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| 3GPP TS 26.532 V18.2.1 (2024-07) | |
| Technical Specification | |
| 3rd Generation Partnership Project;  Technical Specification Group Services and System Aspects; Data Collection and Reporting;  Protocols and Formats;  (Release 18) | |
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Contents

Foreword 7

1 Scope 9

2 References 9

3 Definitions of terms, symbols and abbreviations 10

3.1 Terms 10

3.2 Symbols 10

3.3 Abbreviations 10

4 Procedures for Data Collection and Reporting 10

4.1 General 10

4.2 Network-side procedures 11

4.2.1 General 11

4.2.2 Data Collection AF registration with NRF 11

4.2.3 Data collection and reporting provisioning 11

4.2.3.1 General 11

4.2.3.2 Provisioning Session procedures 11

4.2.3.2.1 General 11

4.2.3.2.2 Create Provisioning Session 11

4.2.3.2.3 Retrieve Provisioning Session properties 11

4.2.3.2.4 Update Provisioning Session properties 12

4.2.3.2.5 Destroy Provisioning Session 12

4.2.3.3 Data Reporting Configuration procedures 12

4.2.3.3.1 General 12

4.2.3.3.2 Data Reporting Configuration entity 12

4.2.3.3.3 Create Data Reporting Configuration 12

4.2.3.3.4 Retrieve Data Reporting Configuration 13

4.2.3.3.5 Update Data Reporting Configuration 13

4.2.3.3.6 Destroy Data Reporting Configuration 13

4.2.4 Configuration of Indirect Data Collection Client 13

4.2.4.1 General 13

4.2.4.2 Indirect Data Collection Client retrieves its initial configuration by creating a Data Reporting Session 14

4.2.4.3 Updating and renewing data collection and reporting configuration 14

4.2.4.3.1 Introduction 14

4.2.4.3.2 Indirect Data Collection Client retrieves up-to-date configuration 15

4.2.4.3.3 DataReportingSession updated in response to data reporting 15

4.2.4.4 Indirect Data Collection Client destroys Data Reporting Session 15

4.2.5 Configuration of Application Server 16

4.2.5.1 General 16

4.2.5.2 Application Server retrieves its initial configuration by creating a Data Reporting Session 16

4.2.5.3 Updating and renewing data collection and reporting configuration 16

4.2.5.3.1 Introduction 16

4.2.5.3.2 Application Server retrieves up-to-date configuration 17

4.2.5.3.3 DataReportingSession updated in response to data reporting 17

4.2.5.4 Application Server destroys Data Reporting Session 17

4.2.6 Indirect data reporting 17

4.2.7 Reporting by Application Server 18

4.2.8 Event subscription, management and publication 19

4.3 UE-to-network procedures 19

4.3.1 General 19

4.3.2 Configuration of Direct Data Reporting Client 19

4.3.2.1 General 19

4.3.2.2 Direct Data Collection Client retrieves its initial configuration by creating a Data Reporting Session 19

4.3.2.3 Updating and renewing data collection and reporting configuration 20

4.3.2.3.1 Introduction 20

4.3.2.3.2 Direct Data Collection Client retrieves up-to-date configuration 20

4.3.2.3.3 DataReportingSession updated in response to data reporting 20

4.3.2.4 Direct Data Collection Client destroys Data Reporting Session 21

4.3.3 Direct data reporting 21

4.4 UE-internal procedures 22

4.4.1 General 22

4.4.2 Application registration procedure 22

4.4.4 Data reporting procedure 22

4.4.5 Configuration update procedure 22

4.4.6 Procedure for changing consent to report the UE identifier 23

4.4.7 Procedure for changing the opaque client reporting identifier 23

4.4.8 Application deregistration procedure 23

5 General Aspects of APIs for Data Collection and Reporting 23

5.1 Overview 23

5.2 HTTP resource URIs and paths 23

5.3 Usage of HTTP 24

5.3.1 HTTP protocol version 24

5.3.2 HTTP standard headers 24

5.3.2.1 General 24

5.3.2.2 Origin 24

5.3.2.3 Content type 24

5.3.2.4 Access-Control-Allow-Origin 24

5.3.2.5 Access-Control-Allow-Methods 24

5.3.2.6 Access-Control-Allow-Headers 24

5.3.2.7 Cache-Control 24

5.3.3 HTTP response codes 24

5.4 Common API data types 25

5.4.0 General 25

5.4.1 Simple data types 25

