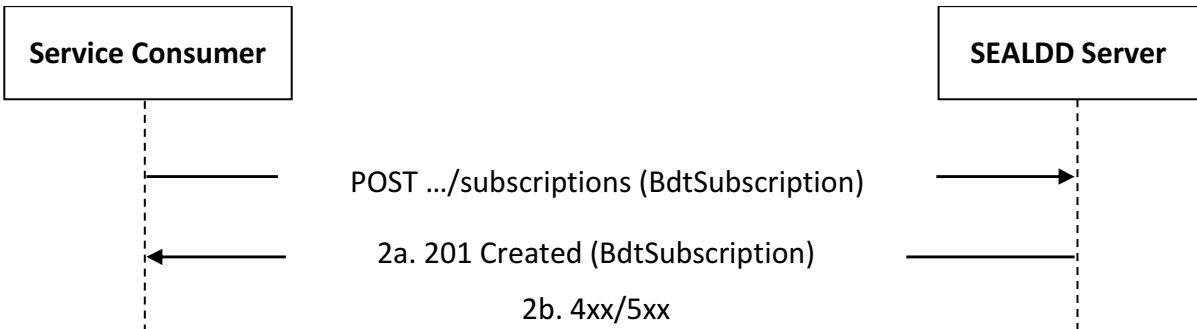


Figure 5.7.2.2.2-1: Procedure for BDT Subscription Creation

1. In order to create a new SEALDD BDT Subscription, the service consumer shall send an HTTP POST request to the SEALDD Server targeting the URI of the "BDT Subscriptions" collection resource, with the request body including the BdtSubscription data structure.
- 2a. Upon success, the SEALDD Server shall respond with an HTTP "201 Created" status code with the response body containing a representation of the created "Individual BDT Subscription" resource within the BdtSubscription data structure, and an HTTP "Location" header field containing the URI of the created resource.
- 2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body, as specified in clause 6.6.7.

5.7.2.3 SDD_BDT_Update

5.7.2.3.1 General

This service operation is used by a service consumer to request the update of an existing SEALDD BDT Subscription at the SEALDD Server.

The following procedures are supported by the "SDD_BDT_Update" service operation:

- BDT Subscription Update.

5.7.2.3.2 BDT Subscription Update

Figure 5.7.2.3.2-1 depicts a scenario where a service consumer sends a request to the SEALDD Server to request the update of an existing SEALDD BDT Subscription (see also clause 9.11 of 3GPP TS 23.433[7]).

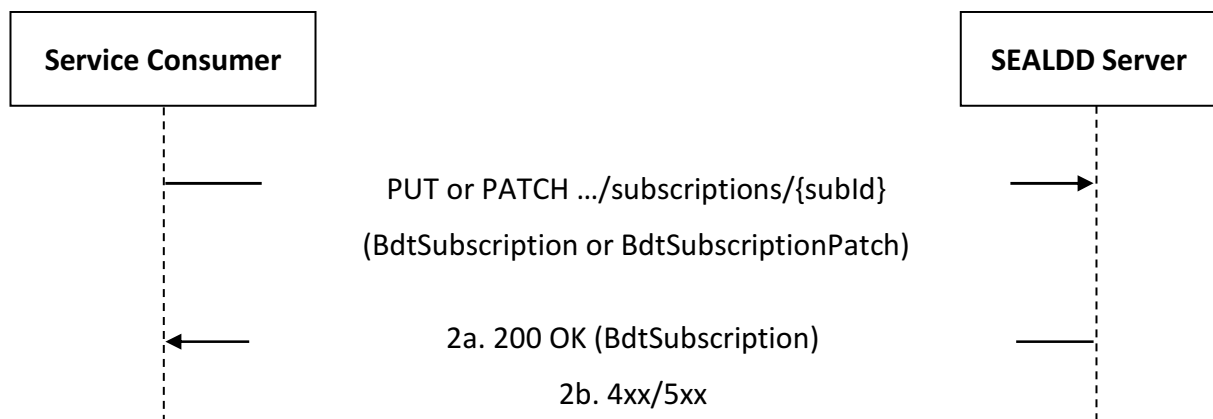


Figure 5.7.2.3.2-1: Procedure for SDD Subscription Update

1. In order to update an existing SEALDD BDT Subscription, the service consumer shall send an HTTP PUT/PATCH request to the SEALDD Server, targeting the URI of the corresponding "Individual BDT Subscription" resource, with the request body including either:
 - the updated representation of the resource within the BdtSubscription data structure, in case the HTTP PUT method is used; or
 - the requested modifications to the resource within the BdtSubscriptionPatch data structure, in case the HTTP PATCH method is used.
- 2a. Upon success, the SEALDD Server shall update the targeted "Individual BDT Subscription" resource accordingly and respond with either:
 - an HTTP "200 OK" status code with the response body containing a representation of the updated "Individual BDT Subscription" resource within the BdtSubscription data structure; or
 - an HTTP "204 No Content" status code.

- 2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP PUT/PATCH response body, as specified in clause 6.6.7.

5.7.2.4 SDD_BDT_Delete

5.7.2.4.1 General

This service operation is used by a service consumer to request the deletion of an existing SEALDD BDT Subscription at the SEALDD Server.

The following procedures are supported by the "SDD_BDT_Delete" service operation:

- BDT Subscription Deletion.

5.7.2.4.2 BDT Subscription Deletion

Figure 5.7.2.4.2-1 depicts a scenario where a service consumer sends a request to the SEALDD Server to request the deletion of an existing SEALDD BDT Subscription (see also clause 9.11 of 3GPP TS 23.433[7]).

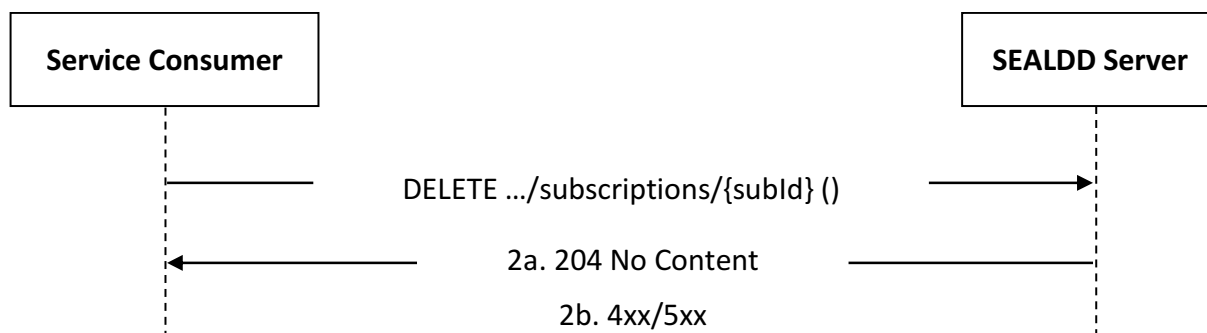


Figure 5.7.2.4.2-1: Procedure for SDD Subscription Deletion

1. In order to request the deletion of an existing SEALDD BDT Subscription, the service consumer shall send an HTTP DELETE request to the SEALDD Server targeting the URI of the corresponding "Individual BDT Subscription" resource.
- 2a. Upon success, the SEALDD Server shall respond with an HTTP "204 No Content" status code.
- 2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP DELETE response body, as specified in clause 6.6.7.

5.7.2.5 SDD_BDT_Notify

5.7.2.5.1 General

This service operation is used by a SEALDD Server to notify a previously subscribed service consumer on:

- BDT related event(s).

The following procedures are supported by the "SDD_BDT_Notify" service operation:

- BDT Notification.

5.7.2.5.2 BDT Notification

Figure 5.7.2.5.2-1 depicts a scenario where the SEALDD Server sends a request to notify a previously subscribed service consumer on BDT related event(s) (see also clause 9.11 of 3GPP TS 23.433[7]).

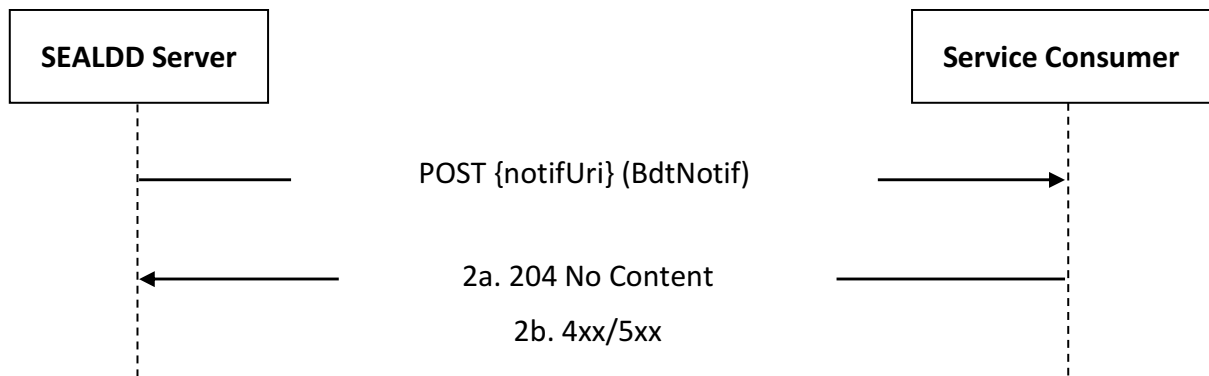


Figure 5.7.2.5.2-1: Procedure for BDT Notification

1. In order to notify a previously subscribed service consumer on BDT related event(s), the SEALDD Server shall send an HTTP POST request to the service consumer with the request URI set to "{notifUri}", where the "notifUri" variable is set to the value received from the service consumer during the creation/update of the corresponding BDT Subscription using the procedures defined in clauses 5.7.2.2 and 5.7.2.3, and the request body including the BdtNotif data structure.
- 2a. Upon success, the service consumer shall respond to the SEALDD Server with an HTTP "204 No Content" status code to acknowledge the successful reception of the notification.
- 2b. On failure, the appropriate HTTP status code indicating the error shall be returned and appropriate additional error information should be returned in the HTTP POST response body, as specified in clause 6.6.7.

6 API Definitions

6.1 SDD_Transmission Service API

6.1.1 Introduction

The SDD_Transmission service shall use the SDD_Transmission API.

The API URI of the SDD_Transmission API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 6.5 of 3GPP TS 29.549 [15], i.e.:

{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>

with the following components:

- The {apiRoot} shall be set as described in clause 6.5 of 3GPP TS 29.549 [15].
- The <apiName> shall be "sdd-trans".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 6.5 of 3GPP TS 29.549 [15].

NOTE: When 3GPP TS 29.122 [2] is referenced for the common protocol and interface aspects for API definition in the clauses under clause 6.1, the SEALDD Server takes the role of the SCEF and the service consumer takes the role of the SCS/AS.

6.1.2 Usage of HTTP

The provisions of clause 6.3 of 3GPP TS 29.549 [15] shall apply for the SDD_Transmission API.

6.1.3 Resources

6.1.3.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 6.1.3.1-1 depicts the resource URIs structure for the SDD_Transmission API.

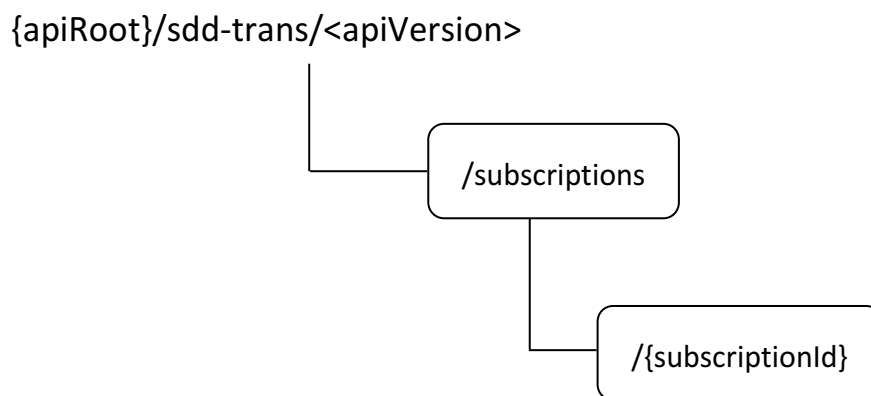


Figure 6.1.3.1-1: Resource URI structure of the SDD_Transmission API

Table 6.1.3.1-1 provides an overview of the resources and applicable HTTP methods.

Table 6.1.3.1-1: Resources and methods overview

Resource purpose/name	Resource URI (relative path after API URI)	HTTP method or custom operation	Description (service operation)
Connection Status Subscriptions	/subscriptions	POST	Request the creation of a new Connection Status Subscription.
Individual Connection Status Subscription	/subscriptions/{subscriptionId}	GET	Retrieve an existing "Individual Connection Status Subscription" resource.
		PUT	Request the update of an existing "Individual Connection Status Subscription" resource.
		PATCH	Request the modification of an existing "Individual Connection Status Subscription" resource.
		DELETE	Request the deletion of an existing "Individual Connection Status Subscription" resource.

6.1.3.2 Resource: Connection Status Subscriptions

6.1.3.2.1 Description

This resource represents the collection of Connection Status Subscription(s) managed by the SEALDD Server.

6.1.3.2.2 Resource Definition

Resource URI: {apiRoot}/sdd-trans/<apiVersion>/subscriptions

This resource shall support the resource URI variables defined in table 6.1.3.2.2-1.

Table 6.1.3.2.2-1: Resource URI variables for this resource

Name	Data type	Definition
apiRoot	string	See clause 6.1.1.

6.1.3.2.3 Resource Standard Methods

6.1.3.2.3.1 POST

The HTTP POST method enables a service consumer to request the creation of a new Connection Status Subscription at the SEALDD Server.

This method shall support the URI query parameters specified in table 6.1.3.2.3.1-1.

Table 6.1.3.2.3.1-1: URI query parameters supported by the POST method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.1.3.2.3.1-2 and the response data structures and response codes specified in table 6.1.3.2.3.1-3.

Table 6.1.3.2.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
ConnStatusSubsc	M	1	Represents the parameters to request the creation of a Connection Status Subscription.

Table 6.1.3.2.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
ConnStatusSubsc	M	1	201 Created	Successful case. The Connection Status Subscription is successfully created and a representation of the created "Individual Connection Status Subscription" resource shall be returned in the response body. An HTTP "Location" header that contains the URI of the created resource shall also be included.
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.1.3.2.3.1-4: Headers supported by the 201 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains the URI of the newly created resource, according to the structure: {apiRoot}/sdd-trans/<apiVersion>/subscriptions/{subscriptionId}

6.1.3.2.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

6.1.3.3 Resource: Individual Connection Status Subscription

6.1.3.3.1 Description

This resource represents a Connection Status Subscription managed by the SEALDD Server.

6.1.3.3.2 Resource Definition

Resource URI: {apiRoot}/sdd-trans/<apiVersion>/subscriptions/{subscriptionId}

This resource shall support the resource URI variables defined in table 6.1.3.3.2-1.

Table 6.1.3.3.2-1: Resource URI variables for this resource

Name	Data type	Definition
apiRoot	string	See clause 6.1.1.
subscriptionId	string	Represents the identifier of the "Individual Connection Status Subscription" resource.

6.1.3.3.3 Resource Standard Methods

6.1.3.3.3.1 GET

The HTTP GET method allows a service consumer to retrieve an existing "Individual Connection Status Subscription" resource at the SEALDD Server.

This method shall support the URI query parameters specified in table 6.1.3.3.3.1-1.

Table 6.1.3.3.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.1.3.3.3.1-2 and the response data structures and response codes specified in table 6.1.3.3.3.1-3.

Table 6.1.3.3.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 6.1.3.3.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
ConnStatusSubsc	M	1	200 OK	Successful case. The requested "Individual Connection Status Subscription" resource shall be returned.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.1.3.3.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

Table 6.1.3.3.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

6.1.3.3.3.2 PUT

The HTTP PUT method allows a service consumer to request the update of an existing "Individual Connection Status Subscription" resource at the SEALDD Server.

This method shall support the URI query parameters specified in table 6.1.3.3.3.2-1.

Table 6.1.3.3.2-1: URI query parameters supported by the PUT method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.1.3.3.2-2 and the response data structures and response codes specified in table 6.1.3.3.2-3.

Table 6.1.3.3.2-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
ConnStatusSubsc	M	1	Represents the updated representation of the "Individual Connection Status Subscription" resource.

Table 6.1.3.3.2-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
ConnStatusSubsc	M	1	200 OK	Successful case. The "Individual Connection Status Subscription" resource is successfully updated and a representation of the updated resource shall be returned in the response body.
n/a			204 No Content	Successful case. The "Individual Connection Status Subscription" resource is successfully updated and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.1.3.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

Table 6.1.3.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

6.1.3.3.3 PATCH

The HTTP PATCH method allows a service consumer to request the modification of an existing "Individual Connection Status Subscription" resource at the SEALDD Server.

This method shall support the URI query parameters specified in table 6.1.3.3.3.3-1.

Table 6.1.3.3.3.3-1: URI query parameters supported by the PATCH method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.1.3.3.3.3-2 and the response data structures and response codes specified in table 6.1.3.3.3.3-3.

Table 6.1.3.3.3.3-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
ConnStatusSubscPatch	M	1	Represents the parameters to request the modification of the "Individual Connection Status Subscription" resource.

Table 6.1.3.3.3.3-3: Data structures supported by the PATCH Response Body on this resource

Data type	P	Cardinality	Response codes	Description
ConnStatusSubsc	M	1	200 OK	Successful case. The "Individual Connection Status Subscription" resource is successfully modified and a representation of the updated resource shall be returned in the response body.
n/a			204 No Content	Successful case. The "Individual Connection Status Subscription" resource is successfully modified and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.1.3.3.3.3-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

Table 6.1.3.3.3.3-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

6.1.3.3.3.4 DELETE

The HTTP DELETE method allows a service consumer to request the deletion of an existing "Individual Connection Status Subscription" resource at the SEALDD Server.

This method shall support the URI query parameters specified in table 6.1.3.3.3.4-1.

Table 6.1.3.3.3.4-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.1.3.3.3.4-2 and the response data structures and response codes specified in table 6.1.3.3.3.4-3.

Table 6.1.3.3.3.4-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 6.1.3.3.3.4-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The "Individual Connection Status Subscription" resource is successfully deleted.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.1.3.3.3.4-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

Table 6.1.3.3.3.4-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

6.1.3.3.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

6.1.4 Custom Operations without associated resources

6.1.4.1 Overview

The structure of the custom operation URIs of the SDD_Transmission API is shown in Figure 6.1.4.1-1.

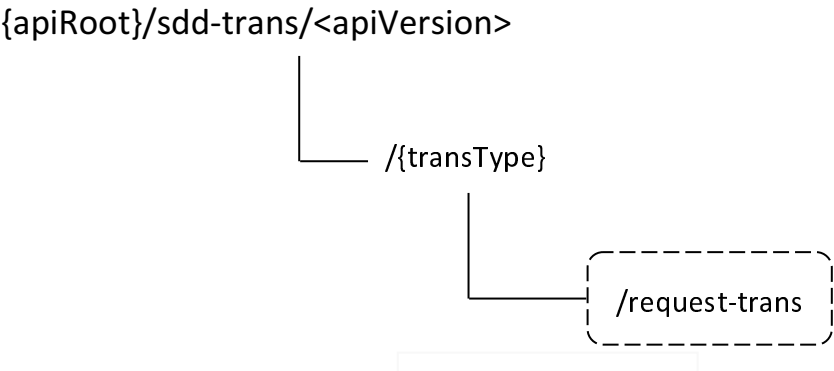


Figure 6.1.4.1-1: Custom operation URI structure of the SDD_Transmission API

Table 6.1.4.1-1 provides an overview of the custom operations and applicable HTTP methods defined for the SDD_Transmission API.

Table 6.1.4.1-1: Custom operations without associated resources

Custom operation name	Custom operation URI	Mapped HTTP method	Description
RequestTrans	/ {transType}/request-trans	POST	Enables a service consumer to request SEALDD enabled application data transmission.

The custom operations shall support the URI variables defined in table 6.1.4.1-2.

Table 6.1.4.1-2: URI variables for this custom operation

Name	Data type	Definition
apiRoot	string	See clause 6.1.1.
transType	TransType	Represents the requested transmission type (i.e., "regular" for Regular application data transmission, "urllc" for URLLC application data transmission, "mm" for Multi-modal application data transmission or "satellite" for S&F Satellite application data transmission).

6.1.4.2 Operation: RequestTrans

6.1.4.2.1 Description

The custom operation enables a service consumer to request SEALDD enabled application data transmission to the SEALDD Server.

6.1.4.2.2 Operation Definition

This operation shall support the request data structures specified in table 6.1.4.2.2-1 and the response data structures and response codes specified in table 6.1.4.2.2-2.

Table 6.1.4.2.2-1: Data structures supported by the POST Request Body on this custom operation

Data type	P	Cardinality	Description
TransReq	M	1	Contains the parameters to request SEALDD enabled application data transmission.

Table 6.1.4.2.2-2: Data structures supported by the POST Response Body on this custom operation

Data type	P	Cardinality	Response codes	Description
TransResp	M	1	200 OK	Successful case. The SEALDD enabled application data transmission service request is successfully received and processed, and SEALDD enabled application data transmission related information shall be returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.1.4.2.2-3: Headers supported by the 307 Response Code on this custom operation

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative target URI located in an alternative SEALDD Server.

Table 6.1.4.2.2-4: Headers supported by the 308 Response Code on this custom operation

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative target URI located in an alternative SEALDD Server.

6.1.5 Notifications

6.1.5.1 General

Notifications shall comply to clause 6.6 of 3GPP TS 29.549 [15].

Table 6.1.5.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
Connection Status Notification	{notifUri}	POST	Enables a SEALDD Server to notify a previously subscribed service consumer on SEALDD connection status event(s).

6.1.5.2 Connection Status Notification

6.1.5.2.1 Description

The Connection Status Notification is used by the SEALDD Server to notify a previously subscribed service consumer on SEALDD connection status event(s).

6.1.5.2.2 Target URI

The Callback URI "{notifUri}" shall be used with the callback URI variables defined in table 6.1.5.2.2-1.

Table 6.1.5.2.2-1: Callback URI variables

Name	Definition
notifUri	Represents the callback URI encoded as a string formatted as URI.

6.1.5.2.3 Standard Methods

6.1.5.2.3.1 POST

This method shall support the request data structures specified in table 6.1.5.2.3.1-1 and the response data structures and response codes specified in table 6.1.5.2.3.1-2.

Table 6.1.5.2.3.1-1: Data structures supported by the POST Request Body

Data type	P	Cardinality	Description
ConnStatusNotif	M	1	Represents the SEALDD Connection Status Notification.

Table 6.1.5.2.3.1-2: Data structures supported by the POST Response Body

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The Connection Status Notification is successfully received.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative service consumer towards which the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative service consumer towards which the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.1.5.2.3.1-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative service consumer towards which the notification should be redirected.

Table 6.1.5.2.3.1-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative service consumer towards which the notification should be redirected.

6.1.6 Data Model

6.1.6.1 General

This clause specifies the application data model supported by the API.

Table 6.1.6.1-1 specifies the data types defined for the SDD_Transmission API.

Table 6.1.6.1-1: SDD_Transmission API specific Data Types

Data type	Clause defined	Description	Applicability
ClientConnStatus	6.1.6.3.5	Represents the connection status of a SEALDD Client.	SEALDD_2, 5GSATApp
ConnEstabData	6.1.6.2.12	Represents SEALDD connection status establishment data.	
ConnStatusEvent	6.1.6.3.3	Represents a Connection Status Event.	
ConnInfo	6.1.6.2.4	Represents the SEALDD connection information.	
ConnStatusNotif	6.1.6.2.10	Represents a Connection Status Notification.	
ConnStatusReport	6.1.6.2.11	Represents a Connection Status Event report.	
ConnStatusSubsc	6.1.6.2.8	Represents a Connection Status Subscription.	
ConnStatusSubscPatch	6.1.6.2.9	Represents the requested modifications to a Connection Status Subscription.	
DLDelInstructions	6.1.6.3.6	Represents the DL data delivery instructions.	5GSATApp
MultiModalFlowInfo	6.1.6.2.15	Represents the multi-modal flow related application data transmission information.	XRMAApp
ProtocolDesc	6.1.6.2.13	Represents the protocol description information for Multi-modal application data transmission.	XRMAApp
QoSInfo	6.1.6.2.5	Represents SEALDD related QoS requirements.	
SatConnStatusSubsc	6.1.6.2.14	Represents a Connection Status Subscription relative to the S&F Satellite application data transmission.	5GSATApp
TransReq	6.1.6.2.2	Represents the parameters to request SEALDD enabled application data transmission service.	
TransResp	6.1.6.2.3	Represents a SEALDD enabled application data transmission service response.	
TransType	6.1.6.3.4	Represents the requested transmission type (i.e., Regular transmission or URLLC transmission).	
ValServBdw	6.1.6.2.6	Represents VAL Server related bandwidth information.	
ValUsersBdw	6.1.6.2.7	Represents VAL users related bandwidth information.	

Table 6.1.6.1-2 specifies data types re-used by the SDD_Transmission API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the SDD_Transmission API.

Table 6.1.6.1-2: SDD_Transmission API re-used Data Types

Data type	Reference	Comments	Applicability
AlternativeServiceRequirementsData	3GPP TS 29.514 [19]	Represents alternative QoS related service requirements.	
Bandwidth	3GPP TS 29.122 [2]	Represents a bandwidth.	
DateTime	3GPP TS 29.122 [2]	Represents a date and a time.	
DateTimeRo	3GPP TS 29.122 [2]	Represents a date and a time with the read-only property.	
DurationSec	3GPP TS 29.122 [2]	Represents a time duration in seconds.	
Ipv4Addr	3GPP TS 29.122 [2]	Represents an IPv4 address.	
Ipv6Addr	3GPP TS 29.122 [2]	Represents an IPv6 address.	
MultiModalId	3GPP TS 29.514 [19]	Represents the identifier of a multi-modal service.	XRMAApp
Non3gppAccessMeasPol	Clause 6.5.6.2.11	Represents the non-3GPP access measurement policy.	SEALDD_2
Port	3GPP TS 29.122 [2]	Represents an IP port.	
ProtocolDescription	3GPP TS 29.571 [18]	Represents the protocol description information.	XRMAApp
SupportedFeatures	3GPP TS 29.571 [18]	Represents the list of supported feature(s) and used to negotiate the applicability of the optional features.	
Uri	3GPP TS 29.122 [2]	Represents a URI.	
ValTargetUe	3GPP TS 29.549 [15]	Represents the identifier of the targeted VAL UE or VAL user.	

6.1.6.2 Structured data types

6.1.6.2.1 Introduction

This clause defines the structures to be used in resource representations.

6.1.6.2.2 Type: TransReq

Table 6.1.6.2.2-1: Definition of type TransReq

Attribute name	Data type	P	Cardinality	Description	Applicability
valServiceId	string	O	0..1	Contains the identifier of the target VAL service.	
valTargetId	ValTargetUe	O	0..1	Contains the identifier of the target VAL UE or VAL user.	
valServerConnInfo	ConnInfo	C	0..1	Contains the VAL Server's side SEALDD-S connection information, i.e., address/port and/or URI via which the VAL Server desires to receive the traffic from the SEALDD Server. (NOTE)	
multiModalId	MultiModalId	O	0..1	Contains the identifier of the multi-modal service.	XRMAApp
multiModalFlows	array(MultiModalFlowInfo)	C	1..N	Contains the requested multi-modal flow(s) related application data transmission information. (NOTE)	XRMAApp
qosInfo	QosInfo	O	0..1	Contains the requested QoS requirements for the application data transmission. (NOTE)	
valServerBdw	ValServBdw	O	0..1	Contains the total UL/DL bandwidth limit of the VAL Server.	
valUsersBdw	ValUsersBdw	O	0..1	Contains the UL/DL bandwidth limits for VAL users.	
connStatusSubsc	SatConnStatusSubsc	O	0..1	Contains the connection status subscription information.	5GSATApp
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported features among the ones defined in clause 6.1.8. This attribute shall be present only when feature negotiation needs to take place.	
NOTE: When the "XRMAApp" feature is supported, the "valServerConnInfo" and "multiModalFlows" attributes are mutually exclusive and only one of them shall be present, and the "qosInfo" attribute and the "multiModalFlows" attribute are mutually exclusive.					

6.1.6.2.3 Type: TransResp

Table 6.1.6.2.3-1: Definition of type TransResp

Attribute name	Data type	P	Cardinality	Description	Applicability
ddServerConnInfo	ConnInfo	C	0..1	Contains the SEALDD Server's side SEALDD-S connection information, i.e., address/port and/or URI via which the SEALDD Server desires to receive the traffic from the VAL Server. This attribute shall be provided, if needed.	
connStatusSubsc	SatConnStatusSubsc	O	0..1	Contains the created connection status subscription information.	5GSATApp
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported features among the ones defined in clause 6.1.8. This attribute shall be present only when feature negotiation needs to take place.	

6.1.6.2.4 Type: ConnInfo

Table 6.1.6.2.4-1: Definition of type ConnInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
ipv4Addr	Ipv4Addr	C	0..1	Contains the IPv4 address. (NOTE)	
ipv6Addr	Ipv6Addr	C	0..1	Contains the IPv6 address. (NOTE)	
port	Port	O	0..1	Contains the port information. This attribute may be present only when either the "ipv4Addr" attribute or the "ipv6Addr" attribute is present.	
uri	Uri	C	0..1	Contains the URI. (NOTE)	
NOTE: These attributes are mutually exclusive. Either one of them shall be present.					

6.1.6.2.5 Type: QosInfo

Table 6.1.6.2.5-1: Definition of type QosInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
qosReference	string	C	0..1	Contains a reference to a pre-defined QoS information set. (NOTE 1, NOTE 3)	
altQoSReferences	array(string)	C	1..N	Contains an ordered list of identifier(s) of pre-defined QoS information set(s). The lower the index of the array for a given entry, the higher the priority of this entry. (NOTE 1, NOTE 2)	
altQosReqs	array(AlternativeServiceRequirementsData)	C	1..N	Contains an ordered list of alternative service requirements that include individual QoS parameter set(s). The lower the index of the array for a given entry, the higher the priority of this entry. (NOTE 1, NOTE 2, NOTE 3)	

NOTE 1: At least one of these attributes shall be provided.

NOTE 2: These attributes are mutually exclusive.

NOTE 3: These attributes are mutually exclusive.

6.1.6.2.6 Type: ValServBdw

Table 6.1.6.2.6-1: Definition of type ValServBdw

Attribute name	Data type	P	Cardinality	Description	Applicability
totalUIBdw	Bandwidth	M	1	Contains the total UL bandwidth of the VAL Server.	
totalDIBdw	Bandwidth	M	1	Contains the total DL bandwidth of the VAL Server.	

6.1.6.2.7 Type: ValUsersBdw

Table 6.1.6.2.7-1: Definition of type ValUserBdw

Attribute name	Data type	P	Cardinality	Description	Applicability
minUIBdw	Bandwidth	M	1	Contains the minimum UL bandwidth for VAL users.	
minDIBdw	Bandwidth	M	1	Contains the minimum DL bandwidth for VAL users.	
maxUIBdw	Bandwidth	M	1	Contains the maximum UL bandwidth for VAL users.	
maxDIBdw	Bandwidth	M	1	Contains the maximum DL bandwidth for VAL users.	

6.1.6.2.8 Type: ConnStatusSubsc

Table 6.1.6.2.8-1: Definition of type ConnStatusSubsc

Attribute name	Data type	P	Cardinality	Description	Applicability
events	array(ConnStatusEvent)	M	1..N	Contains the list of the subscribed event(s).	
valServiceId	string	O	0..1	Contains the identity of the target VAL service. When the "SEALDD_2" feature is supported, this attribute shall be present when one of the subscribed events within the "events" attribute is "CLIENT_CONN_STATUS".	
valTgtUe	ValTargetUe	O	0..1	Contains the targeted VAL UE or VAL user.	
valServerConnInfo	ConnInfo	M	1	Contains the SEALDD-S connection information.	
immRep	boolean	O	0..1	Contains the immediate reporting indication. - "true" indicates that immediate reporting is requested. - "false" indicates that immediate reporting is not requested. - The default value is "false" when this attribute is omitted.	SEALDD_2, 5GSATApp
reports	array(ConnStatusReport)	C	1..N	Contains the connection status event report(s). This attribute may be present only in the response to a subscription creation/update request and only if the "immRep" attribute of the corresponding subscription resource representation is present and set to "true".	SEALDD_2, 5GSATApp
connStatusPer	DurationSec	O	0..1	Represents the periodicity to be used for the SEALDD Client connection status reporting. This attribute may be present only if one of the subscribed events within the "events" attribute is "CLIENT_CONN_STATUS".	SEALDD_2, 5GSATApp
notifUri	Uri	M	1	Contains the URI via which the Connection Status notifications shall be delivered.	
expTime	DateTimeRo	O	0..1	Contains the subscription's expiration time. This attribute may be present only in the response to a SEALDD Connection Status Subscription creation/update request.	
non3gppMeasInfo	Non3gppAccessMeasPol	O	0..1	Contains the Non-3GPP access measurement information.	SEALDD_2
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported features among the ones defined in clause 6.1.8. This attribute shall be present only when the feature negotiation needs to take place.	

6.1.6.2.9 Type: ConnStatusSubscPatch

Table 6.1.6.2.9-1: Definition of type ConnStatusSubscPatch

Attribute name	Data type	P	Cardinality	Description	Applicability
events	array(ConnStatusEvent)	O	1..N	Contains the updated list of the subscribed event(s).	
valServiceId	string	O	0..1	Contains the identity of the VAL service.	
valTgtUe	ValTargetUe	O	0..1	Contains the targeted VAL UE or VAL user.	
valServerConnInfo	ConnInfo	O	0..1	Contains the updated SEALDD-S connection information.	
connStatusPer	DurationSec	O	0..1	Represents the updated periodicity to be used for the SEALDD Client connection status reporting. This attribute may be present only if one of the subscribed events within the "events" attribute is "CLIENT_CONN_STATUS".	SEALDD_2, 5GSATApp
notifUri	Uri	O	0..1	Contains the updated URI via which the Connection Status notifications shall be delivered.	

6.1.6.2.10 Type: ConnStatusNotif

Table 6.1.6.2.10-1: Definition of type ConnStatusNotif

Attribute name	Data type	P	Cardinality	Description	Applicability
subscriptionId	string	M	1	Contains the identifier of the subscription to which the Connection Status notification is related.	
reports	array(ConnStatusReport)	M	1..N	Contains the connection status event report(s).	

6.1.6.2.11 Type: ConnStatusReport

Table 6.1.6.2.11-1: Definition of type ConnStatusReport

Attribute name	Data type	P	Cardinality	Description	Applicability
event	ConnStatusEvent	M	1	Contains the reported connection status event.	
valTgtUe	ValTargetUe	M	1	Contains the VAL UE or VAL user to which the connection status event report is related.	
valServiceId	string	M	1	Contains the identity of the VAL service to which the connection status event report is related.	
connEstData	ConnEstabData	C	0..1	Contains the SEALDD connection establishment data. This attribute shall be present only if the "event" attribute is set to "ESTABLISHED".	
clientConnStat	ClientConnStatus	C	0..1	Contains the connection status of the SEALDD Client. This attribute shall be present only if the "event" attribute is set to "CLIENT_CONN_STATUS".	SEALDD_2, 5GSATApp
congestLevel	integer	C	0..1	Contains the congestion level of the VAL service, i.e., the current load level of the VAL Service expressed as a percentage. Minimum: 0, Maximum: 100. This attribute shall be present only if the "event" attribute is set to "CONGESTION".	SEALDD_2
dlDelInstrucs	DLDelInstructions	C	0..1	Contains the DL data transmission instructions. This attribute shall be present only if the "event" attribute is set to "DL_DEL_INSTRUCTIONS".	5GSATApp
timestamp	DateTime	O	0..1	Contains the timestamp of this SEALDD connection status report.	

6.1.6.2.12 Type: ConnEstabData

Table 6.1.6.2.12-1: Definition of type ConnEstabData

Attribute name	Data type	P	Cardinality	Description	Applicability
ddServerConnInfo	ConnInfo	M	1	Contains the SEALDD Server's side SEALDD-S connection information, i.e., address/port and/or URI via which the SEALDD Server sends/receives the traffic.	
comLifetime	DurationSec	O	0..1	Contains the SEALDD communication lifetime.	

6.1.6.2.13 Type: ProtocolDesc

Table 6.1.6.2.13-1: Definition of type ProtocolDesc

Attribute name	Data type	P	Cardinality	Description	Applicability
dlDescInfo	ProtocolDescription	C	0..1	Contains the protocol description information for the downlink direction. (NOTE)	
ulDescInfo	ProtocolDescription	C	0..1	Contains the protocol description information for the uplink direction. (NOTE)	
packetizationInd	boolean	O	0..1	Contains the packetization indication. - "true" indicates that packetization is requested. - "false" indicates that packetization is not requested. - The default value is "false" when this attribute is omitted.	
NOTE: At least one of these attributes shall be present.					

6.1.6.2.14 Type: SatConnStatusSubsc

Table 6.1.6.2.14-1: Definition of type SatConnStatusSubsc

Attribute name	Data type	P	Cardinality	Description	Applicability
events	array(ConnStatusEvent)	M	1..N	Contains the list of the subscribed event(s).	
valServiceId	string	O	0..1	Contains the identity of the target VAL service. This attribute shall be present when one of the subscribed events within the "events" attribute is the "CLIENT_CONN_STATUS".	
valTgtUe	ValTargetUe	O	0..1	Contains the targeted VAL UE or VAL user.	
valServerConnInfo	ConnInfo	M	1	Contains the SEALDD-S data transmission connection information.	
immRep	boolean	O	0..1	Contains the immediate reporting indication. - "true" indicates that immediate reporting is requested. - "false" indicates that immediate reporting is not requested. - The default value is "false" when this attribute is omitted.	
reports	array(ConnStatusReport)	C	0..1	Contains the connection status event report(s). This attribute may be present only in a S&F Satellite application data transmission response and only if the "immRep" attribute was present in the corresponding request.	
connStatusPer	DurationSec	O	0..1	Represents the periodicity to be used for the SEALDD Client connection status reporting. This attribute may be present only if one of the subscribed events within the "events" attribute is "CLIENT_CONN_STATUS".	
notifUri	Uri	M	1	Contains the URI via which the Connection Status notifications shall be delivered.	
expTime	DateTimeRo	O	0..1	Contains the subscription's expiration time. This attribute may be present only in a S&F Satellite application data transmission response.	

6.1.6.2.15 Type: MultiModalFlowInfo

Table 6.1.6.2.15-1: Definition of type MultiModalFlowInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
valServerConnInfo	ConnInfo	M	1	Contains the VAL Server's side SEALDD-S connection information, i.e., address/port and/or URI via which the VAL Server desires to receive the multi-modal flow traffic from the SEALDD Server.	
qosInfo	QosInfo	O	0..1	Contains the requested QoS requirements for this multi-modal flow's data transmission.	
protocolDesc	ProtocolDesc	O	0..1	Contains the protocol description information.	

6.1.6.3 Simple data types and enumerations

6.1.6.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

6.1.6.3.2 Simple data types

The simple data types defined in table 6.1.6.3.2-1 shall be supported.

Table 6.1.6.3.2-1: Simple data types

Type Name	Type Definition	Description	Applicability

6.1.6.3.3 Enumeration: ConnStatusEvent

The enumeration ConnStatusEvent represents a Connection Status Event. It shall comply with the provisions defined in table 6.1.6.3.3-1.

