ETSI TS 129 548 V18.0.0 (2024-05)

5G;
Service Enabler Architecture Layer for Verticals (SEAL);
SEAL Data Delivery (SEALDD) Server Services;
Stage 3
(3GPP TS 29.548 version 18.0.0 Release 18)

Reference
DTS/TSGC-0329548vi00

Keywords
5G

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - APE 7112B
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° w061004871

Intellectual Property Rights

Essential patents

IPRs essential or potentially essential to normative deliverables may have been declared to ETSI. The declarations pertaining to these essential IPRs, if any, are publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (https://ipr.etsi.org/).

Pursuant to the ETSI Directives including the ETSI IPR Policy, no investigation regarding the essentiality of IPRs, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Trademarks

The present document may include trademarks and/or tradenames which are asserted and/or registered by their owners. ETSI claims no ownership of these except for any which are indicated as being the property of ETSI, and conveys no right to use or reproduce any trademark and/or tradename. Mention of those trademarks in the present document does not constitute an endorsement by ETSI of products, services or organizations associated with those trademarks.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are trademarks of ETSI registered for the benefit of its Members. **3GPP™** and **LTE™** are trademarks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners. **oneM2M™** logo is a trademark of ETSI registered for the benefit of its Members and of the oneM2M Partners. **GSM**® and the GSM logo are trademarks registered and owned by the GSM Association.

Legal Notice

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

The present document may refer to technical specifications or reports using their 3GPP identities. These shall be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between 3GPP and ETSI identities can be found under https://webapp.etsi.org/key/queryform.asp.

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

Contents

Intellectual Property Rights 2
Legal Notice 2
Modal verbs terminology 2
Foreword 10
1 Scope 12
2 References 13
3 Definitions, symbols and abbreviations 14
3.1 Definitions 14
3.2 Symbols 14
3.3 Abbreviations 14
4 Overview 15
5 Services offered by the SEALDD Server 16
5.1 Introduction 16
5.2 SDD_Transmission Service 17
5.2.1 Service Description 17
5.2.2 Service Operations 17
5.2.2.1 Introduction 17
5.2.2.2 SDD_Transmission_Request 17
5.2.2.2.1 General 17
5.2.2.2.2 SEALDD Transmission Request 17
5.2.2.3 SDD_Transmission_ConnStatusSubscribe 18
5.2.2.3.1 General 18
5.2.2.3.2 SEALDD Connection Status Subscription Creation 18
5.2.2.3.3 SEALDD Connection Status Subscription Update 19
5.2.2.3.4 SEALDD Connection Status Subscription Deletion 19
5.2.2.4 SDD_Transmission_ConnStatusNotify 20
5.2.2.4.1 General 20
5.2.2.4.2 SEALDD Connection Status Notification 20
5.3 SDD_DataStorage Service 21
5.3.1 Service Description 21
5.3.2 Service Operations 21
5.3.2.1 Introduction 21
5.3.2.2 SDD_DataStorage_Create 21
5.3.2.2.1 General 21
5.3.2.2.2 Data Storage Creation 22
5.3.2.2.3 Data Management and/or Status Information Notification 22
5.3.2.3 SDD_DataStorage_Manage 23
5.3.2.3.1 General 23
5.3.2.3.2 Data Storage Update 23
5.3.2.3.3 Data Storage Deletion 24
5.3.2.4 SDD_DataStorage_Query 24
5.3.2.4.1 General 24
5.3.2.4.2 Data Storage(s) Query 24
5.3.2.5 SDD_DataStorage_DelRequest 25
5.3.2.5.1 General 25
5.3.2.5.2 SEALDD Data Storage Delivery Request 25
5.3.2.6 SDD_DataStorage_EstablishDelConn 26
5.3.2.6.1 General 26
5.3.2.6.2 SEALDD Data Storage Delivery Connection Establishment Request 26
5.3.2.7 SDD_DataStorage_DelSubscribe 27
5.3.2.7.1 General 27
5.3.2.7.2 Data Storage Delivery Subscription Creation 27
5.3.2.7.3 Data Storage Delivery Subscription Update 27

5.3.2.7.4 Data Storage Delivery Subscription Deletion 28
5.3.2.8 SDD_DataStorage_DelNotify 29
5.3.2.8.1 General 29
5.3.2.8.2 Data Storage Delivery Notification 29
5.4 SDD_DDContext Service 30
5.4.1 Service Description 30
5.4.2 Service Operations 30
5.4.2.1 Introduction 30
5.4.2.2 SDD_DDContext_Push 30
5.4.2.2.1 General 30
5.4.2.2.2 DD Context Push 30
5.4.2.3 SDD_DDContext_Pull 31
5.4.2.3.1 General 31
5.4.2.3.2 DD Context Pull 31
5.5 SDD_TransmissionQualityMeasurement 32
5.5.1 Service Description 32
5.5.2 Service Operations 32
5.5.2.1 Introduction 32
5.5.2.2 SDD_TransmissionQualityMeasurement_Subscribe 32
5.5.2.2.1 General 32
5.5.2.2.2 Transmission Quality Measurement Subscription Creation 32
5.5.2.3 SDD_TransmissionQualityMeasurement_Update 33
5.5.2.3.1 General 33
5.5.2.3.2 Transmission Quality Measurement Subscription Update 33
5.5.2.4 SDD_TransmissionQualityMeasurement_Delete 34
5.5.2.4.1 General 34
5.5.2.4.2 Transmission Quality Measurement Subscription Deletion 34
5.5.2.5 SDD_TransmissionQualityMeasurement_Notify 35
5.5.2.5.1 General 35
5.5.2.5.2 Transmission Quality Measurement Notification 35
5.5.2.4 SDD_TransmissionQualityMeasurement_Request 36
5.5.2.4.1 General 36
5.5.2.4.2 Transmission Quality Measurement Retrieval 36
5.6 SDD_PolicyConfiguration 37
5.6.1 Service Description 37
5.6.2 Service Operations 37
5.6.2.1 Introduction 37
5.6.2.2 SDD_PolicyConfiguration_Create 37
5.6.2.2.1 General 37
5.6.2.2.2 Policy Configuration Creation 37
5.6.2.3 SDD_PolicyConfiguration_Update 38
5.6.2.3.1 General 38
5.6.2.3.2 Policy Configuration Update 38
5.6.2.4 SDD_PolicyConfiguration_Delete 39
5.6.2.4.1 General 39
5.6.2.4.2 Policy Configuration Deletion 39

6 API Definitions 40
6.1 SDD_Transmission Service API 40
6.1.1 Introduction 40
6.1.2 Usage of HTTP 40
6.1.3 Resources 40
6.1.3.1 Overview 40
6.1.3.2 Resource: Connection Status Subscriptions 41
6.1.3.2.1 Description 41
6.1.3.2.2 Resource Definition 41
6.1.3.2.3 Resource Standard Methods 41
6.1.3.2.3.1 POST 41
6.1.3.2.4 Resource Custom Operations 42
6.1.3.3 Resource: Individual Connection Status Subscription 42
6.1.3.3.1 Description 42
6.1.3.3.2 Resource Definition 42

6.1.3.3.3 Resource Standard Methods 42
6.1.3.3.3.1 GET 42
6.1.3.3.3.2 PUT 43
6.1.3.3.3.3 PATCH 44
6.1.3.3.3.4 DELETE 46
6.1.3.3.4 Resource Custom Operations 46
6.1.4 Custom Operations without associated resources 47
6.1.4.1 Overview 47
6.1.4.2 Operation: RequestTrans 47
6.1.4.2.1 Description 47
6.1.4.2.2 Operation Definition 47
6.1.5 Notifications 48
6.1.5.1 General 48
6.1.5.2 Connection Status Notification 49
6.1.5.2.1 Description 49
6.1.5.2.2 Target URI 49
6.1.5.2.3 Standard Methods 49
6.1.6 Data Model 50
6.1.6.1 General 50
6.1.6.2 Structured data types 51
6.1.6.2.1 Introduction 51
6.1.6.2.2 Type: TransReq 52
6.1.6.2.3 Type: TransResp 52
6.1.6.2.4 Type: ConnInfo 53
6.1.6.2.5 Type: QosInfo 53
6.1.6.2.6 Type: ValServBdw 53
6.1.6.2.7 Type: ValUsersBdw 54
6.1.6.2.8 Type: ConnStatusSubsc 54
6.1.6.2.9 Type: ConnStatusSubscPatch 54
6.1.6.2.10 Type: ConnStatusNotif 55
6.1.6.2.11 Type: ConnStatusReport 55
6.1.6.2.12 Type: ConnEstabData 55
6.1.6.3 Simple data types and enumerations 55
6.1.6.3.1 Introduction 55
6.1.6.3.2 Simple data types 55
6.1.6.3.3 Enumeration: ConnStatusEvent 56
6.1.6.3.4 Enumeration: TransType 56
6.1.6.4 Data types describing alternative data types or combinations of data types 56
6.1.6.5 Binary data 56
6.1.6.5.1 Binary Data Types 56
6.1.7 Error Handling 56
6.1.7.1 General 56
6.1.7.2 Protocol Errors 56
6.1.7.3 Application Errors 56
6.1.8 Feature negotiation 57
6.1.9 Security 57
6.2 SDD_DataStorage Service API 58
6.2.1 Introduction 58
6.2.2 Usage of HTTP 58
6.2.3 Resources 58
6.2.3.1 Overview 58
6.2.3.2 Resource: Data Storages 60
6.2.3.2.1 Description 60
6.2.3.2.2 Resource Definition 60
6.2.3.2.3 Resource Standard Methods 60
6.2.3.2.3.1 GET 60
6.2.3.2.3.2 POST 61
6.2.3.2.4 Resource Custom Operations 62
6.2.3.3 Resource: Individual Data Storage 62
6.2.3.3.1 Description 62
6.2.3.3.2 Resource Definition 62
6.2.3.3.3 Resource Standard Methods 62

6.2.3.3.3.1 GET 62
6.2.3.3.3.2 PUT 63
6.2.3.3.3.3 PATCH 64
6.2.3.3.3.4 DELETE 66
6.2.3.3.4 Resource Custom Operations 66
6.2.3.4 Resource: Data Storage Delivery Subscriptions 67
6.2.3.4.1 Description 67
6.2.3.4.2 Resource Definition 67
6.2.3.4.3 Resource Standard Methods 67
6.2.3.4.3.2 POST 67
6.2.3.4.4 Resource Custom Operations 68
6.2.3.5 Resource: Individual Data Storage Delivery Subscription 68
6.2.3.5.1 Description 68
6.2.3.5.2 Resource Definition 68
6.2.3.5.3 Resource Standard Methods 68
6.2.3.5.3.1 GET 68
6.2.3.5.3.2 PUT 69
6.2.3.5.3.3 PATCH 70
6.2.3.5.3.4 DELETE 71
6.2.3.5.4 Resource Custom Operations 72
6.2.4 Custom Operations without associated resources 72
6.2.4.1 Overview 72
6.2.4.2 Operation: DataDeliveryRequest 73
6.2.4.2.1 Description 73
6.2.4.2.2 Operation Definition 73
6.2.4.3 Operation: EstablishDelConn 74
6.2.4.3.1 Description 74
6.2.4.3.2 Operation Definition 74
6.2.5 Notifications 75
6.2.5.1 General 75
6.2.5.2 Data Management and/or Status Information Notification 76
6.2.5.2.1 Description 76
6.2.5.2.2 Target URI 76
6.2.5.2.3 Standard Methods 76
6.2.5.3 Data Storage Delivery Notification 77
6.2.5.3.1 Description 77
6.2.5.3.2 Target URI 77
6.2.5.3.3 Standard Methods 77
6.2.6 Data Model 78
6.2.6.1 General 78
6.2.6.2 Structured data types 80
6.2.6.2.1 Introduction 80
6.2.6.2.2 Type: DataStorage 80
6.2.6.2.3 Type: ReservReqData 80
6.2.6.2.4 Type: ReservRespData 80
6.2.6.2.5 Type: DataStoragePatch 81
6.2.6.2.6 Type: AccessCtrlPolicy 81
6.2.6.2.7 Type: DataMngtSubsc 81
6.2.6.2.8 Type: DataMngtNotif 82
6.2.6.2.9 Type: DataAccessStats 82
6.2.6.2.10 Type: DataMngtStats 83
6.2.6.2.11 Type: DataDelSubsc 83
6.2.6.2.12 Type: DataDelSubscPatch 83
6.2.6.2.13 Type: DataDelNotif 84
6.2.6.2.14 Type: DataDelReq 84
6.2.6.2.15 Type: DelConnEstabReq 84
6.2.6.2.16 Type: DelConnEstabResp 85
6.2.6.3 Simple data types and enumerations 85
6.2.6.3.1 Introduction 85
6.2.6.3.2 Simple data types 85
6.2.6.3.3 Enumeration: EntityName 85
6.2.6.3.4 Enumeration: DataAccessRight 85