5.4.2 Structured data types 25

5.4.2.1 DataSamplingRule type 25

5.4.2.1A DataReportingCondition type 26

5.4.2.2 DataReportingRule type 26

5.4.3 Enumerated data types 27

5.4.3.1 DataCollectionClientType enumeration 27

5.4.3.2 DataReportingConditionType enumeration 27

5.4.3.3 DataReportingEventTrigger enumeration 27

5.5 Explanation of API data model notation 27

6 Ndcaf\_DataReportingProvisioning service 28

6.1 General 28

6.2 Resources 28

6.2.1 Resource structure 28

6.2.2 Data Reporting Provisioning Sessions resource collection 29

6.2.2.1 Description 29

6.2.2.2 Resource definition 29

6.2.2.3 Resource Standard Methods 30

6.2.2.3.1 Ndcaf\_DataReportingProvisioning\_CreateSession operation using POST method 30

6.2.3 Data Reporting Provisioning Session resource 31

6.2.3.1 Description 31

6.2.3.2 Resource definition 31

6.2.3.3 Resource standard methods 31

6.2.3.3.1 Ndcaf\_DataReportingProvisioning\_RetrieveSession operation using GET method 31

6.2.3.3.2 Ndcaf\_DataReportingProvisioning\_UpdateSession operation 33

6.2.3.3.3 Ndcaf\_DataReportingProvisioning\_DestroySession operation using DELETE method 33

6.2.4 Data Reporting Configurations resource collection 34

6.2.4.1 Description 34

6.2.4.2 Resource definition 34

6.2.4.3 Resource standard methods 35

6.2.4.3.1 Ndcaf\_DataReportingProvisioning\_CreateConfiguration operation using POST method 35

6.2.5 Data Reporting Configuration resource 35

6.2.5.1 Description 35

6.2.5.2 Resource definition 36

6.2.5.3 Resource standard methods 36

6.2.5.3.1 Ndcaf\_DataReportingProvisioning\_RetrieveConfiguration operation using GET method 36

6.2.5.3.2 Ndcaf\_DataReportingProvisioning\_UpdateConfiguration operation using PUT or PATCH method 38

6.2.5.3.3 Ndcaf\_DataReportingProvisioning\_DestroyConfiguration operation using DELETE method 40

6.3 Data model 42

6.3.1 General 42

6.3.2 Structured data types 43

6.3.2.1 DataReportingProvisioningSession resource type 43

6.3.2.2 DataReportingConfiguration resource type 44

6.3.2.2A DataReportingConfigurationPatch resource type 45

6.3.2.3 DataAccessProfile type 46

6.3.3 Simple data types and enumerations 46

6.3.3.1 EventConsumerType enumeration 46

6.3.3.2 DataAggregationFunctionType enumeration 47

6.4 Error handling 47

6.5 Mediation by NEF 47

7 Ndcaf\_DataReporting service 47

7.1 General 47

7.2 Resources 47

7.2.1 Resource structure 47

7.2.2 Data Reporting Sessions resource collection 48

7.2.2.1 Description 48

7.2.2.2 Resource definition 48

7.2.2.3 Resource standard methods 48

7.2.2.3.1 Ndcaf\_DataReporting\_CreateSession operation using POST method 48

7.2.3 Data Reporting Session resource 50

7.2.3.1 Description 50

7.2.3.2 Resource definition 50

7.2.3.3 Resource standard methods 50

7.2.3.3.1 Ndcaf\_DataReporting\_RetrieveSession operation using GET method 50

7.2.3.3.2 Ndcaf\_DataReporting\_UpdateSession operation using PUT method 52

7.2.3.3.3 Ndcaf\_DataReporting\_DestroySession operation using DELETE method 52

7.2.3.4 Resource custom operations 53

7.2.3.4.1 Ndcaf\_DataReporting\_Report operation using POST method 53

7.3 Data model 54

7.3.1 General 54

7.3.2 Structured data types 55

7.3.2.1 DataReportingSession resource type 55

7.3.2.2 Void 56

7.3.2.3 DataReport type 56

7.3.3 Simple data types and enumerations 57

7.3.3.1 DataDomain enumeration 57

7.3.3.2 Void 57

7.3.3.3 Void 57

7.4 Error handling 57

7.5 Mediation by NEF 57

8 UE Data Collection, Reporting and Notification API 57

8.1 Overview 57

8.2 Direct Data Collection Client state model 59

8.2.1 Overview 59

8.2.2 Direct Data Collection Client internal operations 60

8.2.3 Starting and stopping the Direct Data Collection Client 60

8.3 Methods 60

8.3.1 Overview 60

9 Security and Access Control 62

10 Data packaging strategies 62

10.1 General 62

10.2 Service Experience data packaging strategies 62

10.3 Location data packaging strategies 62

10.4 Communication data packaging strategies 63