Table 6.1.6.3.3-1: Enumeration ConnStatusEvent

Enumeration value	Description	Applicability
ESTABLISHED	Indicates that the SEALDD connection status event is that the SEALDD connection is established.	
RELEASED	Indicates that the SEALDD connection status event is that the SEALDD connection is released.	
CLIENT_CONN_STATUS	Indicates that the SEALDD connection status event is the connection status of the SEALDD Client.	SEALDD_2, 5GSATApp
CONGESTION	Indicates that the SEALDD connection status event is congestion reporting.	SEALDD_2
DL_DEL_INSTRUCTIONS	Indicates that the SEALDD connection status event is the DL data delivery instructions.	5GSATApp

6.1.6.3.4 Enumeration: TransType

The enumeration TransType represents the requested transmission type. It shall comply with the provisions defined in table 6.1.6.3.4-1.

Table 6.1.6.3.4-1: Enumeration TransType

Enumeration value	Description	Applicability
regular	Indicates that the requested transmission type is Regular transmission.	
urllc	Indicates that the requested transmission type is URLLC transmission.	
mm	Indicates that the requested transmission type is Multi-modal transmission.	XRMAApp
satellite	Indicates that the requested transmission type is S&F Satellite transmission.	5GSATApp
NOTE: The enumeration values defined in this table shall use the "lower-with-hyphen" naming convention, as defined in clause 5.2.4.1 of 3GPP TS 29.122 [2], because they are used as values of a URI path segment variable (see Table 6.1.4.1-2). Therefore, they shall not follow the "UPPER_WITH_UNDERSCORE" convention for enumerations defined in clause 5.2.9.10 of 3GPP TS 29.122 [2].		

6.1.6.3.5 Enumeration: ClientConnStatus

The enumeration ClientConnStatus represents the connection status of a SEALDD client. It shall comply with the provisions defined in table 6.1.6.3.5-1.

Table 6.1.6.3.5-1: Enumeration ClientConnStatus

Enumeration value	Description	Applicability
REACHABLE	Indicates that the SEALDD Client connection status is reachable.	
UNREACHABLE	Indicates that the SEALDD Client connection status is unreachable.	
SLEEPING	Indicates that the SEALDD Client connection status is sleeping.	

6.1.6.3.6 Enumeration: DLDelInstructions

The enumeration DLDelInstructions represents the DL data delivery instructions. It shall comply with the provisions defined in table 6.1.6.3.6-1.

Table 6.1.6.3.6-1: Enumeration DLDelInstructions

Enumeration value	Description	Applicability
ADJUST	Indicates that the DL data delivery instructions are to adjust data delivery.	
PENDING_DL	Indicates that the DL data delivery instructions are to suspend data delivery as there is pending data delivery (e.g., feeder link is not available).	
RESUMED_DL	Indicates that the DL data delivery instructions are to resume data delivery (e.g., feeder link is available).	

6.1.6.4 Data types describing alternative data types or combinations of data types

There are no data types describing alternative data types or combinations of data types defined for this API in this release of the specification.

6.1.6.5 Binary data

6.1.6.5.1 Binary Data Types

Table 6.1.6.5.1-1: Binary Data Types

Name	Clause defined	Content type

6.1.7 Error Handling

6.1.7.1 General

For the SDD_Transmission API, error handling shall be supported as specified in clause 6.7 of 3GPP TS 29.549 [15].

In addition, the requirements in the following clauses are applicable for the SDD_Transmission API.

6.1.7.2 Protocol Errors

No specific procedures for the SDD_Transmission API are specified.

6.1.7.3 Application Errors

The application errors defined for the SDD_Transmission API are listed in Table 6.1.7.3-1.

Table 6.1.7.3-1: Application errors

Application Error	HTTP status code	Description	Applicability

6.1.8 Feature negotiation

The optional features in table 6.1.8-1 are defined for the SDD_Transmission API. They shall be negotiated using the extensibility mechanism defined in clause 6.8 of 3GPP TS 29.549 [15].

Table 6.1.8-1: Supported Features

Feature number	Feature Name	Description
1	SEALDD_2	This feature indicates the support of the first set of enhancements to the SEAL Data Delivery Enabler Layer. Within this feature, the following enhancements are covered: - Support of immediate reporting for the SEALDD Connection Status reporting. - Support SEALDD Client connection status reporting. - Support congestion reporting. - Support of Non-3GPP access measurement information provisioning.
2	XRMApp	This feature indicates the support of the first set of enhancements to the SEAL Data Delivery Enabler Layer to support XRM applications. Within this feature, the following enhancements are covered: - Support Multi-modal application data transmission.
3	5GSATApp	This feature indicates the support of the first set of enhancements to the SEAL Data Delivery Enabler Layer to support 5G Satellite applications. Within this feature, the following enhancements are covered: - Support S&F Satellite application data transmission.

6.1.9 Security

The provisions of clause 9 of 3GPP TS 29.549 [15] shall apply for the SDD_Transmission API.

6.2 SDD_DataStorage Service API

6.2.1 Introduction

The SDD_DataStorage service shall use the SDD_DataStorage API.

The API URI of the SDD_DataStorage Service API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 6.5 of 3GPP TS 29.549 [15], i.e.:

{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>

with the following components:

- The {apiRoot} shall be set as described in clause 6.5 of 3GPP TS 29.549 [15].
- The <apiName> shall be "sdd-ds".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 6.5 of 3GPP TS 29.549 [15].

NOTE: When 3GPP TS 29.122 [2] is referenced for the common protocol and interface aspects for API definition in the clauses under clause 6.2, the SEALDD Server takes the role of the SCEF and the service consumer takes the role of the SCS/AS.

6.2.2 Usage of HTTP

The provisions of clause 6.3 of 3GPP TS 29.549 [15] shall apply for the SDD_DataStorage API.

6.2.3 Resources

6.2.3.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 6.2.3.1-1 depicts the resource URIs structure for the SDD_DataStorage API.

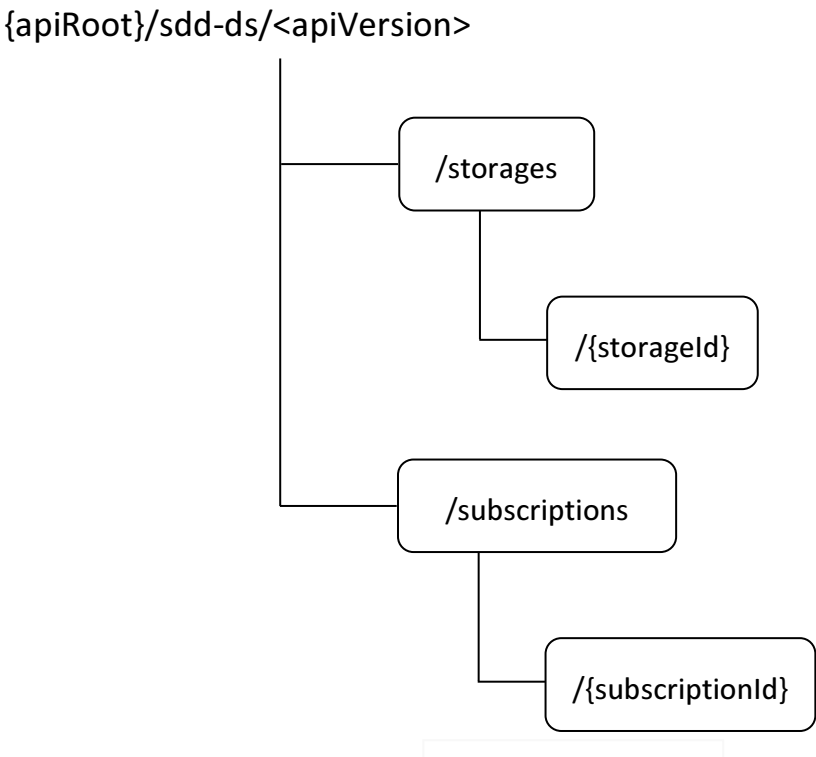


Figure 6.2.3.1-1: Resource URIs structure of the SDD_DataStorage API

Table 6.2.3.1-1 provides an overview of the resources and applicable HTTP methods for the SDD_DataStorage API.

Table 6.2.3.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method or custom operation	Description
Data Storages	/storages	GET	Retrieve one or several existing data Storage(s).
		POST	Request the creation of a Data Storage.
Individual Data Storage	/storages/{storageId}	GET	Retrieve an existing Data Storage.
		PUT	Request the update of an existing "Individual Data Storage" resource.
		PATCH	Request the modification of an existing "Individual Data Storage" resource.
		DELETE	Request the deletion of an existing "Individual Data Storage" resource.
Data Storage Delivery Subscriptions	/subscriptions	POST	Request the creation of a Data Storage Delivery Subscription.
Individual Data Storage Delivery Subscription	/subscriptions/{subscriptionId}	GET	Retrieve an existing "Individual Data Storage Delivery Subscription" resource.
		PUT	Request the update of an existing "Individual Data Storage Delivery Subscription" resource.
		PATCH	Request the modification of an existing "Individual Data Storage Delivery Subscription" resource.
		DELETE	Request the deletion of an existing "Individual Data Storage Delivery Subscription" resource.

6.2.3.2 Resource: Data Storages

6.2.3.2.1 Description

This resource represents the collection of Data Storage(s) managed by the SEALDD Server.

6.2.3.2.2 Resource Definition

Resource URI: {apiRoot}/sdd-ds/<apiVersion>/storages

This resource shall support the resource URI variables defined in table 6.2.3.2.2-1.

Table 6.2.3.2.2-1: Resource URI variables for this resource

Name	Data type	Definition
apiRoot	string	See clause 6.2.1.

6.2.3.2.3 Resource Standard Methods

6.2.3.2.3.1 GET

The HTTP GET method allows a service consumer to retrieve one or several existing "Individual Data Storage" resource(s) managed by the SEALDD Server.

This method shall support the URI query parameters specified in table 6.2.3.2.3.1-1.

Table 6.2.3.2.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description	Applicability
storage-ids	array(string)	O	1..N	Contains the identifier(s) of the targeted Data Storage resource(s). (NOTE)	
app-data-ids	array(AppDataId)	O	1..N	Contains the application-level identifier(s) of the targeted stored Data. (NOTE)	SEALDD_2
supp-feats	SupportedFeatures	C	0..1	Contains the list of supported features among the ones defined in clause 6.2.8. This query parameter shall be present only when feature negotiation needs to take place.	
NOTE: These query parameters are mutually exclusive and only one of them may be present.					

This method shall support the request data structures specified in table 6.2.3.2.3.1-2 and the response data structures and response codes specified in table 6.2.3.2.3.1-3.

Table 6.2.3.2.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 6.2.3.2.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
array(DataStorage)	M	0..N	200 OK	Successful case. The requested "Individual Data Storage" resource(s) shall be returned. If there are no available "Individual Data Storage" resource(s) fulfilling the request, an empty array shall be returned.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.2.3.2.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

Table 6.2.3.2.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

6.2.3.2.3.2 POST

The HTTP POST method allows a service consumer to request the creation of a Data Storage at the SEALDD Server.

This method shall support the URI query parameters specified in table 6.2.3.2.3.2-1.

Table 6.2.3.2.3.2-1: URI query parameters supported by the POST method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.2.3.2.3.2-2 and the response data structures and response codes specified in table 6.2.3.2.3.2-3.

Table 6.2.3.2.3.2-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
DataStorageReq	M	1	Represents the parameters to request the creation or reservation of a Data Storage resource.

Table 6.2.3.2.3.2-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
DataStorage	M	1	201 Created	Successful case. The Data Storage is successfully created and a representation of the created "Individual Data Storage" resource shall be returned. An HTTP "Location" header that contains the resource URI of the created resource shall also be included.
ReservRespData	M	1	200 OK	Successful case. The Data Storage resource is successfully reserved and Data Storage resource reservation related information shall be returned.
ProblemDetails	O	0..1	403 Forbidden	(NOTE 2)
NOTE 1: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				
NOTE 2: Failure causes are described in clause 6.2.7.				

Table 6.2.3.2.3.2-4: Headers supported by the 201 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains the URI of the newly created resource, according to the structure: {apiRoot}/sdd-ds/<apiVersion>/storages/{storageId}

6.2.3.2.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

6.2.3.3 Resource: Individual Data Storage

6.2.3.3.1 Description

This resource represents an "Individual Data Storage" resource managed by the SEALDD Server.

6.2.3.3.2 Resource Definition

Resource URI: {apiRoot}/sdd-ds/<apiVersion>/storages/{storageId}

This resource shall support the resource URI variables defined in table 6.2.3.3.2-1.

Table 6.2.3.3.2-1: Resource URI variables for this resource

Name	Data type	Definition
apiRoot	string	See clause 6.2.1.
storageId	string	Represents the identifier of the "Individual Data Storage" resource.

6.2.3.3.3 Resource Standard Methods

6.2.3.3.3.1 GET

The HTTP GET method allows a service consumer to retrieve an existing "Individual Data Storage" resource at the SEALDD Server.

This method shall support the URI query parameters specified in table 6.2.3.3.3.1-1.

Table 6.2.3.3.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.2.3.3.3.1-2 and the response data structures and response codes specified in table 6.2.3.3.3.1-3.

Table 6.2.3.3.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 6.2.3.3.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
DataStorage	M	1	200 OK	Successful case. The requested "Individual Data Storage" resource shall be returned.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.2.3.3.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

Table 6.2.3.3.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

6.2.3.3.3.2 PUT

The HTTP PUT method allows a service consumer to request the update of an existing "Individual Data Storage" resource at the SEALDD Server.

This method shall support the URI query parameters specified in table 6.2.3.3.3.2-1.

Table 6.2.3.3.2-1: URI query parameters supported by the PUT method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.2.3.3.2-2 and the response data structures and response codes specified in table 6.2.3.3.2-3.

Table 6.2.3.3.2-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
DataStorage	M	1	Represents the updated representation of the "Individual Data Storage" resource.

Table 6.2.3.3.2-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
DataStorage	M	1	200 OK	Successful case. The "Individual Data Storage" resource is successfully updated and a representation of the updated resource shall be returned in the response body.
n/a			204 No Content	Successful case. The "Individual Data Storage" resource is successfully updated and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.2.3.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

Table 6.2.3.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

6.2.3.3.3 PATCH

The HTTP PATCH method allows a service consumer to request the modification of an existing "Individual Data Storage" resource at the SEALDD Server.

This method shall support the URI query parameters specified in table 6.2.3.3.3.3-1.

Table 6.2.3.3.3.3-1: URI query parameters supported by the PATCH method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.2.3.3.3.3-2 and the response data structures and response codes specified in table 6.2.3.3.3.3-3.

Table 6.2.3.3.3.3-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
DataStoragePatch	M	1	Represents the parameters to request the modification of the "Individual Data Storage" resource.

Table 6.2.3.3.3.3-3: Data structures supported by the PATCH Response Body on this resource

Data type	P	Cardinality	Response codes	Description
DataStorage	M	1	200 OK	Successful case. The "Individual Data Storage" resource is successfully modified and a representation of the updated resource shall be returned in the response body.
n/a			204 No Content	Successful case. The "Individual Data Storage" resource is successfully modified and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.2.3.3.3.3-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

Table 6.2.3.3.3.3-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

6.2.3.3.3.4 DELETE

The HTTP DELETE method allows a service consumer to request the deletion of an existing "Individual Data Storage" resource at the SEALDD Server.

This method shall support the URI query parameters specified in table 6.2.3.3.3.4-1.

Table 6.2.3.3.3.4-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.2.3.3.3.4-2 and the response data structures and response codes specified in table 6.2.3.3.3.4-3.

Table 6.2.3.3.3.4-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 6.2.3.3.3.4-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The "Individual Data Storage" resource is successfully deleted.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.2.3.3.3.4-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

Table 6.2.3.3.3.4-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

6.2.3.3.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

6.2.3.4 Resource: Data Storage Delivery Subscriptions

6.2.3.4.1 Description

This resource represents the collection of Data Storage Delivery Subscription(s) managed by the SEALDD Server.

6.2.3.4.2 Resource Definition

Resource URI: {apiRoot}/sdd-ds/<apiVersion>/subscriptions

This resource shall support the resource URI variables defined in table 6.2.3.4.2-1.

Table 6.2.3.4.2-1: Resource URI variables for this resource

Name	Data type	Definition
apiRoot	string	See clause 6.2.1.

6.2.3.4.3 Resource Standard Methods

6.2.3.4.3.2 POST

The HTTP POST method allows a service consumer to request the creation of a Data Storage Delivery Subscription at the SEALDD Server.

This method shall support the URI query parameters specified in table 6.2.3.4.3.2-1.

Table 6.2.3.4.3.2-1: URI query parameters supported by the POST method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.2.3.4.3.2-2 and the response data structures and response codes specified in table 6.2.3.4.3.2-3.

Table 6.2.3.4.3.2-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
DataDelSubsc	M	1	Represents the parameters to request the creation of a Data Storage Delivery Subscription resource.

Table 6.2.3.4.3.2-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
DataDelSubsc	M	1	201 Created	Successful case. The Data Storage Delivery Subscription is successfully created and a representation of the created "Individual Data Storage Delivery Subscription" resource shall be returned. An HTTP "Location" header that contains the resource URI of the created resource shall also be included.
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.2.3.4.3.2-4: Headers supported by the 201 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains the URI of the newly created resource, according to the structure: {apiRoot}/sdd-ds/<apiVersion>/subscriptions/{subscriptionId}

6.2.3.4.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

6.2.3.5 Resource: Individual Data Storage Delivery Subscription

6.2.3.5.1 Description

This resource represents an "Individual Data Storage Delivery Subscription" resource managed by the SEALDD Server.

6.2.3.5.2 Resource Definition

Resource URI: {apiRoot}/sdd-ds/<apiVersion>/subscriptions/{subscriptionId}

This resource shall support the resource URI variables defined in table 6.2.3.5.2-1.

Table 6.2.3.5.2-1: Resource URI variables for this resource

Name	Data type	Definition
apiRoot	string	See clause 6.2.1.
subscriptionId	string	Represents the identifier of the "Individual Data Storage Delivery Subscription" resource.

6.2.3.5.3 Resource Standard Methods

6.2.3.5.3.1 GET

The HTTP GET method allows a service consumer to retrieve an existing "Individual Data Storage Delivery Subscription" resource at the SEALDD Server.

This method shall support the URI query parameters specified in table 6.2.3.5.3.1-1.

Table 6.2.3.5.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.2.3.5.3.1-2 and the response data structures and response codes specified in table 6.2.3.5.3.1-3.

Table 6.2.3.5.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 6.2.3.5.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
DataDelSubsc	M	1	200 OK	Successful case. The requested "Individual Data Storage Delivery Subscription" resource shall be returned.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.2.3.5.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

Table 6.2.3.5.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

6.2.3.5.3.2 PUT

The HTTP PUT method allows a service consumer to request the update of an existing "Individual Data Storage Delivery Subscription" resource at the SEALDD Server.

This method shall support the URI query parameters specified in table 6.2.3.5.3.2-1.

Table 6.2.3.5.3.2-1: URI query parameters supported by the PUT method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.2.3.5.3.2-2 and the response data structures and response codes specified in table 6.2.3.5.3.2-3.

Table 6.2.3.5.3.2-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
DataDelSubsc	M	1	Represents the updated representation of the "Individual Data Storage Delivery Subscription" resource.

Table 6.2.3.5.3.2-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
DataDelSubsc	M	1	200 OK	Successful case. The "Individual Data Storage Delivery Subscription" resource is successfully updated and a representation of the updated resource shall be returned in the response body.
n/a			204 No Content	Successful case. The "Individual Data Storage Delivery Subscription" resource is successfully updated and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.2.3.5.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

Table 6.2.3.5.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

6.2.3.5.3.3 PATCH

The HTTP PATCH method allows a service consumer to request the modification of an existing "Individual Data Storage Delivery Subscription" resource at the SEALDD Server.

This method shall support the URI query parameters specified in table 6.2.3.5.3.3-1.

Table 6.2.3.5.3.3-1: URI query parameters supported by the PATCH method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.2.3.5.3.3-2 and the response data structures and response codes specified in table 6.2.3.5.3.3-3.

Table 6.2.3.5.3.3-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
DataDelSubscPatch	M	1	Represents the parameters to request the modification of the "Individual Data Storage Delivery Subscription" resource.

Table 6.2.3.5.3.3-3: Data structures supported by the PATCH Response Body on this resource

Data type	P	Cardinality	Response codes	Description
DataDelSubsc	M	1	200 OK	Successful case. The "Individual Data Storage Delivery Subscription" resource is successfully modified and a representation of the updated resource shall be returned in the response body.
n/a			204 No Content	Successful case. The "Individual Data Storage Delivery Subscription" resource is successfully modified and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.2.3.5.3.3-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

Table 6.2.3.5.3.3-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

6.2.3.5.3.4 DELETE

The HTTP DELETE method allows a service consumer to request the deletion of an existing "Individual Data Storage Delivery Subscription" resource at the SEALDD Server.

This method shall support the URI query parameters specified in table 6.2.3.5.3.4-1.

Table 6.2.3.5.3.4-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.2.3.5.3.4-2 and the response data structures and response codes specified in table 6.2.3.5.3.4-3.

Table 6.2.3.5.3.4-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 6.2.3.5.3.4-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The "Individual Data Storage Delivery Subscription" resource is successfully deleted.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.2.3.5.3.4-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

Table 6.2.3.5.3.4-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

6.2.3.5.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

6.2.4 Custom Operations without associated resources

6.2.4.1 Overview

The structure of the custom operation URIs of the SDD_DataStorage API is shown in Figure 6.2.4.1-1.

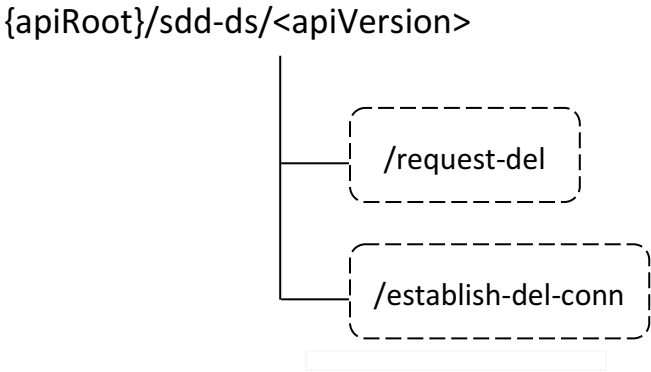


Figure 6.2.4.1-1: Custom operation URI structure of the SDD_DataStorage API

Table 6.2.4.1-1 provides an overview of the custom operations and applicable HTTP methods defined for the SDD_DataStorage API.

Table 6.2.4.1-1: Custom operations without associated resources

Custom operation name	Custom operation URI	Mapped HTTP method	Description
DataDeliveryRequest	/request-del	POST	Enables a service consumer to request SEALDD data storage delivery.
EstablishDelConn	/establish-del-conn	POST	Enables a service consumer to request SEALDD data storage delivery connection establishment.

The custom operations shall support the URI variables defined in table 6.2.4.1-2.

Table 6.2.4.1-2: URI variables for this custom operation

Name	Data type	Definition
apiRoot	string	See clause 6.2.1.

6.2.4.2 Operation: DataDeliveryRequest

6.2.4.2.1 Description

The custom operation enables a service consumer to request SEALDD Data Storage delivery to the SEALDD Server.

6.2.4.2.2 Operation Definition

This operation shall support the request data structures specified in table 6.2.4.2.2-1 and the response data structures and response codes specified in table 6.2.4.2.2-2.

Table 6.2.4.2.2-1: Data structures supported by the POST Request Body on this custom operation

Data type	P	Cardinality	Description
DataDelReq	M	1	Contains the parameters to request SEALDD Data Storage delivery.

Table 6.2.4.2.2-2: Data structures supported by the POST Response Body on this custom operation

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The SEALDD Data Storage delivery request is successfully received and processed.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2]
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.2.4.2.2-3: Headers supported by the 307 Response Code on this custom operation

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative target URI located in an alternative SEALDD Server.

Table 6.2.4.2.2-4: Headers supported by the 308 Response Code on this custom operation

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative target URI located in an alternative SEALDD Server.

6.2.4.3 Operation: EstablishDelConn

6.2.4.3.1 Description

The custom operation enables a service consumer to request SEALDD Data Storage delivery connection establishment to the SEALDD Server.

6.2.4.3.2 Operation Definition

This operation shall support the request data structures specified in table 6.2.4.3.2-1 and the response data structures and response codes specified in table 6.2.4.3.2-2.

Table 6.2.4.3.2-1: Data structures supported by the POST Request Body on this custom operation

Data type	P	Cardinality	Description
DelConnEstabReq	M	1	Contains the parameters to request SEALDD Data Storage delivery connection establishment.

Table 6.2.4.3.2-2: Data structures supported by the POST Response Body on this custom operation

Data type	P	Cardinality	Response codes	Description
DelConnEstabResp	M	1	200 OK	Successful case. The SEALDD Data Storage delivery connection establishment request is successfully received and processed, and SEALDD Data Storage delivery connection establishment related information shall be returned in the response body.
n/a			204 No Content	Successful case. The SEALDD Data Storage delivery connection establishment request is successfully received and processed.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.2.4.3.2-3: Headers supported by the 307 Response Code on this custom operation

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative target URI located in an alternative SEALDD Server.

Table 6.2.4.3.2-4: Headers supported by the 308 Response Code on this custom operation

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative target URI located in an alternative SEALDD Server.

6.2.5 Notifications

6.2.5.1 General

Notifications shall comply to clause 6.6 of 3GPP TS 29.549 [15].

Table 6.2.5.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
Data Management and/or Status Information Notification	{notifUri}	POST	Enables a SEALDD Server to notify a previously subscribed service consumer on SEALDD Data Management and/or Status Information event(s).
Data Storage Delivery Notification	{notifUri}	POST	Enables a SEALDD Server to notify a previously subscribed service consumer on SEALDD Data Storage Delivery.

6.2.5.2 Data Management and/or Status Information Notification

6.2.5.2.1 Description

The Data Management and/or Status Information Notification is used by the SEALDD Server to notify a previously subscribed service consumer on SEALDD Data Management and/or Status Information event(s).

6.2.5.2.2 Target URI

The Callback URI "{**notifUri**}" shall be used with the callback URI variables defined in table 6.2.5.2.2-1.

Table 6.2.5.2.2-1: Callback URI variables

Name	Definition
notifUri	Represents the callback URI encoded as a string formatted as a URI.

6.2.5.2.3 Standard Methods

6.2.5.2.3.1 POST

This method shall support the request data structures specified in table 6.2.5.2.3.1-1 and the response data structures and response codes specified in table 6.2.5.2.3.1-2.

Table 6.2.5.2.3.1-1: Data structures supported by the POST Request Body

Data type	P	Cardinality	Description
DataMngtNotif	M	1	Represents the Data Management and/or Status Information Notification.

Table 6.2.5.2.3.1-2: Data structures supported by the POST Response Body

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The Data Management and/or Status Information Notification is successfully received.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative service consumer towards which the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative service consumer towards which the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.2.5.2.3.1-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative service consumer towards which the notification should be redirected.

Table 6.2.5.2.3.1-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative service consumer towards which the notification should be redirected.

6.2.5.3 Data Storage Delivery Notification

6.2.5.3.1 Description

The Data Storage Delivery Notification is used by the SEALDD Server to notify a previously subscribed service consumer on SEALDD Data Storage Delivery.

6.2.5.3.2 Target URI

The Callback URI "{notifUri}" shall be used with the callback URI variables defined in table 6.2.5.3.2-1.

Table 6.2.5.3.2-1: Callback URI variables

Name	Definition
notifUri	Represents the callback URI encoded as a string formatted as a URI.

6.2.5.3.3 Standard Methods

6.2.5.3.3.1 POST

This method shall support the request data structures specified in table 6.2.5.3.3.1-1 and the response data structures and response codes specified in table 6.2.5.3.3.1-2.

Table 6.2.5.3.3.1-1: Data structures supported by the POST Request Body

Data type	P	Cardinality	Description
DataDelNotif	M	1	Represents the Data Storage Delivery Notification.

Table 6.2.5.3.3.1-2: Data structures supported by the POST Response Body

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The Data Storage Delivery Notification is successfully received.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative service consumer towards which the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative service consumer towards which the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.2.5.3.3.1-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative service consumer towards which the notification should be redirected.

Table 6.2.5.3.3.1-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative service consumer towards which the notification should be redirected.

6.2.6 Data Model

6.2.6.1 General

This clause specifies the application data model supported by the API.

Table 6.2.6.1-1 specifies the data types defined for the SDD_DataStorage API.

Table 6.2.6.1-1: SDD_DataStorage API specific Data Types

Data type	Clause defined	Description	Applicability
AccessCtrlPolicy	6.2.6.2.6	Represents the data access control policy.	
AppDataId	6.2.6.3.2	Represents identifier of a stored application data that uniquely identifies the stored application data in multiple SEALDD Servers.	SEALDD_2
DataAccessRight	6.2.6.3.4	Represents the data access right.	
DataAccessStats	6.2.6.2.9	Represents data access statistics.	
DataDelNotif	6.2.6.2.13	Represents a SEALDD Data Storage Delivery Notification.	
DataDelReq	6.2.6.2.14	Represents a SEALDD Data Storage Delivery request.	
DataDelSubsc	6.2.6.2.11	Represents a SEALDD Data Storage Delivery Subscription.	
DataDelSubscPatch	6.2.6.2.12	Represents the requested modification to a SEALDD Data Storage Delivery Subscription.	
DataMngtEvent	6.2.6.3.5	Represents the Data Management and/or Status Information events.	
DataMngtNotif	6.2.6.2.8	Represents a SEALDD Data Management and/or Status Information Notification.	
DataMngtStats	6.2.6.2.10	Represents data management statistics.	
DataMngtSubsc	6.2.6.2.7	Represents the stored data management and/or status information subscription related information.	
DataStorage	6.2.6.2.2	Represents a SEALDD Data Storage.	
DataStoragePatch	6.2.6.2.5	Represents the requested modification to a SEALDD Data Storage.	
DataStorageReq	6.2.6.4.1	Represents a SEALDD Data Storage creation or reservation request.	
DelConnEstabReq	6.2.6.2.15	Represents a SEALDD Data Storage Delivery connection establishment request.	
DelConnEstabResp	6.2.6.2.16	Represents the response to a SEALDD Data Storage Delivery connection establishment request.	
EntityName	6.2.6.3.3	Represents the name of a SEALDD entity.	
ReservReqData	6.2.6.2.3	Represents a Data Storage reservation request.	
ReservRespData	6.2.6.2.4	Represents a Data Storage reservation response.	

Table 6.2.6.1-2 specifies data types re-used by the SDD_DataStorage API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the SDD_DataStorage API.

Table 6.2.6.1-2: SDD_DataStorage API re-used Data Types

Data type	Reference	Comments	Applicability
Bytes	3GPP TS 29.122 [2]	Represents a sequence of bytes.	
ConnInfo	6.1.6.2.4	Represents SEALDD connection information.	
DateTime	3GPP TS 29.122 [2]	Represents a date and a time.	
DateTimeRo	3GPP TS 29.122 [2]	Represents a date and a time with the read-only property.	
DurationSec	3GPP TS 29.122 [2]	Represents a time duration in seconds.	
ProblemDetails	3GPP TS 29.122 [2]	Represents error related information.	
SupportedFeatures	3GPP TS 29.571 [18]	Represents the list of supported feature(s) and used to negotiate the applicability of the optional features.	
TransportProtocol	3GPP TS 29.558 [17]	Represents the transport layer protocol.	
UInteger	3GPP TS 29.571 [18]	Represents an unsigned integer.	
Uri	3GPP TS 29.122 [2]	Represents a URI.	

6.2.6.2 Structured data types

6.2.6.2.1 Introduction

This clause defines the data structures to be used in resource representations.

6.2.6.2.2 Type: DataStorage

Table 6.2.6.2.2-1: Definition of type DataStorage

Attribute name	Data type	P	Cardinality	Description	Applicability
data	Bytes	M	1	Contains the stored application data.	
ctrlPolicies	array(AccessCtrlPolicy)	O	1..N	Contains the Storage of policy(ies) for controlling the access to the data.	
expTime	DateTime	O	0..1	Contains the expiration time of the stored data.	
mngrSubsc	DataMngtSubsc	O	0..1	Contains the stored data management and/or status information subscription related information.	
appDataId	AppDataId	O	0..1	Contains the application-level identifier of the stored data, assigned by the service consumer.	SEALDD_2
supFeat	SupportedFeatures	C	0..1	Contains the list of supported features among the ones defined in clause 6.2.8. This attribute shall be present only when feature negotiation needs to take place.	

6.2.6.2.3 Type: ReservReqData

Table 6.2.6.2.3-1: Definition of type ReservReqData

Attribute name	Data type	P	Cardinality	Description	Applicability
valServiceId	string	M	1	Contains the identifier of the target VAL service.	
dataLength	UInteger	O	0..1	Contains the length of the data to be stored and for which a Data Storage resource needs to be reserved.	
supFeat	SupportedFeatures	C	0..1	Contains the list of supported features among the ones defined in clause 6.2.8. This attribute shall be present only when feature negotiation needs to take place.	

6.2.6.2.4 Type: ReservRespData

Table 6.2.6.2.4-1: Definition of type ReservRespData

Attribute name	Data type	P	Cardinality	Description	Applicability
resourceAddr	Uri	M	1	Contains the URI of the reserved Data Storage resource.	

6.2.6.2.5 Type: DataStoragePatch

Table 6.2.6.2.5-1: Definition of type DataStoragePatch

Attribute name	Data type	P	Cardinality	Description	Applicability
data	Bytes	O	0..1	Contains the updated application data to be stored.	
ctrlPolicies	array(AccessCtrlPolicy)	O	1..N	Contains the updated access control policy(ies) for the stored data.	
expTime	DateTime	O	0..1	Contains the updated expiration time of the data to be stored.	
mngtSubsc	DataMngtSubsc	O	0..1	Contains the updated stored data management and/or status information subscription related information.	

6.2.6.2.6 Type: AccessCtrlPolicy

Table 6.2.6.2.6-1: Definition of type AccessCtrlPolicy

Attribute name	Data type	P	Cardinality	Description	Applicability
entityName	EntityName	C	0..1	Contains the allowed entity's name. (NOTE)	
entityId	string	C	0..1	Contains the allowed entity's identifier. (NOTE)	
rights	array(DataAccessRight)	M	1..N	Contains the allowed access right(s) for the entity identified by the "entityName" and/or "entityId" attribute(s).	
NOTE: At least one of these attributes shall be present.					

6.2.6.2.7 Type: DataMngtSubsc

Table 6.2.6.2.7-1: Definition of type DataMngtSubsc

Attribute name	Data type	P	Cardinality	Description	Applicability
events	array(DataMngtEvent)	M	1..N	Contains the list of subscribed data management and/or status information event(s).	
notifUri	Uri	M	1	Contains the URI via which Data Management and/or Status Information Notifications shall be delivered.	
repPeriodicity	DurationSec	C	0..1	Contains the reporting periodicity. This attribute shall be present only when the subscribed event(s) within the "events" attribute is/are "DATA_ACCESS_STATISTICS" and/or "DATA_MNGT_STATISTICS".	

6.2.6.2.8 Type: DataMngtNotif

Table 6.2.6.2.8-1: Definition of type DataMngtNotif

Attribute name	Data type	P	Cardinality	Description	Applicability
storageId	string	M	1	Contains the identifier of the data storage to which the data management and/or status information notification is related.	
events	array(DataMngtEvent)	M	1..N	Contains the list of reported data management and/or status information event(s).	
accessStats	DataAccessStats	C	0..1	Contains the data access statistics of the stored data. This attribute shall be present only when one of the reported event(s) within the "events" attribute is "DATA_ACCESS_STATISTICS".	
mngtStats	DataMngtStats	C	0..1	Contains the data management statistics of the stored data. This attribute shall be present only when one of the reported event(s) within the "events" attribute is "DATA_MNGT_STATISTICS".	

6.2.6.2.9 Type: DataAccessStats

Table 6.2.6.2.9-1: Definition of type DataAccessStats

Attribute name	Data type	P	Cardinality	Description	Applicability
genAccessStats	UInteger	C	0..1	Represents the general data access statistics of the stored data. It contains how many times the stored data was accessed (i.e., retrieved or updated). (NOTE)	
detAccessStats	map(Uinteger)	C	1..N	Represents the data access statistics of the stored data detailed per consumer SEALDD entity. It contains how many times the stored data was accessed (i.e., retrieved or updated) per SEALDD entity. The key of the map shall be the name of the SEALDD entity, encoded using the EntityName data type as specified in clause 6.2.6.3.3, to which the data access statistics provided within the map value are related. (NOTE)	
NOTE: At least one of these attributes shall be present.					

6.2.6.2.10 Type: DataMngtStats

Table 6.2.6.2.10-1: Definition of type DataMngtStats

Attribute name	Data type	P	Cardinality	Description	Applicability
genMngtStats	UInteger	C	0..1	Represents the general data management statistics of the stored data. It contains how many times the stored data was accessed for management purposes (i.e., data update). (NOTE)	
detMngtStats	map(Uinteger)	C	1..N	Represents the data management statistics of the stored data detailed per consumer SEALDD entity. It contains how many times the stored data was accessed for management purposes (i.e., data update) per SEALDD entity. The key of the map shall be the name of the SEALDD entity, encoded using the EntityName data type as specified in clause 6.2.6.3.3, to which the data management statistics provided within the map value are related. (NOTE)	
NOTE: At least one of these attributes shall be present.					

6.2.6.2.11 Type: DataDelSubsc

Table 6.2.6.2.11-1: Definition of type DataDelSubsc

Attribute name	Data type	P	Cardinality	Description	Applicability
notifUri	Uri	M	1	Contains the URI via which Data Storage Delivery notifications shall be delivered.	
expTime	DateTimeRo	O	0..1	Contains the subscription's expiration time. This attribute may be present only in the response to a Data Storage Delivery Subscription creation/update request.	
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported features among the ones defined in clause 6.2.8. This attribute shall be present only when feature negotiation needs to take place.	

6.2.6.2.12 Type: DataDelSubscPatch

Table 6.2.6.2.12-1: Definition of type DataDelSubscPatch

Attribute name	Data type	P	Cardinality	Description	Applicability
notifUri	Uri	M	1	Contains the updated URI via which Data Storage Delivery notifications shall be delivered.	

6.2.6.2.13 Type: DataDelNotif

Table 6.2.6.2.13-1: Definition of type DataDelNotif

Attribute name	Data type	P	Cardinality	Description	Applicability
subscriptionId	string	M	1	Contains the identifier of the subscription to which the data storage delivery notification is related.	
data	Bytes	C	0..1	Contains the stored data. (NOTE)	
storageId	string	C	0..1	Contains the identifier of the "Individual Data Storage" resource where the data is stored. (NOTE)	
NOTE: These attributes are mutually exclusive. Either one of them shall be present.					

6.2.6.2.14 Type: DataDelReq

Table 6.2.6.2.14-1: Definition of type DataDelReq

Attribute name	Data type	P	Cardinality	Description	Applicability
targetId	string	M	1	Contains the identifier of the target (e.g., VAL Server).	
sealddServId	string	O	0..1	Contains the identifier of the target SEALDD Server.	
storageId	string	C	0..1	Contains the identifier of the Data Storage resource where is stored the data to be delivered. (NOTE)	
data	Bytes	C	0..1	Contains the data to be delivered. (NOTE)	
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported features among the ones defined in clause 6.2.8. This attribute shall be present only when feature negotiation needs to take place.	
NOTE: These attributes are mutually exclusive. Either one of them shall be present.					