6.2.6.3.5 Enumeration: DataMngtEvent 86
6.2.6.4 Data types describing alternative data types or combinations of data types 86
6.2.6.4.1 Type: DataStorageReq 86
6.2.6.5 Binary data 86
6.2.6.5.1 Binary Data Types 86
6.2.7 Error Handling 86
6.2.7.1 General 86
6.2.7.2 Protocol Errors 86
6.2.7.3 Application Errors 86
6.2.8 Feature negotiation 87
6.2.9 Security 87
6.3 SDD_DDContext Service API 88
6.3.1 Introduction 88
6.3.2 Usage of HTTP 88
6.3.3 Resources 88
6.3.3.1 Overview 88
6.3.3.2 Resource: DD Contexts 89
6.3.3.2.1 Description 89
6.3.3.2.2 Resource Definition 89
6.3.3.2.3 Resource Standard Methods 89
6.3.3.2.3.1 POST 89
6.3.3.2.3.2 GET 90
6.3.3.2.4 Resource Custom Operations 92
6.3.4 Custom Operations without associated resources 92
6.3.5 Notifications 92
6.3.6 Data Model 92
6.3.6.1 General 92
6.3.6.2 Structured data types 93
6.3.6.2.1 Introduction 93
6.3.6.2.2 Type: DdContext 93
6.3.6.2.3 Type: TranspLayerContext 93
6.3.6.2.4 Type: DdContextPushReq 93
6.3.6.2.5 Type: DdContextResp 94
6.3.6.2.6 Type: SddUuContext 94
6.3.6.2.7 Type: SddSContext 95
6.3.6.3 Simple data types and enumerations 95
6.3.6.3.1 Introduction 95
6.3.6.3.2 Simple data types 95
6.3.6.4 Data types describing alternative data types or combinations of data types 95
6.3.6.5 Binary data 95
6.3.6.5.1 Binary Data Types 95
6.3.7 Error Handling 96
6.3.7.1 General 96
6.3.7.2 Protocol Errors 96
6.3.7.3 Application Errors 96
6.3.8 Feature negotiation 96
6.3.9 Security 96
6.4 SDD_TransmissionQualityMeasurement Service API 97
6.4.1 Introduction 97
6.4.2 Usage of HTTP 97
6.4.3 Resources 97
6.4.3.1 Overview 97
6.4.3.2 Resource: Transmission Quality Measurement Subscriptions 98
6.4.3.2.1 Description 98
6.4.3.2.2 Resource Definition 98
6.4.3.2.3 Resource Standard Methods 98
6.4.3.2.3.1 POST 98
6.4.3.2.4 Resource Custom Operations 99
6.4.3.3 Resource: Individual Transmission Quality Measurement Subscription 99
6.4.3.3.1 Description 99
6.4.3.3.2 Resource Definition 99
6.4.3.3.3 Resource Standard Methods 100

6.4.3.3.3.1 GET 100
6.4.3.3.3.2 PUT 101
6.4.3.3.3.3 PATCH 102
6.4.3.3.3.4 DELETE 103
6.4.3.3.4 Resource Custom Operations 104
6.4.3.4 Resource: Historical Transmission Quality Measurement Reports 104
6.4.3.4.1 Description 104
6.4.3.4.2 Resource Definition 104
6.4.3.4.3 Resource Standard Methods 105
6.4.3.4.3.1 GET 105
6.4.3.4.4 Resource Custom Operations 106
6.4.4 Custom Operations without associated resources 106
6.4.5 Notifications 106
6.4.5.1 General 106
6.4.5.2 Transmission Quality Measurement Notification 107
6.4.5.2.1 Description 107
6.4.5.2.2 Target URI 107
6.4.5.2.3 Standard Methods 107
6.4.5.2.3.1 POST 107
6.4.6 Data Model 108
6.4.6.1 General 108
6.4.6.2 Structured data types 109
6.4.6.2.1 Introduction 109
6.4.6.2.2 Type: TransQualMeasSubsc 110
6.4.6.2.3 Type: TransQualMeasReq 111
6.4.6.2.4 Type: TransQualMeasSubscPatch 111
6.4.6.2.5 Type: TransQualMeasNotif 112
6.4.6.2.6 Type: TransQualMeasReport 112
6.4.6.2.7 Type: TransQualMeasCriteria 113
6.4.6.2.8 Type: TransQualMeasData 114
6.4.6.2.9 Type: HistTransQualMeasReports 117
6.4.6.2.10 Type: TransQualMeasCriteriaSet 117
6.4.6.3 Simple data types and enumerations 117
6.4.6.3.1 Introduction 117
6.4.6.3.2 Simple data types 117
6.4.6.3.3 Enumeration: MeasurementId 117
6.4.6.3.4 Enumeration: RepGranularity 118
6.4.6.4 Data types describing alternative data types or combinations of data types 118
6.4.6.5 Binary data 118
6.4.6.5.1 Binary Data Types 118
6.4.7 Error Handling 118
6.4.7.1 General 118
6.4.7.2 Protocol Errors 118
6.4.7.3 Application Errors 118
6.4.8 Feature negotiation 119
6.4.9 Security 119
6.5 SDD_PolicyConfiguration Service API 120
6.5.1 Introduction 120
6.5.2 Usage of HTTP 120
6.5.3 Resources 120
6.5.3.1 Overview 120
6.5.3.2 Resource: Policy Configurations 121
6.5.3.2.1 Description 121
6.5.3.2.2 Resource Definition 121
6.5.3.2.3 Resource Standard Methods 121
6.5.3.2.3.1 POST 121
6.5.3.2.4 Resource Custom Operations 122
6.5.3.3 Resource: Individual Policy Configuration 122
6.5.3.3.1 Description 122
6.5.3.3.2 Resource Definition 122
6.5.3.3.3 Resource Standard Methods 122
6.5.3.3.3.1 GET 122

6.5.3.3.3.2 PUT 123
6.5.3.3.3.3 PATCH 124
6.5.3.3.3.4 DELETE 126
6.5.3.3.4 Resource Custom Operations 126
6.5.4 Custom Operations without associated resources 127
6.5.5 Notifications 127
6.5.6 Data Model 127
6.5.6.1 General 127
6.5.6.2 Structured data types 127
6.5.6.2.1 Introduction 127
6.5.6.2.2 Type: PolicyConfig 128
6.5.6.2.3 Type: PolicyConfigPatch 128
6.5.6.2.4 Type: SealddPolicy 128
6.5.6.2.5 Type: QualGuarPolicy 129
6.5.6.2.6 Type: QualGuarThresh 129
6.5.6.3 Simple data types and enumerations 129
6.5.6.3.1 Introduction 129
6.5.6.3.2 Simple data types 129
6.5.6.3.3 Enumeration: BdwCtrlPolicy 129
6.5.6.4 Data types describing alternative data types or combinations of data types 130
6.5.6.5 Binary data 130
6.5.6.5.1 Binary Data Types 130
6.5.7 Error Handling 130
6.5.7.1 General 130
6.5.7.2 Protocol Errors 130
6.5.7.3 Application Errors 130
6.5.8 Feature negotiation 130
6.5.9 Security 131
7 Using Common API Framework 132
Annex A (normative): OpenAPI specification 133
A.1 General 133
A.2 SDD_Transmission API 134
A.3 SDD_DataStorage API 143
A.4 SDD_DDContext API 157
A.5 SDD_TransmissionQualityMeasurement API 161
A.6 SDD_PolicyConfiguration API 171
Annex B (informative): Withdrawn API versions 176
B.1 General 176
B.2 SDD_Transmission API 176
B.3 SDD_DataStorage API 176
B.4 SDD_DDContext API 176
B.5 SDD_TransmissionQualityMeasurement API 176
B.6 SDD_PolicyConfiguration API 177
Annex C (informative): Change history 178
History 179

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] IETF RFC 9113: "HTTP/2".

[13] IETF RFC 8259: "The JavaScript Object Notation (JSON) Data Interchange Format".

[14] IETF RFC 9457: "Problem Details for HTTP APIs".

[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".

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].

DD	Data Delivery
E2E	End to End
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 Regular or URLLC application data transmission management;
  - SEALDD enabled data storage management;
  - SEALDD enabled data transmission quality measurement management; and
  - SEALDD policy configuration 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:

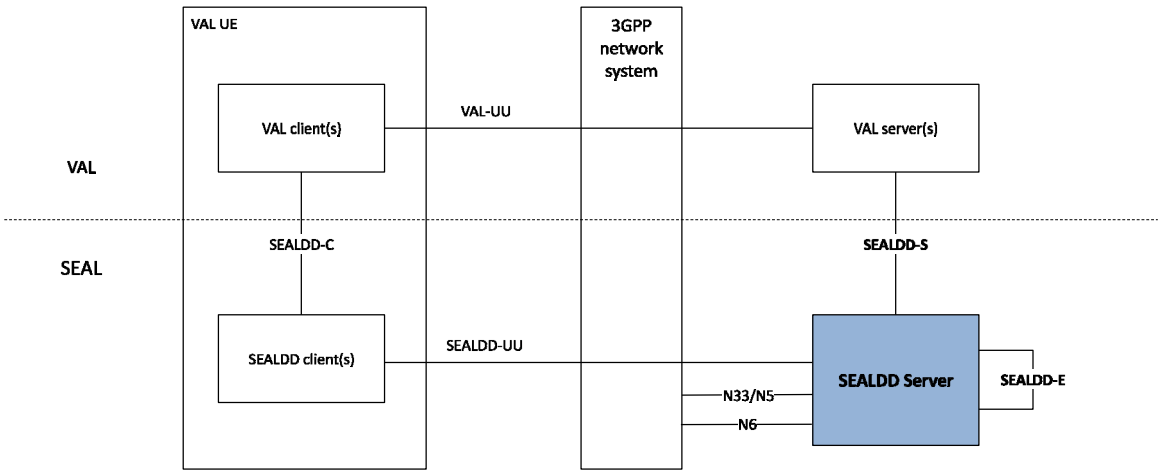

Figure 4-1: SEALDD Enabler Layer functional model

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

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

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 or URLLC 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 regular or URLLC 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 SEALDD connection status event(s) notifications.	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 Regular or URLLC 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 Regular or URLLC application data transmission (see also clauses 9.2 and 9.3 of 3GPP°TS°23.433°[7]).