10.5 Performance data packaging strategies 63

10.6 Application-specific data packaging strategies 63

10.7 Planned trips data packaging strategies 63

Annex A (normative): Data reporting data models 64

A.1 Introduction 64

A.2 Service Experience reporting 64

A.2.1 ServiceExperienceRecord type 64

A.2.2 PerFlowServiceExperienceInfo type 64

A.3 UE Location reporting 65

A.3.1 LocationRecord type 65

A.4 Communication reporting 65

A.4.1 CommunicationRecord type 65

A.5 Network performance Data reporting 66

A.5.1 PerformanceDataRecord type 66

A.6 Application-specific reporting 66

A.6.0 Introduction 66

A.6.1 ApplicationSpecificRecord type 66

A.7 Trip Plan reporting 67

A.7.0 Introduction 67

A.7.1 TripPlanRecord type 67

Annex B (normative): OpenAPI representation of REST APIs for data collection and reporting 68

B.1 General 68

B.2 Data types applicable to multiple services 68

B.3 Ndcaf\_DataReportingProvisioning service API 70

B.4 Ndcaf\_DataReporting service API 77

Annex C (informative): Change history 84

# 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 set of APIs and associated resource structures and data models pertaining to the collection and reporting of UE-related data (synonymously “UE data”) by the Data Collection Application Function (AF) in the 5G System for subsequent event exposure services offered to network consumer entities, as defined in 3GPP TS 23.501 [2], TS 23.502 [3], TS 23.288 [4], TS 29.517 [5], TS 29.510 [6] and TS 26.531 [7] .

# 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 23.501: "System architecture for the 5G System (5GS)".

[3] 3GPP TS 23.502: "Procedures for the 5G System (5GS)".

[4] 3GPP TS 23.288: "Architecture enhancements for 5G System (5GS) to support network data analytics services".

[5] 3GPP TS 29.517: "5G System; Application Function Event Exposure Service; Stage 3".

[6] 3GPP TS 29.510: "5G System; Network Function Repository Services; Stage 3".

[7] 3GPP TS 26.531: "Data Collection and Reporting; General Description and Architecture".

[8] IETF RFC 6750: "The OAuth 2.0 Authorization Framework: Bearer Token Usage".

[9] 3GPP TS 29.500: "5G System; Technical Realization of Service Based Architecture; Stage 3".

[10] "CORS (Cross-Origin Resource Sharing)" protocol as defined in the ‘Fetch’ standard of WHATWG: <https://fetch.spec.whatwg.org/#cors-protocol>.

[11] 3GPP TS 29.502: "5G System; Session Management Services; Stage 3".

[12] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces; Stage 3".

[13] 3GPP TS 26.512: “5G Media Streaming (5GMS); Protocols”.

[14] 3GPP TS 29.122: "T8 reference point for Northbound APIs".

[15] 3GPP TS 29.572: "5G System; Location Management Services; Stage 3".

[16] OpenAPI: "OpenAPI 3.0.0 Specification", <https://github.com/OAI/OpenAPI-Specification/blob/master/versions/3.0.0.md>.

[17] 3GPP TS 29.501: "5G System; Principles and Guidelines for Services Definition; Stage 3".

[18] IETF RFC 9113: "HTTP/2", June 2022.

[19] IETF RFC 9112: "HTTP/1.1", June 2022.

[20] IETF RFC 9110: "HTTP Semantics", June 2022.

[21] Void.

[22] Void.

[23] IETF RFC 9111: "HTTP Caching", June 2022.

[24] Void.

[25] ISO 8601-1:2019: "Date and time – Representations for information interchange – Part 1: Basic rules".

[26] 3GPP TS 29.514: "5G System; Policy Authorization Service; Stage 3".

[27] 3GPP TS 29.522: "5G System; Network Exposure Function Northbound APIs; Stage 3".

[28] IETF RFC 8259: "The JavaScript Object Notation (JSON) Data Interchange Format", December 2017.

# 3 Definitions of terms, symbols and abbreviations

## 3.1 Terms

For the purposes of the present document, the terms given in 3GPP TR 21.905 [1], TS 23.501 [2], TS 23.502 [3], TS 23.288 [4], TS 29.517 [5], TS 29.510 [6], TS 26.531 [7] 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].

**example:** text used to clarify abstract rules by applying them literally.

## 3.2 Symbols

For the purposes of the present document, the following symbols apply:

Void.