6.2.6.2.15 Type: DelConnEstabReq

Table 6.2.6.2.15-1: Definition of type DelConnEstabReq

Attribute name	Data type	P	Cardinality	Description	Applicability
targetId	string	M	1	Contains the identifier of the target VAL Server.	
ddServerConnInfo	ConnInfo	O	0..1	Contains source SEALDD Server's side connection information, i.e., address/port and/or URI via which the SEALDD Server will send the data storage delivery data.	
transProtoc	array(TransportProtocol)	O	1..N	Represents the transport layer protocol(s) that are supported by the service consumer (e.g., source SEALDD Server).	
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported features among the ones defined in clause 6.2.8. This attribute shall be present only when feature negotiation needs to take place.	

6.2.6.2.16 Type: DelConnEstabResp

Table 6.2.6.2.16-1: Definition of type DelConnEstabResp

Attribute name	Data type	P	Cardinality	Description	Applicability
ddServerConnInfo	ConnInfo	O	0..1	Contains target SEALDD Server's side connection information, i.e., address/port and/or URI via which the SEALDD Server desires to receive the data storage delivery data.	
transProtoc	TransportProtocol	O	0..1	Represents the transport layer protocol that is retained by the SEALDD Server (e.g., target SEALDD Server).	
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported features among the ones defined in clause 6.2.8. This attribute shall be present only when feature negotiation needs to take place.	

6.2.6.3 Simple data types and enumerations

6.2.6.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

6.2.6.3.2 Simple data types

The simple data types defined in table 6.2.6.3.2-1 shall be supported.

Table 6.2.6.3.2-1: Simple data types

Type Name	Type Definition	Description	Applicability
AppDataId	string	Represents identifier of a stored application data that uniquely identifies the stored application data in multiple SEALDD Servers. This identifier shall be generated either based on the identifier of the service consumer that assigns it or using the Universally Unique Identifier (UUID) version 4 as described in IETF RFC 9562 [21].	SEALDD_2

6.2.6.3.3 Enumeration: EntityName

The enumeration EntityName represents the name of a SEALDD entity. It shall comply with the provisions defined in table 6.2.6.3.3-1.

Table 6.2.6.3.3-1: Enumeration EntityName

Enumeration value	Description	Applicability
SEALDD_SERVER	Indicates the SEALDD Server.	
SEALDD_CLIENT	Indicates the SEALDD Client.	
VAL_SERVER	Indicates the VAL Server.	

6.2.6.3.4 Enumeration: DataAccessRight

The enumeration DataAccessRight represents the data access rights. It shall comply with the provisions defined in table 6.2.6.3.4-1.

Table 6.2.6.3.4-1: Enumeration DataAccessRight

Enumeration value	Description	Applicability
RETRIEVE	Indicates that the access right is data storage retrieval.	
UPDATE	Indicates that the access right is data storage update.	
DELETE	Indicates that the access right is data storage deletion.	

6.2.6.3.5 Enumeration: DataMngtEvent

The enumeration DataMngtEvent represents the Data Management and/or Status Information events. It shall comply with the provisions defined in table 6.2.6.3.5-1.

Table 6.2.6.3.5-1: Enumeration DataMngtEvent

Enumeration value	Description	Applicability
DATA_ACCESS_STATISTICS	Indicates that the Data Management Event is data access statistics (i.e., how often the stored data is accessed).	
DATA_MNGT_STATISTICS	Indicates that the Data Management Event is data management statistics (i.e., how often the stored data is managed).	

6.2.6.4 Data types describing alternative data types or combinations of data types

6.2.6.4.1 Type: DataStorageReq

Table 6.2.6.4.1-1: Definition of type DataStorageReq as a list of mutually exclusive alternatives

Data type	Cardinality	Description	Applicability
DataStorage	0..1	Represents a Data Storage resource creation request containing the necessary parameters to create the Data Storage resource.	
ReservReqData	0..1	Represents a Data Storage resource reservation request containing the necessary parameters to reserve of a Data storage resource.	

6.2.6.5 Binary data

6.2.6.5.1 Binary Data Types

Table 6.2.6.5.1-1: Binary Data Types

Name	Clause defined	Content type

6.2.7 Error Handling

6.2.7.1 General

For the SDD_DataStorage API, error handling shall be supported as specified in clause 6.7 of 3GPP TS 29.549 [15].

In addition, the requirements in the following clauses are applicable for the SDD_DataStorage API.

6.2.7.2 Protocol Errors

No specific protocol errors for the SDD_DataStorage API are specified.

6.2.7.3 Application Errors

The application errors defined for the SDD_DataStorage API are listed in Table 6.2.7.3-1.

Table 6.2.7.3-1: Application errors

Application Error	HTTP status code	Description	Applicability
STORAGE_REQ_REJECTED	403 Forbidden	Indicates that the Data Storage creation or reservation request is rejected because the service consumer is not authorized.	
DATA_LENGTH_FAILURE	403 Forbidden	Indicates that the Data Storage creation or reservation request is rejected because the length of requested Data Storage is not available or not authorized.	

6.2.8 Feature negotiation

The optional features listed in table 6.2.8-1 are defined for the SDD_DataStorage API. They shall be negotiated using the extensibility mechanism defined in clause 6.8 of 3GPP TS 29.549 [15].

Table 6.2.8-1: Supported Features

Feature number	Feature Name	Description
1	SEALDD_2	This feature indicates the support of the first set of enhancements to the SEAL Data Delivery Enabler Layer. Within this feature, the following enhancements are covered: - Support the provisioning of the application data identifier for a data storage to enable to uniquely identify a data storage across multiple SEALDD Servers.

6.2.9 Security

The provisions of clause 9 of 3GPP TS 29.549 [15] shall apply for the SDD_DataStorage API.

6.3 SDD_DDContext Service API

6.3.1 Introduction

The SDD_DDContext service shall use the SDD_DDContext API.

The API URI of the SDD_DDContext Service API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests shall have the Resource URI structure as defined in clause 6.5 of 3GPP TS 29.549 [15], i.e.:

{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>

with the following components:

- The {apiRoot} shall be set as described in clause 6.5 of 3GPP TS 29.549 [15].
- The <apiName> shall be "sdd-ddc".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 6.5 of 3GPP TS 29.549 [15].

NOTE: When 3GPP TS 29.122 [2] is referenced for the common protocol and interface aspects for API definition in the clauses under clause 6.3, the SEALDD Server takes the role of the SCEF and the service consumer takes the role of the SCS/AS.

6.3.2 Usage of HTTP

The provisions of clause 6.3 of 3GPP TS 29.549 [15] shall apply for the SDD_DDContext API.

6.3.3 Resources

6.3.3.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 6.3.3.1-1 depicts the resource URIs structure for the SDD_DDContext API.

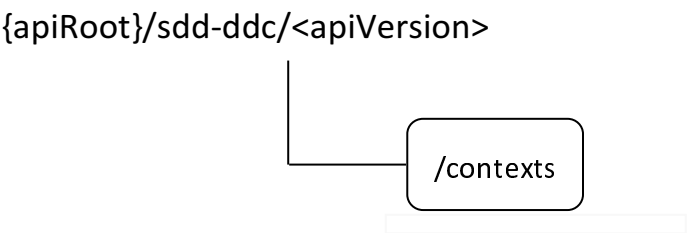


Figure 6.3.3.1-1: Resource URI structure of the SDD_DDContext API

Table 6.3.3.1-1 provides an overview of the resources and applicable HTTP methods for the SDD_DDContext API.

Table 6.3.3.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method or custom operation	Description
DD Contexts	/contexts	POST	Push the DD context to the SEALDD Server.
		GET	Pull the DD context from the SEALDD Server.

6.3.3.2 Resource: DD Contexts

6.3.3.2.1 Description

This resource represents the collection of DD Context(s) managed by the SEALDD Server.

6.3.3.2.2 Resource Definition

Resource URI: {apiRoot}/sdd-ddc/<apiVersion>/contexts

This resource shall support the resource URI variables defined in the table 6.3.3.2.2-1.

Table 6.3.3.2.2-1: Resource URI variables for this resource

Name	Data Type	Definition
apiRoot	string	See clause 6.3.1.

6.3.3.2.3 Resource Standard Methods

6.3.3.2.3.1 POST

The HTTP POST method enables a service consumer to push a DD context to the SEALDD Server.

This method shall support the URI query parameters specified in table 6.3.3.2.3.1-1.

Table 6.3.3.2.3.1-1: URI query parameters supported by the POST method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 6.3.3.2.3.1-2 and the response data structures and response codes specified in table 6.3.3.2.3.1-3.

Table 6.3.3.2.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
DdContextPushReq	M	1	Represents the DD context to be pushed to the SEALDD Server.

Table 6.3.3.2.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
DdContextResp	M	1	200 OK	Successful case. The DD context is successfully pushed to the SEALDD Server and the related information is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
ProblemDetails	O	0..1	403 Forbidden	(NOTE 2)
NOTE 1: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				
NOTE 2: Failure causes are described in clause 6.3.7.				

Table 6.3.3.2.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

Table 6.3.3.2.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

6.3.3.2.3.2 GET

The HTTP GET method enables a service consumer to pull a DD Context from the SEALDD Server.

This method shall support the URI query parameters specified in table 6.3.3.2.3.2-1.

Table 6.3.3.2.3.2-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description
sealdd-pol-ind	boolean	O	0..1	Indicates whether the configured SEALDD Policy(ies) at the SEALDD Server, if any, is/are requested and shall hence be provided in addition to the DD Context. - "true" indicates that the configured SEALDD Policy(ies) is/are requested. - "false" indicates that the configured SEALDD Policy(ies) is/are not requested. - The default value when this query parameter is omitted is "false".
supp-feats	SupportedFeatures	C	0..1	Contains the list of supported features among the ones defined in clause 6.3.8. This query parameter shall be present only when feature negotiation needs to take place.

This method shall support the request data structures specified in table 6.3.3.2.3.2-2 and the response data structures and response codes specified in table 6.3.3.2.3.2-3.

Table 6.3.3.2.3.2-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 6.3.3.2.3.2-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
DdContextResp	M	1	200 OK	Successful case. The requested DD context is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.3.3.2.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

Table 6.3.3.2.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

6.3.3.2.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

6.3.4 Custom Operations without associated resources

6.3.4.1 Overview

The structure of the custom operation URIs of the SDD_DDContext API is shown in Figure 6.3.4.1-1.

{apiRoot}/sdd-ddc/<apiVersion>

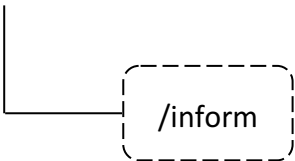


Figure 6.3.4.1-1: Custom operation URI structure of the SDD_DDContext API

Table 6.3.4.1-1 provides an overview of the custom operations and applicable HTTP methods defined for the SDD_DDContext API.

Table 6.3.4.1-1: Custom operations without associated resources

Custom operation name	Custom operation URI	Mapped HTTP method	Description
InformACREvent	/inform	POST	Enables a service consumer to inform the SEALDD Server on ACR event(s).

The custom operations shall support the URI variables defined in table 6.3.4.1-2.

Table 6.3.4.1-2: URI variables for this custom operation

Name	Data type	Definition
apiRoot	string	See clause 6.3.1.

6.3.4.2 Operation: InformACREvent

6.3.4.2.1 Description

The custom operation enables a service consumer to inform the SEALDD Server on ACR event(s).

6.3.4.2.2 Operation Definition

This operation shall support the request data structures specified in table 6.3.4.2.2-1 and the response data structures and response codes specified in table 6.3.4.2.2-2.

Table 6.3.4.2.2-1: Data structures supported by the POST Request Body on this custom operation

Data type	P	Cardinality	Description
InformACREvent	M	1	Contains the ACR event information.

Table 6.3.4.2.2-2: Data structures supported by the POST Response Body on this custom operation

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The ACR event information is successfully received and processed.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative target URI located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative target URI located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.3.4.2.2-3: Headers supported by the 307 Response Code on this custom operation

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative target URI located in an alternative SEALDD Server.

Table 6.3.4.2.2-4: Headers supported by the 308 Response Code on this custom operation

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative target URI located in an alternative SEALDD Server.

6.3.5 Notifications

6.3.5.1 General

Notifications shall comply to clause 6.6 of 3GPP TS 29.549 [15].

Table 6.3.5.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
ACR Event Notification	{notifUri}/inform-acr	POST	Enables a SEALDD Server to notify the service consumer on ACR event status.

6.3.5.2 ACR Event Notification

6.3.5.2.1 Description

The ACR Event Notification is used by the SEALDD Server to notify a previously subscribed service consumer on ACR event status.

6.3.5.2.2 Target URI

The Callback URI "{**notifUri**}/inform-acr" shall be used with the callback URI variables defined in table 6.3.5.2.2-1.

Table 6.3.5.2.2-1: Callback URI variables

Name	Definition
notifUri	Represents the callback URI encoded as a string formatted as a URI.

6.3.5.2.3 Standard Methods

6.3.5.2.3.1 POST

This method shall support the request data structures specified in table 6.3.5.2.3.1-1 and the response data structures and response codes specified in table 6.3.5.2.3.1-2.

Table 6.3.5.2.3.1-1: Data structures supported by the POST Request Body

Data type	P	Cardinality	Description
AcrEventNotif	M	1	Represents the ACR Event Notification.

Table 6.3.5.2.3.1-2: Data structures supported by the POST Response Body

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The ACR Event Notification is successfully received and acknowledged.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative service consumer towards which the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative service consumer towards which the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.3.5.2.3.1-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative service consumer towards which the notification should be redirected.

Table 6.3.5.2.3.1-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative service consumer towards which the notification should be redirected.

6.3.6 Data Model

6.3.6.1 General

This clause specifies the application data model supported by the API.

Table 6.3.6.1-1 specifies the data types defined for the SDD_DDContext API.

Table 6.3.6.1-1: SDD_DDContext API specific Data Types

Data type	Section defined	Description	Applicability
AcrEventNotif	6.3.6.2.10	Represents the ACR Event Notification.	
ContentBreakpoint	6.3.6.2.8	Represents the content breakpoint information.	SEALDD_2
DdContext	6.3.6.2.2	Represents the DD context.	
DdContextPushReq	6.3.6.2.4	Represents the DD context push request.	
DdContextResp	6.3.6.2.5	Represents the DD context push response.	
FlowTransResult	6.3.6.3.3	Represents the flow transfer result.	
InformACREvent	6.3.6.2.9	Represents the ACR event information.	
SddUuContext	6.3.6.2.6	Represents the context related to the SEALDD-UU connection.	
SddSContext	6.3.6.2.7	Represents the context related to the SEALDD-S connection.	
TranspLayerContext	6.3.6.2.3	Represents the transport layer context.	

Table 6.3.6.1-2 specifies data types re-used by the SDD_DDContext API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the SDD_DDContext API.

Table 6.3.6.1-2: SDD_DDContext API re-used Data Types

Data type	Reference	Comments	Applicability
ConnInfo	6.1.6.2.4	Represents SEALDD connection information.	
DurationSec	3GPP TS 29.122 [2]	Represents a time duration in seconds.	
ProblemDetails	3GPP TS 29.122 [2]	Represents error related information.	
QoSInfo	6.1.6.2.5	Represents SEALDD related QoS requirements.	
SupportedFeatures	3GPP TS 29.571 [18]	Represents the list of supported feature(s) and used to negotiate the applicability of the optional features.	
TransportProtocol	3GPP TS 29.558 [17]	Represents the transport layer protocol.	
UInteger	3GPP TS 29.571 [18]	Represents an unsigned integer.	SEALDD_2
ValServBdw	6.1.6.2.6	Represents VAL Server related bandwidth information.	
ValTargetUe	3GPP TS 29.549 [15]	Represents the identifier of a VAL UE or VAL user.	
ValUsersBdw	6.1.6.2.7	Represents VAL users related bandwidth information.	
Uri	3GPP TS 29.122 [2]	Represents a URI.	

6.3.6.2 Structured data types

6.3.6.2.1 Introduction

This clause defines the data structures to be used in resource representations.

6.3.6.2.2 Type: DdContext

Table 6.3.6.2.2-1: Definition of type DdContext

Attribute name	Data type	P	Cardinality	Description	Applicability
uuContext	SddUuContext	M	1	Represents the context related to the SEALDD-UU connection.	
sContext	SddSContext	M	1	Represents the context related to the SEALDD-S connection.	
trLayerContext	TranspLayerContext	O	0..1	Represents the transport layer context. This attribute is applicable only for the SEALDD-UU connection.	

6.3.6.2.3 Type: TranspLayerContext

Table 6.3.6.2.3-1: Definition of type TranspLayerContext

Attribute name	Data type	P	Cardinality	Description	Applicability
transProtoc	TransportProtocol	M	1	Represents the transport layer context for the SEALDD-UU user plane communication.	

6.3.6.2.4 Type: DdContextPushReq

Table 6.3.6.2.4-1: Definition of type DdContextPushReq

Attribute name	Data type	P	Cardinality	Description	Applicability
ddContext	DdContext	M	1	Represents the DD context information.	
breakpointInfo	ContentBreakpoint	O	0..1	Contains the content breakpoint information for pre-provisioned data in downlink.	SEALDD_2
suppFeat	SupportedFeatures	C	0..1	Represents the list of supported features among the ones defined in clause 6.3.8. This attribute shall be present only when feature negotiation needs to take place.	

6.3.6.2.5 Type: DdContextResp

Table 6.3.6.2.5-1: Definition of type DdContextResp

Attribute name	Data type	P	Cardinality	Description	Applicability
ddContext	DdContext	C	0..1	Represents the DD context information. This attribute shall be present only in the response to a DD Context Pull request.	
endPoint	ConnInfo	C	0..1	Represents the endpoint information of the SEALDD Server for the new SEALDD-UU user plane communication. This attribute shall be present only in a response to a DD Context Push request.	
policies	array(Policy Config)	C	0..1	Represents the set of SEALDD Policy(ies) and the related configuration information currently configured at (and being used by) the SEALDD Server. This attribute shall be present only in a response to a DD Context Pull request.	
suppFeat	SupportedFeatures	C	0..1	Represents the list of supported features among the ones defined in clause 6.3.8. This attribute shall be present only when feature negotiation needs to take place.	

6.3.6.2.6 Type: SddUuContext

Table 6.3.6.2.6-1: Definition of type SddUuContext

Attribute name	Data type	P	Cardinality	Description	Applicability
sddFlowId	string	M	1	Represents the identifier of the SEALDD-UU flow.	
valServiceId	string	O	0..1	Contains the identifier of the VAL service.	
valServerId	string	O	0..1	Contains the identifier of the VAL Server.	
valServEndPoint	ConnInfo	M	1	Represents the endpoint information of the selected VAL Server.	
ddClientConnInfo	ConnInfo	O	0..1	Represents the SEALDD Client-side SEALDD-UU connection information.	
ddServConnInfo	ConnInfo	O	0..1	Represents the SEALDD Server-side SEALDD-UU connection information.	
valTgtUe	ValTargetUe	O	0..1	Contains the identifier of the target VAL UE or VAL user.	
comLifetime	DurationSec	O	0..1	Represents the SEALDD communication lifetime.	
valUsersBdw	ValUsersBdw	O	0..1	Contains the UL/DL bandwidth limits for VAL users.	
pendingTimer	DurationSec	O	0..1	Contains the value of the pending timer representing the time duration to be respected before triggering re-connection from SEALDD Client when the bandwidth limit check fails.	

6.3.6.2.7 Type: SddSContext

Table 6.3.6.2.7-1: Definition of type SddSContext

Attribute name	Data type	P	Cardinality	Description	Applicability
valServerId	string	M	1	Contains the identifier of the VAL Server that is sending the request.	
valServiceId	string	O	0..1	Contains the identifier of the VAL service.	
valTargetId	ValTargetUe	O	0..1	Contains the identifier of the target VAL UE or VAL user.	
valServerConnInfo	ConnInfo	M	1	Contains VAL Server's side SEALDD-S connection information.	
ddServerConnInfo	ConnInfo	O	0..1	Contains SEALDD Server's side SEALDD-S connection information, i.e., address/port and/or URI via which the SEALDD Server desires to receive the traffic from the VAL Server.	
qosInfo	QosInfo	O	0..1	Contains the requested QoS requirements for the application data transmission.	
valServerBdw	ValServBdw	O	0..1	Contains the total UL/DL bandwidth limit of the VAL Server.	
valUsersBdw	ValUsersBdw	O	0..1	Contains the UL/DL bandwidth limits for VAL users.	

6.3.6.2.8 Type: ContentBreakpoint

Table 6.3.6.2.8-1: Definition of type ContentBreakpoint

Attribute name	Data type	P	Cardinality	Description	Applicability
seqNum	UInteger	C	0..1	Contains the sequence number of the last transmitted data piece of the content. (NOTE)	
NOTE: At least one of these attributes shall be present.					

6.3.6.2.9 Type: InformACREvent

Table 6.3.6.2.9-1: Definition of type InformACREvent

Attribute name	Data type	P	Cardinality	Description	Applicability
valServerId	string	M	1	Contains the identifier of the VAL Server.	
valServiceId	string	O	0..1	Contains the identifier of the VAL service.	
notifUri	Uri	O	0..1	Contains URI via which ACR Event notifications shall be delivered.	
suppFeat	SupportedFeatures	C	0..1	Represents the list of supported features among the ones defined in clause 6.3.8. This attribute shall be present only when feature negotiation needs to take place.	

6.3.6.2.10 Type: AcrEventNotif

Table 6.3.6.2.10-1: Definition of type AcrEventNotif

Attribute name	Data type	P	Cardinality	Description	Applicability
result	FlowTransResult	M	1	Represents the SEALDD flow transfer result.	

6.3.6.3 Simple data types and enumerations

6.3.6.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

6.3.6.3.2 Simple data types

The simple data types defined in table 6.3.6.3.2-1 shall be supported.

Table 6.3.6.3.2-1: Simple data types

Type name	Description

6.3.6.3.3 Enumeration: FlowTransResult

The enumeration FlowTransResult represents the SEALDD flow transfer result. It shall comply with the provisions defined in table 6.3.6.3.3-1.

Table 6.3.6.3.3-1: Enumeration FlowTransResult

Enumeration value	Description	Applicability
SUCCESS	Indicates that the flow transfer was successful.	
FAILURE	Indicates that the flow transfer failed.	

6.3.6.4 Data types describing alternative data types or combinations of data types

There are no data types describing alternative data types or combinations of data types defined for this API in this release of the specification.

6.3.6.5 Binary data

6.3.6.5.1 Binary Data Types

Table 6.3.6.5.1-1: Binary Data Types

Name	Clause defined	Content type

6.3.7 Error Handling

6.3.7.1 General

For the SDD_DDContext API, error handling shall be supported as specified in clause 6.7 of 3GPP TS 29.549 [15].

In addition, the requirements in the following clauses are applicable for the SDD_DDContext API.

6.3.7.2 Protocol Errors

No specific protocol errors for the SDD_DDContext API are specified.

6.3.7.3 Application Errors

The application errors defined for the SDD_DDContext API are listed in table 6.3.7.3-1.

Table 6.3.7.3-1: Application errors

Application Error	HTTP status code	Description	Applicability
RELOCATION_REJECTED	403 Forbidden	Indicates that the DD Context push request is rejected because the DD Context relocation is rejected or not authorized by the SEALDD Server for the concerned SEALDD Client.	

6.3.8 Feature negotiation

The optional features listed in table 6.3.8-1 are defined for the SDD_DDContext API. They shall be negotiated using the extensibility mechanism defined in clause 6.8 of 3GPP TS 29.549 [15].

Table 6.3.8-1: Supported Features

Feature number	Feature Name	Description
1	SEALDD_2	This feature indicates the support of the first set of enhancements to the SEAL Data Delivery Enabler Layer. Within this feature, the following enhancements are covered: - Support the provisioning of the content breakpoint information during the DD Context push procedure.

6.3.9 Security

The provisions of clause 9 of 3GPP TS 29.549 [15] shall apply for the SDD_DDContext API.

6.4 SDD_TransmissionQualityMeasurement Service API

6.4.1 Introduction

The SDD_TransmissionQualityMeasurement service shall use the SDD_TransmissionQualityMeasurement API.

The API URI of the SDD_TransmissionQualityMeasurement Service API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 6.5 of 3GPP TS 29.549 [15], i.e.:

{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>

with the following components:

- The {apiRoot} shall be set as described in clause 6.5 of 3GPP TS 29.549 [15].
- The <apiName> shall be "sdd-tqm".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 6.5 of 3GPP TS 29.549 [15].

NOTE: When 3GPP TS 29.122 [2] is referenced for the common protocol and interface aspects for API definition in the clauses under clause 6.4, the SEALDD Server takes the role of the SCEF and the service consumer takes the role of the SCS/AS.

6.4.2 Usage of HTTP

The provisions of clause 6.3 of 3GPP TS 29.549 [15] shall apply for the SDD_TransmissionQualityMeasurement API.

6.4.3 Resources

6.4.3.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 6.4.3.1-1 depicts the resource URIs structure for the SDD_TransmissionQualityMeasurement API.

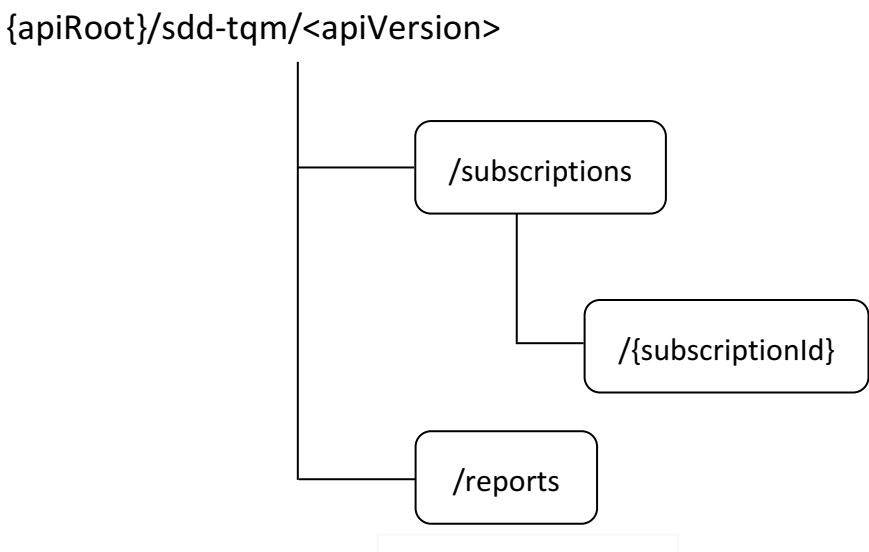


Figure 6.4.3.1-1: Resource URIs structure of the SDD_TransmissionQualityMeasurement API

Table 6.4.3.1-1 provides an overview of the resources and applicable HTTP methods for the SDD_TransmissionQualityMeasurement API.

Table 6.4.3.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method or custom operation	Description
Transmission Quality Measurement Subscriptions	/subscriptions	POST	Request the creation of a Transmission Quality Measurement Subscription.
Individual Transmission Quality Measurement Subscription	/subscriptions/{subscriptionId}	GET	Retrieve an existing "Individual Transmission Quality Measurement Subscription" resource.
		PUT	Request the update of an existing "Individual Transmission Quality Measurement Subscription" resource.
		PATCH	Request the modification of an existing "Individual Transmission Quality Measurement Subscription" resource.
		DELETE	Request the deletion of an existing "Individual Transmission Quality Measurement Subscription" resource.
Historical Transmission Quality Measurement Reports	/reports	GET	Retrieve Historical Transmission Quality Measurement Report(s).

6.4.3.2 Resource: Transmission Quality Measurement Subscriptions

6.4.3.2.1 Description

This resource represents the collection of Transmission Quality Measurement Subscription(s) managed by the SEALDD Server.

6.4.3.2.2 Resource Definition

Resource URI: **{apiRoot}/sdd-tqm/<apiVersion>/subscriptions**

This resource shall support the resource URI variables defined in table 6.4.3.2.2-1.

Table 6.4.3.2.2-1: Resource URI variables for this resource

Name	Data type	Definition
apiRoot	string	See clause 6.4.1.

6.4.3.2.3 Resource Standard Methods

6.4.3.2.3.1 POST

The HTTP POST method allows a service consumer to request the creation of a Transmission Quality Measurement Subscription at the SEALDD Server.

This method shall support the URI query parameters specified in table 6.4.3.2.3.1-1.

Table 6.4.3.2.3.1-1: URI query parameters supported by the POST method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.4.3.2.3.1-2 and the response data structures and response codes specified in table 6.4.3.2.3.1-3.

Table 6.4.3.2.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
TransQualMeasSubsc	M	1	Represents the parameters to request the creation of a Transmission Quality Measurement Subscription.

Table 6.4.3.2.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
TransQualMeasSubsc	M	1	201 Created	Successful case. The Transmission Quality Measurement Subscription is successfully created and a representation of the created "Individual Transmission Quality Measurement Subscription" resource shall be returned in the response body. An HTTP "Location" header that contains the URI of the created resource shall also be included.
ProblemDetails	O	0..1	403 Forbidden	(NOTE 2)
NOTE 1: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				
NOTE 2: Failure causes are described in clause 6.4.7.				

Table 6.4.3.2.3.1-4: Headers supported by the 201 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains the URI of the newly created resource, according to the structure: {apiRoot}/sdd-tqm/<apiVersion>/subscriptions/{subscriptionId}

6.4.3.2.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

6.4.3.3 Resource: Individual Transmission Quality Measurement Subscription

6.4.3.3.1 Description

This resource represents a Transmission Quality Measurement Subscription managed by the SEALDD Server.

6.4.3.3.2 Resource Definition

Resource URI: {apiRoot}/sdd-tqm/<apiVersion>/subscriptions/{subscriptionId}

This resource shall support the resource URI variables defined in table 6.4.3.3.2-1.

Table 6.4.3.3.2-1: Resource URI variables for this resource

Name	Data type	Definition
apiRoot	string	See clause 6.4.1.
subscriptionId	string	Represents the identifier of the "Individual Transmission Quality Measurement Subscription" resource.

6.4.3.3.3 Resource Standard Methods

6.4.3.3.3.1 GET

The HTTP GET method allows a service consumer to retrieve an existing "Individual Transmission Quality Measurement Subscription" resource at the SEALDD Server.

This method shall support the URI query parameters specified in table 6.4.3.3.3.1-1.

Table 6.4.3.3.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.4.3.3.3.1-2 and the response data structures and response codes specified in table 6.4.3.3.3.1-3.

Table 6.4.3.3.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 6.4.3.3.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
TransQualMeasSubsc	M	1	200 OK	Successful case. The requested "Individual Transmission Quality Measurement Subscription" resource shall be returned.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.4.3.3.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

Table 6.4.3.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

6.4.3.3.2 PUT

The HTTP PUT method allows a service consumer to request the update of an existing "Individual Transmission Quality Measurement Subscription" resource at the SEALDD Server.

This method shall support the URI query parameters specified in table 6.4.3.3.2-1.

Table 6.4.3.3.2-1: URI query parameters supported by the PUT method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.4.3.3.2-2 and the response data structures and response codes specified in table 6.4.3.3.2-3.

Table 6.4.3.3.2-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
TransQualMeasSubsc	M	1	Represents the updated representation of the "Individual Transmission Quality Measurement Subscription" resource.

Table 6.4.3.3.2-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
TransQualMeasSubsc	M	1	200 OK	Successful case. The "Individual Transmission Quality Measurement Subscription" resource is successfully updated and a representation of the updated resource shall be returned in the response body.
n/a			204 No Content	Successful case. The "Individual Transmission Quality Measurement Subscription" resource is successfully updated and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
ProblemDetails	O	0..1	403 Forbidden	(NOTE 2)
NOTE 1: The mandatory HTTP error status codes for the HTTP PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				
NOTE 2: Failure causes are described in clause 6.4.7.				

Table 6.4.3.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

Table 6.4.3.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

6.4.3.3.3.3 PATCH

The HTTP PATCH method allows a service consumer to request the modification of an existing "Individual Transmission Quality Measurement Subscription" resource at the SEALDD Server.

This method shall support the URI query parameters specified in table 6.4.3.3.3.3-1.

Table 6.4.3.3.3.3-1: URI query parameters supported by the PATCH method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.4.3.3.3.3-2 and the response data structures and response codes specified in table 6.4.3.3.3.3-3.

Table 6.4.3.3.3.3-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
TransQualMeasSubscPatch	M	1	Represents the parameters to request the modification of the "Individual Transmission Quality Measurement Subscription" resource.

Table 6.4.3.3.3-3: Data structures supported by the PATCH Response Body on this resource

Data type	P	Cardinality	Response codes	Description
TransQualMeasSubsc	M	1	200 OK	Successful case. The "Individual Transmission Quality Measurement Subscription" resource is successfully modified and a representation of the updated resource shall be returned in the response body.
n/a			204 No Content	Successful case. The "Individual Transmission Quality Measurement Subscription" resource is successfully modified and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
ProblemDetails	O	0..1	403 Forbidden	(NOTE 2)
NOTE 1: The mandatory HTTP error status codes for the HTTP PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				
NOTE 2: Failure causes are described in clause 6.4.7.				

Table 6.4.3.3.3-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

Table 6.4.3.3.3-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

6.4.3.3.4 DELETE

The HTTP DELETE method allows a service consumer to request the deletion of an existing "Individual Transmission Quality Measurement Subscription" resource at the SEALDD Server.

This method shall support the URI query parameters specified in table 6.4.3.3.4-1.

Table 6.4.3.3.4-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.4.3.3.4-2 and the response data structures and response codes specified in table 6.4.3.3.4-3.

Table 6.4.3.3.4-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 6.4.3.3.4-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The "Individual Transmission Quality Measurement Subscription" resource is successfully deleted.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.4.3.3.4-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

Table 6.4.3.3.4-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

6.4.3.3.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

6.4.3.4 Resource: Historical Transmission Quality Measurement Reports

6.4.3.4.1 Description

This resource represents the collection of Historical Transmission Quality Measurement Report(s) managed by the SEALDD Server.

6.4.3.4.2 Resource Definition

Resource URI: **{apiRoot}/sdd-tqm/<apiVersion>/reports**

This resource shall support the resource URI variables defined in table 6.4.3.4.2-1.

Table 6.4.3.4.2-1: Resource URI variables for this resource

Name	Data type	Definition
apiRoot	string	See clause 6.4.1.

6.4.3.4.3 Resource Standard Methods

6.4.3.4.3.1 GET

The HTTP GET method allows a service consumer to retrieve Historical Transmission Quality Measurement Report(s) from the SEALDD Server.

This method shall support the URI query parameters specified in table 6.4.3.4.3.1-1.

Table 6.4.3.4.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description	Applicability
app-traffic-ids	array(string)	M	1..N	Contains the identifier(s) of the targeted application traffic (e.g., VAL Service ID, VAL Server ID).	
val-group-id	string	O	0..1	Contains the identity of the VAL group to which the request is related. (NOTE)	
val-ue-ids-list	array(string)	O	1..N	Contains the list of the identifier(s) of the VAL UE(s) to which the request is related. (NOTE)	
val-user-ids-list	array(string)	O	1..N	Contains the list of the identifier(s) of the VAL user(s) to which the request is related. (NOTE)	
all-val-ues	boolean	O	0..1	Indicates that the request is related to all VAL UE/user(s) of the application traffic identified by the application traffic identifier(s) provided within the "appTrafficIds" attribute. - "true" indicates that the request is related to all VAL UE/user(s). - "false" indicates that the request is not related to all VAL UE/user(s). - The default value when this query parameter is omitted is "false". (NOTE)	
supp-feat	SupportedFeatures	C	0..1	Contains the list of supported features among the ones defined in clause 6.4.8. This query parameter shall be present only when feature negotiation needs to take place.	
NOTE: The "val-group-id" query parameter, the "val-ue-ids-list" query parameter and/or the "val-user-ids-list" query parameter, and when set to "true", the "all-val-ues" query parameter, are mutually exclusive. Either one of them may be present.					

This method shall support the request data structures specified in table 6.4.3.4.3.1-2 and the response data structures and response codes specified in table 6.4.3.4.3.1-3.

Table 6.4.3.4.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 6.4.3.4.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
HistTransQualMeasReports	M	1	200 OK	Successful case. The requested Historical Transmission Quality Measurement Report(s), if any, shall be returned.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.4.3.4.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

Table 6.4.3.4.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

6.4.3.4.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

6.4.4 Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

6.4.5 Notifications

6.4.5.1 General

Notifications shall comply to clause 6.6 of 3GPP TS 29.549 [15].

Table 6.4.5.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
Transmission Quality Measurement Notification	{notifUri}	POST	Enables a SEALDD Server to notify a previously subscribed service consumer on Transmission Quality Measurement report(s).

6.4.5.2 Transmission Quality Measurement Notification

6.4.5.2.1 Description

The Transmission Quality Measurement Notification is used by a SEALDD Server to notify a previously subscribed service consumer on Transmission Quality Measurement report(s).

6.4.5.2.2 Target URI

The Callback URI "{**notifUri**}" shall be used with the callback URI variables defined in table 6.4.5.2.2-1.

Table 6.4.5.2.2-1: Callback URI variables

Name	Data type	Definition
notifUri	Uri	Represents the callback URI encoded as a string formatted as a URI.

6.4.5.2.3 Standard Methods

6.4.5.2.3.1 POST

This method shall support the request data structures specified in table 6.4.5.2.3.1-1 and the response data structures and response codes specified in table 6.4.5.2.3.1-2.

Table 6.4.5.2.3.1-1: Data structures supported by the POST Request Body

Data type	P	Cardinality	Description
TransQualMeasNotif	M	1	Represents the Transmission Quality Measurement Notification.

Table 6.4.5.2.3.1-2: Data structures supported by the POST Response Body

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The Transmission Quality Measurement Notification is successfully received and acknowledged.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative service consumer towards which the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative service consumer towards which the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.4.5.2.3.1-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative service consumer towards which the notification should be redirected.

Table 6.4.5.2.3.1-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative service consumer towards which the notification should be redirected.

6.4.6 Data Model

6.4.6.1 General

This clause specifies the application data model supported by the API.

Table 6.4.6.1-1 specifies the data types defined for the SDD_TransmissionQualityMeasurement API.

Table 6.4.6.1-1: SDD_TransmissionQualityMeasurement API specific Data Types

Data type	Clause defined	Description	Applicability
Crossflow	6.4.6.2.11	Represents a crossflow.	XRMAApp
CrossflowInfo	6.4.6.2.12	Represents the crossflow information.	XRMAApp
FlowDirection	6.4.6.3.5	Represents the flow direction.	XRMAApp
HistTransQualMeasReports	6.4.6.2.9	Represents the Historical Transmission Quality Measurement Report(s).	
MeasurementId	6.4.6.3.3	Represents the transmission quality measurement type.	
RepGranularity	6.4.6.3.4	Represents the reporting granularity.	
TransQualMeasCriteria	6.4.6.2.7	Represents the transmission quality measurement reporting criteria.	
TransQualMeasCriteriaSet	6.4.6.2.10	Represents a set of transmission quality measurement reporting criteria.	
TransQualMeasData	6.4.6.2.8	Represents the transmission quality measurement data.	
TransQualMeasNotif	6.4.6.2.5	Represents a Transmission Quality Measurement Notification.	
TransQualMeasReport	6.4.6.2.6	Represents a Transmission Quality Measurement report.	
TransQualMeasReq	6.4.6.2.3	Represents the Transmission Quality Measurement reporting requirements.	
TransQualMeasSubsc	6.4.6.2.2	Represents a Transmission Quality Measurement Subscription.	
TransQualMeasSubscPatch	6.4.6.2.4	Represents the requested modifications to a Transmission Quality Measurement Subscription.	