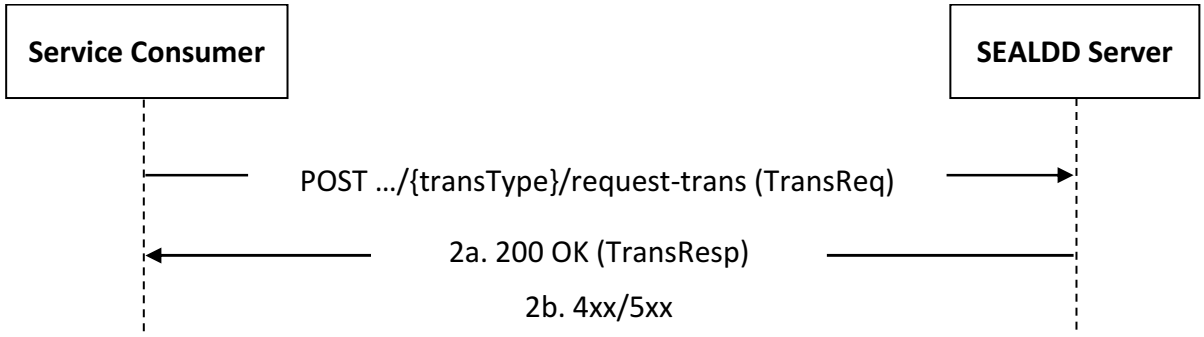

Figure 5.2.2.2.2-1: Procedure for SEALDD Transmission Request

1. In order to request SEALDD enabled Regular or URLLC 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; or

   - "urllc", when URLLC application data transmission is requested.

2a. Upon success, the SEALDD Server shall respond with an HTTP "200 OK" status code with the response body containing 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]).

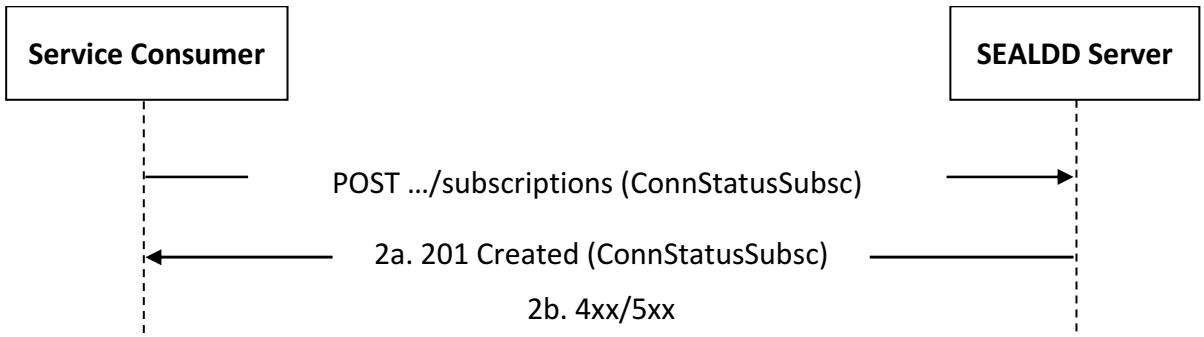

Figure 5.2.2.3.2-1: Procedure for SEALDD Connection Status Subscription Creation

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]).

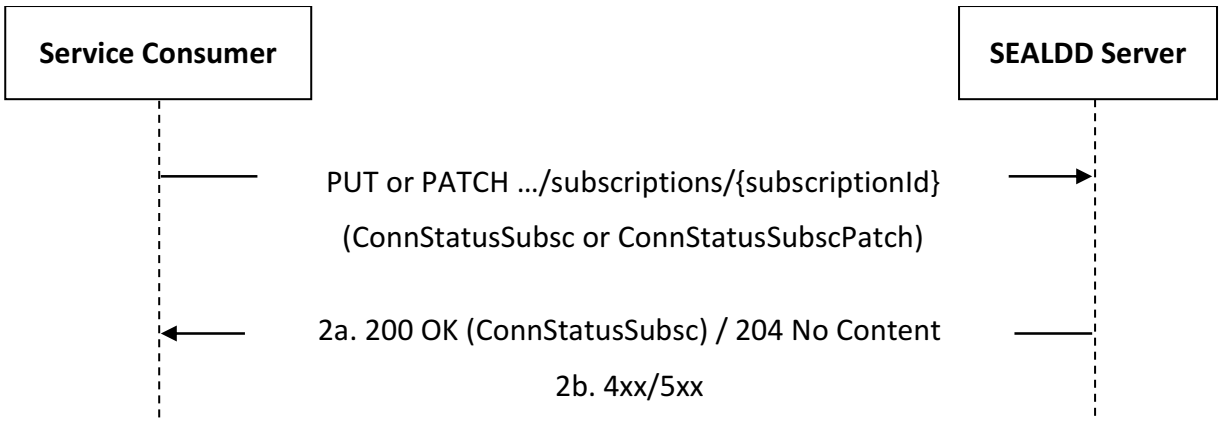

Figure 5.2.2.3.3-1: Procedure for SEALDD Connection Status Subscription Update

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]).

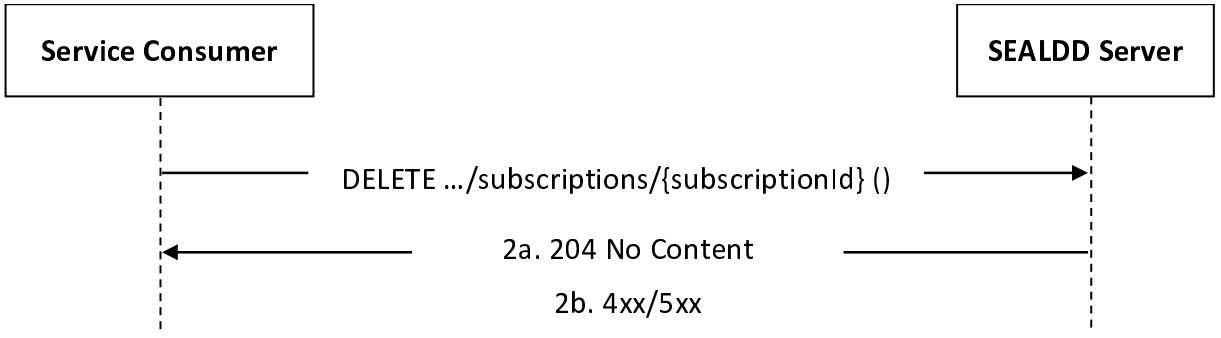

Figure 5.2.2.3.4-1: Procedure for SEALDD Connection Status Subscription Deletion

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 and 9.3 of 3GPP°TS°23.433°[7]).

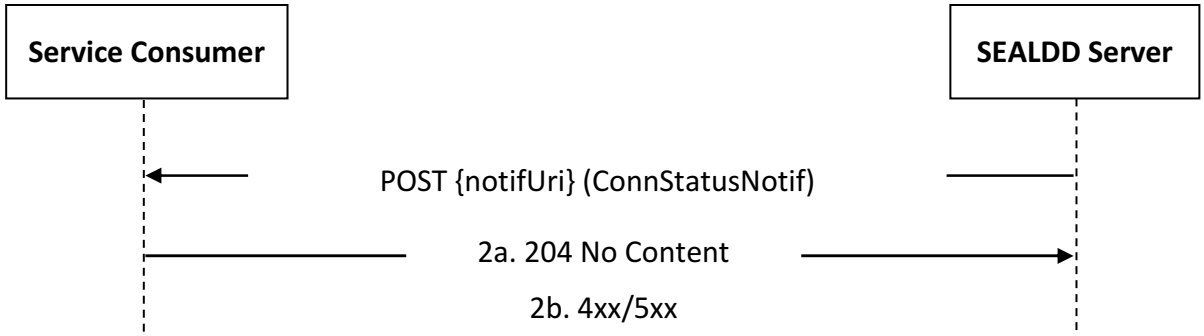

Figure 5.2.2.4.2-1: Procedure for SEALDD Connection Status Notification

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 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

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 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]).

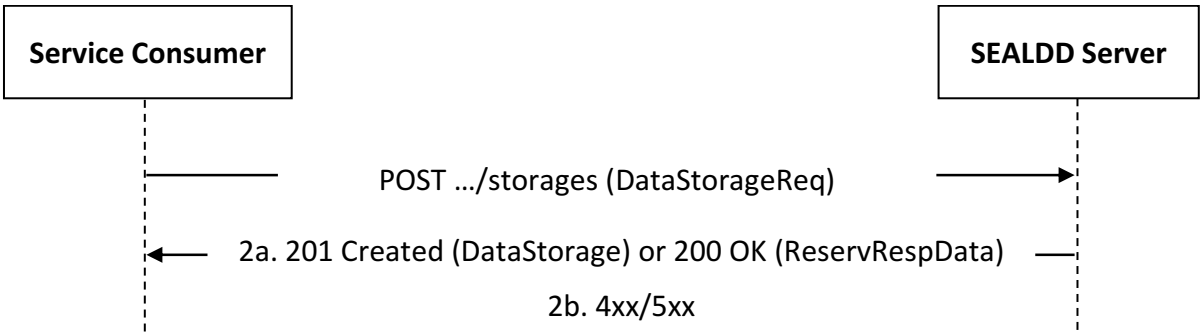

Figure 5.3.2.2.2-1: Procedure for Data Storage Creation

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;

   - 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]).

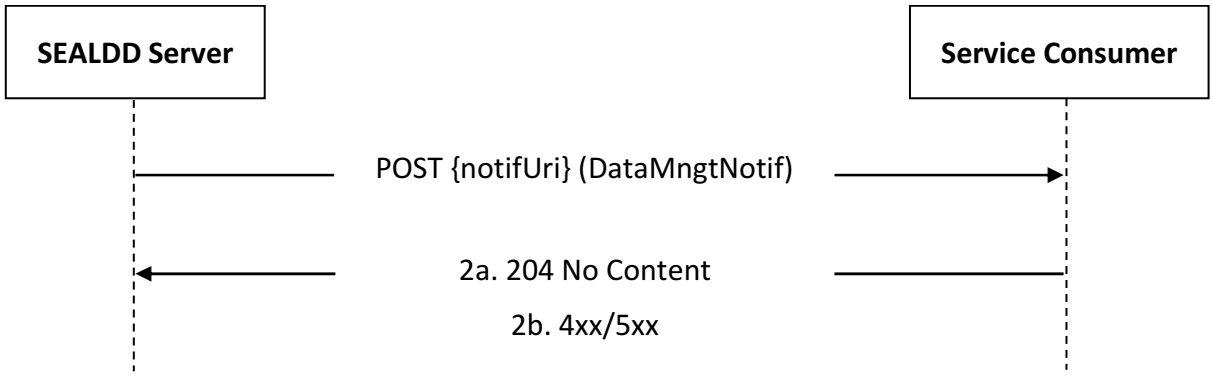

Figure 5.3.2.2.3-1: Data Storage Delivery Notification

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 or 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]).

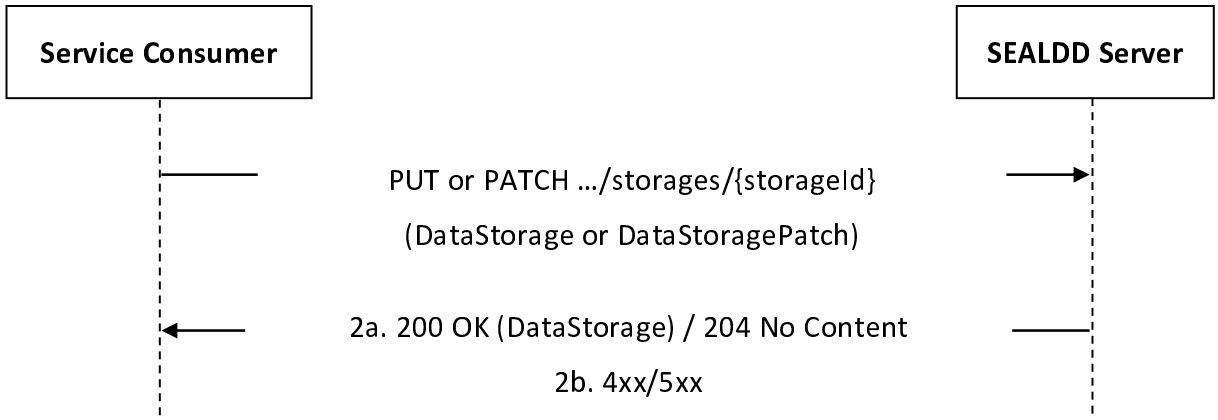

Figure 5.3.2.3.2-1: Procedure for Data Storage Update

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]).