## 3.3 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [1], TS 23.501 [2], TS 23.502 [3], TS 23.288 [4], TS 29.517 [5], TS 29.510 [6], TS 26.531 [7] 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].

AF Application Function

AS Application Server

ASP Application Service Provider

DC-AF Data Collection AF

DC-Client Data Collection Client

NEF Network Exposure Function

NRF Network Repository Function

NWDAF Network Data Analytics Function

# 4 Procedures for Data Collection and Reporting

## 4.1 General

This clause specifies the stage 3 procedures for data collection and reporting.

## 4.2 Network-side procedures

### 4.2.1 General

This clause specifies the procedures used between network-side entities for UE data collection and reporting, along with related functionality pertaining to the provisioning, management, and delivery of such data between the Data Collection AF and consumer entities.

### 4.2.2 Data Collection AF registration with NRF

This clause specifies the use of the Nnrf\_NFManagement service API as defined in TS 29.510 [7] and invoked by a Data Collection AF instance to register its profile with the NRF in order to enable the discovery of the Data Collection AF by consumer entities.

### 4.2.3 Data collection and reporting provisioning

#### 4.2.3.1 General

An Application Service Provider, via its Provisioing AF, may use the procedures in this clause to supply data collection and reporting provisioning information, as defined in clause 4.2 of TS 26.531 [7], to the Data Collection AF via reference point R1 in the form of Data Reporting Configuration resources. A given Data Reporting Configuration comprises instructions and other information to be followed/used by data collection clients in their collection, processing and reporting to the Data Collection AF of UE data for the associated application service. In addition, a Data Reporting Configuration instance may contain data exposure restrictions for use by the Data Collection AF in controlling access by consumers to event data pertaining to the UE data that it has collected.

The provisioning process begins with the Provisioning AF using the procedures defined in clause 4.2.3.2 to create a Provisioning Session resource as an umbrella for subsequent Data Reporting Configuration resources.

The process then proceeds with the Provisioning AF using the procedures defined in clause 4.2.3.3 to provide the Data Collection AF with one or more Data Reporting Configuration resources. Each set of provisioning information pertains to one application, identified by its External Application Identifier, and one type of exposed event, uniquely identified in the 5G System by its Event ID, as defined in clause 4.15.1 of TS 23.502 [3].

#### 4.2.3.2 Provisioning Session procedures

##### 4.2.3.2.1 General

Prior to provisioning of data collection and reporting , the Provisioning AF shall create a new Provisioning Session. The following CRUD operations are used to manage Provisioning Session resources. Additional details are provided under clause 6.

##### 4.2.3.2.2 Create Provisioning Session

This procedure shall be used by the Provisioning AF to create a new Provisioning Session. The HTTP POST method shall be used for this purpose.

Upon successful creation, the Data Collection AF shall respond with a 201 (Created) response message that includes the resource identifier of the newly created Provisioning Session in the body of the reply, and along with the URL of the resource, including its resource identifier, shall be returned as part of the HTTP Location header field.

##### 4.2.3.2.3 Retrieve Provisioning Session properties

This procedure is used by the Provisioning AF to obtain the properties of an existing Provisioning Session from the Data Collection AF. The HTTP GET method shall be used for this purpose.

##### 4.2.3.2.4 Update Provisioning Session properties

The Update operation is not allowed on Provisioning Session resources.

##### 4.2.3.2.5 Destroy Provisioning Session

This procedure is used by the Provisioning AF to destroy a Provisioning Session. The Data Collection AF shall use the HTTP DELETE method for this purpose.

As a side-effect of destroying a Provisioning Session, the Data Collection AF shall release any associated resources, purge any cached data, and delete all UE data reporting configurations associated with this Provisioning Session.

#### 4.2.3.3 Data Reporting Configuration procedures

##### 4.2.3.3.1 General

Upon the successful creation of a Provisioning Session, the Provisioning AF shall use the procedures defined in this clause to configure UE data collection and reporting functionality specific to an application in the Data Collection AF. This clause defines the basic procedures. Additional details are provided under clause 6.3.

##### 4.2.3.3.2 Data Reporting Configuration entity

A given instance of a Data Reporting Configuration resource is identified by the dataReportingConfigurationId property of the DataReportingConfiguration resource, and applies to one type of data collection client. The properties of this resource, as defined in the following clauses, pertain to UE data collection and reporting by different data collection clients to the Data Collection AF, and control of access by different consumer entities to event data exposed by the Data Collection AF.

The type of a Data Reporting Configuration resource is identified by the dataCollectionClientType property of the DataReportingConfiguration resource as specified in clause 6.3.2.2.