Table 6.4.6.1-2 specifies data types re-used by the SDD_TransmissionQualityMeasurement API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the SDD_TransmissionQualityMeasurement API.

Table 6.4.6.1-2: SDD_TransmissionQualityMeasurement API re-used Data Types

Data type	Reference	Comments	Applicability
BitRate	3GPP TS 29.571 [18]	Represents a bit rate.	
DateTime	3GPP TS 29.122 [2]	Represents a date and a time.	
DateTimeRo	3GPP TS 29.122 [2]	Represents a date and a time with the read-only property.	
DurationSec	3GPP TS 29.122 [2]	Represents a time duration in seconds.	
MatchingDirection	3GPP TS 29.520 [20]	Represents the threshold matching direction.	
NotificationMethod	3GPP TS 29.508 [16]	Represents the reporting type.	
PacketLossRate	3GPP TS 29.571 [18]	Represents the packet loss rate.	
ProblemDetails	3GPP TS 29.122 [2]	Represents error related information.	
SupportedFeatures	3GPP TS 29.571 [18]	Represents the list of supported feature(s) and used to negotiate the applicability of the optional features.	
TimeWindow	3GPP TS 29.122 [2]	Represents a time window.	
Uint32	3GPP TS 29.571 [18]	Represents an unsigned 32-bit integer.	
UInteger	3GPP TS 29.571 [18]	Represents an unsigned integer.	
Uri	3GPP TS 29.122 [2]	Represents a URI.	
ValidityConditions	3GPP TS 29.549 [15]	Represents temporal and/or spatial validity conditions.	

6.4.6.2 Structured data types

6.4.6.2.1 Introduction

This clause defines the data structures to be used in resource representations.

6.4.6.2.2

Type: TransQualMeasSubsc

Table 6.4.6.2.2-1: Definition of type TransQualMeasSubsc

Attribute name	Data type	P	Cardinality	Description	Applicability
appTrafficIds	array(string)	M	1..N	Contains the identifier(s) of the targeted application traffic (e.g., VAL Service ID, VAL Server ID).	
notifUri	Uri	M	1	Contains the URI via which Transmission Quality Measurement notifications shall be delivered.	
valGroupId	string	C	0..1	Contains the identity of the VAL group to which the subscription is related. (NOTE)	
valUeIdsList	array(string)	C	1..N	Contains the list of the identifier(s) of the VAL UE(s) to which the subscription is related. (NOTE)	
valUserIdsList	array(string)	C	1..N	Contains the list of the identifier(s) of the VAL user(s) to which the subscription is related. (NOTE)	
allValUesInd	boolean	C	0..1	Indicates that the subscription is related to all VAL UE/user(s) of the application traffic identified by the application traffic identifier(s) provided within the "appTrafficIds" attribute. - "true" indicates that the subscription is related to all VAL UE/user(s). - "false" indicates that the subscription is not related to all VAL UE/user(s). - The default value when this attribute is omitted is "false". (NOTE)	
flows	array(ConnInfo)	C	1..N	Contains the descriptor(s) of the SEALDD flow(s) to which the subscription is related. (NOTE)	XRMApp
crossflows	array(Crossflow)	C	1..N	Contains the descriptor(s) of the SEALDD crossflow(s) to which the subscription is related. (NOTE)	XRMApp
measConds	array(ValidityConditions)	O	1..N	Contains the set of temporal and/or spatial measurement condition(s) of the subscription.	
reqs	map(TransQualMeasReq)	M	1..N	Contains the transmission quality measurement reporting requirements of the subscription. The key of the map shall be any unique string encoded value.	
subsExpTime	DateTimeRo	O	0..1	Indicates the time at which the subscription shall expire. This attribute may be present only in Transmission Quality Measurement subscription creation/update responses. If this attribute is absent, this means that the subscription shall not expire, until explicitly deleted by the service consumer.	
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported features among the ones defined in clause 6.4.8. This attribute shall be present only when feature negotiation needs to take place.	

NOTE: The "valGroupId" attribute, the "valUeIdsList" attribute, the "flows" attribute, the "crossflows" attribute and/or the "valUserIdsList" attribute, and when set to "true", the "allValUesInd" attribute, are mutually exclusive. Either one of them shall be present.

6.4.6.2.3 Type: TransQualMeasReq

Table 6.4.6.2.3-1: Definition of type TransQualMeasReq

Attribute name	Data type	P	Cardinality	Description	Applicability
measId	array(MeasurementId)	M	1..N	Contains the requested transmission quality measurement(s).	
repType	NotificationMethod	O	0..1	Contains the requested reporting type (e.g. periodic reporting). The default value is "PERIODIC" (i.e., periodic reporting), if this attribute is not present.	
repPeriodicity	DurationSec	C	0..1	Contains the reporting periodicity. This attribute shall be present only if the "repType" attribute is not present, or present and set to the value "PERIODIC".	
repGranularity	RepGranularity	O	0..1	Contains the reporting granularity, i.e., whether the requested transmission quality measurement reporting is per individual VAL UE/user, VAL group or all VAL UE/user(s) granularity.	
measWindow	TimeWindow	O	0..1	Contains the measurement window for the requested transmission quality measurements.	
measExpTime	DateTime	O	0..1	Contains the measurement expiration time.	
repCriteriaSets	map(TransQualMeasCriteriaSet)	O	1..N	Contains one or several set(s) of transmission quality measurement reporting criteria. The key of the map shall be any unique string encoded value. Only the criteria related to the subscribed measurement(s) within the "measId" attribute shall be present within this attribute. (NOTE)	
NOTE: This attribute shall not contain two map entries having the same value for the "criteria" attribute of the TransQualMeasCriteriaSet data type (i.e., a transmission quality measurement reporting criteria shall not be provided twice).					

6.4.6.2.4 Type: TransQualMeasSubscPatch

Table 6.4.6.2.4-1: Definition of type TransQualMeasSubscPatch

Attribute name	Data type	P	Cardinality	Description	Applicability
measConds	array(ValidityConditions)	O	1..N	Contains the updated set of temporal and/or spatial measurement condition(s) of the subscription.	
reqs	map(TransQualMeasReq)	O	1..N	Contains the updated transmission quality measurement reporting requirements of the subscription. The key of the map shall be any unique string encoded value and shall be set to the same value as the one provided during the creation of the corresponding transmission quality measurement subscription.	
notifUri	Uri	O	0..1	Contains the updated URI via which the notifications shall be delivered.	

6.4.6.2.5 Type: TransQualMeasNotif

Table 6.4.6.2.5-1: Definition of type TransQualMeasNotif

Attribute name	Data type	P	Cardinality	Description	Applicability
subscriptionId	string	M	1	Contains the identifier of the subscription to which the transmission quality measurement notification is related.	
reports	array(TransQualMeasReport)	M	1..N	Contains the transmission quality measurement report(s).	

6.4.6.2.6 Type: TransQualMeasReport

Table 6.4.6.2.6-1: Definition of type TransQualMeasReport

Attribute name	Data type	P	Cardinality	Description	Applicability
measId	array(MeasurementId)	M	1..N	Contains the reported transmission quality measurement(s).	
valUeIds	array(string)	C	1..N	Contains the list of the identifier(s) of the VAL UE(s) to which the transmission quality measurement(s) report is related. (NOTE)	
valUserIds	array(string)	C	1..N	Contains the list of the identifier(s) of the VAL user(s) to which the transmission quality measurement(s) report is related. (NOTE)	
flows	array(ConnInfo)	C	1..N	Contains the descriptor(s) of the SEALDD flow(s) to which the transmission quality measurement(s) report is related. (NOTE)	XRMAApp
crossflows	array(Crossflow)	C	1..N	Contains the descriptor(s) of the SEALDD crossflow(s) to which the transmission quality measurement(s) report is related. (NOTE)	XRMAApp
measData	TransQualMeasData	O	0..1	Contains the reported transmission quality measurement(s) data.	
timestamp	DateTime	O	0..1	Contains the timestamp of this transmission quality measurement(s) report.	
NOTE: These attributes are mutually exclusive. Either one of them shall be present, unless the corresponding request targets a single VAL UE/user, in which case these attributes may not be present.					

6.4.6.2.7

Type: TransQualMeasCriteria

Table 6.4.6.2.7-1: Definition of type TransQualMeasCriteria

Attribute name	Data type	P	Cardinality	Description	Applicability
minLatency	UInteger	C	0..1	Contains the requested minimum E2E latency (expressed in milliseconds) for transmission quality measurement reporting. (NOTE)	
avgLatency	UInteger	C	0..1	Contains the requested average E2E latency (expressed in milliseconds) for transmission quality measurement reporting. (NOTE)	
maxLatency	UInteger	C	0..1	Contains the requested maximum E2E latency (expressed in milliseconds) for transmission quality measurement reporting. (NOTE)	
minLatencyDI	UInteger	C	0..1	Contains the requested minimum DL latency (expressed in milliseconds) for transmission quality measurement reporting. (NOTE)	XRMAApp
avgLatencyDI	UInteger	C	0..1	Contains the requested average DL latency (expressed in milliseconds) for transmission quality measurement reporting. (NOTE)	XRMAApp
maxLatencyDI	UInteger	C	0..1	Contains the requested maximum DL latency (expressed in milliseconds) for transmission quality measurement reporting. (NOTE)	XRMAApp
minLatencyUI	UInteger	C	0..1	Contains the requested minimum UL latency (expressed in milliseconds) for transmission quality measurement reporting. (NOTE)	XRMAApp
avgLatencyUI	UInteger	C	0..1	Contains the requested average UL latency (expressed in milliseconds) for transmission quality measurement reporting. (NOTE)	XRMAApp
maxLatencyUI	UInteger	C	0..1	Contains the requested maximum UL latency (expressed in milliseconds) for transmission quality measurement reporting. (NOTE)	XRMAApp
minLatencyCross flow	UInteger	C	0..1	Contains the requested minimum crossflow latency (expressed in milliseconds) for transmission quality measurement reporting. (NOTE)	XRMAApp
avgLatencyCross flow	UInteger	C	0..1	Contains the requested average crossflow latency (expressed in milliseconds) for transmission quality measurement reporting. (NOTE)	XRMAApp
maxLatencyCross flow	UInteger	C	0..1	Contains the requested maximum crossflow latency (expressed in milliseconds) for transmission quality measurement reporting. (NOTE)	XRMAApp
minBitRate	BitRate	C	0..1	Contains the requested minimum E2E bit rate for transmission quality measurement reporting. (NOTE)	

avgBitRate	BitRate	C	0..1	Contains the requested average E2E bit rate for transmission quality measurement reporting. (NOTE)	
maxBitRate	BitRate	C	0..1	Contains the requested maximum E2E bit rate for transmission quality measurement reporting. (NOTE)	
minBitRateDL	BitRate	C	0..1	Contains the requested minimum DL bit rate for transmission quality measurement reporting. (NOTE)	XRMAApp
avgBitRateDL	BitRate	C	0..1	Contains the requested average DL bit rate for transmission quality measurement reporting. (NOTE)	XRMAApp
maxBitRateDL	BitRate	C	0..1	Contains the requested maximum DL bit rate for transmission quality measurement reporting. (NOTE)	XRMAApp
minBitRateUL	BitRate	C	0..1	Contains the requested minimum UL bit rate for transmission quality measurement reporting. (NOTE)	XRMAApp
avgBitRateUL	BitRate	C	0..1	Contains the requested average UL bit rate for transmission quality measurement reporting. (NOTE)	XRMAApp
maxBitRateUL	BitRate	C	0..1	Contains the requested maximum UL bit rate for transmission quality measurement reporting. (NOTE)	XRMAApp
minBitRateCrossflow	BitRate	C	0..1	Contains the requested minimum crossflow bit rate for transmission quality measurement reporting. (NOTE)	XRMAApp
avgBitRateCrossflow	BitRate	C	0..1	Contains the requested average crossflow bit rate for transmission quality measurement reporting. (NOTE)	XRMAApp
maxBitRateCrossflow	BitRate	C	0..1	Contains the requested maximum crossflow bit rate for transmission quality measurement reporting. (NOTE)	XRMAApp
minPacketLossRate	PacketLossRate	C	0..1	Contains the requested minimum E2E packet loss rate for transmission quality measurement reporting. (NOTE)	
avgPacketLossRate	PacketLossRate	C	0..1	Contains the requested average E2E packet loss rate for transmission quality measurement reporting. (NOTE)	

maxPackLossRate	PacketLossRate	C	0..1	Contains the requested maximum E2E packet loss rate for transmission quality measurement reporting. (NOTE)	
minPackLossRateDL	PacketLossRate	C	0..1	Contains the requested minimum DL packet loss rate for transmission quality measurement reporting. (NOTE)	XRMAApp
avgPackLossRateDL	PacketLossRate	C	0..1	Contains the requested average DL packet loss rate for transmission quality measurement reporting. (NOTE)	XRMAApp
maxPackLossRateDL	PacketLossRate	C	0..1	Contains the requested maximum DL packet loss rate for transmission quality measurement reporting. (NOTE)	XRMAApp
minPackLossRateUL	PacketLossRate	C	0..1	Contains the requested minimum UL packet loss rate for transmission quality measurement reporting. (NOTE)	XRMAApp
avgPackLossRateUL	PacketLossRate	C	0..1	Contains the requested average UL packet loss rate for transmission quality measurement reporting. (NOTE)	XRMAApp
maxPackLossRateUL	PacketLossRate	C	0..1	Contains the requested maximum UL packet loss rate for transmission quality measurement reporting. (NOTE)	XRMAApp
minPackLossRateCrossflow	PacketLossRate	C	0..1	Contains the requested minimum crossflow packet loss rate for transmission quality measurement reporting. (NOTE)	XRMAApp
avgPackLossRateCrossflow	PacketLossRate	C	0..1	Contains the requested average crossflow packet loss rate for transmission quality measurement reporting. (NOTE)	XRMAApp
maxPackLossRateCrossflow	PacketLossRate	C	0..1	Contains the requested maximum crossflow packet loss rate for transmission quality measurement reporting. (NOTE)	XRMAApp
minJitter	UInt32	C	0..1	Contains the requested minimum jitter (expressed in nanoseconds) for transmission quality measurement reporting. (NOTE)	
avgJitter	UInt32	C	0..1	Contains the requested average jitter (expressed in nanoseconds) for transmission quality measurement reporting. (NOTE)	
maxJitter	UInt32	C	0..1	Contains the requested maximum jitter (expressed in nanoseconds) for transmission quality measurement reporting. (NOTE)	

minJitterUI	Uint32	C	0..1	Contains the requested minimum UL jitter (expressed in nanoseconds) for transmission quality measurement reporting. (NOTE)	XRMAApp
avgJitterUI	Uint32	C	0..1	Contains the requested average UL jitter (expressed in nanoseconds) for transmission quality measurement reporting. (NOTE)	XRMAApp
maxJitterUI	Uint32	C	0..1	Contains the requested maximum UL jitter (expressed in nanoseconds) for transmission quality measurement reporting. (NOTE)	XRMAApp
minJitterDI	Uint32	C	0..1	Contains the requested minimum DL jitter (expressed in nanoseconds) for transmission quality measurement reporting. (NOTE)	XRMAApp
avgJitterDI	Uint32	C	0..1	Contains the requested average DL jitter (expressed in nanoseconds) for transmission quality measurement reporting. (NOTE)	XRMAApp
maxJitterDI	Uint32	C	0..1	Contains the requested maximum DL jitter (expressed in nanoseconds) for transmission quality measurement reporting. (NOTE)	XRMAApp
minJitterCrossflow	Uint32	C	0..1	Contains the requested minimum crossflow jitter (expressed in nanoseconds) for transmission quality measurement reporting. (NOTE)	XRMAApp
avgJitterCrossflow	Uint32	C	0..1	Contains the requested average crossflow jitter (expressed in nanoseconds) for transmission quality measurement reporting. (NOTE)	XRMAApp
maxJitterCrossflow	Uint32	C	0..1	Contains the requested maximum crossflow jitter (expressed in nanoseconds) for transmission quality measurement reporting. (NOTE)	XRMAApp
NOTE: These attributes are mutually exclusive. Either one of them shall be present.					

6.4.6.2.8

Type: TransQualMeasData

Table 6.4.6.2.8-1: Definition of type TransQualMeasData

Attribute name	Data type	P	Cardinality	Description	Applicability
minLatency	UInteger	O	0..1	Contains the measured minimum E2E latency (expressed in milliseconds). (NOTE)	
maxLatency	UInteger	O	0..1	Contains the measured maximum E2E latency (expressed in milliseconds). (NOTE)	
avgLatency	UInteger	O	0..1	Contains the measured average E2E latency (expressed in milliseconds). (NOTE)	
stdDevLatency	UInteger	O	0..1	Contains the standard deviation (expressed in milliseconds) for the measured E2E latency. This attribute may be present only if the "minLatency", "maxLatency" and/or "avgLatency" attribute(s) is/are present.	
kPercLatency	UInteger	O	0..1	Contains the kPercentile (expressed in milliseconds) for the measured E2E latency. This attribute may be present only if the "minLatency", "maxLatency" and/or "avgLatency" attribute(s) is/are present.	
kValLatency	UInteger	C	0..1	Contains the value of the reported percentile ("k" parameter value) within the "kPercLatency" attribute. This attribute shall be present only if the "kPercLatency" attribute is present.	
minLatencyUI	UInteger	O	0..1	Contains the measured minimum UL latency (expressed in milliseconds). (NOTE)	XRMAApp
maxLatencyUI	UInteger	O	0..1	Contains the measured maximum UL latency (expressed in milliseconds). (NOTE)	XRMAApp
avgLatencyUI	UInteger	O	0..1	Contains the measured average UL latency (expressed in milliseconds). (NOTE)	XRMAApp
stdDevLatencyUI	UInteger	O	0..1	Contains the standard deviation (expressed in milliseconds) for the measured UL latency. This attribute may be present only if the "minLatencyUI", "maxLatencyUI" and/or "avgLatencyUI" attribute(s) is/are present.	XRMAApp
kPercLatencyUI	UInteger	O	0..1	Contains the kPercentile (expressed in milliseconds) for the measured UL latency. This attribute may be present only if the "minLatencyUI", "maxLatencyUI" and/or "avgLatencyUI" attribute(s) is/are present.	XRMAApp
kValLatencyUI	UInteger	C	0..1	Contains the value of the reported percentile ("k" parameter value) within the "kPercLatencyUI" attribute. This attribute shall be present only if the "kPercLatencyUI" attribute is present.	XRMAApp

minLatencyDI	UInteger	O	0..1	Contains the measured minimum DL latency (expressed in milliseconds). (NOTE)	XRMAApp
maxLatencyDI	UInteger	O	0..1	Contains the measured maximum DL latency (expressed in milliseconds). (NOTE)	XRMAApp
avgLatencyDI	UInteger	O	0..1	Contains the measured average DL latency (expressed in milliseconds). (NOTE)	XRMAApp
stdDevLatencyDI	UInteger	O	0..1	Contains the standard deviation (expressed in milliseconds) for the measured DL latency. This attribute may be present only if the "minLatencyDI", "maxLatencyDI" and/or "avgLatencyDI" attribute(s) is/are present.	XRMAApp
kPercLatencyDI	UInteger	O	0..1	Contains the kPercentile (expressed in milliseconds) for the measured DL latency. This attribute may be present only if the "minLatencyDI", "maxLatencyDI" and/or "avgLatencyDI" attribute(s) is/are present.	XRMAApp
kValLatencyDI	UInteger	C	0..1	Contains the value of the reported percentile ("k" parameter value) within the "kPercLatencyDI" attribute. This attribute shall be present only if the "kPercLatencyDI" attribute is present.	XRMAApp
minLatencyCrossflow	UInteger	O	0..1	Contains the measured minimum crossflow latency (expressed in milliseconds). (NOTE)	XRMAApp
maxLatencyCrossflow	UInteger	O	0..1	Contains the measured maximum crossflow latency (expressed in milliseconds). (NOTE)	XRMAApp
avgLatencyCrossflow	UInteger	O	0..1	Contains the measured average crossflow latency (expressed in milliseconds). (NOTE)	XRMAApp
stdDevLatencyCrossflow	UInteger	O	0..1	Contains the standard deviation (expressed in milliseconds) for the measured crossflow latency. This attribute may be present only if the "minLatencyCrossflow", "maxLatencyCrossflow" and/or "avgLatencyCrossflow" attribute(s) is/are present.	XRMAApp
kPercLatencyCrossflow	UInteger	O	0..1	Contains the kPercentile (expressed in milliseconds) for the measured crossflow latency. This attribute may be present only if the "minLatencyCrossflow", "maxLatencyCrossflow" and/or "avgLatencyCrossflow" attribute(s) is/are present.	XRMAApp

kValLatencyCrossflow	UInteger	C	0..1	Contains the value of the reported percentile ("k" parameter value) within the "kPercLatencyCrossflow" attribute. This attribute shall be present only if the "kPercLatencyCrossflow" attribute is present.	XRMAApp
minBitRate	BitRate	O	0..1	Contains the measured minimum E2E bit rate. (NOTE)	
maxBitRate	BitRate	O	0..1	Contains the measured maximum E2E bit rate. (NOTE)	
avgBitRate	BitRate	O	0..1	Contains the measured average E2E bit rate. (NOTE)	
stdDevBitRate	BitRate	O	0..1	Contains the standard deviation for the measured E2E bit rate. This attribute may be present only if the "minBitRate", "maxBitRate" and/or "avgBitRate" attribute(s) is/are present.	
kPercBitRate	BitRate	O	0..1	Contains the kPercentile for the measured E2E bit rate. This attribute may be present only if the "minBitRate", "maxBitRate" and/or "avgBitRate" attribute(s) is/are present.	
kValBitRate	UInteger	C	0..1	Contains the value of the reported percentile ("k" parameter value) within the "kPercBitRate" attribute. This attribute shall be present only if the "kPercBitRate" attribute is present.	
minBitRateUI	BitRate	O	0..1	Contains the measured minimum UL bit rate. (NOTE)	XRMAApp
maxBitRateUI	BitRate	O	0..1	Contains the measured maximum UL bit rate. (NOTE)	XRMAApp
avgBitRateUI	BitRate	O	0..1	Contains the measured average UL bit rate. (NOTE)	XRMAApp
stdDevBitRateUI	BitRate	O	0..1	Contains the standard deviation for the measured UL bit rate. This attribute may be present only if the "minBitRateUI", "maxBitRateUI" and/or "avgBitRateUI" attribute(s) is/are present.	XRMAApp
kPercBitRateUI	BitRate	O	0..1	Contains the kPercentile for the measured UL bit rate. This attribute may be present only if the "minBitRateUI", "maxBitRateUI" and/or "avgBitRateUI" attribute(s) is/are present.	XRMAApp
kValBitRateUI	UInteger	C	0..1	Contains the value of the reported percentile ("k" parameter value) within the "kPercBitRateUI" attribute. This attribute shall be present only if the "kPercBitRateUI" attribute is present.	XRMAApp

minBitRateDI	BitRate	O	0..1	Contains the measured minimum DL bit rate. (NOTE)	XRMAApp
maxBitRateDI	BitRate	O	0..1	Contains the measured maximum DL bit rate. (NOTE)	XRMAApp
avgBitRateDI	BitRate	O	0..1	Contains the measured average DL bit rate. (NOTE)	XRMAApp
stdDevBitRateDI	BitRate	O	0..1	Contains the standard deviation DL for the measured bit rate. This attribute may be present only if the "minBitRateDI", "maxBitRateDI" and/or "avgBitRateDI" attribute(s) is/are present.	XRMAApp
kPercBitRateDI	BitRate	O	0..1	Contains the kPercentile for the measured DL bit rate. This attribute may be present only if the "minBitRateDI", "maxBitRateDI" and/or "avgBitRateDI" attribute(s) is/are present.	XRMAApp
kValBitRateDI	UInteger	C	0..1	Contains the value of the reported percentile ("k" parameter value) within the "kPercBitRateDI" attribute. This attribute shall be present only if the "kPercBitRateDI" attribute is present.	XRMAApp
minBitRateCrossflow	BitRate	O	0..1	Contains the measured minimum crossflow bit rate. (NOTE)	XRMAApp
maxBitRateCrossflow	BitRate	O	0..1	Contains the measured maximum crossflow bit rate. (NOTE)	XRMAApp
avgBitRateCrossflow	BitRate	O	0..1	Contains the measured average crossflow bit rate. (NOTE)	XRMAApp
stdDevBitRateCrossflow	BitRate	O	0..1	Contains the standard deviation crossflow for the measured bit rate. This attribute may be present only if the "minBitRateCrossflow", "maxBitRateCrossflow" and/or "avgBitRateCrossflow" attribute(s) is/are present.	XRMAApp
kPercBitRateCrossflow	BitRate	O	0..1	Contains the kPercentile for the measured crossflow bit rate. This attribute may be present only if the "minBitRateCrossflow", "maxBitRateCrossflow" and/or "avgBitRateCrossflow" attribute(s) is/are present.	XRMAApp
kValBitRateCrossflow	UInteger	C	0..1	Contains the value of the reported percentile ("k" parameter value) within the "kPercBitRateCrossflow" attribute. This attribute shall be present only if the "kPercBitRateCrossflow" attribute is present.	XRMAApp

minPackLossRate	PacketLossRate	O	0..1	Contains the measured minimum E2E packet loss rate. (NOTE)	
maxPackLossRate	PacketLossRate	O	0..1	Contains the measured maximum E2E packet loss rate. (NOTE)	
avgPackLossRate	PacketLossRate	O	0..1	Contains the measured average E2E packet loss rate. (NOTE)	
stdDevPackLossRate	PacketLossRate	O	0..1	Contains the standard deviation for the measured E2E packet loss rate. This attribute may be present only if the "minPackLossRate", "maxPackLossRate" and/or "avgPackLossRate" attribute(s) is/are present.	
kPercPackLossRate	PacketLossRate	O	0..1	Contains the kPercentile for the measured E2E packet loss rate. This attribute may be present only if the "minPackLossRate", "maxPackLossRate" and/or "avgPackLossRate" attribute(s) is/are present.	
kValPackLossRate	UInteger	C	0..1	Contains the value of the reported percentile ("k" parameter value) within the "kPercPackLossRate" attribute. This attribute shall be present only if the "kPercPackLossRate" attribute is present.	
minPackLossRateUI	PacketLossRate	O	0..1	Contains the measured minimum UL packet loss rate. (NOTE)	XRMAApp
maxPackLossRateUI	PacketLossRate	O	0..1	Contains the measured maximum UL packet loss rate. (NOTE)	XRMAApp
avgPackLossRateUI	PacketLossRate	O	0..1	Contains the measured average UL packet loss rate. (NOTE)	XRMAApp
stdDevPackLossRateUI	PacketLossRate	O	0..1	Contains the standard deviation for the measured UL packet loss rate. This attribute may be present only if the "minPackLossRateUI", "maxPackLossRateUI" and/or "avgPackLossRateUI" attribute(s) is/are present.	XRMAApp
kPercPackLossRateUI	PacketLossRate	O	0..1	Contains the kPercentile for the measured UL packet loss rate. This attribute may be present only if the "minPackLossRateUI", "maxPackLossRateUI" and/or "avgPackLossRateUI" attribute(s) is/are present.	XRMAApp
kValPackLossRateUI	UInteger	C	0..1	Contains the value of the reported percentile ("k" parameter value) within the "kPercPackLossRateUI" attribute. This attribute shall be present only if the "kPercPackLossRateUI" attribute is present.	XRMAApp

minPackLossRateDI	PacketLossRate	O	0..1	Contains the measured minimum DL packet loss rate. (NOTE)	XRMAApp
maxPackLossRateDI	PacketLossRate	O	0..1	Contains the measured maximum DL packet loss rate. (NOTE)	XRMAApp
avgPackLossRateDI	PacketLossRate	O	0..1	Contains the measured average DL packet loss rate. (NOTE)	XRMAApp
stdDevPackLossRateDI	PacketLossRate	O	0..1	Contains the standard deviation for the measured DL packet loss rate. This attribute may be present only if the "minPackLossRateDI", "maxPackLossRateDI" and/or "avgPackLossRateDI" attribute(s) is/are present.	XRMAApp
kPercPackLossRateDI	PacketLossRate	O	0..1	Contains the kPercentile for the measured DL packet loss rate. This attribute may be present only if the "minPackLossRateDI", "maxPackLossRateDI" and/or "avgPackLossRateDI" attribute(s) is/are present.	XRMAApp
kValPackLossRateDI	UInteger	C	0..1	Contains the value of the reported percentile ("k" parameter value) within the "kPercPackLossRateDI" attribute. This attribute shall be present only if the "kPercPackLossRateDI" attribute is present.	XRMAApp
minPackLossRateCrossflow	PacketLossRate	O	0..1	Contains the measured minimum crossflow packet loss rate. (NOTE)	XRMAApp
maxPackLossRateCrossflow	PacketLossRate	O	0..1	Contains the measured maximum crossflow packet loss rate. (NOTE)	XRMAApp
avgPackLossRateCrossflow	PacketLossRate	O	0..1	Contains the measured average crossflow packet loss rate. (NOTE)	XRMAApp
stdDevPackLossRateCrossflow	PacketLossRate	O	0..1	Contains the standard deviation for the measured crossflow packet loss rate. This attribute may be present only if the "minPackLossRateCrossflow", "maxPackLossRateCrossflow" and/or "avgPackLossRateCrossflow" attribute(s) is/are present.	XRMAApp
kPercPackLossRateCrossflow	PacketLossRate	O	0..1	Contains the kPercentile for the measured crossflow packet loss rate. This attribute may be present only if the "minPackLossRateCrossflow", "maxPackLossRateCrossflow" and/or "avgPackLossRateCrossflow" attribute(s) is/are present.	XRMAApp

kValPackLossRateCrossflow	UInteger	C	0..1	Contains the value of the reported percentile ("k" parameter value) within the "kPercPackLossRateCrossflow" attribute. This attribute shall be present only if the "kPercPackLossRateCrossflow" attribute is present.	XRMAApp
minJitter	Uint32	O	0..1	Contains the measured minimum jitter (expressed in nanoseconds). (NOTE)	
maxJitter	Uint32	O	0..1	Contains the measured maximum jitter (expressed in nanoseconds). (NOTE)	
avgJitter	Uint32	O	0..1	Contains the measured average jitter (expressed in nanoseconds). (NOTE)	
stdDevJitter	Uint32	O	0..1	Contains the standard deviation (expressed in nanoseconds) for the measured Jitter. This attribute may be present only if the "minJitter", "maxJitter" and/or "avgJitter" attribute(s) is/are present.	
kPercJitter	Uint32	O	0..1	Contains the kPercentile (expressed in nanoseconds) for the measured Jitter. This attribute may be present only if the "minJitter", "maxJitter" and/or "avgJitter" attribute(s) is/are present.	
kValJitter	UInteger	C	0..1	Contains the value of the reported percentile ("k" parameter value) within the "kPercJitter" attribute. This attribute shall be present only if the "kPercJitter" attribute is present.	
minJitterUI	Uint32	O	0..1	Contains the measured minimum UL jitter (expressed in nanoseconds). (NOTE)	XRMAApp
maxJitterUI	Uint32	O	0..1	Contains the measured maximum UL jitter (expressed in nanoseconds). (NOTE)	XRMAApp
avgJitterUI	Uint32	O	0..1	Contains the measured average UL jitter (expressed in nanoseconds). (NOTE)	XRMAApp
stdDevJitterUI	Uint32	O	0..1	Contains the standard deviation (expressed in nanoseconds) for the measured UL Jitter. This attribute may be present only if the "minJitterUI", "maxJitterUI" and/or "avgJitterUI" attribute(s) is/are present.	XRMAApp
kPercJitterUI	Uint32	O	0..1	Contains the kPercentile (expressed in nanoseconds) for the measured UL Jitter. This attribute may be present only if the "minJitterUI", "maxJitterUI" and/or "avgJitterUI" attribute(s) is/are present.	XRMAApp

kValJitterUI	UInteger	C	0..1	Contains the value of the reported percentile ("k" parameter value) within the "kPercJitterUI" attribute. This attribute shall be present only if the "kPercJitterUI" attribute is present.	XRMAApp
minJitterDI	Uint32	O	0..1	Contains the measured minimum DL jitter (expressed in nanoseconds). (NOTE)	XRMAApp
maxJitterDI	Uint32	O	0..1	Contains the measured maximum DL jitter (expressed in nanoseconds). (NOTE)	XRMAApp
avgJitterDI	Uint32	O	0..1	Contains the measured average DL jitter (expressed in nanoseconds). (NOTE)	XRMAApp
stdDevJitterDI	Uint32	O	0..1	Contains the standard deviation (expressed in nanoseconds) for the measured DL Jitter. This attribute may be present only if the "minJitterDI", "maxJitterDI" and/or "avgJitterDI" attribute(s) is/are present.	XRMAApp
kPercJitterDI	Uint32	O	0..1	Contains the kPercentile (expressed in nanoseconds) for the measured DI Jitter. This attribute may be present only if the "minJitterDI", "maxJitterDI" and/or "avgJitterDI" attribute(s) is/are present.	XRMAApp
kValJitterDI	UInteger	C	0..1	Contains the value of the reported percentile ("k" parameter value) within the "kPercJitterDI" attribute. This attribute shall be present only if the "kPercJitterDI" attribute is present.	XRMAApp
minJitterCrossflow	Uint32	O	0..1	Contains the measured minimum crossflow jitter (expressed in nanoseconds). (NOTE)	XRMAApp
maxJitterCrossflow	Uint32	O	0..1	Contains the measured maximum crossflow jitter (expressed in nanoseconds). (NOTE)	XRMAApp
avgJitterCrossflow	Uint32	O	0..1	Contains the measured average crossflow jitter (expressed in nanoseconds). (NOTE)	XRMAApp
stdDevJitterCrossflow	Uint32	O	0..1	Contains the standard deviation (expressed in nanoseconds) for the measured crossflow Jitter. This attribute may be present only if the "minJitterCrossflow", "maxJitterCrossflow" and/or "avgJitterCrossflow" attribute(s) is/are present.	XRMAApp
kPercJitterCrossflow	Uint32	O	0..1	Contains the kPercentile (expressed in nanoseconds) for the measured crossflow Jitter. This attribute may be present only if the "minJitterCrossflow", "maxJitterCrossflow" and/or "avgJitterCrossflow" attribute(s) is/are present.	XRMAApp

kValJitterCrossflow	UInteger	C	0..1	Contains the value of the reported percentile ("k" parameter value) within the "kPercJitterCrossflow" attribute. This attribute shall be present only if the "kPercJitterCrossflow" attribute is present.	XRMAApp
measPeriod	DurationSec	O	0..1	Contains the measurement period of the reported measurements.	
timestamp	DateTime	O	0..1	Contains the timestamp of the reported measurements.	
NOTE: At least one of these attributes shall be present.					

6.4.6.2.9 Type: HistTransQualMeasReports

Table 6.4.6.2.9-1: Definition of type HistTransQualMeasReports

Attribute name	Data type	P	Cardinality	Description	Applicability
reports	array(TransQualMeasReport)	M	0..N	Contains the Historical Transmission Quality Measurement Report(s). If there are no Historical Transmission Quality Measurement Report(s) fulfilling the request, this attribute shall contain an empty array.	
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported features among the ones defined in clause 6.4.8. This attribute shall be present only when feature negotiation needs to take place.	

6.4.6.2.10 Type: TransQualMeasCriteriaSet

Table 6.4.6.2.10-1: Definition of type TransQualMeasCriteriaSet

Attribute name	Data type	P	Cardinality	Description	Applicability
criteria	TransQualMeasCriteria	M	1	Represents the transmission quality measurement reporting criteria.	
direction	MatchingDirection	M	1	Indicates the matching direction for the transmission quality measurement reporting criteria provided within the "criteria" attribute.	

6.4.6.2.11 Type: Crossflow

Table 6.4.6.2.11-1: Definition of type Crossflow

Attribute name	Data type	P	Cardinality	Description	Applicability
crossflow	array(CrossflowInfo)	M	2..2	Contains the crossflow information. (NOTE)	
NOTE: This attribute cannot contain two array elements with the "direction" attribute of the corresponding CrossflowInfo data structure set to the same value (i.e., both set to "UL" or both set to "DL").					

6.4.6.2.12 Type: CrossflowInfo

Table 6.4.6.2.12-1: Definition of type CrossflowInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
flowDesc	ConnInfo	M	1	Contains the descriptor of the SEALDD crossflow.	
direction	FlowDirection	M	1	Contains the SEALDD crossflow direction.	

6.4.6.3 Simple data types and enumerations

6.4.6.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

6.4.6.3.2 Simple data types

The simple data types defined in table 6.4.6.3.2-1 shall be supported.

Table 6.4.6.3.2-1: Simple data types

Type Name	Type Definition	Description	Applicability

6.4.6.3.3 Enumeration: MeasurementId

The enumeration MeasurementId represents the transmission quality measurement type. It shall comply with the provisions defined in table 6.4.6.3.3-1.

Table 6.4.6.3.3-1: Enumeration MeasurementId

Enumeration value	Description	Applicability
LATENCY	Indicates that the requested/reported measurement is the E2E latency.	
UL_LATENCY	Indicates that the requested/reported measurement is the UL latency.	XRMAApp
DL_LATENCY	Indicates that the requested/reported measurement is the DL latency.	XRMAApp
CROSSFLOW_LATENCY	Indicates that the requested/reported measurement is the crossflow latency.	XRMAApp
BITRATE	Indicates that the requested/reported measurement is the E2E bit rate.	
UL_BITRATE	Indicates that the requested/reported measurement is the UL bit rate.	XRMAApp
DL_BITRATE	Indicates that the requested/reported measurement is the DL bit rate.	XRMAApp
CROSSFLOW_BITRATE	Indicates that the requested/reported measurement is the crossflow bit rate.	XRMAApp
PACKET_LOSS_RATE	Indicates that the requested/reported measurement is the E2E packet loss rate.	
UL_PACKET_LOSS_RATE	Indicates that the requested/reported measurement is the UL packet loss rate.	XRMAApp
DL_PACKET_LOSS_RATE	Indicates that the requested/reported measurement is the DL packet loss rate.	XRMAApp
CROSSFLOW_PACKET_LOSS_RATE	Indicates that the requested/reported measurement is the crossflow packet loss rate.	XRMAApp
JITTER	Indicates that the requested/reported measurement is the jitter.	
UL_JITTER	Indicates that the requested/reported measurement is the UL jitter.	XRMAApp
DL_JITTER	Indicates that the requested/reported measurement is the DL jitter.	XRMAApp
CROSSFLOW_JITTER	Indicates that the requested/reported measurement is the crossflow jitter.	XRMAApp

6.4.6.3.4 Enumeration: RepGranularity

The enumeration RepGranularity represents the reporting granularity. It shall comply with the provisions defined in table 6.4.6.3.4-1.