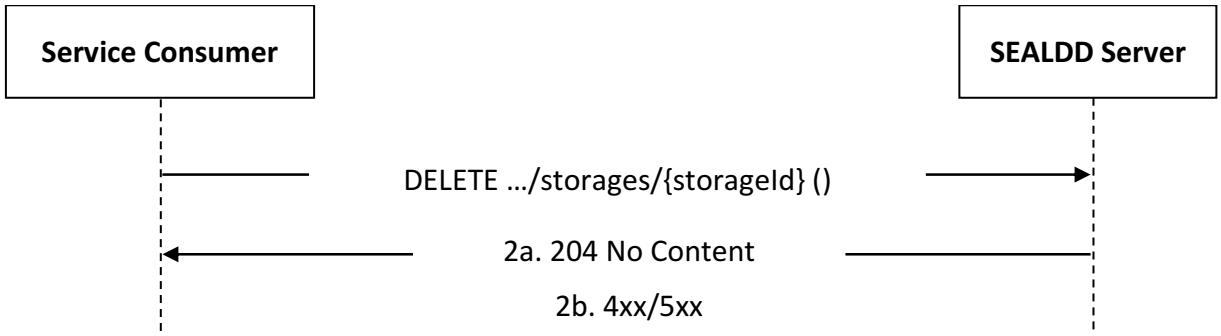

Figure 5.3.2.3.3-1: Procedure for Data Storage Deletion

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 5.3.2.2.2-1 depicts a scenario where a 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]).

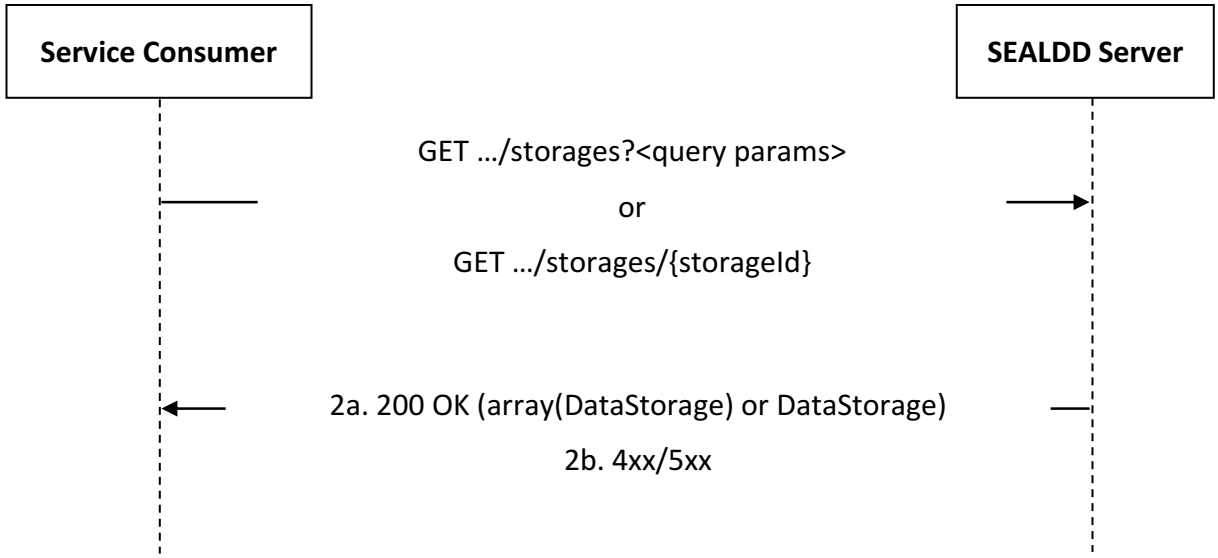

Figure 5.3.2.4.2-1: Procedure for Data Storage(s) Query

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 targeted.

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]).

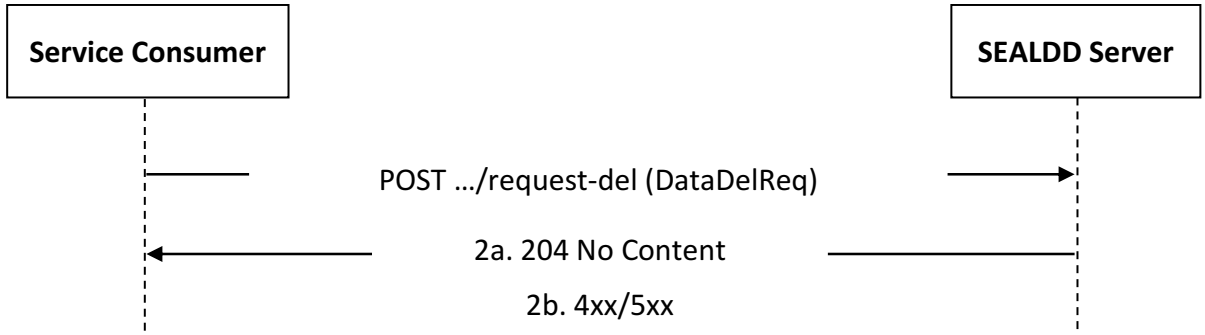

Figure 5.3.2.5.2-1: Procedure for SEALDD Data Storage Delivery Request

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]).

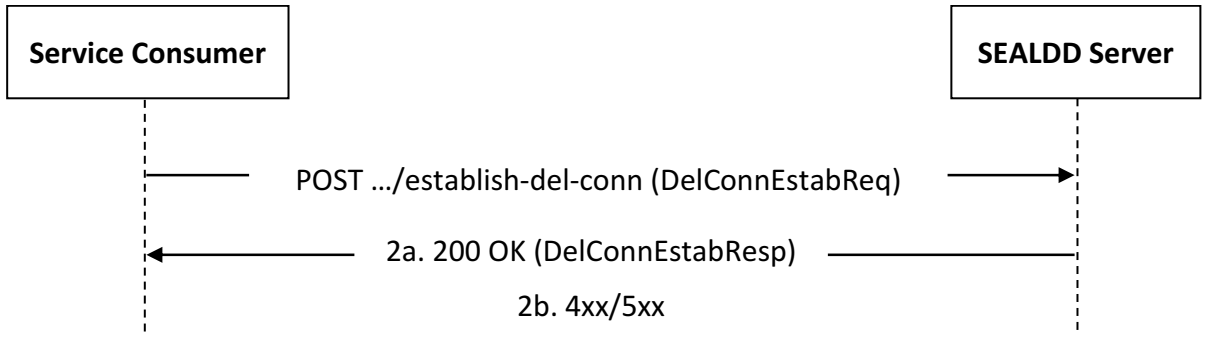

Figure 5.3.2.6.2-1: Procedure for SEALDD Data Storage Delivery Connection Establishment Request

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.

- 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 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]).

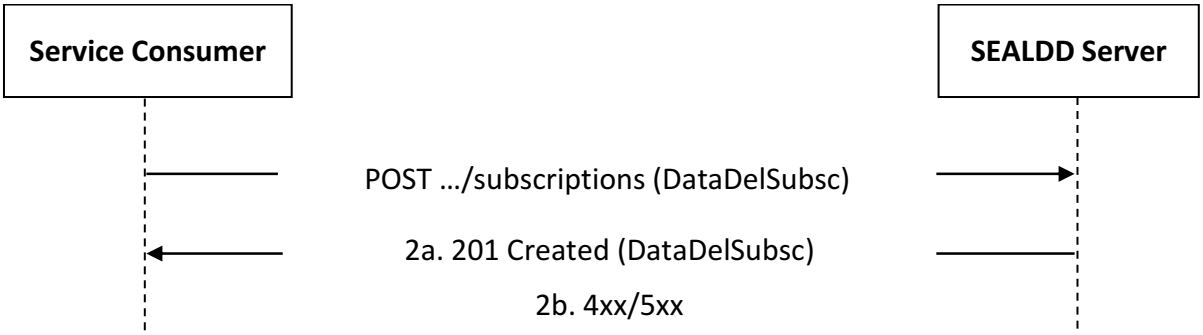

Figure 5.3.2.7.2-1: Procedure for Data Storage Delivery Subscription Creation

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]).

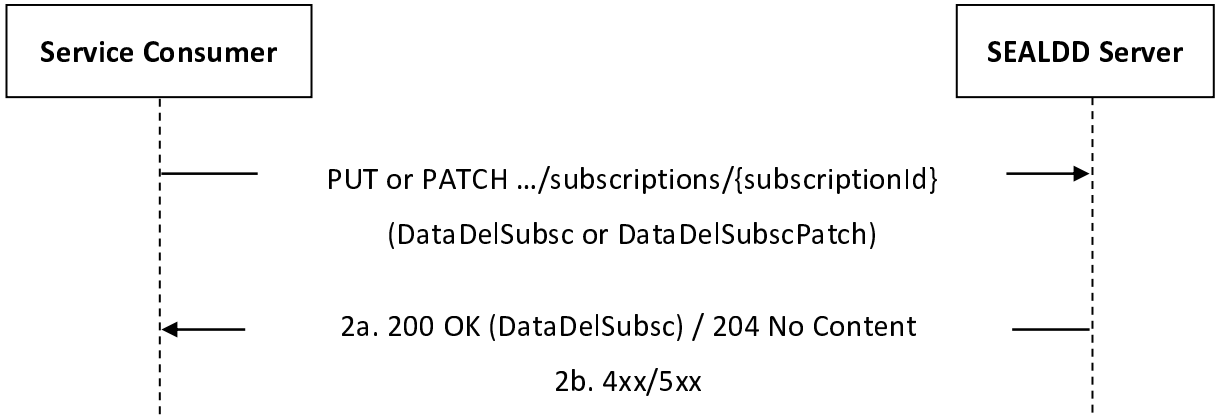

Figure 5.3.2.7.3-1: Procedure for Data Storage Delivery Subscription Update

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]).

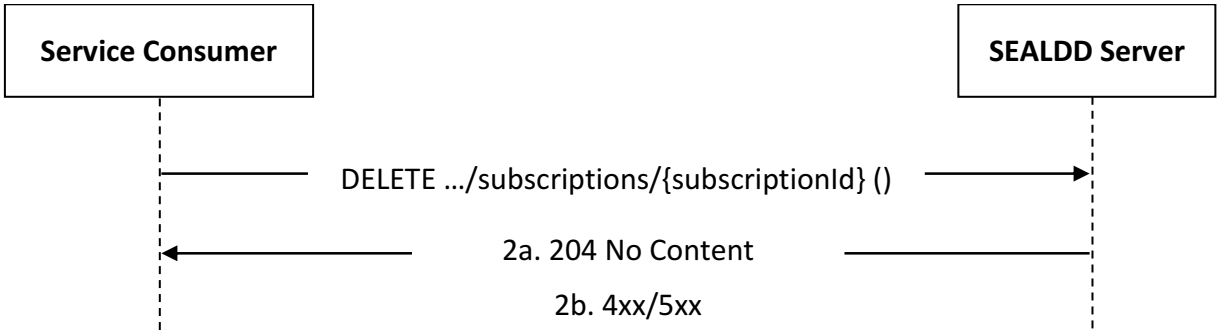

Figure 5.3.2.7.4-1: Procedure for Data Storage Delivery Subscription Deletion

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]).