NOTE 1: The *dataCollectionClientType* property corresponds to the *Data collection client type* parameter in table 4.6.2-1 of TS 26.531 [7].

The Data Reporting Configuration resource shall include one or more sets of instructions for data collection clients on the collection and reporting of UE data to the Data Collection AF, and may contain one or more sets of data exposure restrictions, expressed as Data Access Profiles (see clause 6.3.2.3), each one determining the level of access by event consumer entities to the event-related UE data reported to the Data Collection AF. A Data Access Profile defines the granularity of access to a particular subset of collected event data parameters for the Event ID of concern. This granularity is expressed as a set of data aggregation functions along the time, user, and location dimensions. The subset of parameters to be exposed is identified using a controlled vocabulary specific to the Event ID. An authorization procedure is in place to determine which Data Access Profile is granted to a particular event consumer entity.

NOTE 2: The process of matching event consumers to Data Access Profiles is implementation-specific and therefore beyond the scope of the present document.

##### 4.2.3.3.3 Create Data Reporting Configuration

This procedure is used by the Provisioning AF to create a Data Reporting Configuration resource within the scope of a particular Provisioning Session. The HTTP POST method shall be used for this purpose and the request message body may include a DataReportingConfiguration resource, as specified under clause 6.3.2.2.

Upon success, the Data Collection AF shall respond with a 201 (Created) response message and the resource URL for the newly-created Data Reporting Configuration resource shall be returned in the Location header field.

If the procedure is unsuccessful, the Data Collection AF shall provide an error response status code as defined in clause 5.3.3.

This procedure may be performed multiple times to provision different Data Reporting Configurations in the scope of a particular Provisioning Session.

##### 4.2.3.3.4 Retrieve Data Reporting Configuration

This procedure is used by the Provisioning AF to obtain the properties of an existing Data Reporting Configuration resource from the Data Collection AF. The HTTP GET method shall be used for this purpose.

If successful, the Data Collection AF shall respond with a 200 (OK) and the requested DataReportingConfiguration resource shall be returned in the body of the HTTP response message.

If the procedure is unsuccessful, the Data Collection AF shall provide an error response status code as defined in clause 5.3.3.

##### 4.2.3.3.5 Update Data Reporting Configuration

The update operation is invoked by the Provisioning AF to initially upload the representation of a Data Reporting Configuration resource created using the procedure in clause 4.2.3.3.3 or, in the case of an existing Data Reporting Configuration resource, to entirely replace or modify certain properties of that resource. All available properties may be updated. The HTTP PATCH or HTTP PUT methods shall be used for the update operation.

If the procedure is successful, the Data Collection AF shall respond with a 200 (OK) reflecting the successful update operation.

If the procedure is unsuccessful, the Data Collection AF shall provide a response code as defined in clause 5.3.3.

##### 4.2.3.3.6 Destroy Data Reporting Configuration

This operation is used by the Provisioning AF to destroy a Data Reporting Configuration resource and to terminate the related UE data reporting procedure. The HTTP DELETE method shall be used for this purpose.

As a result, the Data Collection AF should release any associated resources, deliver any pending data to subscribed recipients, as appropriate to the Event ID in question, and delete any corresponding configurations.

If the procedure is successful, the Data Collection AF shall respond with a 200 (OK) response message.

If the procedure is unsuccessful, the Data Collection AF shall provide an error response status code as defined in clause 5.3.3.

### 4.2.4 Configuration of Indirect Data Collection Client

#### 4.2.4.1 General

Indirect reporting operation involves first a UE Application instance sending domain-specific UE data to an Application Service Provider (ASP) server instance across reference point R8. That UE data is passed from to an Indirect Data Reporting Client function operated by the Application Service Provider to be subsequently sent as data reports, possibly in processed form, to a Data Collection AF instance. Operation of the latter procedure is conditioned upon the Indirect Data Collection Client having acquired its data collection and reporting configuration from the Data Collection AF by means of the Ndcaf\_DataReporting service (either directly across the reference point R3 or via an equivalent service exposed by the NEF, depending on whether the Indirect Data Collection Client and the Data Collection AF reside in the same or separate trust domains).

The Indirect Data Collection Client shall obtain its configuration by invoking the Ndcaf\_DataReporting\_CreateSession service operation, as described under clause 7.2,2,3.1.

The configuration information is contained in a generic data collection and reporting configuration envelope that shall include at minimum the baseline configuration parameters defined in clause 4.6.3 of TS 26.531 [7]. In particular, the configuration shall specify the domain-specific parameters associated with the specified Event ID(s) to be reported to the Data Collection AF.