Table 6.4.6.3.4-1: Enumeration RepGranularity

Enumeration value	Description	Applicability
INDIVIDUAL_VAL_UE	Indicates that the granularity is individual VAL UE/user.	
VAL_GROUP	Indicates that the granularity is VAL Group.	
ALL_VAL_UES	Indicates that the granularity is all VAL UE/user(s).	

6.4.6.3.5 Enumeration: FlowDirection

The enumeration FlowDirection represents the flow direction. It shall comply with the provisions defined in table 6.4.6.3.5-1.

Table 6.4.6.3.5-1: Enumeration FlowDirection

Enumeration value	Description	Applicability
UL	Indicates that the flow direction is uplink.	
DL	Indicates that the flow direction is downlink.	

6.4.6.4 Data types describing alternative data types or combinations of data types

There are no data types describing alternative data types or combinations of data types defined for this API in this release of the specification.

6.4.6.5 Binary data

6.4.6.5.1 Binary Data Types

Table 6.4.6.5.1-1: Binary Data Types

Name	Clause defined	Content type

6.4.7 Error Handling

6.4.7.1 General

For the SDD_TransmissionQualityMeasurement API, error handling shall be supported as specified in clause 6.7 of 3GPP TS 29.549 [15].

In addition, the requirements in the following clauses are applicable for the SDD_TransmissionQualityMeasurement API.

6.4.7.2 Protocol Errors

No specific protocol errors for the SDD_TransmissionQualityMeasurement API are specified.

6.4.7.3 Application Errors

The application errors defined for the SDD_TransmissionQualityMeasurement API are listed in Table 6.4.7.3-1.

Table 6.4.7.3-1: Application errors

Application Error	HTTP status code	Description	Applicability
NO_TRANS_CONN	403 Forbidden	Indicates that the Transmission Quality Measurement Subscription creation/update request is rejected because there are no existing Regular/URLLC transmission connections corresponding to the parameters provided in the request.	

6.4.8 Feature negotiation

The optional features listed in table 6.4.8-1 are defined for the SDD_TransmissionQualityMeasurement API. They shall be negotiated using the extensibility mechanism defined in clause 6.8 of 3GPP TS 29.549 [15].

Table 6.4.8-1: Supported Features

Feature number	Feature Name	Description
1	XRMApp	This feature indicates the support of the first set of enhancements to the SEAL Data Delivery Enabler Layer to support XRM applications. Within this feature, the following enhancements are covered: - Support granular QoS monitoring for XR services.

6.4.9 Security

The provisions of clause 9 of 3GPP TS 29.549 [15] shall apply for the SDD_TransmissionQualityMeasurement API.

6.5 SDD_PolicyConfiguration Service API

6.5.1 Introduction

The SDD_PolicyConfiguration service shall use the SDD_PolicyConfiguration API.

The API URI of the SDD_PolicyConfiguration Service API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 6.5 of 3GPP TS 29.549 [15], i.e.:

{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>

with the following components:

- The {apiRoot} shall be set as described in clause 6.5 of 3GPP TS 29.549 [15].
- The <apiName> shall be "sdd-pc".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 6.5 of 3GPP TS 29.549 [15].

NOTE: When 3GPP TS 29.122 [2] is referenced for the common protocol and interface aspects for API definition in the clauses under clause 6.5, the SEALDD Server takes the role of the SCEF and the service consumer takes the role of the SCS/AS.

6.5.2 Usage of HTTP

The provisions of clause 6.3 of 3GPP TS 29.549 [15] shall apply for the SDD_PolicyConfiguration API.

6.5.3 Resources

6.5.3.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 6.5.3.1-1 depicts the resource URIs structure for the SDD_PolicyConfiguration API.

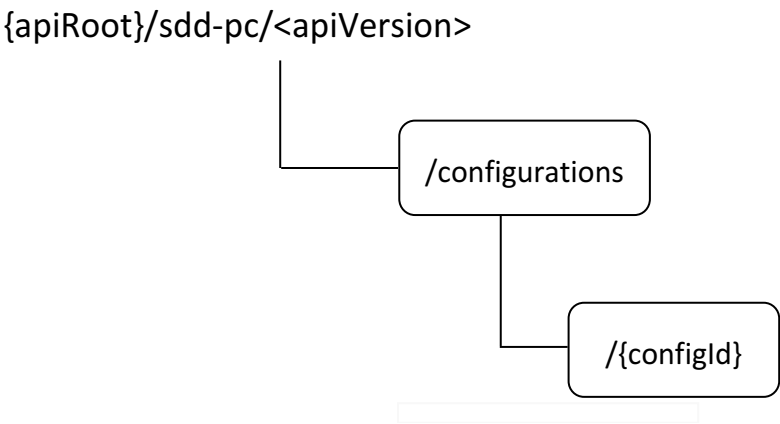


Figure 6.5.3.1-1: Resource URIs structure of the SDD_PolicyConfiguration API

Table 6.5.3.1-1 provides an overview of the resources and applicable HTTP methods for the SDD_PolicyConfiguration API.

Table 6.5.3.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method or custom operation	Description
Policy Configurations	/configurations	POST	Request the creation of a Policy Configuration.
Individual Policy Configuration	/configurations/{configId}	GET	Retrieve an existing "Individual Policy Configuration" resource.
		PUT	Request the update of an existing "Individual Policy Configuration" resource.
		PATCH	Request the modification of an existing "Individual Policy Configuration" resource.
		DELETE	Request the deletion of an existing "Individual Policy Configuration" resource.

6.5.3.2 Resource: Policy Configurations

6.5.3.2.1 Description

This resource represents the collection of SEALDD Policy Configuration(s) managed by the SEALDD Server.

6.5.3.2.2 Resource Definition

Resource URI: **{apiRoot}/sdd-pc/<apiVersion>/configurations**

This resource shall support the resource URI variables defined in table 6.5.3.2.2-1.

Table 6.5.3.2.2-1: Resource URI variables for this resource

Name	Data type	Definition
apiRoot	string	See clause 6.5.1.

6.5.3.2.3 Resource Standard Methods

6.5.3.2.3.1 POST

The HTTP POST method allows a service consumer to request the creation of a Policy Configuration at the SEALDD Server.

This method shall support the URI query parameters specified in table 6.5.3.2.3.1-1.

Table 6.5.3.2.3.1-1: URI query parameters supported by the POST method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.5.3.2.3.1-2 and the response data structures and response codes specified in table 6.5.3.2.3.1-3.

Table 6.5.3.2.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
PolicyConfig	M	1	Represents the parameters to request the creation of a Policy Configuration.

Table 6.5.3.2.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
PolicyConfig	M	1	201 Created	Successful case. The Policy Configuration is successfully created and a representation of the created "Individual Policy Configuration" resource shall be returned. An HTTP "Location" header that contains the URI of the created resource shall also be included.
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.5.3.2.3.1-4: Headers supported by the 201 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains the URI of the newly created resource, according to the structure: {apiRoot}/sdd-pc/<apiVersion>/configurations/{configId}

6.5.3.2.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

6.5.3.3 Resource: Individual Policy Configuration

6.5.3.3.1 Description

This resource represents an "Individual SEALDD Policy Configuration" resource managed by the SEALDD Server.

6.5.3.3.2 Resource Definition

Resource URI: {apiRoot}/sdd-pc/<apiVersion>/configurations/{configId}

This resource shall support the resource URI variables defined in table 6.5.3.3.2-1.

Table 6.5.3.3.2-1: Resource URI variables for this resource

Name	Data type	Definition
apiRoot	string	See clause 6.5.1.
configId	string	Represents the identifier of the "Individual Policy Configuration" resource.

6.5.3.3.3 Resource Standard Methods

6.5.3.3.3.1 GET

The HTTP GET method allows a service consumer to retrieve an existing "Individual Policy Configuration" resource at the SEALDD Server.

This method shall support the URI query parameters specified in table 6.5.3.3.3.1-1.

Table 6.5.3.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.5.3.3.1-2 and the response data structures and response codes specified in table 6.5.3.3.1-3.

Table 6.5.3.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 6.5.3.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
PolicyConfig	M	1	200 OK	Successful case. The requested "Individual Policy Configuration" resource shall be returned.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.5.3.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

Table 6.5.3.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

6.5.3.3.3.2 PUT

The HTTP PUT method allows a service consumer to request the update of an existing "Individual Policy Configuration" resource at the SEALDD Server.

This method shall support the URI query parameters specified in table 6.5.3.3.2-1.

Table 6.5.3.3.2-1: URI query parameters supported by the PUT method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.5.3.3.2-2 and the response data structures and response codes specified in table 6.5.3.3.2-3.

Table 6.5.3.3.2-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
PolicyConfig	M	1	Represents the updated representation of the "Individual Policy Configuration" resource.

Table 6.5.3.3.2-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
PolicyConfig	M	1	200 OK	Successful case. The "Individual Policy Configuration" resource is successfully updated and a representation of the updated resource shall be returned in the response body.
n/a			204 No Content	Successful case. The "Individual Policy Configuration" resource is successfully updated and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.5.3.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

Table 6.5.3.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

6.5.3.3.3 PATCH

The HTTP PATCH method allows a service consumer to request the modification of an existing "Individual Policy Configuration" resource at the SEALDD Server.

This method shall support the URI query parameters specified in table 6.5.3.3.3.3-1.

Table 6.5.3.3.3.3-1: URI query parameters supported by the PATCH method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.5.3.3.3.3-2 and the response data structures and response codes specified in table 6.5.3.3.3.3-3.

Table 6.5.3.3.3.3-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
PolicyConfigPatch	M	1	Represents the parameters to request the modification of the "Individual Policy Configuration" resource.

Table 6.5.3.3.3.3-3: Data structures supported by the PATCH Response Body on this resource

Data type	P	Cardinality	Response codes	Description
PolicyConfig	M	1	200 OK	Successful case. The "Individual Policy Configuration" resource is successfully modified and a representation of the updated resource shall be returned in the response body.
n/a			204 No Content	Successful case. The "Individual Policy Configuration" resource is successfully modified and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.5.3.3.3.3-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

Table 6.5.3.3.3.3-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

6.5.3.3.3.4 DELETE

The HTTP DELETE method allows a service consumer to request the deletion of an existing "Individual Policy Configuration" resource at the SEALDD Server.

This method shall support the URI query parameters specified in table 6.5.3.3.3.4-1.

Table 6.5.3.3.3.4-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.5.3.3.3.4-2 and the response data structures and response codes specified in table 6.5.3.3.3.4-3.

Table 6.5.3.3.3.4-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 6.5.3.3.3.4-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The "Individual Policy Configuration" resource is successfully deleted.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.5.3.3.3.4-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

Table 6.5.3.3.3.4-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

6.5.3.3.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

6.5.4 Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

6.5.5 Notifications

There are no notifications defined for this API in this release of the specification.

6.5.6 Data Model

6.5.6.1 General

This clause specifies the application data model supported by the API.

Table 6.5.6.1-1 specifies the data types defined for the SDD_PolicyConfiguration API.

Table 6.5.6.1-1: SDD_PolicyConfiguration API specific Data Types

Data type	Clause defined	Description	Applicability
AlignmentPolicy	6.5.6.2.15	Represents the multi-modal flows alignment policy.	XRMAApp
BdwCtrlPolicy	6.5.6.3.3	Represents the bandwidth control policy.	
GeofencingArea	6.5.6.2.8	Represents the geofencing area.	SEALDD_2
GeofencingPolicy	6.5.6.2.7	Represents the geofencing policy.	SEALDD_2
GeoPolAction	6.5.6.3.4	Represents the geofencing policy action.	SEALDD_2
MultiModalFlowType	6.5.6.3.5	Represents the Multi-modal flow type.	XRMAApp
MultiModalSealddPolicy	6.5.6.2.9	Represents the Multi-modal SEALDD Policy.	XRMAApp
Non3gppAccessMeasPol	6.5.6.2.11	Represents the non-3GPP access measurement policy.	SEALDD_2
QualGuarPolicy	6.5.6.2.5	Represents the quality guarantee policy.	
QualGuarThresh	6.5.6.2.6	Represents the quality guarantee related thresholds.	
PolicyConfig	6.5.6.2.2	Represents a SEALDD Policy Configuration.	
PolicyConfigPatch	6.5.6.2.3	Represents the parameters to request the modification of a SEALDD Policy Configuration.	
ProximityThresholds	6.5.6.2.17	Represents the proximity thresholds for entering/leaving the UE-to-UE direct communication mode.	XRMAApp
QoEThresholds	6.5.6.2.19	Represents the QoE thresholds for entering/leaving the UE-to-UE direct communication mode.	XRMAApp
QoSThresholds	6.5.6.2.18	Represents the QoS thresholds for entering/leaving the UE-to-UE direct communication mode.	XRMAApp
SealddPolicy	6.5.6.2.4	Represents a SEALDD Policy.	
SignalStrength	6.5.6.2.12	Represents the signal strength value.	SEALDD_2
SignalStrengthThreshold	6.5.6.2.13	Represents the signal strength threshold.	SEALDD_2
SyncPolicy	6.5.6.2.14	Represents the multi-modal synchronization policy.	XRMAApp
TempPolicy	6.5.6.2.10	Represents the temporal policy.	SEALDD_2
UEToUEPolicy	6.5.6.2.16	Represents the multi-modal UE-to-UE policy.	XRMAApp

Table 6.5.6.1-2 specifies data types re-used by the SDD_PolicyConfiguration API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the SDD_PolicyConfiguration API.

Table 6.5.6.1-2: SDD_PolicyConfiguration API re-used Data Types

Data type	Reference	Comments	Applicability
BitRate	3GPP TS 29.571 [18]	Represents a bit rate.	XRMAApp
DateTimeRo	3GPP TS 29.122 [2]	Represents a date and a time with the "read-only" property.	
DurationMilliSec	3GPP TS 29.122 [2]	Represents a time duration in units of milliseconds.	XRMAApp
GeographicArea	3GPP TS 29.572 [22]	Represents a geographical area.	SEALDD_2
MatchingDirection	3GPP TS 29.520 [20]	Represents a threshold matching direction.	SEALDD_2
MeasurementId	Clause 6.4.6.3.3	Represents the transmission quality measurement type.	
MultiModalId	3GPP TS 29.514 [19]	Represents the identifier of a multi-modal service.	XRMAApp
PacketErrRate	3GPP TS 29.571 [18]	Represents the packet error rate.	XRMAApp
PacketLossRate	3GPP TS 29.571 [18]	Represents the packet loss rate.	XRMAApp
ScheduledCommunicationTime	3GPP TS 29.122 [2]	Represents a time schedule.	SEALDD_2
Snssai	3GPP TS 29.571 [18]	Represents a S-NSSAI.	XRMAApp
SupportedFeatures	3GPP TS 29.571 [18]	Represents the list of supported feature(s) and used to negotiate the applicability of the optional features.	
ThresholdHandlingMode	3GPP TS 29.549 [15]	Represents threshold handling mode.	SEALDD_2
TransQualMeasCriteria	Clause 6.4.6.2.7	Represents the transmission quality measurement reporting criteria.	
TimeWindow	3GPP TS 29.122 [2]	Represents a time window.	SEALDD_2
Uint32	3GPP TS 29.571 [18]	Represents an unsigned 32-bit integer.	XRMAApp
UInteger	3GPP TS 29.571 [18]	Represents an unsigned integer.	XRMAApp
Uri	3GPP TS 29.122 [2]	Represents a URI.	
ValTargetUe	3GPP TS 29.549 [15]	Represents the identifier of the targeted VAL UE or VAL user.	

6.5.6.2 Structured data types

6.5.6.2.1 Introduction

This clause defines the data structures to be used in resource representations.

6.5.6.2.2 Type: PolicyConfig

Table 6.5.6.2.2-1: Definition of type PolicyConfig

Attribute name	Data type	P	Cardinality	Description	Applicability
appTrafficIds	array(string)	M	1..N	Contains the identifier(s) of the targeted application traffic. This can be in the form of e.g., VAL Service ID, VAL Server ID.	
valTargetId	ValTargetUe	O	0..1	Contains the identifier of the VAL UE or VAL user to which the SEALDD policy configuration is related.	
slicId	Snsai	O	0..1	Contains the S-NSSAI for which the SEALDD policy configuration applies.	XRMAApp
sealddPol	SealddPolicy	C	0..1	Represents the SEALDD policy that is to be configured. (NOTE)	
expTime	DateTimeRo	O	0..1	Contains the expiration time of the policy configuration. This attribute may be present only in Policy Configuration creation/update responses. If this attribute is absent, this means that the Policy Configuration shall not expire, until explicitly deleted by the service consumer.	
multimodsddPol	MultiModalSealddPolicy	C	0..1	Represents the Multi-modal SEALDD policy that is to be configured. (NOTE)	XRMAApp
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported feature(s) among the ones defined in clause 6.5.8. This attribute shall be present only when feature negotiation needs to take place.	
NOTE: When the "XRMAApp" feature is supported, then at least one of these attributes shall be present. Otherwise, the "sealddPol" attribute shall be present.					

6.5.6.2.3 Type: PolicyConfigPatch

Table 6.5.6.2.3-1: Definition of type PolicyConfigPatch

Attribute name	Data type	P	Cardinality	Description	Applicability
sealddPol	SealddPolicy	O	0..1	Represents the updated SEALDD policy to be configured.	
multimodsddPol	MultiModalSealddPolicy	O	0..1	Represents the updated Multi-modal SEALDD policy to be configured.	XRMAApp

6.5.6.2.4 Type: SealddPolicy

Table 6.5.6.2.4-1: Definition of type SealddPolicy

Attribute name	Data type	P	Cardinality	Description	Applicability
qualGuarPol	QualGuarPolicy	O	0..1	Contains the quality guarantee policy. (NOTE)	
qualOptPol	QualGuarPolicy	O	0..1	Contains the quality optimization policy. (NOTE)	SEALDD_2
bdwCtrlSets	array(BdwCtrlPolicy)	O	1..N	Contains the bandwidth control policy. This attribute shall not contain at the same time both the "REALLOCATE_DL" and "NOT_REALLOCATE_DL" actions nor both the "REALLOCATE_UL" and "NOT_REALLOCATE_UL" actions. (NOTE)	
geoPol	array(Geofencing Policy)	O	1..N	Contains the geofencing policy. (NOTE)	SEALDD_2
tempPol	TempPolicy	O	0..1	Contains the temporal policy. (NOTE)	SEALDD_2
non3gppAccMeasPol	Non3gppAccess MeasPol	O	0..1	Contains the non-3GPP access measurement policy. (NOTE)	SEALDD_2
NOTE: At least one of these attributes shall be present.					

6.5.6.2.5 Type: QualGuarPolicy

Table 6.5.6.2.5-1: Definition of type QualGuarPolicy

Attribute name	Data type	P	Cardinality	Description	Applicability
thresholds	QualGuarThresh	M	1	Contains the quality guarantee/optimization threshold(s), i.e., the measurement threshold(s) to be used by SEALDD as criteria for triggering quality guarantee or quality optimization action(s) (e.g., adjust data transmission, establish a redundant transmission path, re-establish the transmission path, switch to backup transmission path, switch back to a single transmission path, etc.).	

6.5.6.2.6 Type: QualGuarThresh

Table 6.5.6.2.6-1: Definition of type QualGuarThresh

Attribute name	Data type	P	Cardinality	Description	Applicability
measId	array(MeasurementId)	M	1..N	Contains the considered transmission quality measurement(s).	
measThesh	TransQualMeasCriteria	M	1	Contains the transmission quality measurement threshold criteria. Only the criteria related to the considered measurements provided within the "measId" attribute shall be present within this attribute.	

6.5.6.2.7 Type: GeofencingPolicy

Table 6.5.6.2.7-1: Definition of type GeofencingPolicy

Attribute name	Data type	P	Cardinality	Description	Applicability
valServiceId	string	M	1	Contains the identifier of the VAL service for which the given geofencing policy applies.	
area	GeofencingArea	M	1	Contains the area within which the given geofencing policy action is applicable.	
action	GeoPolAction	M	1	Indicates the geofencing policy action to be applied in the indicated area.	

6.5.6.2.8 Type: GeofencingArea

Table 6.5.6.2.8-1: Definition of type GeofencingArea

Attribute name	Data type	P	Cardinality	Description	Applicability
geoAreas	array(Geographic Area)	O	1..N	Contains the geographic area(s) that constitute the geofencing area. (NOTE)	
NOTE: At least one of these attributes shall be present.					

6.5.6.2.9 Type: MultiModalSealddPolicy

Table 6.5.6.2.9-1: Definition of type MultiModalSealddPolicy

Attribute name	Data type	P	Cardinality	Description	Applicability
syncPol	array(SyncPolicy)	C	1..N	Contains the multi-modal synchronization policy. (NOTE 1, NOTE 2)	
alignmentPol	AlignmentPolicy	C	0..1	Contains the multi-modal flows alignment policy. (NOTE 1)	
ueToUePol	UEToUEPolicy	C	0..1	Contains the multi-modal UE-to-UE policy. (NOTE 1)	
expTime	DateTimeRo	O	0..1	Contains the expiration time of the Multi-modal SEALDD policy configuration. This attribute may be present only in a Policy Configuration creation/update response. If this attribute is absent, this means that the the Multi-modal SEALDD policy configuration shall not expire until explicitly deleted by the service consumer.	
NOTE 1: At least one of these attributes shall be present.					
NOTE 2: This attribute may contain synchronization thresholds in two directions for one or several pairs of multi-modal flows (e.g., multi-modal flow1 delay compared to multi-modal flow2 and multi-modal flow2 delay compared to multi-modal flow1). In such case, this is achieved by including two array elements within this attribute (i.e., one for each direction) for each concerned pair of multi-modal flows.					

6.5.6.2.10 Type: TempPolicy

Table 6.5.6.2.10-1: Definition of type TempPolicy

Attribute name	Data type	P	Cardinality	Description	Applicability
schedule	array(Scheduled Communication Time)	C	1..N	Contains the time schedule within which the SEALDD traffic is allowed.	
timeWindow	TimeWindow	C	0..1	Contains the time window within which the SEALDD traffic is allowed.	
NOTE: These attributes are mutually exclusive and only one of them shall be present.					

6.5.6.2.11 Type: Non3gppAccessMeasPol

Table 6.5.6.2.11-1: Definition of type Non3gppAccessMeasPol

Attribute name	Data type	P	Cardinality	Description	Applicability
accessIds	array(string)	C	1..N	Contains the identifier(s) of the non-3GPP access(es) (e.g., WLAN SSIDs/BSSIDs) that can be used for offloading the traffic. (NOTE)	
thresholds	array(SignalStrengthThreshold)	C	1..N	Contains the signal strength related thresholds. (NOTE)	
thrHandling	ThresholdHandlingMode	O	0..1	Contains the thresholds handling mode. This attribute may be present only if the "thresholds" attribute is present.	
timeThr	TempPolicy	O	0..1	Contains the time-based thresholds for offloading to WLAN, i.e., the time schedule within which the traffic should be offloaded to WLAN. (NOTE)	
NOTE: At least one of these attributes shall be present.					

6.5.6.2.12 Type: SignalStrength

Table 6.5.6.2.12-1: Definition of type SignalStrength

Attribute name	Data type	P	Cardinality	Description	Applicability
rsqi	Float	C	0..1	Represents the RSSI in dBm.	
NOTE: At least one of the attributes shall be present.					

6.5.6.2.13 Type: SignalStrengthThreshold

Table 6.5.6.2.13-1: Definition of type SignalStrengthThreshold

Attribute name	Data type	P	Cardinality	Description	Applicability
value	SignalStrength	M	1	Represents signal strength value.	
direction	MatchingDirection	M	1	Represents threshold matching direction.	

6.5.6.2.14 Type: SyncPolicy

Table 6.5.6.2.14-1: Definition of type SyncPolicy

Attribute name	Data type	P	Cardinality	Description	Applicability
flowType1	MultiModalFlowType	M	1	Contains the first multi-modal flow type.	
flowType2	MultiModalFlowType	M	1	Contains the second multi-modal flow type.	
syncThreshold	DurationMilliSec	M	1	Contains the maximum tolerable time delay, expressed in milliseconds, by which the multi-modal flow type identified by the "flowType1" attribute can be delayed compared to the multi-modal flow type identified by the "flowType2" attribute of the application, such that they can be perceived as being synchronous.	

6.5.6.2.15 Type: AlignmentPolicy

Table 6.5.6.2.15-1: Definition of type AlignmentPolicy

Attribute name	Data type	P	Cardinality	Description	Applicability
multiModalId	MultiModalId	C	0..1	Contains the identifier of the multi-modal service. (NOTE)	
maxAlignTime	DurationMilliSec	M	1	Contains the maximum acceptable time duration for multi-modal traffic flow alignment in units of milliseconds. (NOTE)	
NOTE: At least one of these attributes shall be present.					

6.5.6.2.16 Type: UEToUEPolicy

Table 6.5.6.2.16-1: Definition of type UEToUEPolicy

Attribute name	Data type	P	Cardinality	Description	Applicability
entProxThresh	ProximityThresholds	C	0..1	Contains the proximity threshold(s) for entering the UE-to-UE direct communication mode, i.e., the threshold proximity between the UEs used to determine that the UE-to-UE direct communication mode should be entered (i.e., used). (NOTE 1, NOTE 2)	
leavProxThresh	ProximityThresholds	C	0..1	Contains the proximity threshold(s) for leaving the UE-to-UE direct communication mode, i.e., the threshold proximity between the UEs used to determine that the UE-to-UE direct communication mode should be left (i.e., not used anymore). (NOTE 1, NOTE 3)	
entQoSThresh	QoSThresholds	C	0..1	Contains the QoS threshold(s) for entering the UE-to-UE direct communication mode, i.e., the threshold QoS value(s) used to determine that the UE-to-UE direct communication mode should be entered (i.e., used). (NOTE 1, NOTE 2)	
leavQoSThresh	QoSThresholds	C	0..1	Contains the QoS threshold(s) for leaving the UE-to-UE direct communication mode, i.e., the threshold QoS value(s) used to determine that the UE-to-UE direct communication mode should be left (i.e., not used anymore). (NOTE 1, NOTE 3)	
entQoETHresh	QoETHresholds	C	0..1	Contains the QoE threshold(s) for entering the UE-to-UE direct communication mode, i.e., the threshold QoE value(s) used to determine that the UE-to-UE direct communication mode should be entered (i.e., used). (NOTE 1)	
leavQoETHresh	QoETHresholds	C	0..1	Contains the QoE threshold(s) for leaving the UE-to-UE direct communication mode, i.e., the threshold QoE value(s) used to determine that the UE-to-UE direct communication mode should be left (i.e., not used anymore). (NOTE 1)	
NOTE 1: At least one of these attributes shall be present. NOTE 2: When these attributes contain both a minimum and a maximum threshold value, then the minimum threshold represents the threshold below which the UE-to-UE direct communication mode should be entered (i.e., used), and the maximum threshold represents the threshold above which the UE-to-UE direct communication mode should be entered (i.e., used). NOTE 3: When these attributes contain both a minimum and a maximum threshold value, then the minimum threshold represents the threshold above which the UE-to-UE direct communication mode should be left (i.e., not used anymore), and the maximum threshold represents the threshold below which the UE-to-UE direct communication mode should be left (i.e., not used anymore).					

6.6.6.2.17

Type: ProximityThresholds

Table 6.4.6.2.17-1: Definition of type ProximityThresholds

Attribute name	Data type	P	Cardinality	Description	Applicability
minUeToUedist	number	C	0..1	Contains the threshold minimum linear distance between the UEs, expressed in units of meters. (NOTE)	
avgUeToUedist	number	C	0..1	Contains the threshold average linear distance between the UEs, expressed in units of meters. (NOTE)	
maxUeToUedist	number	C	0..1	Contains the threshold maximum linear distance between the UEs, expressed in units of meters. (NOTE)	
NOTE: At least one of these attributes shall be present.					

6.5.6.2.18 Type: QoSThresholds

Table 6.4.6.2.18-1: Definition of type QoSThresholds

Attribute name	Data type	P	Cardinality	Description	Applicability
minLatency	UInteger	C	0..1	Contains the minimum E2E latency (expressed in units of milliseconds). (NOTE)	
avgLatency	UInteger	C	0..1	Contains the average E2E latency (expressed in units of milliseconds). (NOTE)	
maxLatency	UInteger	C	0..1	Contains the maximum E2E latency (expressed in units of milliseconds). (NOTE)	
minBitRate	BitRate	C	0..1	Contains the minimum E2E bit rate. (NOTE)	
avgBitRate	BitRate	C	0..1	Contains the average E2E bit rate. (NOTE)	
maxBitRate	BitRate	C	0..1	Contains the maximum E2E bit rate. (NOTE)	
minPackLossRate	PacketLossRate	C	0..1	Contains the minimum E2E packet loss rate. (NOTE)	
avgPackLossRate	PacketLossRate	C	0..1	Contains the average E2E packet loss rate. (NOTE)	
maxPackLossRate	PacketLossRate	C	0..1	Contains the maximum E2E packet loss rate. (NOTE)	
minPackErrRate	PacketErrRate	C	0..1	Contains the minimum E2E packet error rate. (NOTE)	
avgPackErrRate	PacketErrRate	C	0..1	Contains the average E2E packet error rate. (NOTE)	
maxPackErrRate	PacketErrRate	C	0..1	Contains the maximum E2E packet error rate. (NOTE)	
minJitter	Uint32	C	0..1	Contains the minimum E2E jitter (expressed in units of nanoseconds). (NOTE)	
avgJitter	Uint32	C	0..1	Contains the average E2E jitter (expressed in units of nanoseconds). (NOTE)	
maxJitter	Uint32	C	0..1	Contains the maximum E2E jitter (expressed in units of nanoseconds). (NOTE)	
NOTE: At least one of these attributes shall be present.					

6.6.6.2.19 Type: QoEThresholds

Table 6.4.6.2.19-1: Definition of type QoEThresholds

Attribute name	Data type	P	Cardinality	Description	Applicability
mos	integer	C	0..1	Contains the threshold Mean Opinion Score (MOS). Minimum: 1, Maximum: 5. (NOTE)	
NOTE: At least one of these attributes shall be present.					

6.5.6.3 Simple data types and enumerations

6.5.6.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

6.5.6.3.2 Simple data types

The simple data types defined in table 6.5.6.3.2-1 shall be supported.

Table 6.5.6.3.2-1: Simple data types

Type Name	Type Definition	Description	Applicability

6.5.6.3.3 Enumeration: BdwCtrlPolicy

The enumeration BdwCtrlPolicy represents the bandwidth control policy. It shall comply with the provisions defined in table 6.5.6.3.3-1.

Table 6.5.6.3.3-1: Enumeration BdwCtrlPolicy

Enumeration value	Description	Applicability
REALLOCATE_DL	Indicates that the bandwidth control action is to reallocate the bandwidth limit between different VAL users for DL traffic.	
REALLOCATE_UL	Indicates that the bandwidth control action is to reallocate the bandwidth limit between different VAL users for UL traffic.	
NOT_REALLOCATE_DL	Indicates that the bandwidth control action is to not reallocate the bandwidth limit between different VAL users for DL traffic.	
NOT_REALLOCATE_UL	Indicates that the bandwidth control action is to not reallocate the bandwidth limit between different VAL users for UL traffic.	

6.5.6.3.4 Enumeration: GeoPolAction

The enumeration GeoPolAction represents the geofencing policy action. It shall comply with the provisions defined in table 6.5.6.3.4-1.

Table 6.5.6.3.4-1: Enumeration GeoPolAction

Enumeration value	Description	Applicability
ALLOW	Indicates that the geofencing policy is to allow.	
BLOCK	Indicates that the geofencing policy is to block.	

6.5.6.3.5 Enumeration: MultiModalFlowType

The enumeration MultiModalFlowType represents the Multi-modal flow type. It shall comply with the provisions defined in table 6.5.6.3.5-1.

Table 6.5.6.3.5-1: Enumeration MultiModalFlowType

Enumeration value	Description	Applicability
AUDIO	Indicates that the Multi-modal flow type is audio.	
VIDEO	Indicates that the Multi-modal flow type is video.	
VOICE	Indicates that the Multi-modal flow type is voice.	

6.5.6.4 Data types describing alternative data types or combinations of data types

There are no data types describing alternative data types or combinations of data types defined for this API in this release of the specification.

6.5.6.5 Binary data

6.5.6.5.1 Binary Data Types

Table 6.5.6.5.1-1: Binary Data Types

Name	Clause defined	Content type

6.5.7 Error Handling

6.5.7.1 General

For the SDD_PolicyConfiguration API, error handling shall be supported as specified in clause 6.7 of 3GPP TS 29.549 [15].

In addition, the requirements in the following clauses are applicable for the SDD_PolicyConfiguration API.

6.5.7.2 Protocol Errors

No specific protocol errors for the SDD_PolicyConfiguration API are specified.

6.5.7.3 Application Errors

The application errors defined for the SDD_PolicyConfiguration API are listed in Table 6.5.7.3-1.

Table 6.5.7.3-1: Application errors

Application Error	HTTP status code	Description	Applicability

6.5.8 Feature negotiation

The optional features listed in table 6.5.8-1 are defined for the SDD_PolicyConfiguration API. They shall be negotiated using the extensibility mechanism defined in clause 6.8 of 3GPP TS 29.549 [15].

Table 6.5.8-1: Supported Features

Feature number	Feature Name	Description
1	SEALDD_2	This feature indicates the support of the first set of enhancements to the SEAL Data Delivery Enabler Layer. Within this feature, the following enhancements are covered: - Support the provisioning of the quality optimization policy. - Support the provisioning of the geofencing policy. - Support the provisioning of the temporal policy. - Support the provisioning of the non-3GPP access measurement policy.
2	XRMApp	This feature indicates the support of the first set of enhancements to the SEAL Data Delivery Enabler Layer to support XRM applications. Within this feature, the following enhancements are covered: - Support Multi-modal Policy provisioning and management. - Support to provision the identifier of the slice for which a policy configuration applies.

6.5.9 Security

The provisions of clause 9 of 3GPP TS 29.549 [15] shall apply for the SDD_PolicyConfiguration API.

6.6 SDD_BDT Service API

6.6.1 Introduction

The SDD_BDT service shall use the SDD_BDT API.

The API URI of the SDD_BDT Service API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests shall have the Resource URI structure defined in clause 6.5 of 3GPP TS 29.549 [15], i.e.:

{apiRoot}/<apiName>/<apiVersion>/<apiSpecificSuffixes>

with the following components:

- The {apiRoot} shall be set as described in clause 6.5 of 3GPP TS 29.549 [15].
- The <apiName> shall be "sdd-bdt".
- The <apiVersion> shall be "v1".
- The <apiSpecificSuffixes> shall be set as described in clause 6.5 of 3GPP TS 29.549 [15].

NOTE: When 3GPP TS 29.122 [2] is referenced for the common protocol and interface aspects for API definition in the clauses under clause 6.6, the SEALDD Server takes the role of the SCEF and the service consumer takes the role of the SCS/AS.

6.6.2 Usage of HTTP

The provisions of clause 6.3 of 3GPP TS 29.549 [15] shall apply for the SDD_BDT API.

6.6.3 Resources

6.6.3.1 Overview

This clause describes the structure for the Resource URIs and the resources and methods used for the service.

Figure 6.6.3.1-1 depicts the resource URIs structure for the SDD_BDT API.

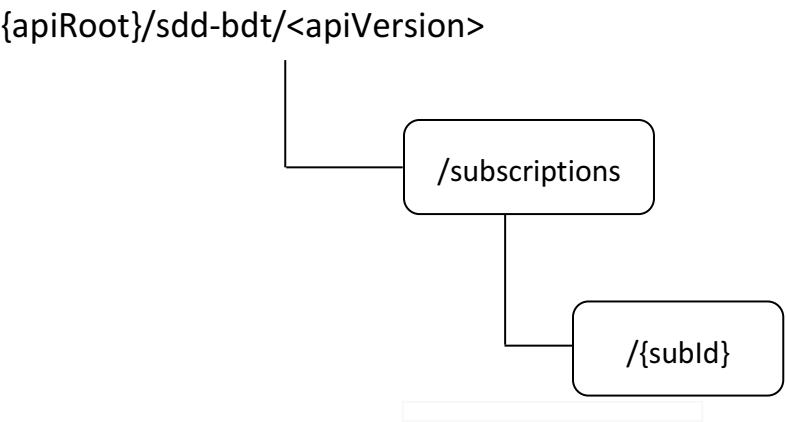


Figure 6.6.3.1-1: Resource URIs structure of the SDD_BDT API

Table 6.6.3.1-1 provides an overview of the resources and applicable HTTP methods for the SDD_BDT API.

Table 6.6.3.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method or custom operation	Description
BDT Subscriptions	/subscriptions	POST	Request the creation of a BDT Subscription.
Individual BDT Subscription	/subscriptions/{subId}	GET	Retrieve an existing "Individual BDT Subscription" resource.
		PUT	Request the update of an existing "Individual BDT Subscription" resource.
		PATCH	Request the modification of an existing "Individual BDT Subscription" resource.
		DELETE	Request the deletion of an existing "Individual BDT Subscription" resource.

6.6.3.2 Resource: BDT Subscriptions

6.6.3.2.1 Description

This resource represents the collection of SEALDD BDT Subscription(s) managed by the SEALDD Server.

6.6.3.2.2 Resource Definition

Resource URI: **{apiRoot}/sdd-bdt/<apiVersion>/subscriptions**

This resource shall support the resource URI variables defined in table 6.6.3.2.2-1.

Table 6.6.3.2.2-1: Resource URI variables for this resource

Name	Data type	Definition
apiRoot	string	See clause 6.6.1.

6.6.3.2.3 Resource Standard Methods

6.6.3.2.3.1 POST

The HTTP POST method allows a service consumer to request the creation of a BDT Subscription at the SEALDD Server.

This method shall support the URI query parameters specified in table 6.6.3.2.3.1-1.

Table 6.6.3.2.3.1-1: URI query parameters supported by the POST method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.6.3.2.3.1-2 and the response data structures and response codes specified in table 6.6.3.2.3.1-3.

Table 6.6.3.2.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
BdtSubscription	M	1	Represents the parameters to request the creation of a BDT Subscription.

Table 6.6.3.2.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
BdtSubscription	M	1	201 Created	Successful case. The BDT Subscription is successfully created and a representation of the created "Individual BDT Subscription" resource shall be returned. An HTTP "Location" header that contains the URI of the created resource shall also be included.
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.6.3.2.3.1-4: Headers supported by the 201 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains the URI of the newly created resource, according to the structure: {apiRoot}/sdd-bdt/<apiVersion>/subscriptions/{subId}

6.6.3.2.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

6.6.3.3 Resource: Individual BDT Subscription

6.6.3.3.1 Description

This resource represents an "Individual BDT Subscription" resource managed by the SEALDD Server.

6.6.3.3.2 Resource Definition

Resource URI: {apiRoot}/sdd-bdt/<apiVersion>/subscriptions/{subId}

This resource shall support the resource URI variables defined in table 6.6.3.3.2-1.

Table 6.6.3.3.2-1: Resource URI variables for this resource

Name	Data type	Definition
apiRoot	string	See clause 6.6.1.
subId	string	Represents the identifier of the "Individual BDT Subscription" resource.

6.6.3.3.3 Resource Standard Methods

6.6.3.3.3.1 GET

The HTTP GET method allows a service consumer to retrieve an existing "Individual BDT Subscription" resource at the SEALDD Server.

This method shall support the URI query parameters specified in table 6.6.3.3.3.1-1.

Table 6.6.3.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.6.3.3.1-2 and the response data structures and response codes specified in table 6.6.3.3.1-3.