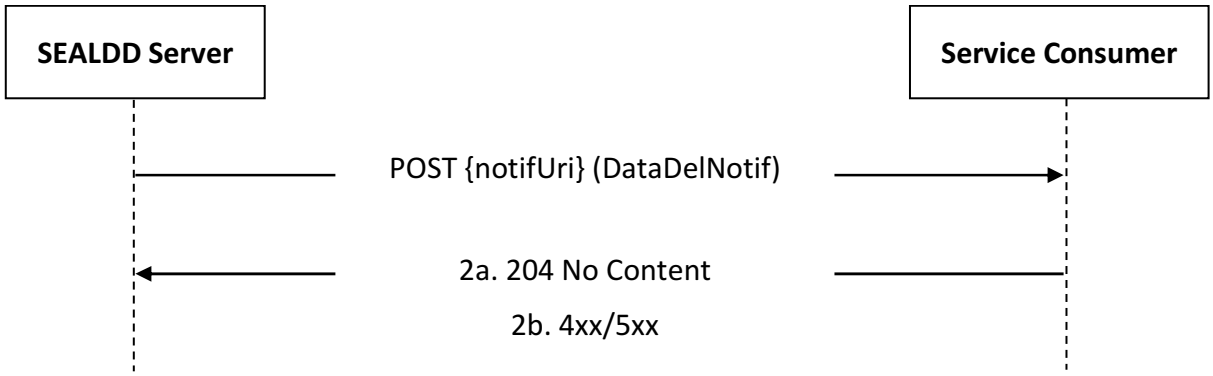

Figure 5.3.2.8.2-1: Procedure for Data Storage Delivery Notification

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; and
- pull the DD context from the SEALDD Server.

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: Operations of the SDD_DDContext API

Service operation name	Description	Initiated by
SDD_DDContext_Push	This service operation is used by a service consumer to push the DD context to the SEALDD Server.	e.g., SEALDD Server
SDD_DDContext_Pull	This service operation is used by a service consumer to pull the DD context from the SEALDD Server.	e.g., 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]).

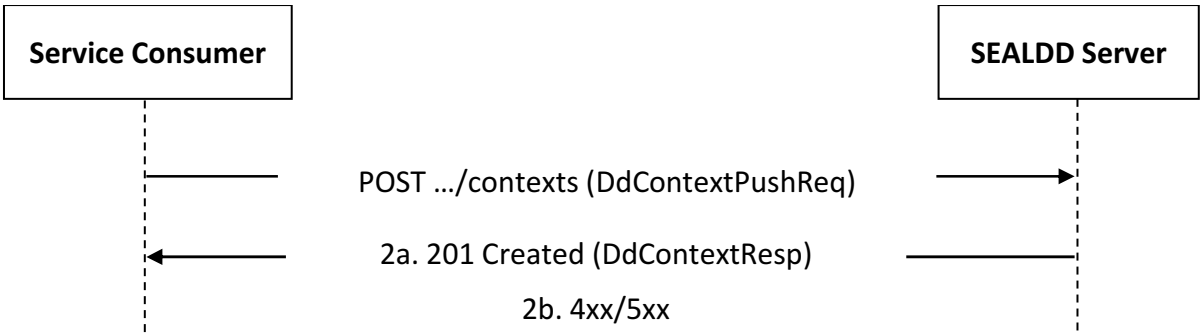

Figure 5.4.2.2.2-1: Procedure for DD Context Push

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_Push" 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]).

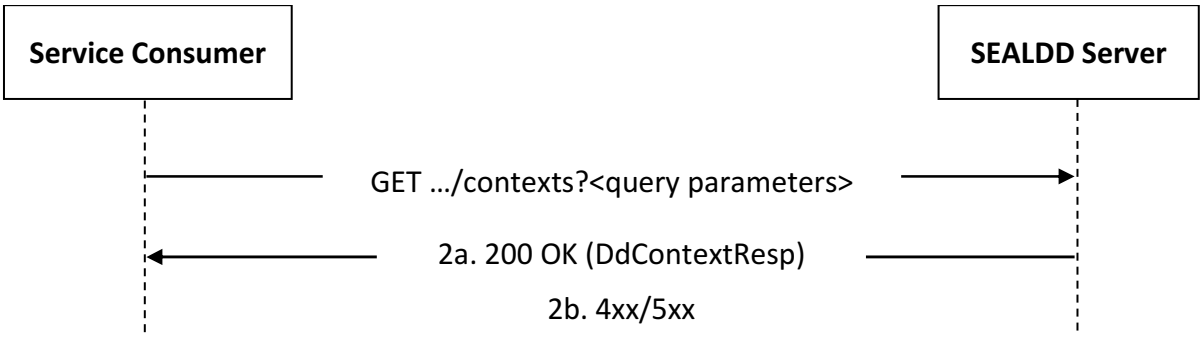

Figure 5.4.2.3.2-1: Procedure for DD Context Pull

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.

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.

5.5 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_Delete	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_Request	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]).

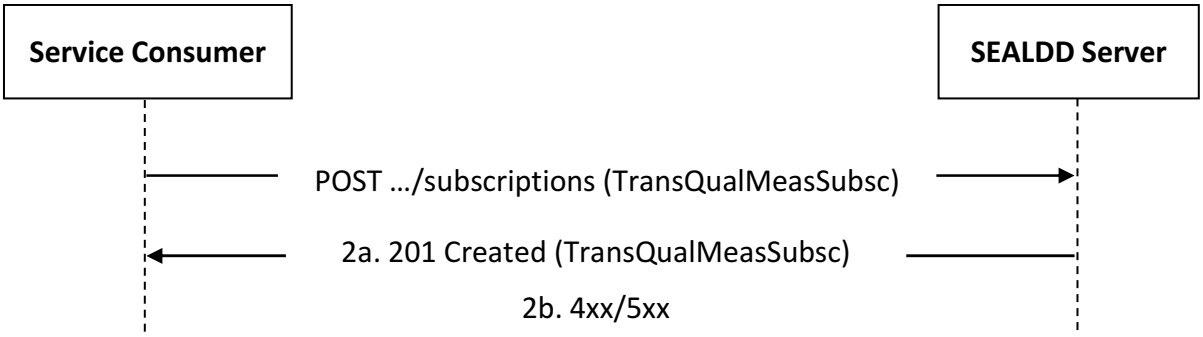

Figure 5.5.2.2.2-1: Procedure for Transmission Quality Measurement Subscription Creation

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]).

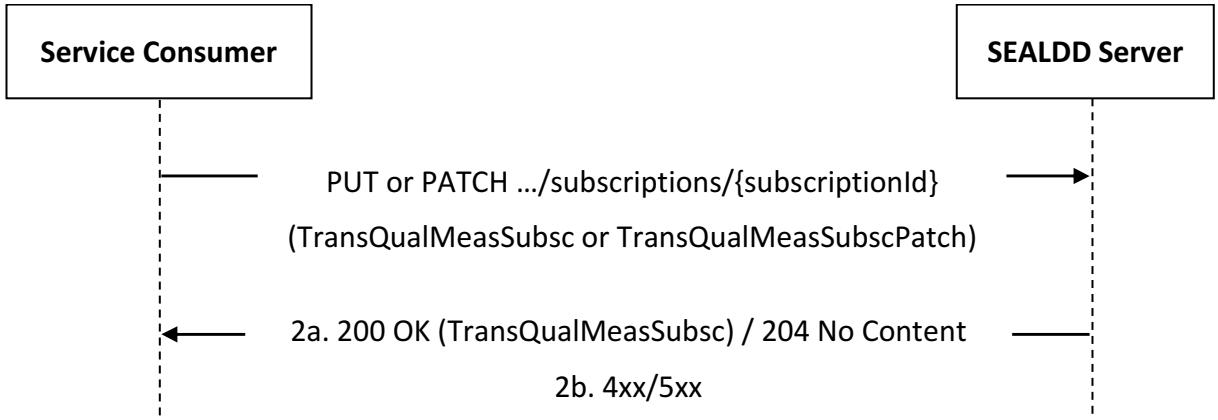

Figure 5.5.2.3.2-1: Procedure for Transmission Quality Measurement Subscription Update

1. In order to update 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_Delete

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_Delete" 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]).

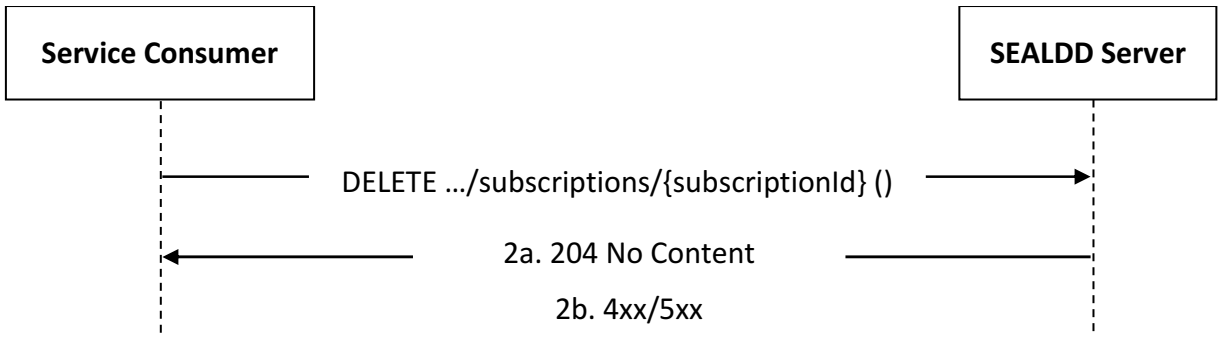

Figure 5.5.2.4.2-1: Procedure for Transmission Quality Measurement Subscription Deletion

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]).

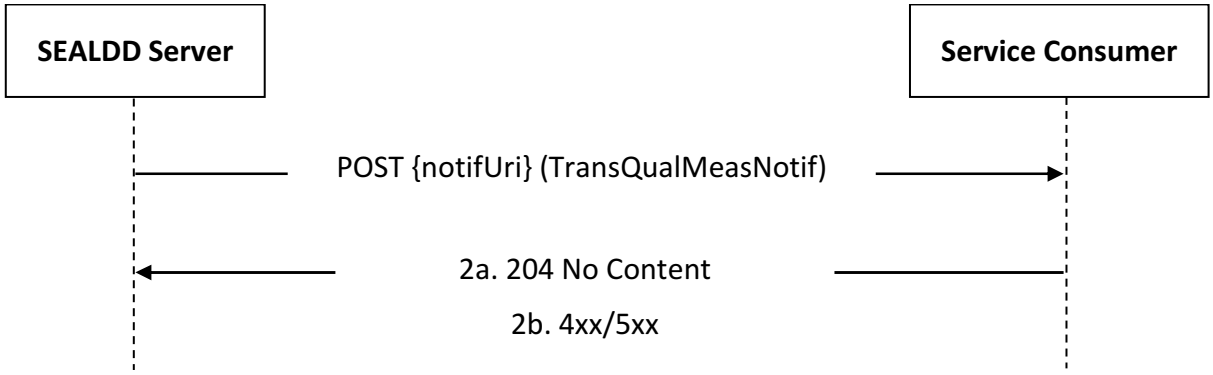

Figure 5.5.2.5.2-1: Procedure for Transmission Quality Measurement Notification

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.

5.5.2.4 SDD_TransmissionQualityMeasurement_Request

5.5.2.4.1 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_Request" service operation:

- Transmission Quality Measurement Retrieval.