#### 4.2.4.2 Indirect Data Collection Client retrieves its initial configuration by creating a Data Reporting Session

The call flow in figure 4.2.4.2‑1 shows the interaction between the Indirect Data Collection Client and the Data Collection AF at the initial configuration of the Indirect Data Collection Client.



Figure 4.2.4.2-1: Initial configuration of Indirect Data Collection Client

The steps in this procedure are as follows:

1. The Indirect Data Collection Client invokes the *Ndcaf\_DataReporting\_CreateSession* service operation by sending an HTTP POST request to the Data Collection AF (see clauses 7.2.2.2 and 7.2.2.3.1). A *DataReportingSession* resource entity (see clause 7.3.2.1) is included in the request message body, but only properties *externalApplicationId* and *supportedDomains* are present (because the other properties are unknown to the Indirect Data Collection Client).

2. In its *201 Created* response, the Data Collection AF provides a *DataReportingSession* resource entity in the message body, which expands the content of the request message body in step 1 by adding the properties *sessionId*, *validUntil*, *reportForDomains* and *reportingCondition*. HTTP cache control headers are set on the response message in accordance with clause 5.3.2.1.

The Indirect Data Collection Client is now configured.

#### 4.2.4.3 Updating and renewing data collection and reporting configuration

##### 4.2.4.3.1 Introduction

The data collection and reporting configuration may change as a result of subscriptions to events exposed by the Data Collection AF, for example, as a result of narrower or wider filters applied to an event subscription. There are two ways for a modified data collection and reporting configuration to be acquired by the Indirect Data Collection Client:

1. The Indirect Data Collection Client invokes the *Ndcaf\_DataReporting\_RetrieveSession* service operation (see clause 4.2.4.3.2).

2. The Data Collection AF supplies a *DataReportingSession* in response to a data report submitted by the Indirect Data Collection Client (see clause 4.2.4.3.3).

##### 4.2.4.3.2 Indirect Data Collection Client retrieves up-to-date configuration

This operation is typically performed when the current *DataReportingSession* stored in the Indirect Data Collection Client is about to expire.



Figure 4.2.4.3.2-1: Indirect Data Collection Client retrieves up-to-date DataReportingSession

The steps in this procedure are as follows:

1. The Indirect Data Collection Client requests the *DataReportingSession* for the current session by using the *Ndcaf\_DataReporting \_RetrieveSession* service operation (see clauses 7.2.3.2 and 7.2.3.3.1).

2. The Data Collection AF provides the latest *DataReportingSession* in the message body of a *200 OK* response. In addition, the Data Collection AF may change properties *reportForDomains* and *reportingCondition*. HTTP cache control headers are set on the response message in accordance with clause 5.3.2.1

##### 4.2.4.3.3 DataReportingSession updated in response to data reporting

See clause 4.2.6.

#### 4.2.4.4 Indirect Data Collection Client destroys Data Reporting Session

The Indirect Data Collection Client may destroy a Data Reporting Session and the data collection and reporting configuration it represents by invoking the *Ndcaf\_DataReporting\_DestroySession* service operation.



Figure 4.2.4.4-1: Indirect Data Collection Client destroys DataReportingSession

The steps in this procedure are as follows:

1. The Indirect Data Collection Client invokes the *Ndcaf\_DataReporting\_DestroySession* service operation by sending an HTTP DELETE request to the Data Collection AF (see clauses 7.2.3.2 and 7.2.3.3.3).

2. The Data Collection AF acknowledges the destruction of the session and its configuration with a *204 No Content* response.

### 4.2.5 Configuration of Application Server

#### 4.2.5.1 General

An Application Server (AS) instance, as a type of data collection client, acquires its domain-specific data collection and reporting configuration from a Data Collection AF instance by means of the Ndcaf\_DataReporting service (either directly across reference point R4 or via an equivalent service exposed by the NEF, depending on whether the AS and the Data Collection AF reside in the same or separate trust domains).

Similar to clause 4.2.4, the AS shall obtain its configuration by invoking the Ndcaf\_DataReporting\_CreateSession service operation, as described under clause 7.2.2.3.1.

The configuration information is contained in a generic data collection and reporting configuration envelope that shall include at minimum the baseline configuration parameters defined in clause 4.6.3 of TS 26.531 [7]. The configuration shall specify the domain-specific parameters associated with the specified Event ID(s) to be reported to the Data Collection AF.

#### 4.2.5.2 Application Server retrieves its initial configuration by creating a Data Reporting Session

The call flow in figure 4.2.5.2‑1 shows the interaction between the Application Server and the Data Collection AF at the initial configuration of the Application Server.