Table 6.6.3.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 6.6.3.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
BdtSubscription	M	1	200 OK	Successful case. The requested "Individual BDT Subscription" resource shall be returned.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP GET method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.6.3.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

Table 6.6.3.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

6.6.3.3.3.2 PUT

The HTTP PUT method allows a service consumer to request the update of an existing "Individual BDT Subscription" resource at the SEALDD Server.

This method shall support the URI query parameters specified in table 6.6.3.3.2-1.

Table 6.6.3.3.2-1: URI query parameters supported by the PUT method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.6.3.3.2-2 and the response data structures and response codes specified in table 6.6.3.3.2-3.

Table 6.6.3.3.2-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
BdtSubscription	M	1	Represents the updated representation of the "Individual BDT Subscription" resource.

Table 6.6.3.3.2-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
BdtSubscription	M	1	200 OK	Successful case. The "Individual BDT Subscription" resource is successfully updated and a representation of the updated resource shall be returned in the response body.
n/a			204 No Content	Successful case. The "Individual BDT Subscription" resource is successfully updated and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP PUT method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.6.3.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

Table 6.6.3.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

6.6.3.3.3 PATCH

The HTTP PATCH method allows a service consumer to request the modification of an existing "Individual BDT Subscription" resource at the SEALDD Server.

This method shall support the URI query parameters specified in table 6.6.3.3.3.3-1.

Table 6.6.3.3.3.3-1: URI query parameters supported by the PATCH method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.6.3.3.3.3-2 and the response data structures and response codes specified in table 6.6.3.3.3.3-3.

Table 6.6.3.3.3.3-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
BdtSubscriptionPatch	M	1	Represents the parameters to request the modification of the "Individual BDT Subscription" resource.

Table 6.6.3.3.3.3-3: Data structures supported by the PATCH Response Body on this resource

Data type	P	Cardinality	Response codes	Description
BdtSubscription	M	1	200 OK	Successful case. The "Individual BDT Subscription" resource is successfully modified and a representation of the updated resource shall be returned in the response body.
n/a			204 No Content	Successful case. The "Individual BDT Subscription" resource is successfully modified and no content is returned in the response body.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP PATCH method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.6.3.3.3.3-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

Table 6.6.3.3.3.3-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

6.6.3.3.3.4 DELETE

The HTTP DELETE method allows a service consumer to request the deletion of an existing "Individual BDT Subscription" resource at the SEALDD Server.

This method shall support the URI query parameters specified in table 6.6.3.3.3.4-1.

Table 6.6.3.3.3.4-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.6.3.3.3.4-2 and the response data structures and response codes specified in table 6.6.3.3.3.4-3.

Table 6.6.3.3.3.4-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 6.6.3.3.3.4-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The "Individual BDT Subscription" resource is successfully deleted.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI of the resource located in an alternative SEALDD Server. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP DELETE method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.6.3.3.3.4-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

Table 6.6.3.3.3.4-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI of the resource located in an alternative SEALDD Server.

6.6.3.3.4 Resource Custom Operations

There are no resource custom operations defined for this resource in this release of the specification.

6.6.4 Custom Operations without associated resources

There are no custom operations without associated resources defined for this API in this release of the specification.

6.6.5 Notifications

6.6.5.1 General

Notifications shall comply to clause 6.6 of 3GPP TS 29.549 [15].

Table 6.6.5.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
BDT Notification	{notifUri}	POST	Enables a SEALDD Server to notify a previously subscribed service consumer on BDT related event(s).

6.6.5.2 BDT Notification

6.6.5.2.1 Description

The BDT Notification is used by a SEALDD Server to notify a previously subscribed service consumer on BDT related event(s).

6.6.5.2.2 Target URI

The Callback URI "{**notifUri**}" shall be used with the callback URI variables defined in table 6.6.5.2.2-1.

Table 6.6.5.2.2-1: Callback URI variables

Name	Data type	Definition
notifUri	Uri	Represents the callback URI encoded as a string formatted as a URI.

6.6.5.2.3 Standard Methods

6.6.5.2.3.1 POST

This method shall support the request data structures specified in table 6.6.5.2.3.1-1 and the response data structures and response codes specified in table 6.6.5.2.3.1-2.

Table 6.6.5.2.3.1-1: Data structures supported by the POST Request Body

Data type	P	Cardinality	Description
BdtNotif	M	1	Represents the BDT Notification.

Table 6.6.5.2.3.1-2: Data structures supported by the POST Response Body

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Successful case. The BDT Notification is successfully received and acknowledged.
n/a			307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative service consumer towards which the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
n/a			308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing an alternative URI representing the end point of an alternative service consumer towards which the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [2].
NOTE: The mandatory HTTP error status codes for the HTTP POST method listed in table 5.2.6-1 of 3GPP TS 29.122 [2] shall also apply.				

Table 6.6.5.2.3.1-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative service consumer towards which the notification should be redirected.

Table 6.6.5.2.3.1-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative service consumer towards which the notification should be redirected.

6.6.6 Data Model

6.6.6.1 General

This clause specifies the application data model supported by the API.

Table 6.6.6.1-1 specifies the data types defined for the SDD_BDT API.

Table 6.6.6.1-1: SDD_BDT API specific Data Types

Data type	Clause defined	Description	Applicability
BdtNotif	6.6.6.2.4	Represents a SEALDD BDT Notification.	
BdtReport	6.6.6.2.5	Represents a BDT report.	
BdtSubscription	6.6.6.2.2	Represents a SEALDD BDT Subscription.	
BdtSubscriptionPatch	6.6.6.2.3	Represents the parameters to request the modification of a SEALDD BDT Subscription.	

Table 6.6.6.1-2 specifies data types re-used by the SDD_BDT API from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the SDD_BDT API.

Table 6.6.6.1-2: SDD_BDT API re-used Data Types

Data type	Reference	Comments	Applicability
PolicyGuidance	3GPP TS 29.549 [15]	Represents the policy guidance.	
TimeWindow	3GPP TS 29.122 [2]	Represents a time window.	
SupportedFeatures	3GPP TS 29.571 [18]	Represents the list of supported feature(s) and used to negotiate the applicability of the optional features.	
TransQualMeasData	Clause 6.4.6.2.8	Represents the transmission quality measurement data.	
UInteger	3GPP TS 29.571 [18]	Represents an unsigned integer.	
Uri	3GPP TS 29.122 [2]	Represents a URI.	
UsageThreshold	3GPP TS 29.122 [2]	Represents a usage threshold.	

6.6.6.2 Structured data types

6.6.6.2.1 Introduction

This clause defines the data structures to be used in resource representations.

6.6.6.2.2 Type: BdtSubscription

Table 6.6.6.2.2-1: Definition of type BdtSubscription

Attribute name	Data type	P	Cardinality	Description	Applicability
valServiceId	string	M	1	Contains the identifier of the VAL service for which BDT shall apply.	
valUeIds	array(string)	C	1..N	Contains the list of the identifier(s) of the VAL UE(s) for which BDT shall apply. (NOTE)	
valGroupId	string	C	0..1	Contains the identifier of the VAL group for which BDT shall apply. (NOTE)	
timeWnd	TimeWindow	O	0..1	Contains the time window for BDT. When present in a BDT Subscription creation/update request, it indicates the requested time window for BDT. When present in a BDT Subscription creation/update response, it indicates the granted time window for BDT.	
area	LocationArea5G	O	0..1	Contains location area within which BDT shall apply.	
policyGuidance	array(PolicyGuidance)	O	1..N	Contains the policy guidance information that shall apply for BDT.	
dataVolume	UsageThreshold	M	1	Contains the size of the data to be stored.	
notifUri	Uri	M	1	Contains the URI via which BDT related notifications shall be delivered.	
suppFeat	SupportedFeatures	C	0..1	Contains the list of supported feature(s) among the ones defined in clause 6.6.8. This attribute shall be present only when feature negotiation needs to take place.	
NOTE: These attributes are mutually exclusive and either one of them shall be present.					

6.6.6.2.3 Type: BdtSubscriptionPatch

Table 6.6.6.2.3-1: Definition of type BdtSubscriptionPatch

Attribute name	Data type	P	Cardinality	Description	Applicability
timeWnd	TimeWindow	O	0..1	Contains the requested time window for BDT.	
area	LocationArea5G	O	0..1	Contains location area within which BDT shall apply.	
policyGuidance	array(PolicyGuidance)	O	1..N	Contains the policy guidance information that shall apply for BDT.	
dataVolume	UsageThreshold	O	0..1	Contains the size of the data to be stored.	
notifUri	Uri	O	0..1	Contains the updated URI via which BDT related notifications shall be delivered.	

6.6.6.2.4 Type: BdtNotif

Table 6.6.6.2.4-1: Definition of type BdtNotif

Attribute name	Data type	P	Cardinality	Description	Applicability
subId	string	M	1	Contains the identifier of the BDT Subscription to which the notification is related.	
reports	array(BdtReport)	M	1..N	Contains the list of BDT report(s).	

6.6.6.2.5 Type: BdtReport

Table 6.6.6.2.5-1: Definition of type BdtReport

Attribute name	Data type	P	Cardinality	Description	Applicability
valUeIds	array(string)	C	1..N	Contains the list of the identifier(s) of the VAL UE(s) for which BDT was successful. (NOTE)	
valGroupId	string	C	0..1	Contains the identifier of the VAL group for which BDT was successful. (NOTE)	
timeWnd	TimeWindow	O	0..1	Contains the executed time window for BDT.	
quality	TransQualMeasData	O	0..1	Contains the observed transmission quality measurement data for BDT.	
NOTE: These attributes are mutually exclusive and either one of them may be present.					

6.6.6.3 Simple data types and enumerations

6.6.6.3.1 Introduction

This clause defines simple data types and enumerations that can be referenced from data structures defined in the previous clauses.

6.6.6.3.2 Simple data types

The simple data types defined in table 6.6.6.3.2-1 shall be supported.

Table 6.6.6.3.2-1: Simple data types

Type Name	Type Definition	Description	Applicability

6.6.6.4 Data types describing alternative data types or combinations of data types

There are no data types describing alternative data types or combinations of data types defined for this API in this release of the specification.

6.6.6.6 Binary data

6.6.6.6.1 Binary Data Types

Table 6.6.6.6.1-1: Binary Data Types

Name	Clause defined	Content type

6.6.7 Error Handling

6.6.7.1 General

For the SDD_BDT API, error handling shall be supported as specified in clause 6.7 of 3GPP TS 29.549 [15].

In addition, the requirements in the following clauses are applicable for the SDD_BDT API.

6.6.7.2 Protocol Errors

No specific protocol errors for the SDD_BDT API are specified.

6.6.7.3 Application Errors

The application errors defined for the SDD_BDT API are listed in Table 6.6.7.3-1.

Table 6.6.7.3-1: Application errors

Application Error	HTTP status code	Description	Applicability

6.6.8 Feature negotiation

The optional features listed in table 6.6.8-1 are defined for the SDD_BDT API. They shall be negotiated using the extensibility mechanism defined in clause 6.8 of 3GPP TS 29.549 [15].

Table 6.6.8-1: Supported Features

Feature number	Feature Name	Description

6.6.9 Security

The provisions of clause 9 of 3GPP TS 29.549 [15] shall apply for the SDD_BDT API.

7 Using Common API Framework

The provisions of clause 8 of 3GPP TS 29.549 [15] shall apply for the SEALDD Server APIs defined in this specification.

Annex A (normative): OpenAPI specification

A.1 General

This Annex specifies the formal definition of the API(s) defined in the present specification. It consists of OpenAPI [4] specifications in YAML format.

This Annex takes precedence when being discrepant to other parts of the specification with respect to the encoding of information elements and methods within the API(s).

NOTE: The semantics and procedures, as well as conditions, e.g. for the applicability and allowed combinations of attributes or values, not expressed in the OpenAPI [4] definitions but defined in other parts of the specification also apply.

Informative copies of the OpenAPI [4] specification files contained in this 3GPP Technical Specification are available on a Git-based repository that uses the GitLab software version control system (see clause 5.3.1 of 3GPP TS 29.501 [3] and clause 5B of 3GPP TR 21.900 [5]).

A.2 SDD_Transmission API

openapi: 3.0.0

info:

```
title: SEALDD Server Data Transmission Service
version: 1.1.0
description: |
  SEALDD Server Data Transmission Service.
  © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
  All rights reserved.
```

externalDocs:

```
description: >
  3GPP TS 29.548 V19.5.0; Service Enabler Architecture Layer for Verticals (SEAL);
  SEAL Data Delivery (SEALDD) Server Services; Stage 3.
url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.548/
```

servers:

```
- url: '{apiRoot}/sdd-trans/v1'
  variables:
    apiRoot:
      default: https://example.com
      description: apiRoot as defined in clause 6.5 of 3GPP TS 29.549
```

security:

```
- {}
- oAuth2ClientCredentials: []
```

paths:

```
/{transType}/request-trans:
  parameters:
    - name: transType
      in: path
      description: >
        Represents the requested transmission type.
      required: true
      schema:
        $ref: '#/components/schemas/TransType'
```

post:

```
summary: Request SEALDD enabled Data Transmission.
operationId: RequestTrans
tags:
  - Request SEALDD Data Transmission
```

requestBody:

```
required: true
content:
  application/json:
    schema:
      $ref: '#/components/schemas/TransReq'
```

responses:

```
'200':
  description: >
    OK. The SEALDD enabled application data transmission service request
    was successfully received and processed.
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/TransResp'
'307':
  $ref: 'TS29122_CommonData.yaml#/components/responses/307'
'308':
  $ref: 'TS29122_CommonData.yaml#/components/responses/308'
'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'411':
  $ref: 'TS29122_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
'415':
```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/subscriptions:
  post:
    summary: Request the Creation of a new Connection Status Subscription.
    operationId: CreateConnStatusSubsc
    tags:
      - Connection Status Subscriptions (Collection)
    requestBody:
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/ConnStatusSubsc'
    responses:
      '201':
        description: >
          Successful case. The requested Connection Status Subscription resource is successfully
          created and a representation of the created "Individual Connection Status Subscription"
          resource is returned in the response body.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/ConnStatusSubsc'
        headers:
          Location:
            description: >
              Contains the URI of the newly created Individual Connection Status Subscription
              resource.
            required: true
            schema:
              type: string
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '411':
        $ref: 'TS29122_CommonData.yaml#/components/responses/411'
      '413':
        $ref: 'TS29122_CommonData.yaml#/components/responses/413'
      '415':
        $ref: 'TS29122_CommonData.yaml#/components/responses/415'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'
    callbacks:
      ConnStatusNotif:
        '{$request.body#/notifUri}':
          post:
            summary: Notify a previously subscribed service consumer on SEALDD connection status
event(s).
            requestBody:
              required: true
              content:
                application/json:
                  schema:
                    $ref: '#/components/schemas/ConnStatusNotif'
            responses:
              '204':
                description: >
                  Successful case. The Connection Status Notification is successfully received.

```

```

    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/subscriptions/{subscriptionId}:
  parameters:
    - name: subscriptionId
      in: path
      description: >
        Represents the identifier of the Individual Connection Status Subscription resource.
      required: true
      schema:
        type: string

  get:
    summary: Retrieve an existing Individual Connection Status Subscription resource.
    operationId: GetIndConnStatusSubsc
    tags:
      - Individual Connection Status Subscription (Document)
    responses:
      '200':
        description: >
          OK. The requested Individual Connection Status Subscription resource shall be returned.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/ConnStatusSubsc'
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '406':
        $ref: 'TS29122_CommonData.yaml#/components/responses/406'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'

  put:
    summary: Request the update of an existing Individual Connection Status Subscription resource.
    operationId: UpdateIndConnStatusSubsc
    tags:
      - Individual Connection Status Subscription (Document)

```

```

requestBody:
  required: true
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/ConnStatusSubsc'
responses:
  '200':
    description: >
      OK. The Individual Connection Status Subscription resource is successfully updated and
      a representation of the updated resource shall be returned in the response body.
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/ConnStatusSubsc'
  '204':
    description: >
      No Content. The Individual Connection Status Subscription resource is successfully
      updated and no content is returned in the response body.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

patch:
  summary: Request the modification of an existing Individual Connection Status Subscription
  resource.
  operationId: ModifyIndConnStatusSubsc
  tags:
    - Individual Connection Status Subscription (Document)
  requestBody:
    required: true
    content:
      application/merge-patch+json:
        schema:
          $ref: '#/components/schemas/ConnStatusSubscPatch'
  responses:
    '200':
      description: >
        OK. The Individual Connection Status Subscription resource is successfully modified
        and a representation of the updated resource shall be returned in the response body.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/ConnStatusSubsc'
    '204':
      description: >
        No Content. The Individual Connection Status Subscription resource is successfully
        modified and no content is returned in the response body.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'

```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

delete:

```

  summary: Request the deletion of an existing Individual Connection Status Subscription
  resource.
  operationId: DeleteIndConnStatusSubsc
  tags:
    - Individual Connection Status Subscription (Document)
  responses:
    '204':
      description: >
        No Content. The Individual Connection Status Subscription resource is successfully
        deleted.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

components:

```

  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}

```

schemas:

```

#
# STRUCTURED DATA TYPES
#

```

TransReq:

```

  description: >
    Represents the parameters to request the SEALDD enabled application data
    transmission service.
  type: object
  properties:
    valServiceId:
      type: string
    valTargetId:
      $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'

```

```
valServerConnInfo:
  $ref: '#/components/schemas/ConnInfo'
multiModalId:
  $ref: 'TS29514_Npcf_PolicyAuthorization.yaml#/components/schemas/MultiModalId'
multiModalFlows:
  type: array
  items:
    $ref: '#/components/schemas/MultiModalFlowInfo'
  minItems: 1
qosInfo:
  $ref: '#/components/schemas/QosInfo'
valServerBdw:
  $ref: '#/components/schemas/ValServBdw'
valUsersBdw:
  $ref: '#/components/schemas/ValUsersBdw'
connStatusSubsc:
  $ref: '#/components/schemas/SatConnStatusSubsc'
suppFeat:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
allOf:
  - oneOf:
    - required: [valServerConnInfo]
    - required: [multiModalFlows]
  - not:
    required: [multiModalFlows, qosInfo]

TransResp:
  description: >
    Represents a SEALDD enabled application data transmission service response.
  type: object
  properties:
    ddServerConnInfo:
      $ref: '#/components/schemas/ConnInfo'
    connStatusSubsc:
      $ref: '#/components/schemas/SatConnStatusSubsc'
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'

ConnInfo:
  description: >
    Represents SEALDD connection information.
  type: object
  properties:
    ipv4Addr:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv4Addr'
    ipv6Addr:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv6Addr'
    port:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Port'
    uri:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
  oneOf:
    - required: [ipv4Addr]
    - required: [ipv6Addr]
    - required: [uri]

QosInfo:
  description: >
    Represents SEALDD related QoS requirements.
  type: object
  properties:
    qosReference:
      type: string
    altQoSReferences:
      type: array
      items:
        type: string
      minItems: 1
    altQoSReqs:
      type: array
      items:
        $ref:
' TS29514_Npcf_PolicyAuthorization.yaml#/components/schemas/AlternativeServiceRequirementsData'
      minItems: 1
  anyOf:
    - required: [qosReference]
    - required: [altQoSReferences]
    - required: [altQoSReqs]
```

```

- not:
  required: [altQoSReferences, altQoSReqs]
- not:
  required: [qosReference, altQoSReqs]

ValServBdw:
  description: >
    Represents VAL Server related bandwidth information.
  type: object
  properties:
    totalULBdw:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Bandwidth'
    totalDLBdw:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Bandwidth'
  required:
    - totalULBdw
    - totalDLBdw

ValUsersBdw:
  description: >
    Represents VAL users related bandwidth information.
  type: object
  properties:
    minULBdw:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Bandwidth'
    minDLBdw:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Bandwidth'
    maxULBdw:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Bandwidth'
    maxDLBdw:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Bandwidth'
  required:
    - minULBdw
    - minDLBdw
    - maxULBdw
    - maxDLBdw

ConnStatusSubsc:
  description: >
    Represents a Connection Status Subscription.
  type: object
  properties:
    events:
      type: array
      items:
        $ref: '#/components/schemas/ConnStatusEvent'
      minItems: 1
      description: >
        Represents the subscribed event(s).
    valServiceId:
      type: string
    valTgtUe:
      $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
    valServerConnInfo:
      $ref: '#/components/schemas/ConnInfo'
    immRep:
      type: boolean
      description: >
        Represents a Connection Status Subscription.
        true indicates that immediate reporting is requested.
        false indicates that immediate reporting is not requested.
        The default value is false when this attribute is omitted.
    reports:
      type: array
      items:
        $ref: '#/components/schemas/ConnStatusReport'
      minItems: 1
    connStatusPer:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DurationSec'
    notifUri:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
    expTime:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTimeRo'
    non3gppMeasInfo:
      $ref: 'TS29548_SDD_PolicyConfiguration.yaml#/components/schemas/Non3gppAccessMeasPol'
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:

```

- events
- valServerConnInfo
- notifUri

ConnStatusSubscPatch:

description: >
Represents the requested modifications to a Connection Status Subscription.
type: object
properties:
 events:
 type: array
 items:
 \$ref: '#/components/schemas/ConnStatusEvent'
 minItems: 1
 valServiceId:
 type: string
 valTgtUe:
 \$ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
 valServerConnInfo:
 \$ref: '#/components/schemas/ConnInfo'
 connStatusPer:
 \$ref: 'TS29122_CommonData.yaml#/components/schemas/DurationSec'
 notifUri:
 \$ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'

ConnStatusNotif:

description: >
Represents a Connection Status Notification.
type: object
properties:
 subscriptionId:
 type: string
 reports:
 type: array
 items:
 \$ref: '#/components/schemas/ConnStatusReport'
 minItems: 1
required:
 - subscriptionId
 - reports

ConnStatusReport:

description: >
Represents a Connection Status Event report.
type: object
properties:
 event:
 \$ref: '#/components/schemas/ConnStatusEvent'
 valTgtUe:
 \$ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
 valServiceId:
 type: string
 connEstData:
 \$ref: '#/components/schemas/ConnEstabData'
 clientConnStat:
 \$ref: '#/components/schemas/ClientConnStatus'
 congestLevel:
 type: integer
 minimum: 0
 maximum: 100
 dlDelInstrucs:
 \$ref: '#/components/schemas/DLDelInstructions'
 timestamp:
 \$ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
required:
 - event
 - valTgtUe
 - valServiceId

ConnEstabData:

description: >
Represents SEALDD connection status establishment data.
type: object
properties:
 ddServerConnInfo:
 \$ref: '#/components/schemas/ConnInfo'
 comLifetime:
 \$ref: 'TS29122_CommonData.yaml#/components/schemas/DurationSec'

```

    required:
      - ddServerConnInfo

ProtocolDesc:
  description: >
    Represents the protocol description information for Multi-modal application data
    transmission.
  type: object
  properties:
    dlDescInfo:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/ProtocolDescription'
    ulDescInfo:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/ProtocolDescription'
    packetizationInd:
      type: boolean
      default: false
      description: >
        Contains the packetization indication.
        true indicates that packetization is requested.
        false indicates that packetization is not requested.
        The default value is false when this attribute is omitted.
  anyOf:
    - required: [dlDescInfo]
    - required: [ulDescInfo]

SatConnStatusSubsc:
  description: >
    Represents a Connection Status Subscription relative to the S&F Satellite application data
    transmission.
  type: object
  properties:
    events:
      type: array
      items:
        $ref: '#/components/schemas/ConnStatusEvent'
      minItems: 1
      description: >
        Represents the subscribed event(s).
    valServiceId:
      type: string
    valTgtUe:
      $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
    valServerConnInfo:
      $ref: '#/components/schemas/ConnInfo'
    immRep:
      type: boolean
    reports:
      type: array
      items:
        $ref: '#/components/schemas/ConnStatusReport'
      minItems: 1
    connStatusPer:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DurationSec'
    notifUri:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
    expTime:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTimeRo'
  required:
    - events
    - valServerConnInfo
    - notifUri

MultiModalFlowInfo:
  description: >
    Represents the multi-modal flow related application data transmission information.
  type: object
  properties:
    valServerConnInfo:
      $ref: '#/components/schemas/ConnInfo'
    qosInfo:
      $ref: '#/components/schemas/QosInfo'
    protocolDesc:
      $ref: '#/components/schemas/ProtocolDesc'
  required:
    - valServerConnInfo

```

SIMPLE DATA TYPES

#

#

ENUMERATIONS

#

```
ConnStatusEvent:
  anyOf:
  - type: string
    enum:
      - ESTABLISHED
      - RELEASED
      - CLIENT_CONN_STATUS
      - CONGESTION
      - DL_DEL_INSTRUCTIONS
  - type: string
    description: >
      This string provides forward-compatibility with future extensions to the enumeration
      and is not used to encode content defined in the present version of this API.
description: |
  Represents Connection Status Events.
  Possible values are:
  - ESTABLISHED: Indicates that the SEALDD connection status event is that the SEALDD
    connection is established.
  - RELEASED: Indicates that the SEALDD connection status event is that the SEALDD connection
    is released.
  - CLIENT_CONN_STATUS: Indicates that the SEALDD connection status event is the connection
    status of the SEALDD Client.
  - CONGESTION: Indicates that the SEALDD connection status event is congestion reporting.
  - DL_DEL_INSTRUCTIONS: Indicates that the SEALDD connection status event is the the DL data
    delivery instructions.

TransType:
  anyOf:
  - type: string
    enum:
      - regular
      - urllc
      - mm
      - satellite
  - type: string
    description: >
      This string provides forward-compatibility with future extensions to the enumeration
      and is not used to encode content defined in the present version of this API.
description: |
  Represents the requested transmission type.
  Possible values are:
  - regular: Indicates that the requested transmission type is Regular transmission.
  - urllc: Indicates that the requested transmission type is URLLC transmission.
  - mm: Indicates that the requested transmission type is Multi-modal transmission.
  - satellite: Indicates that the requested transmission type is S&F Satellite transmission.

ClientConnStatus:
  anyOf:
  - type: string
    enum:
      - REACHABLE
      - UNREACHABLE
      - SLEEPING
  - type: string
    description: >
      This string provides forward-compatibility with future extensions to the enumeration
      and is not used to encode content defined in the present version of this API.
description: |
  Represents a SEALDD client connection status.
  Possible values are:
  - REACHABLE: Indicates that the SEALDD Client connection status is reachable.
  - UNREACHABLE: Indicates that the SEALDD Client connection status is unreachable.
  - SLEEPING: Indicates that the SEALDD Client connection status is sleeping.

DLDelInstructions:
  anyOf:
  - type: string
    enum:
      - ADJUST
      - PENDING_DL
      - RESUMED_DL
  - type: string
```

description: >
This string provides forward-compatibility with future extensions to the enumeration
and is not used to encode content defined in the present version of this API.

description: |
Represents the DL data delivery instructions.
Possible values are:

- ADJUST: Indicates that the DL data delivery instructions are to adjust data delivery.
- PENDING_DL: Indicates that the DL data delivery instructions are to suspend data delivery
as there is pending data delivery (e.g., feeder link is not available).
- RESUMED_DL: Indicates that the DL data delivery instructions are to resume data delivery
(e.g., feeder link is available).

Data types describing alternative data types or combinations of data types:
#

A.3 SDD_DataStorage API

openapi: 3.0.0

info:

```
title: SEALDD Server Data Storage Service
version: 1.1.0
description: |
  SEALDD Server Data Storage Service.
  © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
  All rights reserved.
```

externalDocs:

```
description: >
  3GPP TS 29.548 V19.5.0; Service Enabler Architecture Layer for Verticals (SEAL);
  SEAL Data Delivery (SEALDD) Server Services; Stage 3.
url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.548/
```

servers:

```
- url: '{apiRoot}/sdd-ds/v1'
  variables:
    apiRoot:
      default: https://example.com
      description: apiRoot as defined in clause 6.5 of 3GPP TS 29.549
```

security:

```
- {}
- oAuth2ClientCredentials: []
```

paths:

```
/storages:
  get:
    summary: Retrieve one or several existing Individual Data Storage resource(s).
    operationId: GetDataStorages
    tags:
      - Data Storages (Collection)
    parameters:
      - name: storage-ids
        in: query
        description: Contains the identifier(s) of the targeted Data Storage resource(s).
        required: false
        schema:
          type: array
          items:
            type: string
          minItems: 1
      - name: app-data-ids
        in: query
        description: Contains the application-level identifier(s) of the targeted stored Data.
        required: false
        style: form
        explode: false
        schema:
          type: array
          items:
            $ref: '#/components/schemas/AppDataId'
          minItems: 1
      - name: supp-feats
        in: query
        description: Contains the list of supported features.
        required: false
        schema:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    responses:
      '200':
        description: >
          OK. The requested Individual Data Storage resource shall be returned.
        content:
          application/json:
            schema:
              type: array
              items:
                $ref: '#/components/schemas/DataStorage'
              minItems: 0
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
```

```
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '406':
    $ref: 'TS29122_CommonData.yaml#/components/responses/406'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

post:

- summary: Request the creation of a Data Storage.
- operationId: CreateDataStorage
- tags:
 - Data Storages (Collection)
- requestBody:
 - required: true
 - content:
 - application/json:
 - schema:
 - \$ref: '#/components/schemas/DataStorageReq'
- responses:
 - '201':
 - description: >
Created. The Data Storage is successfully created and a representation of the created Individual Data Storage resource shall be returned.
 - content:
 - application/json:
 - schema:
 - \$ref: '#/components/schemas/DataStorage'
 - headers:
 - Location:
 - description: >
Contains the URI of the created Individual Data Storage resource.
 - required: true
 - schema:
 - type: string
 - '200':
 - description: >
OK. The Data Storage resource is successfully reserved and Data Storage resource reservation related information shall be returned.
 - content:
 - application/json:
 - schema:
 - \$ref: '#/components/schemas/ReservRespData'
 - '400':
 - \$ref: 'TS29122_CommonData.yaml#/components/responses/400'
 - '401':
 - \$ref: 'TS29122_CommonData.yaml#/components/responses/401'
 - '403':
 - \$ref: 'TS29122_CommonData.yaml#/components/responses/403'
 - '404':
 - \$ref: 'TS29122_CommonData.yaml#/components/responses/404'
 - '411':
 - \$ref: 'TS29122_CommonData.yaml#/components/responses/411'
 - '413':
 - \$ref: 'TS29122_CommonData.yaml#/components/responses/413'
 - '415':
 - \$ref: 'TS29122_CommonData.yaml#/components/responses/415'
 - '429':
 - \$ref: 'TS29122_CommonData.yaml#/components/responses/429'
 - '500':
 - \$ref: 'TS29122_CommonData.yaml#/components/responses/500'
 - '503':
 - \$ref: 'TS29122_CommonData.yaml#/components/responses/503'
 - default:
 - \$ref: 'TS29122_CommonData.yaml#/components/responses/default'
- callbacks:

```

DataMngtNotif:
  '{$request.body#/notifUri}':
    post:
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/DataMngtNotif'
      responses:
        '204':
          description: >
            No Content. The Data Management and or Status Information Notification is
            successfully received and acknowledged.
        '307':
          $ref: 'TS29122_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29122_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29122_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29122_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29122_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29122_CommonData.yaml#/components/responses/404'
        '411':
          $ref: 'TS29122_CommonData.yaml#/components/responses/411'
        '413':
          $ref: 'TS29122_CommonData.yaml#/components/responses/413'
        '415':
          $ref: 'TS29122_CommonData.yaml#/components/responses/415'
        '429':
          $ref: 'TS29122_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29122_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29122_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/storages/{storageId}:
  parameters:
    - name: storageId
      in: path
      description: >
        Represents the identifier of the Individual Data Storage resource.
      required: true
      schema:
        type: string

  get:
    summary: Retrieve an existing Individual Data Storage resource.
    operationId: GetIndDataStorage
    tags:
      - Individual Data Storage (Document)
    responses:
      '200':
        description: >
          OK. The requested Individual Data Storage resource shall be returned.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/DataStorage'
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '406':
        $ref: 'TS29122_CommonData.yaml#/components/responses/406'

```

```

    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

put:
  summary: Request the update of an existing Individual Data Storage resource.
  operationId: UpdateIndDataStorage
  tags:
    - Individual Data Storage (Document)
  requestBody:
    required: true
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/DataStorage'
  responses:
    '200':
      description: >
        OK. The Individual Data Storage resource is successfully updated and a representation
        of the updated resource shall be returned in the response body.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/DataStorage'
    '204':
      description: >
        No Content. The Individual Data Storage resource is successfully updated and no content
        is returned in the response body.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

patch:
  summary: Request the modification of an existing Individual Data Storage resource.
  operationId: ModifyIndDataStorage
  tags:
    - Individual Data Storage (Document)
  requestBody:
    required: true
    content:
      application/merge-patch+json:
        schema:
          $ref: '#/components/schemas/DataStoragePatch'
  responses:
    '200':
      description: >
        OK. The Individual Data Storage resource is successfully modified and a representation
        of the updated resource shall be returned in the response body.
      content:
        application/json:

```

```
    schema:
      $ref: '#/components/schemas/DataStorage'
  '204':
    description: >
      No Content. The Individual Data Storage resource is successfully modified and no content
      is returned in the response body.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

delete:
  summary: Request the deletion of an existing Individual Data Storage resource.
  operationId: DeleteIndDataStorage
  tags:
    - Individual Data Storage (Document)
  responses:
    '204':
      description: >
        No Content. The Individual Data Storage resource is successfully deleted.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/subscriptions:
  post:
    summary: Request the creation of a Data Storage Delivery Subscription.
    operationId: CreateDataDelSubsc
    tags:
      - Data Storage Delivery Subscriptions (Collection)
    requestBody:
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/DataDelSubsc'
    responses:
      '201':
        description: >
```

```

    Created. The Data Storage Delivery Subscription is successfully created and a
    representation of the created Individual Data Storage Delivery Subscription resource
    shall be returned.
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/DataDelSubsc'
  headers:
    Location:
      description: >
        Contains the URI of the created Individual Data Storage Delivery Subscription
        resource.
      required: true
      schema:
        type: string
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
callbacks:
  DataDelNotif:
    '{ $request.body#/notifUri }':
      post:
        requestBody:
          required: true
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/DataDelNotif'
        responses:
          '204':
            description: >
              No Content. The Data Storage Delivery Notification is successfully received
              and acknowledged.
          '307':
            $ref: 'TS29122_CommonData.yaml#/components/responses/307'
          '308':
            $ref: 'TS29122_CommonData.yaml#/components/responses/308'
          '400':
            $ref: 'TS29122_CommonData.yaml#/components/responses/400'
          '401':
            $ref: 'TS29122_CommonData.yaml#/components/responses/401'
          '403':
            $ref: 'TS29122_CommonData.yaml#/components/responses/403'
          '404':
            $ref: 'TS29122_CommonData.yaml#/components/responses/404'
          '411':
            $ref: 'TS29122_CommonData.yaml#/components/responses/411'
          '413':
            $ref: 'TS29122_CommonData.yaml#/components/responses/413'
          '415':
            $ref: 'TS29122_CommonData.yaml#/components/responses/415'
          '429':
            $ref: 'TS29122_CommonData.yaml#/components/responses/429'
          '500':
            $ref: 'TS29122_CommonData.yaml#/components/responses/500'
          '503':
            $ref: 'TS29122_CommonData.yaml#/components/responses/503'
          default:
            $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

```
/subscriptions/{subscriptionId}:
  parameters:
    - name: subscriptionId
      in: path
      description: >
        Represents the identifier of the Individual Data Storage Delivery Subscription resource.
      required: true
      schema:
        type: string

get:
  summary: Retrieve an existing Individual Data Storage Delivery Subscription resource.
  operationId: GetIndDataDelSubsc
  tags:
    - Individual Data Storage Delivery Subscription (Document)
  responses:
    '200':
      description: >
        OK. The requested Individual Data Storage Delivery Subscription resource shall be
        returned.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/DataDelSubsc'
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '406':
      $ref: 'TS29122_CommonData.yaml#/components/responses/406'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

put:
  summary: Request the update of an existing Individual Data Storage Delivery Subscription
  resource.
  operationId: UpdateIndDataDelSubsc
  tags:
    - Individual Data Storage Delivery Subscription (Document)
  requestBody:
    required: true
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/DataDelSubsc'
  responses:
    '200':
      description: >
        OK. The Individual Data Storage Delivery Subscription resource is successfully
        updated and a representation of the updated resource shall be returned in the
        response body.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/DataDelSubsc'
    '204':
      description: >
        No Content. The Individual Data Storage Delivery Subscription resource is successfully
        updated and no content is returned in the response body.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

patch:

summary: Request the modification of an existing Individual Data Storage Delivery Subscription resource.

operationId: ModifyIndDataDelSubsc

tags:

- Individual Data Storage Delivery Subscription (Document)

requestBody:

required: true

content:

application/merge-patch+json:

schema:

\$ref: '#/components/schemas/DataDelSubscPatch'

responses:

'200':

description: >

OK. The Individual Data Storage Delivery Subscription resource is successfully modified and a representation of the updated resource shall be returned in the response body.

content:

application/json:

schema:

\$ref: '#/components/schemas/DataDelSubsc'

'204':

description: >

No Content. The Individual Data Storage Delivery Subscription resource is successfully modified and no content is returned in the response body.

'307':

\$ref: 'TS29122_CommonData.yaml#/components/responses/307'

'308':

\$ref: 'TS29122_CommonData.yaml#/components/responses/308'

'400':

\$ref: 'TS29122_CommonData.yaml#/components/responses/400'

'401':

\$ref: 'TS29122_CommonData.yaml#/components/responses/401'

'403':

\$ref: 'TS29122_CommonData.yaml#/components/responses/403'

'404':

\$ref: 'TS29122_CommonData.yaml#/components/responses/404'

'411':

\$ref: 'TS29122_CommonData.yaml#/components/responses/411'

'413':

\$ref: 'TS29122_CommonData.yaml#/components/responses/413'

'415':

\$ref: 'TS29122_CommonData.yaml#/components/responses/415'

'429':

\$ref: 'TS29122_CommonData.yaml#/components/responses/429'

'500':

\$ref: 'TS29122_CommonData.yaml#/components/responses/500'

'503':

\$ref: 'TS29122_CommonData.yaml#/components/responses/503'

default:

\$ref: 'TS29122_CommonData.yaml#/components/responses/default'

delete:

```
summary: Request the deletion of an existing Individual Data Storage Delivery Subscription
resource.
operationId: DeleteIndDataDelSubsc
tags:
  - Individual Data Storage Delivery Subscription (Document)
responses:
  '204':
    description: >
      No Content. The Individual Data Storage Delivery Subscription resource is successfully
      deleted.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/request-del:
  post:
    summary: Enables a service consumer to request SEALDD data storage delivery.
    operationId: DataDeliveryRequest
    tags:
      - SEALDD Data Storage Delivery Request
    requestBody:
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/DataDelReq'
    responses:
      '204':
        description: >
          No Content. The SEALDD Data Storage delivery request is successfully received and
          processed.
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '411':
        $ref: 'TS29122_CommonData.yaml#/components/responses/411'
      '413':
        $ref: 'TS29122_CommonData.yaml#/components/responses/413'
      '415':
        $ref: 'TS29122_CommonData.yaml#/components/responses/415'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/establish-del-conn:
  post:
```

```

summary: Enables a service consumer to request SEALDD data storage delivery connection
establishment.
operationId: EstablishDelConn
tags:
  - SEALDD Data Storage Delivery Connection Establishment Request
requestBody:
  required: true
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/DelConnEstabReq'
responses:
  '200':
    description: >
      OK. The SEALDD Data Storage delivery connection establishment request is successfully
      received and processed, and SEALDD Data Storage delivery connection establishment
      related information shall be returned in the response body.
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/DelConnEstabResp'
  '204':
    description: >
      No Content. The SEALDD Data Storage delivery connection establishment request is
      successfully received and processed.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}

  schemas:

#
# STRUCTURED DATA TYPES
#

DataStorage:
  description: >
    Represents a SEALDD Data Storage.
  type: object
  properties:
    data:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Bytes'
    ctrlPolicies:
      type: array
      items:

```

```
    $ref: '#/components/schemas/AccessCtrlPolicy'
    minItems: 1
  expTime:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
  mngtSubsc:
    $ref: '#/components/schemas/DataMngtSubsc'
  appDataId:
    $ref: '#/components/schemas/AppDataId'
  suppFeat:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - data

ReservReqData:
  description: >
    Represents a Data Storage reservation request.
  type: object
  properties:
    valServiceId:
      type: string
    dataLength:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - valServiceId

ReservRespData:
  description: >
    Represents a Data Storage reservation response.
  type: object
  properties:
    resourceAddr:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
  required:
    - resourceAddr

DataStoragePatch:
  description: >
    Represents the requested modifications to a SEALDD Data Storage.
  type: object
  properties:
    data:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Bytes'
    ctrlPolicies:
      type: array
      items:
        $ref: '#/components/schemas/AccessCtrlPolicy'
      minItems: 1
    expTime:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
    mngtSubsc:
      $ref: '#/components/schemas/DataMngtSubsc'

AccessCtrlPolicy:
  description: >
    Represents the data access control policy.
  type: object
  properties:
    entityName:
      $ref: '#/components/schemas/EntityName'
    entityId:
      type: string
    rights:
      type: array
      items:
        $ref: '#/components/schemas/DataAccessRight'
      minItems: 1
  required:
    - rights
  anyOf:
    - required: [entityName]
    - required: [entityId]

DataMngtSubsc:
  description: >
    Represents the stored data management and/or status information subscription related
    information.
```

```
type: object
properties:
  events:
    type: array
    items:
      $ref: '#/components/schemas/DataMngtEvent'
    minItems: 1
  notifUri:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
  repPeriodicity:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/DurationSec'
required:
- events
- notifUri

DataMngtNotif:
  description: >
    Represents a SEALDD Data Management and/or Status Information Notification.
  type: object
  properties:
    storageId:
      type: string
    events:
      type: array
      items:
        $ref: '#/components/schemas/DataMngtEvent'
      minItems: 1
    accessStats:
      $ref: '#/components/schemas/DataAccessStats'
    mngtStats:
      $ref: '#/components/schemas/DataMngtStats'
  required:
- storageId
- events
  anyOf:
- required: [accessStats]
- required: [mngtStats]

DataAccessStats:
  description: >
    Represents data access statistics.
  type: object
  properties:
    genAccessStats:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
    detAccessStats:
      type: object
      additionalProperties:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
      minProperties: 1
      description: >
        Represents the data access statistics of the stored data detailed per consumer SEALDD
        entity. It contains how many times the stored data was accessed (i.e., retrieved or
        updated) per SEALDD entity.
        The key of the map shall be the name of the SEALDD entity, encoded using the EntityName
        data type as specified in clause 6.2.6.3.3, to which the data access statistics provided
        within the map value are
        related.
  anyOf:
- required: [genAccessStats]
- required: [detAccessStats]

DataMngtStats:
  description: >
    Represents data management statistics.
  type: object
  properties:
    genMngtStats:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
    detMngtStats:
      type: object
      additionalProperties:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
      minProperties: 1
      description: >
        Represents the data management statistics of the stored data detailed per consumer
        SEALDD entity. It contains how many times the stored data was accessed for management
        purposes (i.e., data update) per SEALDD entity.
```

The key of the map shall be the name of the SEALDD entity, encoded using the EntityName data type as specified in clause 6.2.6.3.3, to which the data management statistics provided within the map value are related.