5.5.2.4.2 Transmission Quality Measurement Retrieval

Figure 5.5.2.4.2-1 depicts a scenario where a 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]).

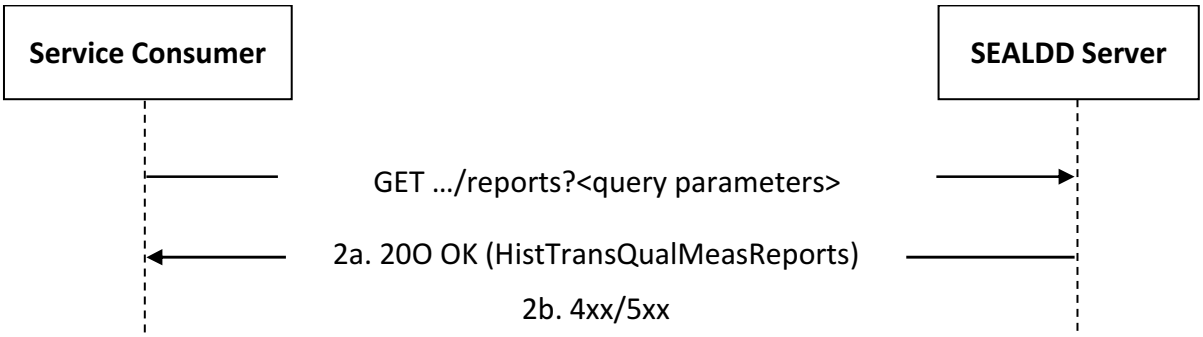

Figure 5.5.2.4.2-1: Procedure for Transmission Quality Measurement Retrieval

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 parameters 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
SDD_PolicyConfiguration_Update	This service operation enables a service consumer to request the update of an existing SEALDD Policy Configuration.	e.g., VAL 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

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 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]).

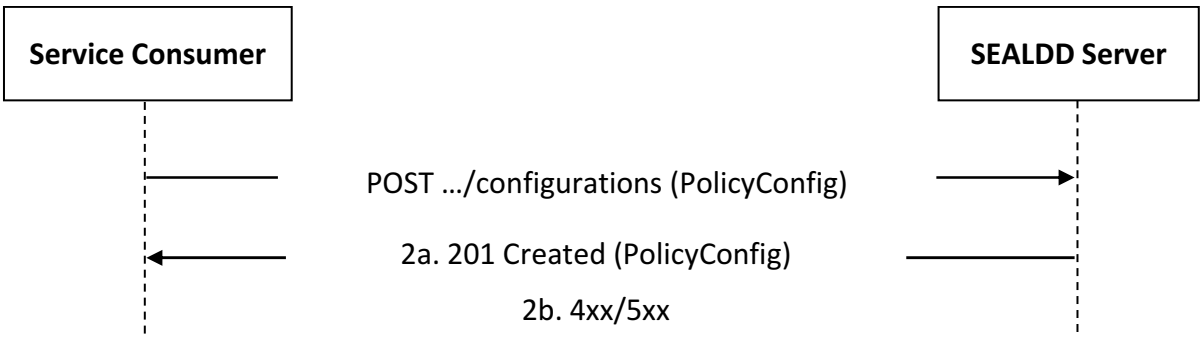

Figure 5.6.2.2.2-1: Procedure for Policy Configuration Creation

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]).

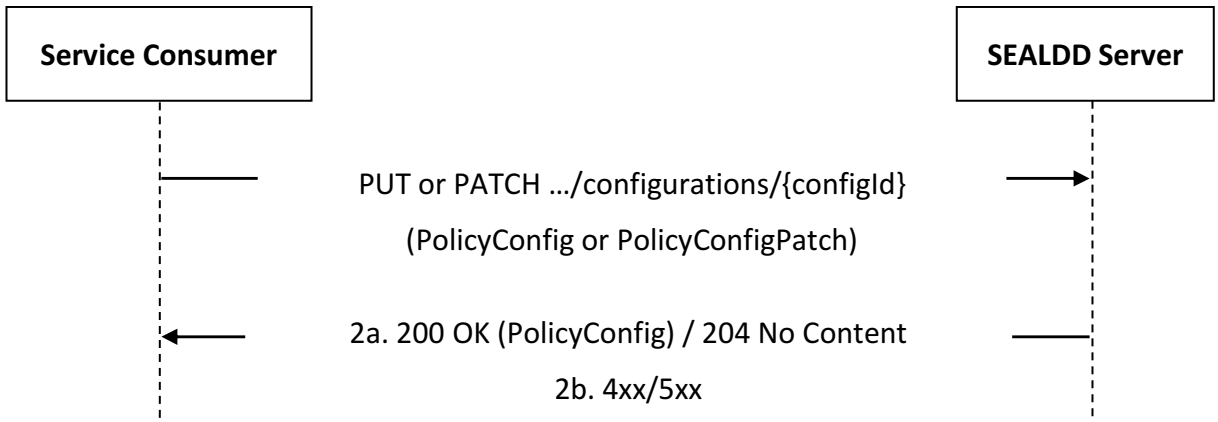

Figure 5.6.2.3.2-1: Procedure for Policy Configuration Update

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]).

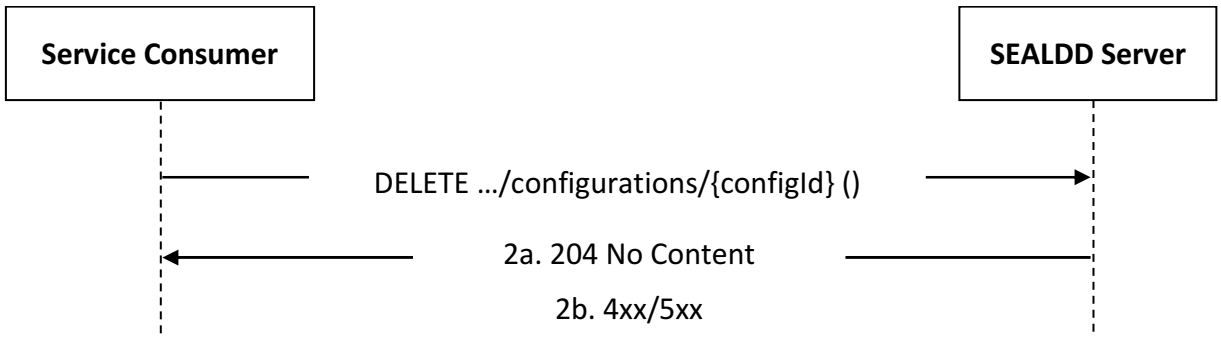

Figure 5.6.2.4.2-1: Procedure for Policy Configuration Deletion

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.

6 API Definitions

6.1 SDD_Transmission Service API

6.1.1 Introduction

The SDD_Transmission 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 5, 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.

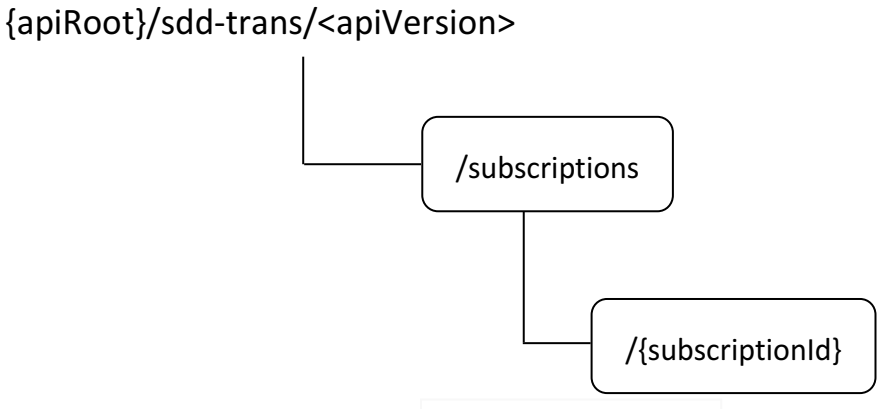

Figure 6.1.3.1-1: Resource URI structure of the SDD_Transmission API

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

This 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 requested Connection Status Subscription is successfully created and a representation of the created "Individual Connection Status Subscription" resource shall be returned in the response body.
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 6.1.3.3.3.2-1: 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 6.1.3.3.3.2-2 and the response data structures and response codes specified in table 6.1.3.3.3.2-3.

Table 6.1.3.3.3.2-2: 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 6.1.3.3.3.2-3: 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 6.1.3.3.3.2-4: 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 6.1.3.3.3.2-5: 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.

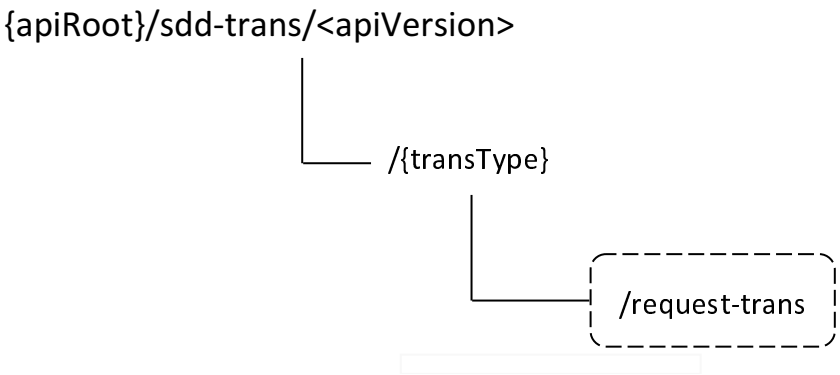

Figure 6.1.4.1-1: Custom operation URI structure of the SDD_Transmission API

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 Regular or URLLC 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 transmission or URLLC transmission).

6.1.4.2 Operation: RequestTrans

6.1.4.2.1 Description

The custom operation enables a service consumer to request SEALDD enabled Regular or URLLC 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 resource

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

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

Data type	P	Cardinality	Response codes	Description
TransResp	M	1	200 OK	The SEALDD enabled Regular or URLLC application data transmission service request was 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 6.1.4.2.2-3: Headers supported by the 307 Response Code on this resource

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 resource

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
ConnStatNotif	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 where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
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 where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
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
ConnEstabData	6.1.6.2.12	Represents SEALDD connection status establishment data.	
ConnStatusEvent	6.1.6.3.3	Represents Connection Status Events.	
ConnInfo	6.1.6.2.4	Represents SEALDD Data transmission 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.	
QoSInfo	6.1.6.2.5	Represents SEALDD related QoS requirements.	
TransReq	6.1.6.2.2	Represents the parameters to request the SEALDD enabled regular or URLLC application data transmission service.	
TransResp	6.1.6.2.3	Represents a SEALDD enabled regular or URLLC 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 parameters.	
Bandwidth	3GPP TS 29.122 [2]	Represents a bandwidth.	
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.	
Port	3GPP TS 29.122 [2]	Represents an IP port.	
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 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 Data transmission connection information, i.e., address/port and/or URI via which the VAL Server desires to receive the application traffic from the SEALDD 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.	
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.	