Figure 4.2.5.2-1: Initial configuration of Application Server

The steps in this procedure are as follows:

1. The Application Server invokes the *Ndcaf\_DataReporting\_CreateSession* service operation by sending an HTTP POST request to the Data Collection AF (see clauses 7.2.2.2 and 7.2.2.3.1). A *DataReportingSession* resource entity (see clause 7.3.2.1) is included in the request message body, but only properties *externalApplicationId* and *supportedDomains* are present (because the other properties are unknown to the Application Server).

2. In its *201 Created* response, the Data Collection AF provides a *DataReportingSession* resource entity in the message body, which expands the content of the request message body in step 1 by adding the properties *sessionId*, *reportForDomains* and *reportingCondition*. HTTP cache control headers are set on the response message in accordance with clause 5.3.2.1.

The Application Server is now configured.

#### 4.2.5.3 Updating and renewing data collection and reporting configuration

##### 4.2.5.3.1 Introduction

The data collection and reporting configuration may change as a result of subscriptions to events exposed by the Data Collection AF, for example, as a result of narrower or wider filters applied to an event subscription. There are two ways for a modified data collection and reporting configuration to be acquired by the Application Server:

1. The Application Server invokes the *Ndcaf\_DataReporting\_RetrieveSession* service operation (see clause 4.2.5.3.2).

2. The Data Collection AF supplies a *DataReportingSession* in response to a data report submitted by the Application Server (see clause 4.2.5.3.3).

##### 4.2.5.3.2 Application Server retrieves up-to-date configuration

This operation is typically performed when the current *DataReportingSession* stored in the Application Server is about to expire.



Figure 4.2.5.3.2-1: Application Server retrieves up-to-date DataReportingSession

The steps in this procedure are as follows:

1. The Application Server requests the *DataReportingSession* for the current session by using the *Ndcaf\_DataReporting \_RetrieveSession* service operation (see clauses 7.2.3.2 and 7.2.3.3.1).

2. The Data Collection AF provides the latest *DataReportingSession* in the message body of a *200 OK* response The Data Collection AF may change properties *reportForDomains* and *reportingCondition*. HTTP cache control headers are set on the response message in accordance with clause 5.3.2.1

##### 4.2.5.3.3 DataReportingSession updated in response to data reporting

See clause 4.2.7.

#### 4.2.5.4 Application Server destroys Data Reporting Session

The Application Server may destroy a Data Reporting Session and the data collection and reporting configuration it represents by invoking the *Ndcaf\_DataReporting\_DestroySession* service operation.



Figure 4.2.5.4-1: Application Server destroys DataReportingSession

The steps in this procedure are as follows:

1. The Application Server invokes the *Ndcaf\_DataReporting\_DestroySession* service operation by sending an HTTP DELETE request to the Data Collection AF (see clauses 7.2.3.2 and 7.2.3.3.3).

2. The Data Collection AF acknowledges the destruction of the session and its configuration with a *204 No Content* response.

### 4.2.6 Indirect data reporting

After acquiring its data collection and configuration from the Data Collection AF, and in accordance with this configuration, the Indirect Data Collection Client shall send reporting domain-specific data reports to the Data Collection AF by invoking the *Ndcaf\_DataReporting\_Report* service operation across reference point R3 as described under clause 7.2.3.4.1. The data reports shall be supplied in a generic data report envelope that includes at minimum the baseline information for data reporting defined in clause 4.6.4 of TS 26.531 [7].

The call flow in figure 4.2.6‑1 shows the procedure for indirect data reporting.

NOTE: It is assumed that the Indirect Data Collection Client is already configured per the procedures specified in clause 4.2.4.



Figure 4.2.6-1: Indirect data reporting

1. When the *reportCondition* of a *DataReportingSession* is fulfilled, the Indirect Data Collection Client invokes the *Ndcaf\_DataReporting\_Report* service operation (see clauses 7.2.3.2 and 7.2.3.4.1) by issuing an HTTP POST request to the Data Collection AF. The request message body is a *DataReport* (see clause 7.3.2.3).

2. In the HTTP response the Data Collection AF may provide an up-to-date *DataReportingSession*. The Indirect Data Collection Client shall take note of any changes and act accordingly.

### 4.2.7 Reporting by Application Server

After acquiring its data collection and configuration from the Data Collection AF, and in accordance with this configuration, the Application Server shall send reporting domain-specific data reports to the Data Collection AF by invoking the *Ndcaf\_DataReporting\_Report* service operation across reference point R4 as described under clause 7.2.3.4.1. The data reports shall be supplied in a generic data report envelope that includes at minimum the baseline information for data reporting defined in clause 4.6.4 of TS 26.531 [7].