```
anyOf:
  - required: [genMngtStats]
  - required: [detMngtStats]

DataDelSubsc:
  description: >
    Represents a SEALDD Data Storage Delivery Subscription.
  type: object
  properties:
    notifUri:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
    expTime:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTimeRo'
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - notifUri

DataDelSubscPatch:
  description: >
    Represents the requested modification to a SEALDD Data Storage Delivery Subscription.
  type: object
  properties:
    notifUri:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'

DataDelNotif:
  description: >
    Represents a SEALDD Data Storage Delivery Notification.
  type: object
  properties:
    subscriptionId:
      type: string
    data:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Bytes'
    storageId:
      type: string
  required:
    - subscriptionId
  oneOf:
    - required: [data]
    - required: [storageId]

DataDelReq:
  description: >
    Represents a SEALDD Data Storage Delivery request.
  type: object
  properties:
    targetId:
      type: string
    sealddServId:
      type: string
    storageId:
      type: string
    data:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Bytes'
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - targetId
  oneOf:
    - required: [data]
    - required: [storageId]

DelConnEstabReq:
  description: >
    Represents a SEALDD Data Storage Delivery connection establishment request.
  type: object
  properties:
    targetId:
      type: string
    ddServerConnInfo:
      $ref: 'TS29548_SDD_Transmission.yaml#/components/schemas/ConnInfo'
    transProtoc:
      type: array
```

```
    items:
      $ref: 'TS29558_Eees_EASRegistration.yaml#/components/schemas/TransportProtocol'
    minItems: 1
  suppFeat:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - targetId

DelConnEstabResp:
  description: >
    Represents the response to a SEALDD Data Storage Delivery connection establishment request.
  type: object
  properties:
    ddServerConnInfo:
      $ref: 'TS29548_SDD_Transmission.yaml#/components/schemas/ConnInfo'
    transProtoc:
      $ref: 'TS29558_Eees_EASRegistration.yaml#/components/schemas/TransportProtocol'
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
```

SIMPLE DATA TYPES

#

```
AppDataId:
  description: >
    Represents identifier of a stored application data that uniquely identifies the stored
    application data in different SEALDD Servers.
    This identifier shall be generated either based on the identifier of the service consumer
    that assigns it or using the Universally Unique Identifier (UUID) version 4 as described in
    IETF RFC 9562.
  type: string
```

#

ENUMERATIONS

#

```
EntityName:
  anyOf:
    - type: string
      enum:
        - SEALDD_SERVER
        - SEALDD_CLIENT
        - VAL_SERVER
    - type: string
      description: >
        This string provides forward-compatibility with future extensions to the enumeration
        and is not used to encode content defined in the present version of this API.
  description: |
    Represents the name of a SEALDD entity.
    Possible values are:
    - SEALDD_SERVER: Indicates the SEALDD Server.
    - SEALDD_CLIENT: Indicates the SEALDD Client.
    - VAL_SERVER: Indicates the VAL Server.
```

```
DataAccessRight:
  anyOf:
    - type: string
      enum:
        - RETRIEVE
        - UPDATE
        - DELETE
    - type: string
      description: >
        This string provides forward-compatibility with future extensions to the enumeration
        and is not used to encode content defined in the present version of this API.
  description: |
    Represents the data access rights.
    Possible values are:
    - RETRIEVE: Indicates that the access right is data storage retrieval.
    - UPDATE: Indicates that the access right is data storage update.
    - DELETE: Indicates that the access right is data storage deletion.
```

```
DataMngtEvent:
  anyOf:
    - type: string
      enum:
```

```
- DATA_ACCESS_STATISTICS
- DATA_MNGT_STATISTICS
- type: string
  description: >
    This string provides forward-compatibility with future extensions to the enumeration
    and is not used to encode content defined in the present version of this API.
description: |
  Represents the Data Management and (or) Status Information events.
  Possible values are:
  - DATA_ACCESS_STATISTICS: Indicates that the Data Management Event is data access statistics
    (i.e., how often the stored data is accessed).
  - DATA_MNGT_STATISTICS: Indicates that the Data Management Event is data management
    statistics (i.e., how often the stored data is managed).
```

```
# Data types describing alternative data types or combinations of data types:
#
```

```
DataStorageReq:
  description: Represents a SEALDD Data Storage creation or reservation request.
  oneOf:
    - $ref: '#/components/schemas/DataStorage'
    - $ref: '#/components/schemas/ReservReqData'
```

A.4 SDD_DDContext API

openapi: 3.0.0

info:

```
title: SEALDD Server Data Delivery Context Relocation
version: 1.1.0
description: |
  SEALDD Server Data Delivery Context Relocation.
  © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
  All rights reserved.
```

externalDocs:

```
description: >
  3GPP TS 29.548 V19.5.0 Service Enabler Architecture Layer for Verticals (SEAL);
  SEAL Data Delivery (SEALDD) Server Services; Stage 3.
url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.548/
```

security:

```
- {}
- oAuth2ClientCredentials: []
```

servers:

```
- url: '{apiRoot}/sdd-ddc/v1'
  variables:
    apiRoot:
      default: https://example.com
      description: apiRoot as defined in clause 6.5 of 3GPP TS 29.549
```

paths:

```
/contexts:
  get:
    summary: Pull the DD context from the SEALDD Server.
    operationId: PullDdContext
    tags:
      - DD Contexts (Collection)
    parameters:
      - name: sealdd-pol-ind
        in: query
        required: false
        schema:
          type: boolean
          default: false
          description: >
            Indicates whether the configured SEALDD Policy(ies), if any, is/are requested and
            shall hence be provided in addition to the DD Context.
            true indicates that the configured SEALDD Policy(ies) is/are requested.
            false indicates that the configured SEALDD Policy(ies) is/are not requested.
            The default value when this query parameter is omitted is false.
      - name: supp-feats
        in: query
        description: Contains the list of supported features.
        required: false
        schema:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    responses:
      '200':
        description: Successful case. The requested DD context is returned.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/DdContextResp'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '406':
        $ref: 'TS29122_CommonData.yaml#/components/responses/406'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
```

```
$ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

post:
  summary: Push the DD context to the SEALDD Server.
  tags:
    - DD Contexts (Collection)
  requestBody:
    description: >
      Represents the DD context to be pushed to the
      SEALDD Server.
    required: true
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/DdContextPushReq'
  responses:
    '201':
      description: >
        Created. Successful case. The DD context is successfully pushed to the SEALDD Server and
        the related information is returned in the response body.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/DdContextResp'
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/inform:
  post:
    summary: Inform the SEALDD Server on ACR event(s).
    operationId: InformAcrEvent
    tags:
      - Inform ACR Events Request
    requestBody:
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/InformACREvent'
    responses:
      '204':
        description: >
          No Content. The ACR event information is successfully received and processed.
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
callbacks:
  ACREventNotif:
    '{ $request.body#/notifUri }/inform-acr':
      post:
        requestBody:
          required: true
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/AcrEventNotif'
        responses:
          '204':
            description: >
              No Content. The ACR Event Notification is successfully received and
              acknowledged.
          '307':
            $ref: 'TS29122_CommonData.yaml#/components/responses/307'
          '308':
            $ref: 'TS29122_CommonData.yaml#/components/responses/308'
          '400':
            $ref: 'TS29122_CommonData.yaml#/components/responses/400'
          '401':
            $ref: 'TS29122_CommonData.yaml#/components/responses/401'
          '403':
            $ref: 'TS29122_CommonData.yaml#/components/responses/403'
          '404':
            $ref: 'TS29122_CommonData.yaml#/components/responses/404'
          '411':
            $ref: 'TS29122_CommonData.yaml#/components/responses/411'
          '413':
            $ref: 'TS29122_CommonData.yaml#/components/responses/413'
          '415':
            $ref: 'TS29122_CommonData.yaml#/components/responses/415'
          '429':
            $ref: 'TS29122_CommonData.yaml#/components/responses/429'
          '500':
            $ref: 'TS29122_CommonData.yaml#/components/responses/500'
          '503':
            $ref: 'TS29122_CommonData.yaml#/components/responses/503'
          default:
            $ref: 'TS29122_CommonData.yaml#/components/responses/default'

components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}

  schemas:

#
# STRUCTURED DATA TYPES
#

DdContext:
  description: Represents the DD context.
  type: object
  properties:

```

```
    uuContext:
      $ref: '#/components/schemas/SddUuContext'
    sContext:
      $ref: '#/components/schemas/SddSContext'
    trLayerContext:
      $ref: '#/components/schemas/TranspLayerContext'
  required:
    - uuContext
    - sContext

TranspLayerContext:
  description: Represents the transport layer context.
  type: object
  properties:
    transProtoc:
      $ref: 'TS29558_Eees_EASRegistration.yaml#/components/schemas/TransportProtocol'
  required:
    - transProtoc

DdContextPushReq:
  description: Represents the DD context push request.
  type: object
  properties:
    ddContext:
      $ref: '#/components/schemas/DdContext'
    breakpointInfo:
      $ref: '#/components/schemas/ContentBreakpoint'
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - ddContext

DdContextResp:
  description: Represents the DD context push response.
  type: object
  properties:
    ddContext:
      $ref: '#/components/schemas/DdContext'
    endPoint:
      $ref: 'TS29548_SDD_Transmission.yaml#/components/schemas/ConnInfo'
    policies:
      type: array
      items:
        $ref: 'TS29548_SDD_PolicyConfiguration.yaml#/components/schemas/PolicyConfig'
      minItems: 1
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'

SddUuContext:
  description: Represents the context related to the SEALDD-UU connection.
  type: object
  properties:
    sddFlowId:
      type: string
    valServiceId:
      type: string
      description: Contains the identifier of the VAL service.
    valServerId:
      type: string
      description: Contains the identifier of the VAL Server.
    valServEndPoint:
      $ref: 'TS29548_SDD_Transmission.yaml#/components/schemas/ConnInfo'
    ddClientConnInfo:
      $ref: 'TS29548_SDD_Transmission.yaml#/components/schemas/ConnInfo'
    ddServConnInfo:
      $ref: 'TS29548_SDD_Transmission.yaml#/components/schemas/ConnInfo'
    valTgtUe:
      $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
    comLifetime:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DurationSec'
    valUsersBdw:
      $ref: 'TS29548_SDD_Transmission.yaml#/components/schemas/ValUsersBdw'
    pendingTimer:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DurationSec'
  required:
    - sddFlowId
    - valServEndPoint
```

```

SddSContext:
  description: Represents the context related to the SEALDD-S connection.
  type: object
  properties:
    valServerId:
      type: string
      description: Contains the identifier of the VAL Server.
    valServiceId:
      type: string
      description: Contains the identifier of the VAL service.
    valTargetId:
      $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
    valServerConnInfo:
      $ref: 'TS29548_SDD_Transmission.yaml#/components/schemas/ConnInfo'
    ddServerConnInfo:
      $ref: 'TS29548_SDD_Transmission.yaml#/components/schemas/ConnInfo'
    qosInfo:
      $ref: 'TS29548_SDD_Transmission.yaml#/components/schemas/QosInfo'
    valServerBdw:
      $ref: 'TS29548_SDD_Transmission.yaml#/components/schemas/ValServBdw'
    valUsersBdw:
      $ref: 'TS29548_SDD_Transmission.yaml#/components/schemas/ValUsersBdw'
  required:
    - valServerId
    - valServerConnInfo

```

```

ContentBreakpoint:
  description: >
    Represents the content breakpoint information.
  type: object
  properties:
    seqNum:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
  anyOf:
    - required: [seqNum]

```

```

InformACREvent:
  description: Represents the ACR event information.
  type: object
  properties:
    valServerId:
      type: string
    valServiceId:
      type: string
    notifUri:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - valServerId

```

```

AcrEventNotif:
  description: Represents the ACR Event Notification.
  type: object
  properties:
    result:
      $ref: '#/components/schemas/FlowTransResult'
  required:
    - result

```

```
# SIMPLE DATA TYPES
```

```
#
```

```
#
```

```
# ENUMERATIONS
```

```
#
```

```

FlowTransResult:
  anyOf:
    - type: string
      enum:
        - SUCCESS
        - FAILURE
    - type: string
      description: >
        This string provides forward-compatibility with future extensions to the enumeration
        and is not used to encode content defined in the present version of this API.

```

description: |
Represents the SEALDD flow transfer result.
Possible values are:
- SUCCESS: Indicates that the flow transfer was successful.
- FAILURE: Indicates that the flow transfer was failed.

Data types describing alternative data types or combinations of data types:
#

A.5 SDD_TransmissionQualityMeasurement API

openapi: 3.0.0

info:

```
title: SEALDD Server Data Transmission Quality Measurement Service
version: 1.1.0
description: |
  SEALDD Server Data Transmission Quality Measurement Service.
  © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
  All rights reserved.
```

externalDocs:

```
description: >
  3GPP TS 29.548 V19.5.0; Service Enabler Architecture Layer for Verticals (SEAL);
  SEAL Data Delivery (SEALDD) Server Services; Stage 3.
url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.548/
```

servers:

```
- url: '{apiRoot}/sdd-tqm/v1'
  variables:
    apiRoot:
      default: https://example.com
      description: apiRoot as defined in clause 6.5 of 3GPP TS 29.549
```

security:

```
- {}
- oAuth2ClientCredentials: []
```

paths:

```
/subscriptions:
  post:
    summary: Request the creation of a Transmission Quality Measurement Subscription.
    operationId: CreateTransQualMeasSubsc
    tags:
      - Transmission Quality Measurement Subscriptions (Collection)
    requestBody:
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/TransQualMeasSubsc'
    responses:
      '201':
        description: >
          Created. The Transmission Quality Measurement Subscription is successfully created
          and a representation of the created Individual Transmission Quality Measurement
          Subscription resource shall be returned.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/TransQualMeasSubsc'
        headers:
          Location:
            description: >
              Contains the URI of the created Individual Transmission Quality Measurement
              Subscription resource.
            required: true
            schema:
              type: string
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '411':
        $ref: 'TS29122_CommonData.yaml#/components/responses/411'
      '413':
        $ref: 'TS29122_CommonData.yaml#/components/responses/413'
      '415':
        $ref: 'TS29122_CommonData.yaml#/components/responses/415'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
callbacks:
  TransQualMeasNotif:
    '{$request.body#/notifUri}':
      post:
        requestBody:
          required: true
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/TransQualMeasNotif'
        responses:
          '204':
            description: >
              No Content. The Transmission Quality Measurement notification is successfully
              received and acknowledged.
          '307':
            $ref: 'TS29122_CommonData.yaml#/components/responses/307'
          '308':
            $ref: 'TS29122_CommonData.yaml#/components/responses/308'
          '400':
            $ref: 'TS29122_CommonData.yaml#/components/responses/400'
          '401':
            $ref: 'TS29122_CommonData.yaml#/components/responses/401'
          '403':
            $ref: 'TS29122_CommonData.yaml#/components/responses/403'
          '404':
            $ref: 'TS29122_CommonData.yaml#/components/responses/404'
          '411':
            $ref: 'TS29122_CommonData.yaml#/components/responses/411'
          '413':
            $ref: 'TS29122_CommonData.yaml#/components/responses/413'
          '415':
            $ref: 'TS29122_CommonData.yaml#/components/responses/415'
          '429':
            $ref: 'TS29122_CommonData.yaml#/components/responses/429'
          '500':
            $ref: 'TS29122_CommonData.yaml#/components/responses/500'
          '503':
            $ref: 'TS29122_CommonData.yaml#/components/responses/503'
          default:
            $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/subscriptions/{subscriptionId}:
  parameters:
    - name: subscriptionId
      in: path
      description: >
        Represents the identifier of the Individual Transmission Quality Measurement Subscription
        resource.
      required: true
      schema:
        type: string

  get:
    summary: Retrieve an existing Individual Transmission Quality Measurement Subscription
    resource.
    operationId: GetIndTransQualMeasSubsc
    tags:
      - Individual Transmission Quality Measurement Subscription (Document)
    responses:
      '200':
        description: >
          OK. The requested Individual Transmission Quality Measurement Subscription resource
          shall be returned.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/TransQualMeasSubsc'
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':

```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '406':
    $ref: 'TS29122_CommonData.yaml#/components/responses/406'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

put:

summary: Request the update of an existing Individual Transmission Quality Measurement Subscription resource.

operationId: UpdateIndTransQualMeasSubsc

tags:

- Individual Transmission Quality Measurement Subscription (Document)

requestBody:

required: true

content:

application/json:

schema:

\$ref: '#/components/schemas/TransQualMeasSubsc'

responses:

'200':

description: >

OK. The Individual Transmission Quality Measurement Subscription resource is successfully updated and a representation of the updated resource shall be returned in the response body.

content:

application/json:

schema:

\$ref: '#/components/schemas/TransQualMeasSubsc'

'204':

description: >

No Content. The Individual Transmission Quality Measurement Subscription resource is successfully updated and no content is returned in the response body.

'307':

\$ref: 'TS29122_CommonData.yaml#/components/responses/307'

'308':

\$ref: 'TS29122_CommonData.yaml#/components/responses/308'

'400':

\$ref: 'TS29122_CommonData.yaml#/components/responses/400'

'401':

\$ref: 'TS29122_CommonData.yaml#/components/responses/401'

'403':

\$ref: 'TS29122_CommonData.yaml#/components/responses/403'

'404':

\$ref: 'TS29122_CommonData.yaml#/components/responses/404'

'411':

\$ref: 'TS29122_CommonData.yaml#/components/responses/411'

'413':

\$ref: 'TS29122_CommonData.yaml#/components/responses/413'

'415':

\$ref: 'TS29122_CommonData.yaml#/components/responses/415'

'429':

\$ref: 'TS29122_CommonData.yaml#/components/responses/429'

'500':

\$ref: 'TS29122_CommonData.yaml#/components/responses/500'

'503':

\$ref: 'TS29122_CommonData.yaml#/components/responses/503'

default:

\$ref: 'TS29122_CommonData.yaml#/components/responses/default'

patch:

summary: Request the modification of an existing Individual Transmission Quality Measurement Subscription resource.

operationId: ModifyIndTransQualMeasSubsc

tags:

- Individual Transmission Quality Measurement Subscription (Document)

requestBody:

```

    required: true
    content:
      application/merge-patch+json:
        schema:
          $ref: '#/components/schemas/TransQualMeasSubscPatch'
  responses:
    '200':
      description: >
        OK. The Individual Transmission Quality Measurement Subscription resource is
        successfully modified and a representation of the updated resource shall be returned in
        the response body.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/TransQualMeasSubsc'
    '204':
      description: >
        No Content. The Individual Transmission Quality Measurement Subscription resource is
        successfully modified and no content is returned in the response body.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

  delete:
    summary: Request the deletion of an existing Individual Transmission Quality Measurement
    Subscription resource.
    operationId: DeleteIndTransQualMeasSubsc
    tags:
      - Individual Transmission Quality Measurement Subscription (Document)
    responses:
      '204':
        description: >
          No Content. The Individual Transmission Quality Measurement Subscription resource is
          successfully deleted.
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

```

/reports:
  get:
    summary: Retrieve Historical Transmission Quality Measurement Report(s).
    operationId: GetHistTransQualMeasReports
    tags:
      - Historical Transmission Quality Measurement Reports (Collection)
    parameters:
      - name: app-traffic-ids
        in: query
        required: true
        schema:
          type: array
          items:
            type: string
            minItems: 1
      - name: val-group-id
        in: query
        required: false
        schema:
          type: string
      - name: val-ue-ids-list
        in: query
        required: false
        schema:
          type: array
          items:
            type: string
            minItems: 1
      - name: val-user-ids-list
        in: query
        required: false
        schema:
          type: array
          items:
            type: string
            minItems: 1
      - name: all-val-ues
        in: query
        required: false
        schema:
          type: boolean
          default: false
          description: >
            Indicates that the request is related to all VAL UE(s) of the application traffic
            identified by the application traffic identifier(s) provided within the
            appTrafficIds attribute.
            true indicates that the request is related to all VAL UE(s).
            false" indicates that the request is not related to all VAL UE(s).
            The default value when this query parameter is omitted is false.
      - name: supp-feat
        in: query
        required: false
        schema:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    responses:
      '200':
        description: >
          OK. The requested Historical Transmission Quality Measurement Report(s) , if any, shall
          be returned.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/HistTransQualMeasReports'
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '406':
        $ref: 'TS29122_CommonData.yaml#/components/responses/406'
      '429':

```

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

components:

```

  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}

```

schemas:

```

#
# STRUCTURED DATA TYPES
#

```

```

TransQualMeasSubsc:
  description: >
    Represents a Transmission Quality Measurement Subscription.
  type: object
  properties:
    appTrafficIds:
      type: array
      items:
        type: string
      minItems: 1
    valGroupId:
      type: string
    valUeIdsList:
      type: array
      items:
        type: string
      minItems: 1
    valUserIdsList:
      type: array
      items:
        type: string
      minItems: 1
    allValUesInd:
      type: boolean
      default: false
    flows:
      type: array
      items:
        $ref: 'TS29548_SDD_Transmission.yaml#/components/schemas/ConnInfo'
      minItems: 1
    crossflows:
      type: array
      items:
        $ref: '#/components/schemas/Crossflow'
      minItems: 1
    measConds:
      type: array
      items:
        $ref: 'TS29549_SS_Events.yaml#/components/schemas/ValidityConditions'
      minItems: 1
    reqs:
      type: object
      additionalProperties:
        $ref: '#/components/schemas/TransQualMeasReq'
      minProperties: 1
      nullable: true
      description: >
        Represents the transmission quality measurement reporting requirements of the
        subscription.
        The key of the map shall be any unique string encoded value.
    subsExpTime:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTimeRo'
    notifUri:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
    suppFeat:

```

```
$ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
required:
  - appTrafficIds
  - reqs
  - notifUri
oneOf:
  - required: [valGroupId]
  - required: [valUeIdsList]
  - required: [valUserIdsList]
  - required: [allValUesInd]

TransQualMeasReq:
  description: >
    Represents Transmission Quality Measurement requirements.
  type: object
  properties:
    measId:
      type: array
      items:
        $ref: '#/components/schemas/MeasurementId'
      minItems: 1
    repType:
      $ref: 'TS29508_Nsmf_EventExposure.yaml#/components/schemas/NotificationMethod'
    repPeriodicity:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DurationSec'
    repGranularity:
      $ref: '#/components/schemas/RepGranularity'
    measWindow:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
    measExpTime:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
    repCriteriaSets:
      type: object
      additionalProperties:
        $ref: '#/components/schemas/TransQualMeasCriteriaSet'
      minProperties: 1
      description: >
        Contains one or several set(s) of transmission quality measurement reporting
        criteria.
        The key of the map shall be any unique string encoded value.
        Only the criteria related to the subscribed measurement(s) within the measId attribute
        shall be present within this attribute.
  required:
    - measId

TransQualMeasSubscPatch:
  description: >
    Represents the requested modifications to a Transmission Quality Measurement Subscription.
  type: object
  properties:
    measConds:
      type: array
      items:
        $ref: 'TS29549_SS_Events.yaml#/components/schemas/ValidityConditions'
      minItems: 1
    reqs:
      type: object
      additionalProperties:
        $ref: '#/components/schemas/TransQualMeasReq'
      minProperties: 1
      nullable: true
      description: >
        Represents the transmission quality measurement reporting requirements of the
        subscription.
        The key of the map shall be any unique string encoded value and shall be set to the same
        value as the one provided during the creation of the transmission quality measurement
        subscription.
    notifUri:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'

TransQualMeasNotif:
  description: >
    Represents a Transmission Quality Measurement Notification.
  type: object
  properties:
    subscriptionId:
      type: string
    reports:
```

```
    type: array
    items:
      $ref: '#/components/schemas/TransQualMeasReport'
    minItems: 1
  required:
    - subscriptionId
    - reports

TransQualMeasReport:
  description: >
    Represents a Transmission Quality Measurement report.
  type: object
  properties:
    measId:
      type: array
      items:
        $ref: '#/components/schemas/MeasurementId'
      minItems: 1
    valUeIds:
      type: array
      items:
        type: string
      minItems: 1
    valUserIds:
      type: array
      items:
        type: string
      minItems: 1
    flows:
      type: array
      items:
        $ref: 'TS29548_SDD_Transmission.yaml#/components/schemas/ConnInfo'
      minItems: 1
    crossflows:
      type: array
      items:
        $ref: '#/components/schemas/Crossflow'
      minItems: 1
    measData:
      $ref: '#/components/schemas/TransQualMeasData'
    timestamp:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
  required:
    - measId
  not:
    required: [valUeIds, valUserIds]

TransQualMeasCriteria:
  description: >
    Represents the Transmission Quality Measurement reporting criteria.
  type: object
  properties:
    minLatency:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
    avgLatency:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
    maxLatency:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
    minLatencyDl:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
    avgLatencyDl:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
    maxLatencyDl:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
    minLatencyUl:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
    avgLatencyUl:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
    maxLatencyUl:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
    minLatencyCrossflow:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
    avgLatencyCrossflow:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
    maxLatencyCrossflow:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
    minBitRate:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
```

```

avgBitRate:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
maxBitRate:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
minBitRateDl:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
avgBitRateDl:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
maxBitRateDl:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
minBitRateUl:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
avgBitRateUl:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
maxBitRateUl:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
minBitRateCrossflow:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
avgBitRateCrossflow:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
maxBitRateCrossflow:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
minPackLossRate:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/PacketLossRate'
avgPackLossRate:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/PacketLossRate'
maxPackLossRate:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/PacketLossRate'
minPackLossRateDl:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/PacketLossRate'
avgPackLossRateDl:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/PacketLossRate'
maxPackLossRateDl:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/PacketLossRate'
minPackLossRateUl:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/PacketLossRate'
avgPackLossRateUl:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/PacketLossRate'
maxPackLossRateUl:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/PacketLossRate'
minPackLossRateCrossflow:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/PacketLossRate'
avgPackLossRateCrossflow:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/PacketLossRate'
maxPackLossRateCrossflow:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/PacketLossRate'
minJitter:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
avgJitter:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
maxJitter:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
minJitterDl:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
avgJitterDl:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
maxJitterDl:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
minJitterUl:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
avgJitterUl:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
maxJitterUl:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
minJitterCrossflow:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
avgJitterCrossflow:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
maxJitterCrossflow:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
oneOf:
  - required: [minLatency]
  - required: [avgLatency]
  - required: [maxLatency]
  - required: [minLatencyDl]
  - required: [avgLatencyDl]
  - required: [maxLatencyDl]
  - required: [minLatencyUl]

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- required: [avgLatencyUl]
- required: [maxLatencyUl]
- required: [minLatencyCrossflow]
- required: [avgLatencyCrossflow]
- required: [maxLatencyCrossflow]
- required: [minBitRate]
- required: [avgBitRate]
- required: [maxBitRate]
- required: [minLatencyDl]
- required: [avgLatencyDl]
- required: [maxLatencyDl]
- required: [minLatencyUl]
- required: [avgLatencyUl]
- required: [maxLatencyUl]
- required: [minLatencyCrossflow]
- required: [avgLatencyCrossflow]
- required: [maxLatencyCrossflow]
- required: [minPackLossRate]
- required: [avgPackLossRate]
- required: [maxPackLossRate]
- required: [minPackLossRateDl]
- required: [avgPackLossRateDl]
- required: [maxPackLossRateDl]
- required: [minPackLossRateUl]
- required: [avgPackLossRateUl]
- required: [maxPackLossRateUl]
- required: [minPackLossRateCrossflow]
- required: [avgPackLossRateCrossflow]
- required: [maxPackLossRateCrossflow]
- required: [minJitter]
- required: [avgJitter]
- required: [maxJitter]
- required: [minJitterDl]
- required: [avgJitterDl]
- required: [maxJitterDl]
- required: [minJitterUl]
- required: [avgJitterUl]
- required: [maxJitterUl]
- required: [minJitterCrossflow]
- required: [avgJitterCrossflow]
- required: [maxJitterCrossflow]

TransQualMeasData:

description: >

Represents the Transmission Quality Measurement data.

type: object

properties:

minLatency:

\$ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'

maxLatency:

\$ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'

avgLatency:

\$ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'

stdDevLatency:

\$ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'

kPercLatency:

\$ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'

kValLatency:

\$ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'

minLatencyUl:

\$ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'

maxLatencyUl:

\$ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'

avgLatencyUl:

\$ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'

stdDevLatencyUl:

\$ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'

kPercLatencyUl:

\$ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'

kValLatencyUl:

\$ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'

minLatencyDl:

\$ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'

maxLatencyDl:

\$ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'

avgLatencyDl:

\$ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'

stdDevLatencyDl:

\$ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
kPercLatencyDl:
\$ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
kValLatencyDl:
\$ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
minLatencyCrossflow:
\$ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
maxLatencyCrossflow:
\$ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
avgLatencyCrossflow:
\$ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
stdDevLatencyCrossflow:
\$ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
kPercLatencyCrossflow:
\$ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
kValLatencyCrossflow:
\$ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
minBitRate:
\$ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
maxBitRate:
\$ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
avgBitRate:
\$ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
stdDevBitRate:
\$ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
kPercBitRate:
\$ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
kValBitRate:
\$ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
minBitRateUl:
\$ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
maxBitRateUl:
\$ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
avgBitRateUl:
\$ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
stdDevBitRateUl:
\$ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
kPercBitRateUl:
\$ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
kValBitRateUl:
\$ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
minBitRateDl:
\$ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
maxBitRateDl:
\$ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
avgBitRateDl:
\$ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
stdDevBitRateDl:
\$ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
kPercBitRateDl:
\$ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
kValBitRateDl:
\$ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
minBitRateCrossflow:
\$ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
maxBitRateCrossflow:
\$ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
avgBitRateCrossflow:
\$ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
stdDevBitRateCrossflow:
\$ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
kPercBitRateCrossflow:
\$ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
kValBitRateCrossflow:
\$ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
minPackLossRate:
\$ref: 'TS29571_CommonData.yaml#/components/schemas/PacketLossRate'
maxPackLossRate:
\$ref: 'TS29571_CommonData.yaml#/components/schemas/PacketLossRate'
avgPackLossRate:
\$ref: 'TS29571_CommonData.yaml#/components/schemas/PacketLossRate'
stdDevPackLossRate:
\$ref: 'TS29571_CommonData.yaml#/components/schemas/PacketLossRate'
kPercPackLossRate:
\$ref: 'TS29571_CommonData.yaml#/components/schemas/PacketLossRate'
kValPackLossRate:
\$ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
minPackLossRateUl:

```
$ref: 'TS29571_CommonData.yaml#/components/schemas/PacketLossRate'
maxPackLossRateUl:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/PacketLossRate'
avgPackLossRateUl:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/PacketLossRate'
stdDevPackLossRateUl:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/PacketLossRate'
kPercPackLossRateUl:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/PacketLossRate'
kValPackLossRateUl:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
minPackLossRateDl:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/PacketLossRate'
maxPackLossRateDl:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/PacketLossRate'
avgPackLossRateDl:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/PacketLossRate'
stdDevPackLossRateDl:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/PacketLossRate'
kPercPackLossRateDl:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/PacketLossRate'
kValPackLossRateDl:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
minPackLossRateCrossflow:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/PacketLossRate'
maxPackLossRateCrossflow:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/PacketLossRate'
avgPackLossRateCrossflow:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/PacketLossRate'
stdDevPackLossRateCrossflow:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/PacketLossRate'
kPercPackLossRateCrossflow:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/PacketLossRate'
kValPackLossRateCrossflow:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
minJitter:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
maxJitter:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
avgJitter:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
stdDevJitter:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
kPercJitter:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
kValJitter:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
minJitterUl:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
maxJitterUl:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
avgJitterUl:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
stdDevJitterUl:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
kPercJitterUl:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
kValJitterUl:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
minJitterDl:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
maxJitterDl:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
avgJitterDl:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
stdDevJitterDl:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
kPercJitterDl:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
kValJitterDl:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
minJitterCrossflow:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
maxJitterCrossflow:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
avgJitterCrossflow:
  $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
stdDevJitterCrossflow:
```

```

    $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
  kPercJitterCrossflow:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
  kValJitterCrossflow:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Integer'
  measPeriod:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/DurationSec'
  timestamp:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
anyOf:
  - required: [minLatency]
  - required: [maxLatency]
  - required: [avgLatency]
  - required: [minLatencyDl]
  - required: [avgLatencyDl]
  - required: [maxLatencyDl]
  - required: [minLatencyUl]
  - required: [avgLatencyUl]
  - required: [maxLatencyUl]
  - required: [minLatencyCrossflow]
  - required: [avgLatencyCrossflow]
  - required: [maxLatencyCrossflow]
  - required: [minBitRate]
  - required: [maxBitRate]
  - required: [avgBitRate]
  - required: [minBitRateDl]
  - required: [avgBitRateDl]
  - required: [maxBitRateDl]
  - required: [minBitRateUl]
  - required: [avgBitRateUl]
  - required: [maxBitRateUl]
  - required: [minBitRateCrossflow]
  - required: [avgBitRateCrossflow]
  - required: [maxBitRateCrossflow]
  - required: [minPackLossRate]
  - required: [maxPackLossRate]
  - required: [avgPackLossRate]
  - required: [minPackLossRateDl]
  - required: [avgPackLossRateDl]
  - required: [maxPackLossRateDl]
  - required: [minPackLossRateUl]
  - required: [avgPackLossRateUl]
  - required: [maxPackLossRateUl]
  - required: [minPackLossRateCrossflow]
  - required: [avgPackLossRateCrossflow]
  - required: [maxPackLossRateCrossflow]
  - required: [minJitter]
  - required: [maxJitter]
  - required: [avgJitter]
  - required: [minJitterDl]
  - required: [avgJitterDl]
  - required: [maxJitterDl]
  - required: [minJitterUl]
  - required: [avgJitterUl]
  - required: [maxJitterUl]
  - required: [minJitterCrossflow]
  - required: [avgJitterCrossflow]
  - required: [maxJitterCrossflow]

HistTransQualMeasReports:
  description: >
    Represents Historical Transmission Quality Measurement Report(s).
  type: object
  properties:
    reports:
      type: array
      items:
        $ref: '#/components/schemas/TransQualMeasReport'
      minItems: 0
      description: >
        Contains the Historical Transmission Quality Measurement Report(s).
        If there are no Historical Transmission Quality Measurement Report(s) fulfilling the
        request, this attribute shall contain an empty array.
  suppFeat:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - reports

```

```
TransQualMeasCriteriaSet:
  description: >
    Represents a set of transmission quality measurement reporting criteria.
  type: object
  properties:
    criteria:
      $ref: '#/components/schemas/TransQualMeasCriteria'
    direction:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/MatchingDirection'
  required:
    - criteria
    - direction

Crossflow:
  description: >
    Represents a crossflow.
  type: object
  properties:
    crossflow:
      type: array
      items:
        $ref: '#/components/schemas/CrossflowInfo'
      minItems: 2
      maxItems: 2
  required:
    - crossflow

CrossflowInfo:
  description: >
    Represents the crossflow information.
  type: object
  properties:
    flowDesc:
      $ref: 'TS29548_SDD_Transmission.yaml#/components/schemas/ConnInfo'
    direction:
      $ref: '#/components/schemas/FlowDirection'
  required:
    - flowDesc
    - direction