6.1.6.2.3 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 SEALDD Server's side SEALDD-S Data transmission connection information, i.e., address/port and/or URI via which the SEALDD Server desires to receive the application traffic from the VAL Server. This attribute shall be provided, if needed.	
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 a target 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
totalUlBdw	Bandwidth	M	1	Contains the total UL bandwidth of the VAL Server.	
totalDlBdw	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
minUlBdw	Bandwidth	M	1	Contains the minimum UL bandwidth for VAL users.	
minDlBdw	Bandwidth	M	1	Contains the minimum DL bandwidth for VAL users.	
maxUlBdw	Bandwidth	M	1	Contains the maximum UL bandwidth for VAL users.	
maxDlBdw	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	Represents the list of the subscribed event(s).	
valServiceId	string	O	0..1	Represents the identity of the VAL service.	
valTgtUe	ValTargetUe	O	0..1	Represents the targeted VAL UE or VAL user.	
valServerConnInfo	ConnInfo	M	1	Represents the SEALDD-S data transmission connection information.	
notifUri	Uri	M	1	It indicates the URI via which the notifications should 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.	
suppFeat	SupportedFeatures	C	0..1	Represents 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	Represents the updated list of the subscribed event(s).	
valServiceId	string	O	0..1	Represents the identity of the VAL service.	
valTgtUe	ValTargetUe	O	0..1	Represents the targeted VAL UE or VAL user.	
valServerConnInfo	ConnInfo	O	0..1	Represents the updated SEALDD-S data transmission connection information.	
notifUri	Uri	O	0..1	It indicates the updated URI via which the notifications should 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 SEALDD connection status notification is related.	
reports	array(ConnStatusReport)	M	1..N	Represents 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	Represents the connection status event.	
valTgtUe	ValTargetUe	M	1	Represents the VAL UE or VAL user to which the SEALDD connection status report is related.	
valServiceId	string	M	1	Represents the identity of the VAL service to which the SEALDD connection status report is related.	
connEstData	ConnEstabData	C	0..1	Represents the SEALDD connection establishment data. This attribute shall be present only if the "event" attribute is set to "ESTABLISHED".	

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 Data transmission connection information, i.e., address/port and/or URI via which the SEALDD Server sends/receives the application traffic.	
comLifetime	DurationSec	O	0..1	Represents the SEALDD communication lifetime.	

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 is established.	
RELEASED	Indicates that the SEALDD connection is released.	

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.	
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], as they are used as a URI path segment. They shall not follow the "UPPER_WITH_UNDERSCORE" convention for enumerations as defined in clause 5.2.9.10 of 3GPP TS 29.122 [2].		

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

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.

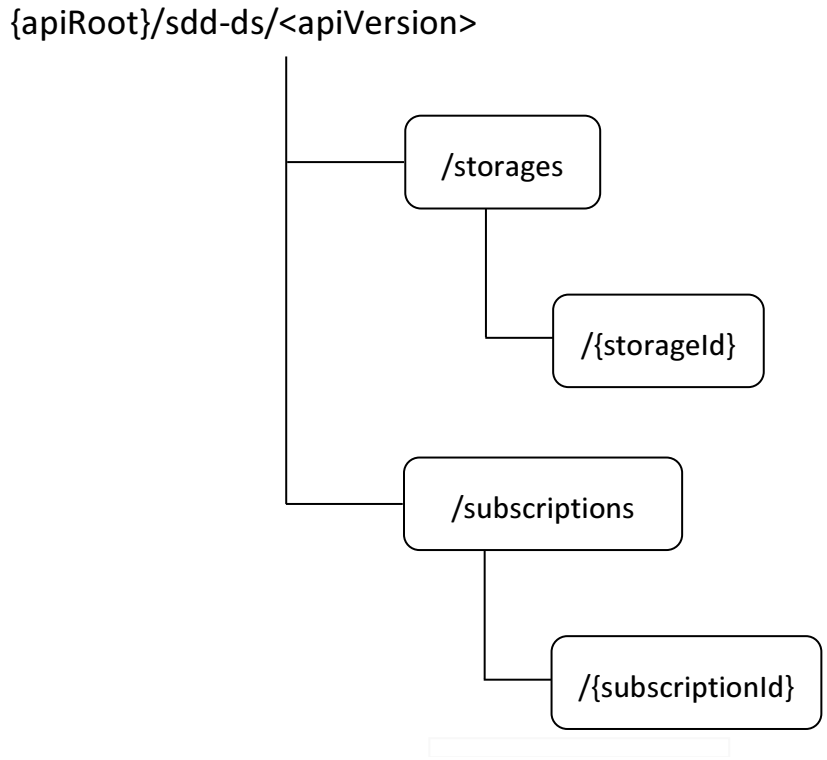

Figure 6.2.3.1-1: Resource URIs structure of the SDD_DataStorage API

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).	
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.	

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 6.2.3.3.3.2-1: 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 6.2.3.3.3.2-2 and the response data structures and response codes specified in table 6.2.3.3.3.2-3.

Table 6.2.3.3.3.2-2: 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 6.2.3.3.3.2-3: 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 6.2.3.3.3.2-4: 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 6.2.3.3.3.2-5: 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.

6.2.3.3.3.3 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.

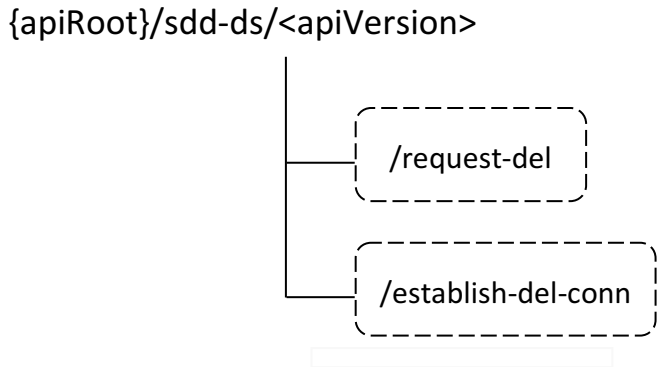

Figure 6.2.4.1-1: Custom operation URI structure of the SDD_DataStorage API

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 resource

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 resource

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 resource

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 resource

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 resource

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 resource

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 resource

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 resource

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 where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
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 where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
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 where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
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 where the notification should be sent. Redirection handling is described in clause 5.2.10 of 3GPP TS 29.122 [3].
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.	
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 [4]	Represents a sequence of bytes.	
ConnInfo	6.1.6.2.4	Represents SEALDD Data transmission 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 application data to be stored.	
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 data to be stored.	
mngtSubsc	DataMngtSubsc	O	0..1	Contains the stored data management and/or status information subscription related information.	
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.	

6.2.6.2.3 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.	
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.	

6.2.6.2.4 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

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

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.

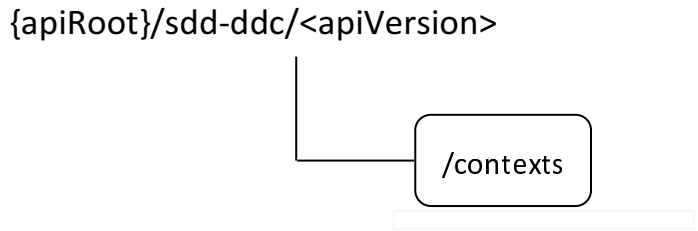

Figure 6.3.3.1-1: Resource URI structure of the SDD_DDContext API

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 5.2.7.1-1 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

There are no custom operations without associated resources defined for this API in this release of the specification.

6.3.5 Notifications

There are no notifications defined for this API in this release of the specification.

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
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.	
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 Data transmission 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.	
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.	

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.	
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(PolicyConfig)	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 SEALDD flow ID.	
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 data transmission connection information.	
ddServConnInfo	ConnInfo	O	0..1	Represents the SEALDD Server-side SEALDD-Uu data transmission 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 data transmission connection information.	
ddServerConnInfo	ConnInfo	O	0..1	Contains SEALDD Server's side SEALDD-S data transmission connection information, i.e., address/port and/or URI via which the SEALDD Server desires to receive the application 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.	

6.3.6.3 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 6.3.6.3.2-1shall be supported.

Table 6.3.6.3.2-1: Simple data types

Type name	Description

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

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.

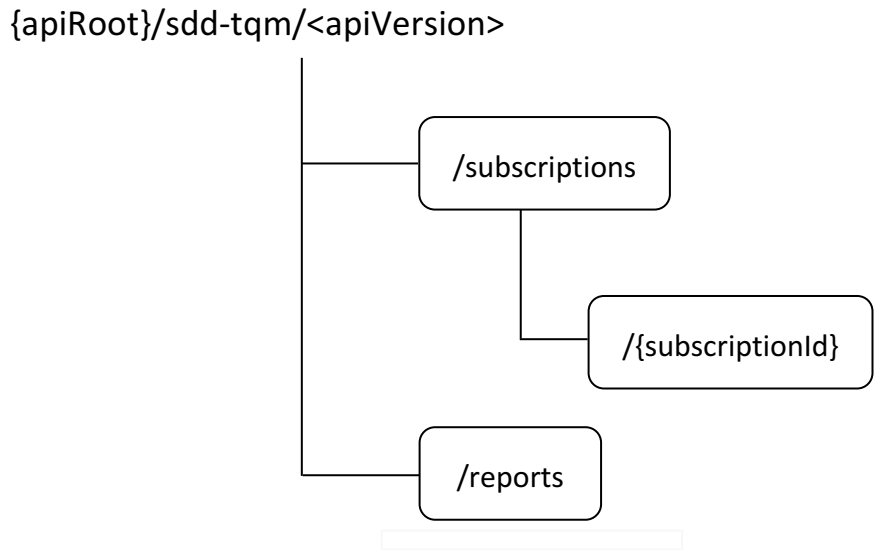

Figure 6.4.3.1-1: Resource URIs structure of the SDD_TransmissionQualityMeasurement API

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. An HTTP "Location" header that contains the resource 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 an "Individual Transmission Quality Measurement Subscription" resource 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 6.4.3.3.3.1-5: 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.

6.4.3.3.3.2 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 6.4.3.3.3.2-1.

Table 6.4.3.3.3.2-1: 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 6.4.3.3.3.2-2 and the response data structures and response codes specified in table 6.4.3.3.3.2-3.

Table 6.4.3.3.3.2-2: 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 6.4.3.3.3.2-3: 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 6.2.7.				

Table 6.4.3.3.3.2-4: 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 6.4.3.3.3.2-5: 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 6.4.3.3.3.3-3: 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 6.2.7.				

Table 6.4.3.3.3.3-4: 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 6.4.3.3.3.3-5: 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.

6.4.3.3.3.4 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 6.4.3.3.3.4-1.

Table 6.4.3.3.3.4-1: 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 6.4.3.3.3.4-2 and the response data structures and response codes specified in table 6.4.3.3.3.4-3.

Table 6.4.3.3.3.4-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 6.4.3.3.3.4-3: 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 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 6.4.3.3.3.4-4: 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 6.4.3.3.3.4-5: 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	Contains the identifier(s) of the targeted application traffic. This can be in the form of 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)	
all-val-ues	boolean	O	0..1	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". (NOTE)	
supp-feat	SupportedFeatures	O	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 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) 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].
ProblemDetails	O	0..1	403 Forbidden	(NOTE 2)
NOTE 1: 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. NOTE 2: Failure causes are described in clause 6.2.7.				

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 reports.

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 reports.