# SIMPLE DATA TYPES
#

#
# ENUMERATIONS
#

MeasurementId:
  anyOf:
    - type: string
      enum:
        - LATENCY
        - UL_LATENCY
        - DL_LATENCY
        - CROSSFLOW_LATENCY
        - BITRATE
        - UL_BITRATE
        - DL_BITRATE
        - CROSSFLOW_BITRATE
        - PACKET_LOSS_RATE
        - UL_PACKET_LOSS_RATE
        - DL_PACKET_LOSS_RATE
        - CROSSFLOW_PACKET_LOSS_RATE
        - JITTER
        - UL_JITTER
        - DL_JITTER
        - CROSSFLOW_JITTER
    - type: string
      description: >
        This string provides forward-compatibility with future extensions to the enumeration
        and is not used to encode content defined in the present version of this API.
  description: |
    Represents the transmission quality measurement type.
    Possible values are:
    - LATENCY: Indicates that the requested/reported measurement is the E2E latency.
    - UL_LATENCY: Indicates that the requested/reported measurement is the UL latency.
    - DL_LATENCY: Indicates that the requested/reported measurement is the DL latency.
```

- CROSSFLOW_LATENCY: Indicates that the requested/reported measurement is the crossflow latency.
- BITRATE: Indicates that the requested/reported measurement is the E2E bit rate.
- UL_BITRATE: Indicates that the requested/reported measurement is the UL bit rate.
- DL_BITRATE: Indicates that the requested/reported measurement is the DL bit rate.
- CROSSFLOW_BITRATE: Indicates that the requested/reported measurement is the crossflow bit rate.
- PACKET_LOSS_RATE: Indicates that the requested/reported measurement is the E2E packet loss rate.
- UL_PACKET_LOSS_RATE: Indicates that the requested/reported measurement is the UL packet loss rate.
- DL_PACKET_LOSS_RATE: Indicates that the requested/reported measurement is the DL packet loss rate.
- CROSSFLOW_PACKET_LOSS_RATE: Indicates that the requested/reported measurement is the crossflow packet loss rate.
- JITTER: Indicates that the requested/reported measurement is the jitter.
- UL_JITTER: Indicates that the requested/reported measurement is the UL jitter.
- DL_JITTER: Indicates that the requested/reported measurement is the DL jitter.
- CROSSFLOW_JITTER: Indicates that the requested/reported measurement is the crossflow jitter.

RepGranularity:

anyOf:

- type: string
- enum:
 - INDIVIDUAL_VAL_UE
 - VAL_GROUP
 - ALL_VAL_UES
- type: string

description: >

This string provides forward-compatibility with future extensions to the enumeration and is not used to encode content defined in the present version of this API.

description: |

Represents the reporting granularity.

Possible values are:

- INDIVIDUAL_VAL_UE: Indicates that the granularity is individual VAL UE/user.
- VAL_GROUP: Indicates that the granularity is VAL Group.
- ALL_VAL_UES: Indicates that the granularity is all VAL UE/user(s).

FlowDirection:

anyOf:

- type: string
- enum:
 - UL
 - DL
- type: string

description: >

This string provides forward-compatibility with future extensions to the enumeration and is not used to encode content defined in the present version of this API.

description: |

Represents the flow direction.

Possible values are:

- UL: Indicates that the flow direction is uplink.
- DL: Indicates that the flow direction is downlink.

Data types describing alternative data types or combinations of data types:

#

A.6 SDD_PolicyConfiguration API

openapi: 3.0.0

info:

title: SEALDD Server Policy Configuration Service
version: 1.1.0
description: |
SEALDD Server Policy Configuration Service.
© 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
All rights reserved.

externalDocs:

description: >
3GPP TS 29.548 V19.5.0; Service Enabler Architecture Layer for Verticals (SEAL);
SEAL Data Delivery (SEALDD) Server Services; Stage 3.
url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.548/

servers:

- url: '{apiRoot}/sdd-pc/v1'
variables:
apiRoot:
default: <https://example.com>
description: apiRoot as defined in clause 6.5 of 3GPP TS 29.549

security:

- {}
- oAuth2ClientCredentials: []

paths:

/configurations:

post:

summary: Request the creation of a Policy Configuration.
operationId: CreatePolicyConfig

tags:

- Policy Configurations (Collection)

requestBody:

required: true

content:

application/json:
schema:
\$ref: '#/components/schemas/PolicyConfig'

responses:

'201':

description: >

Created. The Policy Configuration is successfully created and a representation of the created Individual Policy Configuration resource shall be returned.

content:

application/json:
schema:
\$ref: '#/components/schemas/PolicyConfig'

headers:

Location:

description: >

Contains the URI of the created Individual Policy Configuration resource.

required: true

schema:

type: string

'400':

\$ref: 'TS29122_CommonData.yaml#/components/responses/400'

'401':

\$ref: 'TS29122_CommonData.yaml#/components/responses/401'

'403':

\$ref: 'TS29122_CommonData.yaml#/components/responses/403'

'404':

\$ref: 'TS29122_CommonData.yaml#/components/responses/404'

'411':

\$ref: 'TS29122_CommonData.yaml#/components/responses/411'

'413':

\$ref: 'TS29122_CommonData.yaml#/components/responses/413'

'415':

\$ref: 'TS29122_CommonData.yaml#/components/responses/415'

'429':

\$ref: 'TS29122_CommonData.yaml#/components/responses/429'

'500':

\$ref: 'TS29122_CommonData.yaml#/components/responses/500'

'503':

```
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/configurations/{configId}:
  parameters:
    - name: configId
      in: path
      description: >
        Represents the identifier of the Individual Policy Configuration resource.
      required: true
      schema:
        type: string

  get:
    summary: Retrieve an existing Individual Policy Configuration resource.
    operationId: GetIndPolicyConfig
    tags:
      - Individual Policy Configuration (Document)
    responses:
      '200':
        description: >
          OK. The requested Individual Policy Configuration resource shall be returned.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/PolicyConfig'
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29122_CommonData.yaml#/components/responses/404'
      '406':
        $ref: 'TS29122_CommonData.yaml#/components/responses/406'
      '429':
        $ref: 'TS29122_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29122_CommonData.yaml#/components/responses/500'
      '503':
        $ref: 'TS29122_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29122_CommonData.yaml#/components/responses/default'

  put:
    summary: Request the update of an existing Individual Policy Configuration resource.
    operationId: UpdateIndPolicyConfig
    tags:
      - Individual Policy Configuration (Document)
    requestBody:
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/PolicyConfig'
    responses:
      '200':
        description: >
          OK. The Individual Policy Configuration resource is successfully updated and a
          representation of the updated resource shall be returned in the response body.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/PolicyConfig'
      '204':
        description: >
          No Content. The Individual Policy Configuration resource is successfully updated
          and no content is returned in the response body.
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
```

```

'400':
  $ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
  $ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
  $ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
  $ref: 'TS29122_CommonData.yaml#/components/responses/404'
'411':
  $ref: 'TS29122_CommonData.yaml#/components/responses/411'
'413':
  $ref: 'TS29122_CommonData.yaml#/components/responses/413'
'415':
  $ref: 'TS29122_CommonData.yaml#/components/responses/415'
'429':
  $ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
  $ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':
  $ref: 'TS29122_CommonData.yaml#/components/responses/503'
default:
  $ref: 'TS29122_CommonData.yaml#/components/responses/default'

patch:
  summary: Request the modification of an existing Individual Policy Configuration resource.
  operationId: ModifyIndPolicyConfig
  tags:
    - Individual Policy Configuration (Document)
  requestBody:
    required: true
    content:
      application/merge-patch+json:
        schema:
          $ref: '#/components/schemas/PolicyConfigPatch'
  responses:
    '200':
      description: >
        OK. The Individual Policy Configuration resource is successfully modified and a
        representation of the updated resource shall be returned in the response body.
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/PolicyConfig'
    '204':
      description: >
        No Content. The Individual Policy Configuration resource is successfully modified and
        no content is returned in the response body.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
    default:
      $ref: 'TS29122_CommonData.yaml#/components/responses/default'

delete:
  summary: Request the deletion of an existing Individual Policy Configuration resource.
  operationId: DeleteIndPolicyConfig
  tags:

```

```

    - Individual Policy Configuration (Document)
  responses:
    '204':
      description: >
        No Content. The Individual Policy Configuration resource is successfully deleted.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{tokenUrl}'
          scopes: {}

  schemas:

#
# STRUCTURED DATA TYPES
#

PolicyConfig:
  description: >
    Represents a SEALDD Policy Configuration.
  type: object
  properties:
    appTrafficIds:
      type: array
      items:
        type: string
      minItems: 1
    valTargetId:
      $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
    sliceId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
    sealddPol:
      $ref: '#/components/schemas/SealddPolicy'
    expTime:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTimeRo'
    multimodsddPol:
      $ref: '#/components/schemas/MultiModalSealddPolicy'
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  required:
    - appTrafficIds
  anyOf:
    - required: [sealddPol]
    - required: [multimodsddPol]

PolicyConfigPatch:
  description: >
    Represents the requested modifications to a SEALDD Policy Configuration.
  type: object
  properties:
    sealddPol:
      $ref: '#/components/schemas/SealddPolicy'
    multimodsddPol:

```

\$ref: '#/components/schemas/MultiModalSealddPolicy'

SealddPolicy:
 description: >
 Represents a SEALDD Policy.
 type: object
 properties:
 qualGuarPol:
 \$ref: '#/components/schemas/QualGuarPolicy'
 qualOptPol:
 \$ref: '#/components/schemas/QualGuarPolicy'
 bdwCtrlSets:
 type: array
 items:
 \$ref: '#/components/schemas/BdwCtrlPolicy'
 minItems: 1
 geoPol:
 type: array
 items:
 \$ref: '#/components/schemas/GeofencingPolicy'
 minItems: 1
 tempPol:
 \$ref: '#/components/schemas/TempPolicy'
 non3gppAccMeasPol:
 \$ref: '#/components/schemas/Non3gppAccessMeasPol'
 anyOf:
 - required: [qualGuarPol]
 - required: [qualOptPol]
 - required: [bdwCtrlSets]
 - required: [geoPol]
 - required: [tempPol]
 - required: [non3gppAccMeasPol]

QualGuarPolicy:
 description: >
 Represents the quality guarantee policy.
 type: object
 properties:
 thresholds:
 \$ref: '#/components/schemas/QualGuarThresh'
 required:
 - thresholds

QualGuarThresh:
 description: >
 Represents the quality guarantee related thresholds.
 type: object
 properties:

 measId:
 type: array
 items:
 \$ref: 'TS29548_SDD_TransmissionQualityMeasurement.yaml#/components/schemas/MeasurementId'
 minItems: 1
 measThesh:
 \$ref: 'TS29548_SDD_TransmissionQualityMeasurement.yaml#/components/schemas/TransQualMeasCriteria'
 required:
 - measId
 - measThesh

GeofencingPolicy:
 description: Represents a geofencing policy.
 type: object
 properties:
 valServiceId:
 type: string
 area:
 \$ref: '#/components/schemas/GeofencingArea'
 action:
 \$ref: '#/components/schemas/GeoPolAction'
 required:
 - valServiceId
 - area
 - action

GeofencingArea:
 description: Represents a geofencing area.

```
    type: object
    properties:
      geoAreas:
        type: array
        items:
          $ref: 'TS29572_Nlmf_Location.yaml#/components/schemas/GeographicArea'
        minItems: 1
    anyOf:
      - required: [geoAreas]

MultiModalSealddPolicy:
  description: >
    Represents a Multi-modal SEALDD Policy.
  type: object
  properties:
    syncPol:
      type: array
      items:
        $ref: '#/components/schemas/SyncPolicy'
      minItems: 1
      description: >
        Contains the synchronization policy.
        The key of the map shall be set to the multi-modal flow type provided within the
        "flowType" attribute of the corresponding map value encoded using the SyncPolicy data
        structure.
    alignmentPol:
      $ref: '#/components/schemas/AlignmentPolicy'
    ueToUePol:
      $ref: '#/components/schemas/UEToUEPolicy'
    expTime:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTimeRo'
  anyOf:
    - required: [syncPol]
    - required: [alignmentPol]
    - required: [ueToUePol]

TempPolicy:
  description: >
    Represents a temporal policy.
  type: object
  properties:
    schedule:
      type: array
      items:
        $ref: 'TS29122_CpProvisioning.yaml#/components/schemas/ScheduledCommunicationTime'
      minItems: 1
    timeWindow:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
  oneOf:
    - required: [schedule]
    - required: [timeWindow]

Non3gppAccessMeasPol:
  description: >
    Represents the non-3GPP access measurement policy.
  type: object
  properties:
    accessIds:
      type: array
      items:
        type: string
      minItems: 1
    thresholds:
      type: array
      items:
        $ref: '#/components/schemas/SignalStrengthThreshold'
      minItems: 1
    thrHandling:
      $ref:
        'TS29549_SS_NetworkResourceMonitoring.yaml#/components/schemas/ThresholdHandlingMode'
    timeThr:
      $ref: '#/components/schemas/TempPolicy'
  anyOf:
    - required: [accessIds]
    - required: [thresholds]
    - required: [timeThr]

SignalStrength:
```

```
description: >
  Represents the signal strength value.
type: object
properties:
  rssi:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Float'
anyOf:
  - required: [rssi]

SignalStrengthThreshold:
description: >
  Represents the signal strength threshold.
type: object
properties:
  value:
    $ref: '#/components/schemas/SignalStrength'
  direction:
    $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/MatchingDirection'
required:
  - value
  - direction

SyncPolicy:
description: >
  Represents the synchronization policy.
type: object
properties:
  flowType1:
    $ref: '#/components/schemas/MultiModalFlowType'
  flowType2:
    $ref: '#/components/schemas/MultiModalFlowType'
  syncThreshold:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/DurationMilliSec'
required:
  - flowType1
  - flowType2
  - syncThreshold

AlignmentPolicy:
description: >
  Represents the multi-modal flows alignment policy.
type: object
properties:
  multiModalId:
    $ref: 'TS29514_Npcf_PolicyAuthorization.yaml#/components/schemas/MultiModalId'
  maxAlignTime:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/DurationMilliSec'
anyOf:
  - required: [multiModalId]
  - required: [maxAlignTime]

UEToUEPolicy:
description: >
  Represents the multi-modal UE-to-UE policy.
type: object
properties:
  entProxThresh:
    $ref: '#/components/schemas/ProximityThresholds'
  leavProxThresh:
    $ref: '#/components/schemas/ProximityThresholds'
  entQoSThresh:
    $ref: '#/components/schemas/QoSThresholds'
  leavQoSThresh:
    $ref: '#/components/schemas/QoSThresholds'
  entQoEThresh:
    $ref: '#/components/schemas/QoEThresholds'
  leavQoEThresh:
    $ref: '#/components/schemas/QoEThresholds'
anyOf:
  - required: [entProxThresh]
  - required: [leavProxThresh]
  - required: [entQoSThresh]
  - required: [leavQoSThresh]
  - required: [entQoEThresh]
  - required: [leavQoEThresh]

ProximityThresholds:
description: >
```

Represents the proximity thresholds for entering/leaving the UE-to-UE direct communication mode.

type: object

properties:

- minUeToUedist:
 - type: number
 - format: double
 - minimum: 0
- avgUeToUedist:
 - type: number
 - format: double
 - minimum: 0
- maxUeToUedist:
 - type: number
 - format: double
 - minimum: 0

anyOf:

- required: [minUeToUedist]
- required: [avgUeToUedist]
- required: [maxUeToUedist]

QoSThresholds:

description: >

Represents the QoS thresholds for entering/leaving the UE-to-UE direct communication mode.

type: object

properties:

- minLatency:
 - \$ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
- avgLatency:
 - \$ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
- maxLatency:
 - \$ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
- minBitRate:
 - \$ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
- avgBitRate:
 - \$ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
- maxBitRate:
 - \$ref: 'TS29571_CommonData.yaml#/components/schemas/BitRate'
- minPackLossRate:
 - \$ref: 'TS29571_CommonData.yaml#/components/schemas/PacketLossRate'
- avgPackLossRate:
 - \$ref: 'TS29571_CommonData.yaml#/components/schemas/PacketLossRate'
- maxPackLossRate:
 - \$ref: 'TS29571_CommonData.yaml#/components/schemas/PacketLossRate'
- minPackErrRate:
 - \$ref: 'TS29571_CommonData.yaml#/components/schemas/PacketErrRate'
- avgPackErrRate:
 - \$ref: 'TS29571_CommonData.yaml#/components/schemas/PacketErrRate'
- maxPackErrRate:
 - \$ref: 'TS29571_CommonData.yaml#/components/schemas/PacketErrRate'
- minJitter:
 - \$ref: 'TS29571_CommonData.yaml#/components/schemas/UInt32'
- avgJitter:
 - \$ref: 'TS29571_CommonData.yaml#/components/schemas/UInt32'
- maxJitter:
 - \$ref: 'TS29571_CommonData.yaml#/components/schemas/UInt32'

anyOf:

- required: [minLatency]
- required: [avgLatency]
- required: [maxLatency]
- required: [minBitRate]
- required: [avgBitRate]
- required: [maxBitRate]
- required: [minPackLossRate]
- required: [avgPackLossRate]
- required: [maxPackLossRate]
- required: [minPackErrRate]
- required: [avgPackErrRate]
- required: [maxPackErrRate]
- required: [minJitter]
- required: [avgJitter]
- required: [maxJitter]

QoEThresholds:

description: >

Represents the QoE thresholds for entering/leaving the UE-to-UE direct communication mode.

type: object

properties:

```
mos:
  type: integer
  minimum: 1
  maximum: 5
anyOf:
  - required: [mos]
```

```
# SIMPLE DATA TYPES
#
```

```
#
# ENUMERATIONS
#
```

```
BdwCtrlPolicy:
  anyOf:
    - type: string
      enum:
        - REALLOCATE_DL
        - REALLOCATE_UL
        - NOT_REALLOCATE_DL
        - NOT_REALLOCATE_UL
    - type: string
      description: >
        This string provides forward-compatibility with future extensions to the enumeration
        and is not used to encode content defined in the present version of this API.
  description: |
    Represents the bandwidth control policy.
    Possible values are:
    - REALLOCATE_DL: Indicates that the bandwidth control action is to reallocate the
      bandwidth limit between different VAL users for DL traffic.
    - REALLOCATE_UL: Indicates that the bandwidth control action is to reallocate the
      bandwidth limit between different VAL users for UL traffic.
    - NOT_REALLOCATE_DL: Indicates that the bandwidth control action is to not reallocate
      the bandwidth limit between different VAL users for DL traffic.
    - NOT_REALLOCATE_UL: Indicates that the bandwidth control action is to not reallocate
      the bandwidth limit between different VAL users for UL traffic.
```

```
GeoPolAction:
  anyOf:
    - type: string
      enum:
        - ALLOW
        - BLOCK
    - type: string
      description: >
        This string provides forward-compatibility with future extensions to the enumeration
        and is not used to encode content defined in the present version of this API.
  description: |
    Represents the geofencing policy action.
    Possible values are:
    - ALLOW: Indicates that the geofencing policy is to allow.
    - BLOCK: Indicates that the geofencing policy is to block.
```

```
MultiModalFlowType:
  anyOf:
    - type: string
      enum:
        - AUDIO
        - VIDEO
        - VOICE
    - type: string
      description: >
        This string provides forward-compatibility with future extensions to the enumeration
        and is not used to encode content defined in the present version of this API.
  description: |
    Represents the Multi-modal flow type.
    Possible values are:
    - AUDIO: Indicates that the Multi-modal flow type is audio.
    - VIDEO: Indicates that the Multi-modal flow type is video.
    - VOICE: Indicates that the Multi-modal flow type is voice.
```

```
# Data types describing alternative data types or combinations of data types:
#
```

A.7 SDD_BDT API

openapi: 3.0.0

info:

title: SEALDD Background Data Transfer Service
version: 1.0.0
description: |
SEALDD Background Data Transfer Service.
© 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
All rights reserved.

externalDocs:

description: >
3GPP TS 29.548 V19.5.0; Service Enabler Architecture Layer for Verticals (SEAL);
SEAL Data Delivery (SEALDD) Server Services; Stage 3.
url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.548/

servers:

- url: '{apiRoot}/sdd-bdt/v1'
variables:
apiRoot:
default: <https://example.com>
description: apiRoot as defined in clause 6.5 of 3GPP TS 29.549.

security:

- {}
- oAuth2ClientCredentials: []

paths:

/subscriptions:
post:
summary: Request the creation of a BDT Subscription.
operationId: CreateBDTSubsc
tags:
- BDT Subscriptions (Collection)
requestBody:
required: true
content:
application/json:
schema:
\$ref: '#/components/schemas/BdtSubscription'
responses:
'201':
description: >
Created. The BDT Subscription is successfully created and a representation of the
created Individual BDT Subscription resource shall be returned.
content:
application/json:
schema:
\$ref: '#/components/schemas/BdtSubscription'
headers:
Location:
description: >
Contains the URI of the created Individual BDT Subscription resource.
required: true
schema:
type: string
'400':
\$ref: 'TS29122_CommonData.yaml#/components/responses/400'
'401':
\$ref: 'TS29122_CommonData.yaml#/components/responses/401'
'403':
\$ref: 'TS29122_CommonData.yaml#/components/responses/403'
'404':
\$ref: 'TS29122_CommonData.yaml#/components/responses/404'
'411':
\$ref: 'TS29122_CommonData.yaml#/components/responses/411'
'413':
\$ref: 'TS29122_CommonData.yaml#/components/responses/413'
'415':
\$ref: 'TS29122_CommonData.yaml#/components/responses/415'
'429':
\$ref: 'TS29122_CommonData.yaml#/components/responses/429'
'500':
\$ref: 'TS29122_CommonData.yaml#/components/responses/500'
'503':

```

    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
  callbacks:
    BdtNotif:
      '{$request.body#/notifUri}':
        post:
          requestBody:
            required: true
            content:
              application/json:
                schema:
                  $ref: '#/components/schemas/BdtNotif'
  responses:
    '204':
      description: >
        No Content. The BDT Notification is successfully received and acknowledged.
    '307':
      $ref: 'TS29122_CommonData.yaml#/components/responses/307'
    '308':
      $ref: 'TS29122_CommonData.yaml#/components/responses/308'
    '400':
      $ref: 'TS29122_CommonData.yaml#/components/responses/400'
    '401':
      $ref: 'TS29122_CommonData.yaml#/components/responses/401'
    '403':
      $ref: 'TS29122_CommonData.yaml#/components/responses/403'
    '404':
      $ref: 'TS29122_CommonData.yaml#/components/responses/404'
    '411':
      $ref: 'TS29122_CommonData.yaml#/components/responses/411'
    '413':
      $ref: 'TS29122_CommonData.yaml#/components/responses/413'
    '415':
      $ref: 'TS29122_CommonData.yaml#/components/responses/415'
    '429':
      $ref: 'TS29122_CommonData.yaml#/components/responses/429'
    '500':
      $ref: 'TS29122_CommonData.yaml#/components/responses/500'
    '503':
      $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

/subscriptions/{subId}:
  parameters:
    - name: subId
      in: path
      description: >
        Represents the identifier of the Individual BDT Subscription resource.
      required: true
      schema:
        type: string

  get:
    summary: Retrieve an existing Individual BDT Subscription resource.
    operationId: GetIndBDTSubsc
    tags:
      - Individual BDT Subscription (Document)
    responses:
      '200':
        description: >
          OK. The requested Individual BDT Subscription resource shall be returned.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/BdtSubscription'
      '307':
        $ref: 'TS29122_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29122_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29122_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29122_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29122_CommonData.yaml#/components/responses/403'
      '404':

```

```
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '406':
    $ref: 'TS29122_CommonData.yaml#/components/responses/406'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'
```

put:

summary: Request the update of an existing Individual BDT Subscription resource.

operationId: UpdateIndBDTSubsc

tags:

- Individual BDT Subscription (Document)

requestBody:

required: true

content:

application/json:

schema:

\$ref: '#/components/schemas/BdtSubscription'

responses:

'200':

description: >

OK. The Individual BDT Subscription resource is successfully updated and a representation of the updated resource shall be returned in the response body.

content:

application/json:

schema:

\$ref: '#/components/schemas/BdtSubscription'

'204':

description: >

No Content. The Individual BDT Subscription resource is successfully updated and no content is returned in the response body.

'307':

\$ref: 'TS29122_CommonData.yaml#/components/responses/307'

'308':

\$ref: 'TS29122_CommonData.yaml#/components/responses/308'

'400':

\$ref: 'TS29122_CommonData.yaml#/components/responses/400'

'401':

\$ref: 'TS29122_CommonData.yaml#/components/responses/401'

'403':

\$ref: 'TS29122_CommonData.yaml#/components/responses/403'

'404':

\$ref: 'TS29122_CommonData.yaml#/components/responses/404'

'411':

\$ref: 'TS29122_CommonData.yaml#/components/responses/411'

'413':

\$ref: 'TS29122_CommonData.yaml#/components/responses/413'

'415':

\$ref: 'TS29122_CommonData.yaml#/components/responses/415'

'429':

\$ref: 'TS29122_CommonData.yaml#/components/responses/429'

'500':

\$ref: 'TS29122_CommonData.yaml#/components/responses/500'

'503':

\$ref: 'TS29122_CommonData.yaml#/components/responses/503'

default:

\$ref: 'TS29122_CommonData.yaml#/components/responses/default'

patch:

summary: Request the modification of an existing Individual BDT Subscription resource.

operationId: ModifyIndBDTSubsc

tags:

- Individual BDT Subscription (Document)

requestBody:

required: true

content:

application/merge-patch+json:

schema:

\$ref: '#/components/schemas/BdtSubscriptionPatch'

responses:

'200':

description: >

OK. The Individual BDT Subscription resource is successfully modified and a

```

    representation of the updated resource shall be returned in the response body.
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/BdtSubscription'
  '204':
    description: >
      No Content. The Individual BDT Subscription resource is successfully
      modified and no content is returned in the response body.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '411':
    $ref: 'TS29122_CommonData.yaml#/components/responses/411'
  '413':
    $ref: 'TS29122_CommonData.yaml#/components/responses/413'
  '415':
    $ref: 'TS29122_CommonData.yaml#/components/responses/415'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

delete:

```

summary: Request the deletion of an existing Individual BDT Subscription resource.
operationId: DeleteIndBDTSubsc
tags:
  - Individual BDT Subscription (Document)
responses:
  '204':
    description: >
      No Content. The Individual BDT Subscription resource is successfully deleted.
  '307':
    $ref: 'TS29122_CommonData.yaml#/components/responses/307'
  '308':
    $ref: 'TS29122_CommonData.yaml#/components/responses/308'
  '400':
    $ref: 'TS29122_CommonData.yaml#/components/responses/400'
  '401':
    $ref: 'TS29122_CommonData.yaml#/components/responses/401'
  '403':
    $ref: 'TS29122_CommonData.yaml#/components/responses/403'
  '404':
    $ref: 'TS29122_CommonData.yaml#/components/responses/404'
  '429':
    $ref: 'TS29122_CommonData.yaml#/components/responses/429'
  '500':
    $ref: 'TS29122_CommonData.yaml#/components/responses/500'
  '503':
    $ref: 'TS29122_CommonData.yaml#/components/responses/503'
  default:
    $ref: 'TS29122_CommonData.yaml#/components/responses/default'

```

components:

```

securitySchemes:
  oAuth2ClientCredentials:
    type: oauth2
    flows:
      clientCredentials:
        tokenUrl: '{tokenUrl}'
        scopes: {}

```

schemas:

```
#
# STRUCTURED DATA TYPES
#

BdtSubscription:
  description: >
    Represents a SEALDD BDT Subscription.
  type: object
  properties:
    valServiceId:
      type: string
    valUeIds:
      type: array
      items:
        type: string
      minItems: 1
    valGroupId:
      type: string
    timeWnd:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
    area:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
    policyGuidances:
      type: array
      items:
        $ref: 'TS29549_SS_NetworkResourceAdaptation.yaml#/components/schemas/PolicyGuidance'
      minItems: 1
    dataVolume:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/UsageThreshold'
    notifUri:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  oneOf:
    - required: [valUeIds]
    - required: [valGroupId]
  required:
    - valServiceId
    - notifUri
    - dataVolume

BdtSubscriptionPatch:
  description: >
    Represents the parameters to request the modification of a SEALDD BDT Subscription.
  type: object
  properties:
    timeWnd:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
    area:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/LocationArea5G'
    policyGuidances:
      type: array
      items:
        $ref: 'TS29549_SS_NetworkResourceAdaptation.yaml#/components/schemas/PolicyGuidance'
      minItems: 1
    dataVolume:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/UsageThreshold'
    notifUri:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/Uri'

BdtNotif:
  description: >
    Represents a SEALDD BDT Subscription notification.
  type: object
  properties:
    subId:
      type: string
    reports:
      type: array
      items:
        $ref: '#/components/schemas/BdtReport'
      minItems: 1
  required:
    - subId
    - reports

BdtReport:
  description: >
```

```
    Represents a BDT report.
  type: object
  properties:
    valueIds:
      type: array
      items:
        type: string
      minItems: 1
    valGroupId:
      type: string
    timeWnd:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
    quality:
      $ref:
        'TS29548_SDD_TransmissionQualityMeasurement.yaml#/components/schemas/TransQualMeasData'
  not:
    required: [valueIds, valGroupId]

#
# SIMPLE DATA TYPES
#

#
# ENUMERATIONS
#

# Data types describing alternative data types or combinations of data types:
#
```

Annex B (informative): Withdrawn API versions

B.1 General

This Annex lists withdrawn API versions of the APIs defined in the present specification. 3GPP TS 29.501 [3] clause 4.3.1.6 describes the withdrawal of API versions.

B.2 SDD_Transmission API

The API versions listed in table B.2-1 are withdrawn for the SDD_Transmission API.

Table B.2-1: Withdrawn API versions of the SDD_Transmission service

API version number	Remarks

B.3 SDD_DataStorage API

The API versions listed in table B.3-1 are withdrawn for the SDD_DataStorage API.

Table B.3-1: Withdrawn API versions of the SDD_DataStorage service

API version number	Remarks

B.4 SDD_DDContext API

The API versions listed in table B.4-1 are withdrawn for the SDD_DDContext API.

Table B.4-1: Withdrawn API versions of the SDD_DDContext service

API version number	Remarks

B.5 SDD_TransmissionQualityMeasurement API

The API versions listed in table B.5-1 are withdrawn for the SDD_TransmissionQualityMeasurement API.

Table B.5-1: Withdrawn API versions of the SDD_TransmissionQualityMeasurement service

API version number	Remarks

B.6 SDD_PolicyConfiguration API

The API versions listed in table B.6-1 are withdrawn for the SDD_PolicyConfiguration API.

Table B.6-1: Withdrawn API versions of the SDD_PolicyConfiguration service

API version number	Remarks

B.7 SDD_BDT API

The API versions listed in table B.7-1 are withdrawn for the SDD_BDT API.

Table B.7-1: Withdrawn API versions of the SDD_BDT service

API version number	Remarks

Annex C (informative): Change history

Change history							
Date	Meeting	TDoc	CR	Rev	Cat	Subject/Comment	New version
2023-03	CT3#126	C3-230474	-	-	-	The skeleton for the new SEADD Server Services TS	0.0.0
2023-04	CT3#127-e	C3-231509	-	-	-	Inclusion of C3-231212, C3-231568, C3-231214 and C3-231569.	0.1.0
2023-06	CT3#128	C3-232590	-	-	-	Inclusion of C3-232513, C3-232524, C3-232525, C3-232526 and C3-232527.	0.2.0
2023-09	CT3#129	C3-233737	-	-	-	Inclusion of C3-233655, C3-233656, C3-233657, C3-233658, C3-233659, C3-233660, C3-233715, C3-233716, C3-233717, C3-233718 and C3-233719.	0.3.0
2023-10	CT3#130	C3-234660	-	-	-	Inclusion of C3-234127, C3-234128, C3-234129, C3-234499, C3-234500, C3-234666 and C3-234670.	0.4.0
2023-11	CT3#131	C3-235463	-	-	-	Inclusion of C3-235082, C3-235085, C3-235086, C3-235087, C3-235553, C3-235554 and C3-235625.	0.5.0
2023-12	CT#102	CP-233289				Presentation to TSG CT for information.	1.0.0
2024-03	CT3#133	C3-241654	-	-	-	Inclusion of C3-241313, C3-241531, C3-241619, C3-241676 and C3-241691.	1.1.0
2024-03	CT#103	CP-240214				Presentation to TSG CT for approval.	2.0.0
2024-03	CT#103	CP-240214				Approved by TSG CT.	18.0.0
2024-06	CT#104	CP-241108	0001	1	F	Corrections to SDD_DataStorage API	18.1.0
2024-06	CT#104	CP-241108	0002		F	Corrections to SDD_DDContext API	18.1.0
2024-06	CT#104	CP-241108	0003	1	F	Corrections to SDD_PolicyConfiguration API	18.1.0
2024-06	CT#104	CP-241108	0004	1	F	Corrections to SDD_TransmissionQualityMeasurement API	18.1.0
2024-06	CT#104	CP-241108	0005	1	B	The support of a timestamp indication in notification reports	18.1.0
2024-06	CT#104	CP-241108	0006		F	Various corrections to references	18.1.0
2024-06	CT#104	CP-241083	0007		F	Correct the reference to HTTP error status codes.	18.1.0
2024-06	CT#104	CP-241108	0008	2	F	Corrections to SDD_DataStorage data model and open API	18.1.0
2024-06	CT#104	CP-241108	0009	1	F	Essential corrections to the Historical Transmission Quality Measurement Report(s) retrieval procedure	18.1.0
2024-06	CT#104	CP-241108	0010	1	F	Various essential corrections to the SDD_TransmissionQualityMeasurement API	18.1.0
2024-06	CT#104	CP-241108	0011	1	F	Various essential corrections to the SEALDD APIs	18.1.0
2024-06	CT#104	CP-241086	0012	-	F	Update of info and externalDocs fields	18.1.0
2024-09	CT#105	CP-242114	0013	-	F	Correct presence field for some of the attributes	19.0.0
2024-12	CT#106	CP-243094	0014	2	B	Quality optimization policy support in SDD_PolicyConfiguration API	19.1.0
2024-12	CT#106	CP-243094	0015	1	B	Support SEALDD client connection status monitoring for VAL applications	19.1.0
2024-12	CT#106	CP-243094	0016	1	B	SDD_BDT API definition	19.1.0
2024-12	CT#106	CP-243094	0017	2	B	SDD_BDT OpenAPI file	19.1.0
2024-12	CT#106	CP-243094	0018	1	B	SDD_BDT Service operations	19.1.0
2024-12	CT#106	CP-243094	0019		B	Support SEALDD enabled congestion monitoring for VAL applications	19.1.0
2024-12	CT#106	CP-243094	0020	1	B	Support content breakpoint information for downlink delivery during DD context transfer	19.1.0
2024-12	CT#106	CP-243094	0021	1	B	Support the storage, retrieval and management of the same Application Data by multiple SEALDD Servers	19.1.0
2024-12	CT#106	CP-243094	0022		F	Corrections related to updated SEALDD terminology	19.1.0
2024-12	CT#106	CP-243094	0023	1	F	Naming alignment for the SDD_DataStorage_Query service operation	19.1.0
2024-12	CT#106	CP-243094	0024	1	B	Geofencing policies	19.1.0
2024-12	CT#106	CP-243133	0025	1	B	SEALDD policy configuration for multi-modal flows	19.1.0
2024-12	CT#106	CP-243094	0026	1	B	Complete the support of the retrieval of the same Application Data when stored in multiple SEALDD Servers	19.1.0
2024-12	CT#106	CP-243131	0028		A	Correcting the content of the Connection Status Notification request body	19.1.0
2024-12	CT#106	CP-243094	0029	1	B	Sdd_InformACREvent API implementation	19.1.0
2024-12	CT#106	CP-243094	0030	1	B	Non-3GPP RAT policy in SDD_PolicyConfiguration Service API	19.1.0
2024-12	CT#106	CP-243094	0031	1	B	Temporal policy in the SDD_PolicyConfiguration API	19.1.0
2024-12	CT#106	CP-243094	0032		B	SDD_BDT API Annex	19.1.0
2024-12	CT#106	CP-243133	0033	1	B	Support of QoS measurement for Multi-Modal traffic in SEALDD service	19.1.0
2024-12	CT#106	CP-243147	0034		F	Update of info and externalDocs fields	19.1.0
2025-03	CT#107	CP-250118	0036	1	F	Updates and corrections to the SDD_BDT API	19.2.0
2025-03	CT#107	CP-250118	0037	1	F	Various updates and corrections	19.2.0
2025-03	CT#107	CP-250116	0038	1	B	Support SEALDD enabled XR data transmission	19.2.0
2025-03	CT#107	CP-250116	0039	1	F	Various updates and corrections	19.2.0
2025-03	CT#107	CP-250115	0040	1	B	Support SEALDD enabled transmission for S&F Satellite operation	19.2.0
2025-03	CT#107	CP-250129	0041		F	Update of info and externalDocs fields	19.2.0
2025-06	CT#108	CP-251106	0042	1	B	Updates to the SEALDD enabled XR data transmission support	19.3.0
2025-06	CT#108	CP-251106	0043	3	B	Complete the definition of the Synchronization policy of the Multi-modal SEALDD policy	19.3.0

2025-06	CT#108	CP-251106	0044		B	Updates to the SEALDD policy management to support slice related services	19.3.0
2025-06	CT#108	CP-251106	0045	3	B	Define the Multi-modal flows alignment policy	19.3.0
2025-06	CT#108	CP-251106	0046	3	B	Define the Multi-modal UE-to-UE policy	19.3.0
2025-06	CT#108	CP-251119	0047	1	F	Correction on Non-3GPP access functionality	19.3.0
2025-06	CT#108	CP-251084	0048	1	F	Updates to obsoleted IETF RFC	19.3.0
2025-06	CT#108	CP-251106	0049		B	Terminology alignments for XR data transmission	19.3.0
2025-06	CT#108	CP-251119	0050	1	B	Non-3GPP policy update in SEALDD Server Policy Configuration Service	19.3.0
2025-06	CT#108	CP-251119	0051	1	B	Non-3GPP measurement support in SDD Transmission API	19.3.0
2025-06	CT#108	CP-251231	0052		F	Update of info and externalDocs fields	19.3.0
2025-09	CT#109	CP-252109	0054		F	Corrections to the Non3gppAccessMeasPol data structure	19.4.0
2025-09	CT#109	CP-252099	0055	1	B	Complete the definition of the Synchronization policy of the Multi-modal SEALDD policy	19.4.0
2025-09	CT#109	CP-252099	0056	1	B	Complete the definition of the UE-to-UE policy of the Multi-modal SEALDD policy	19.4.0
2025-09	CT#109	CP-252114	0057		F	Update of info and externalDocs fields	19.4.0
2025-12	CT#110	CP-253041	0058	1	B	Complete the definition of the multi-modal flow type within the Synchronization policy	19.5.0
2025-12	CT#110	CP-253041	0059		B	Updates to the definition of the UE-to-UE policy of the Multi-modal SEALDD policy	19.5.0
2025-12	CT#110	CP-253041	0062	1	B	Multimodal sync policy threshold handling	19.5.0
2025-12	CT#110	CP-253041	0063	1	F	DurationMillisec Common OpenAPI update	19.5.0
2025-12	CT#110	CP-253026	0064	1	F	Correction of incorrect references	19.5.0
2025-12	CT#110	CP-253036	0065	3	F	Removal of unused references	19.5.0
2025-12	CT#110	CP-253041	0066	1	B	Multimodal handling update	19.5.0
2025-12	CT#110	CP-253027	0067		F	Using the reference to OpenAPI specifications	19.5.0
2025-12	CT#110	CP-253065	0068		F	Update of info and externalDocs fields	19.5.0

History

Version	Date	Status
V19.4.0	February 2026	Publication
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