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 where 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 where 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
HistTransQualMeasReports	6.4.6.2.9	Represents 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 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. This can be in the form of e.g., VAL Service ID, VAL Server ID.	
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)	
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 Transmission Quality Measurement 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 Transmission Quality Measurement subscription shall not expire, until explicitly deleted by the service consumer.	
notifUri	Uri	M	1	Contains the URI via which notifications shall be delivered.	
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, 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	O	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 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 report is related. (NOTE)	
measData	TransQualMeasData	O	0..1	Contains the reported transmission quality measurement data.	
NOTE: These attributes are mutually exclusive. Either one of them shall be present, unless the corresponding subscription is for a single VAL UE/user, in which case they 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 latency (expressed in milliseconds) for transmission quality measurement reporting. (NOTE)	
avgLatency	Uinteger	C	0..1	Contains the requested average latency (expressed in milliseconds) for transmission quality measurement reporting. (NOTE)	
maxLatency	Uinteger	C	0..1	Contains the requested maximum latency (expressed in milliseconds) for transmission quality measurement reporting. (NOTE)	
minBitRate	BitRate	C	0..1	Contains the requested minimum bit rate for transmission quality measurement reporting. (NOTE)	
avgBitRate	BitRate	C	0..1	Contains the requested average bit rate for transmission quality measurement reporting. (NOTE)	
maxBitRate	BitRate	C	0..1	Contains the requested maximum bit rate for transmission quality measurement reporting. (NOTE)	
minPackLossRate	PacketLossRate	C	0..1	Contains the requested minimum packet loss rate for transmission quality measurement reporting. (NOTE)	
avgPackLossRate	PacketLossRate	C	0..1	Contains the requested average packet loss rate for transmission quality measurement reporting. (NOTE)	
maxPackLossRate	PacketLossRate	C	0..1	Contains the requested maximum packet loss rate for transmission quality measurement reporting. (NOTE)	
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)	
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 latency (expressed in milliseconds). (NOTE)	
maxLatency	Uinteger	O	0..1	Contains the measured maximum latency (expressed in milliseconds). (NOTE)	
avgLatency	Uinteger	O	0..1	Contains the measured average latency (expressed in milliseconds). (NOTE)	
stdDevLatency	Uinteger	O	0..1	Contains the standard deviation (expressed in milliseconds) for the measured 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 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.	
minBitRate	BitRate	O	0..1	Contains the measured minimum bit rate. (NOTE)	
maxBitRate	BitRate	O	0..1	Contains the measured maximum bit rate. (NOTE)	
avgBitRate	BitRate	O	0..1	Contains the measured average bit rate. (NOTE)	
stdDevBitRate	BitRate	O	0..1	Contains the standard deviation for the measured 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 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.	
minPackLossRate	PacketLossRate	O	0..1	Contains the measured minimum packet loss rate. (NOTE)	
maxPackLossRate	PacketLossRate	O	0..1	Contains the measured maximum packet loss rate. (NOTE)	

avgPackLossRate	PacketLossRate	O	0..1	Contains the measured average packet loss rate. (NOTE)	
stdDevPackLossRate	PacketLossRate	O	0..1	Contains the standard deviation for the measured 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 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.	
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.	
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, an empty array shall be returned within this attribute.	
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.	

6.4.6.3 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 latency.	
BITRATE	Indicates that the requested/reported measurement is the bit rate.	
PACKET_LOSS_RATE	Indicates that the requested/reported measurement is the packet loss rate.	
JITTER	Indicates that the requested/reported measurement is the jitter.	

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).	

6.4.6.4 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 or update/modification request is rejected because there are no existing Regular/URLLC transmission connections corresponding to the parameters provided in the request.	
NO_AVAILABLE_MEAS_DATA	403 Forbidden	Indicates that the historical Transmission Quality Measurement reports retrieval request is rejected because there no existing/available Transmission Quality Measurement reports 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

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.

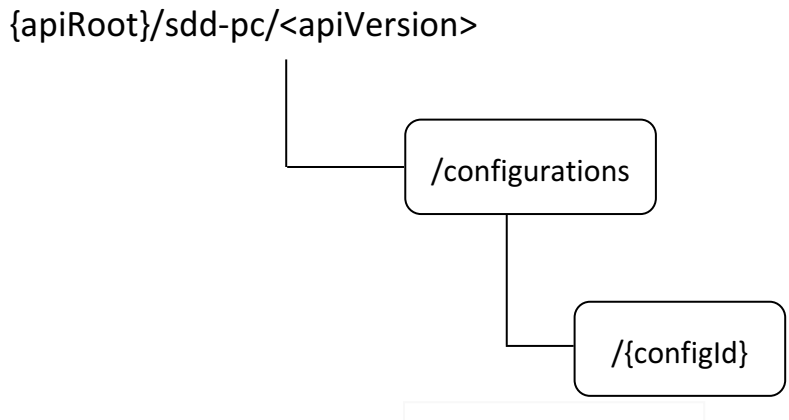

Figure 6.5.3.1-1: Resource URIs structure of the SDD_PolicyConfiguration API

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 6.5.3.3.3.1-1: 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 6.5.3.3.3.1-2 and the response data structures and response codes specified in table 6.5.3.3.3.1-3.

Table 6.5.3.3.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 6.5.3.3.3.1-3: 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 6.5.3.3.3.1-4: 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 6.5.3.3.3.1-5: 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 6.5.3.3.3.2-1.

Table 6.5.3.3.3.2-1: 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 6.5.3.3.3.2-2 and the response data structures and response codes specified in table 6.5.3.3.3.2-3.

Table 6.5.3.3.3.2-2: 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 6.5.3.3.3.2-3: 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 6.5.3.3.3.2-4: 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 6.5.3.3.3.2-5: 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.

6.5.3.3.3.3 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
BdwCtrlPolicy	6.5.6.3.3	Represents the bandwidth control policy.	
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.	
SealddPolicy	6.5.6.2.4	Represents a SEALDD Policy.	

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
DateTimeRo	3GPP TS 29.122 [2]	Represents a date and a time with the "read-only" property.	
MeasurementId	Clause 6.4.6.3.3	Represents the transmission quality measurement type.	
TransQualMeasCriteria	Clause 6.4.6.2.7	Represents the transmission quality measurement reporting criteria.	
Uri	3GPP TS 29.122 [2]	Represents a URI.	
SupportedFeatures	3GPP TS 29.571 [18]	Represents the list of supported feature(s) and used to negotiate the applicability of the optional features.	
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.	
sealddPol	SealddPolicy	M	1	Represents the SEALDD policy that is to be configured.	
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.	
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.	

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.	

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)	
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)	
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 the SEALDD enabler layer as criteria for triggering quality guarantee or quality optimization action(s) (e.g., 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.	

6.5.6.3 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 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.	

6.5.6.4 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

6.5.9 Security

The provisions of clause 9 of 3GPP TS 29.549 [15] shall apply for the SDD_PolicyConfiguration 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 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 1: 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 definitions but defined in other parts of the specification also apply.

Informative copies of the OpenAPI 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: 1.0.0-alpha.7
  description: |
    SEALDD Server Data Transmission Service.
    © 2024, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: >
    3GPP TS 29.548 V18.0.0; 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 Regular or URLLC 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 Regular or URLLC 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'
        '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 Regular or URLLC application data
        transmission service.
      type: object
      properties:
        valServiceId:
          type: string
        valTargetId:
          $ref: 'TS29549_SS_UserProfileRetrieval.yaml#/components/schemas/ValTargetUe'
```

```
        valServerConnInfo:
          $ref: '#/components/schemas/ConnInfo'
        qosInfo:
          $ref: '#/components/schemas/QosInfo'
        valServerBdw:
          $ref: '#/components/schemas/ValServBdw'
        valUsersBdw:
          $ref: '#/components/schemas/ValUsersBdw'
        suppFeat:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
      required:
        - valServerConnInfo

    TransResp:
      description: >
        Represents a SEALDD enabled Regular or URLLC application data transmission service response.
      type: object
      properties:
        ddServerConnInfo:
          $ref: '#/components/schemas/ConnInfo'
        suppFeat:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'

    ConnInfo:
      description: >
        Represents SEALDD Data transmission 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'
        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:
        - 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'
        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'
      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


# SIMPLE DATA TYPES
#

#
# ENUMERATIONS
#

    ConnStatusEvent:
      anyOf:
      - type: string
        enum:
           - ESTABLISHED
           - RELEASED
      - 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 is established.
        - RELEASED: Indicates that the SEALDD connection is released.

    TransType:
      anyOf:
        - type: string
          enum:
          - regular
          - urllc
        - 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.
```

```
# 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: 1.0.0-alpha.5
  description: |
    SEALDD Server Data Storage Service.
    © 2024, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: >
    3GPP TS 29.548 V18.0.0; 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: 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'
      '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'

  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'
      '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'

  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'
      '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'

/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.
          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'
        '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'

    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'
        '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'

    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'
        '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'

  /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'
        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:
        data:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/Bytes'
        storageId:
          type: string
      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:
          $ref: 'TS29558_Eees_EASRegistration.yaml#/components/schemas/TransportProtocol'
        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
#

#
# 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: 1.0.0-alpha.7
  description: |
    SEALDD Server Data Delivery Context Relocation.
    © 2024, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: >
    3GPP TS 29.548 V18.0.0 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'
        '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'

    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'

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'
      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
        description: Represents the SEALDD flow ID.
      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


# SIMPLE DATA TYPES
#

#
# ENUMERATIONS
#

# 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: 1.0.0-alpha.8
  description: |
    SEALDD Server Data Transmission Quality Measurement Service.
    © 2024, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: >
    3GPP TS 29.548 V18.0.0; 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'
        '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'

    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'
        '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'

    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'
        '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'

  /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: 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) 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
        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
      measData:
        $ref: '#/components/schemas/TransQualMeasData'
    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'
      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'
      minJitter:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
      avgJitter:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
      maxJitter:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uint32'
    oneOf:
      - required: [minLatency]
      - required: [avgLatency]
      - required: [maxLatency]
      - required: [minBitRate]
      - required: [avgBitRate]
      - required: [maxBitRate]
      - required: [minPackLossRate]
      - required: [avgPackLossRate]
      - required: [maxPackLossRate]
      - required: [minJitter]
      - required: [avgJitter]
      - required: [maxJitter]

  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'
      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'
        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'
        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'
        measPeriod:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/DurationSec'
        timestamp:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTime'
      anyOf:
        - required: [minLatency]
        - required: [maxLatency]
        - required: [avgLatency]
        - required: [minBitRate]
        - required: [maxBitRate]
        - required: [avgBitRate]
        - required: [minPackLossRate]
        - required: [maxPackLossRate]
        - required: [avgPackLossRate]
        - required: [minJitter]
        - required: [maxJitter]
        - required: [avgJitter]

    HistTransQualMeasReports:
      description: >
        Represents Historical Transmission Quality Measurement Report(s).
      type: object
      properties:
        reports:
          type: array
          items:
            $ref: '#/components/schemas/TransQualMeasReport'
          minItems: 0
        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


# SIMPLE DATA TYPES
#
```

```
#
# ENUMERATIONS
#

    MeasurementId:
      anyOf:
        - type: string
          enum:
          - LATENCY
          - BITRATE
          - PACKET_LOSS_RATE
          - 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 latency.
        - BITRATE: Indicates that the requested/reported measurement is the bit rate.
        - PACKET_LOSS_RATE: Indicates that the requested/reported measurement is the packet loss
          rate.
        - JITTER: Indicates that the requested/reported measurement is the 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).


# 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: 1.0.0-alpha.6
  description: |
    SEALDD Server Policy Configuration Service.
    © 2024, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: >
    3GPP TS 29.548 V18.0.0; 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'
      '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'

  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'
      '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'

  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'
        '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
#

    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'
        sealddPol:
          $ref: '#/components/schemas/SealddPolicy'
        expTime:
          $ref: 'TS29122_CommonData.yaml#/components/schemas/DateTimeRo'
        suppFeat:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
      required:
        - appTrafficIds
        - sealddPol

    PolicyConfigPatch:
      description: >
        Represents the requested modifications to a SEALDD Policy Configuration.
      type: object
      properties:
        sealddPol:
          $ref: '#/components/schemas/SealddPolicy'

    SealddPolicy:
      description: >
        Represents a SEALDD Policy.
      type: object
      properties:
        qualGuarPol:
          $ref: '#/components/schemas/QualGuarPolicy'
        bdwCtrlSets:
          type: array
          items:
            $ref: '#/components/schemas/BdwCtrlPolicy'
          minItems: 1
```

```
      anyOf:
        - required: [qualGuarPol]
        - required: [bdwCtrlSets]

    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


# 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.


# 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

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

History

Document history		
V18.0.0	May 2024	Publication