The call flow in figure 4.2.7‑1 shows the procedure for data reporting by the Application Server.

NOTE: It is assumed that the Application Server is already configured per the procedures specified in clause 4.2.5.



Figure 4.2.7-1: Data reporting by Application Server

1. When the *reportCondition* of a *DataReportingSession* is fulfilled, the Application Server invokes the *Ndcaf\_DataReporting\_Report* service operation (see clauses 7.2.3.2 and 7.2.3.4.1) by issuing an HTTP POST request to the Data Collection AF. The request message body is a *DataReport* (see clause 7.3.2.3).

2. In the HTTP response the Data Collection AF may provide an up-to-date *DataReportingSession*. The Application Server shall take note of any changes and act accordingly.

### 4.2.8 Event subscription, management and publication

This clause pertains to the use of the *Naf\_EventExposure* service API as defined in TS 29.517 [5] and invoked by the NWDAF or an Application Server Provider AF to subscribe to and receive UE data related event information from a Data Collection AF.

## 4.3 UE-to-network procedures

### 4.3.1 General

This clause specifies the procedures used between the UE and Network Functions in support of provisioning a data collection and reporting configuration in the UE’s Direct Data Collection Client, and subsequent reporting of the collected UE data to the Data Collection AF.

### 4.3.2 Configuration of Direct Data Reporting Client

#### 4.3.2.1 General

A Direct Data Reporting Client instance acquires its domain-specific data collection and reporting configuration from a Data Collection AF instance by means of the Ndcaf\_DataReporting service across reference point R2.

The Direct Data Reporting Client shall obtain its configuration by invoking the Ndcaf\_DataReporting\_CreateSession service operation, as described under clause 7.2.2.3.1.

The configuration information is contained in a generic data collection and reporting configuration envelope that shall include at minimum the baseline configuration parameters defined in clause 4.6.3 of TS 26.531 [7]. The configuration shall specify the domain-specific parameters associated with the specified Event ID(s) to be reported to the Data Collection AF.

#### 4.3.2.2 Direct Data Collection Client retrieves its initial configuration by creating a Data Reporting Session

The call flow in figure 4.3.2.2‑1 shows the interaction between the Direct Data Collection Client and the Data Collection AF at the initial configuration of the Direct Data Collection Client.



Figure 4.3.2.2-1: Initial configuration of Direct Data Collection Client

The steps in this procedure are as follows:

1. The Direct Data Collection Client invokes the Ndcaf\_DataReporting\_CreateSession service operation by sending an HTTP POST request to the Data Collection AF (see clauses 7.2.2.2 and 7.2.2.3.1). A DataReportingSession resource entity (see clause 7.3.2.1) is included in the request message body, but only properties externalApplicationId and supportedDomains are present (because the other properties are unknown to the Direct Data Collection Client).

2. In its 201 Created response, the Data Collection AF provides an extended version of the DataReportingSession resource entity in the message body, adding the properties sessionId, reportForDomains and reportingCondition to the entity received from the Direct Data Collection Client in step 1. HTTP cache control headers are set on the response message in accordance with clause 5.3.2.1.

The Direct Data Collection Client is now configured.

#### 4.3.2.3 Updating and renewing data collection and reporting configuration

##### 4.3.2.3.1 Introduction

The data collection and reporting configuration may change as a result of subscriptions to events exposed by the Data Collection AF, for example, as a result of narrower or wider filters applied to an event subscription. There are two ways the data collection and reporting configuration can be updated or renewed by the Direct Data Collection Client:

1. The Direct Data Collection Client invokes the Ndcaf\_DataReporting\_RetrieveSession service operation (see clause 4.3.2.3.2).

2. The Data Collection AF supplies a DataReportingSession in response to a data report submitted by the Direct Data Collection Client (see clause 4.3.2.3.3).

##### 4.3.2.3.2 Direct Data Collection Client retrieves up-to-date configuration

This operation is typically performed when the current DataReportingSession stored in the Direct Data Collection Client is about to expire.



Figure 4.3.2.3.2-1: Direct Data Collection Client retrieves up-to-date DataReportingSession

The steps in this procedure are as follows:

1. The Direct Data Collection Client requests the DataReportingSession for the current session by using the Ndcaf\_DataReporting\_RetrieveSession service operation (see clauses 7.2.3.2 and 7.2.3.3.1).

2. The Data Collection AF provides the latest DataReportingSession in the message body of a 200 OK response. The Data Collection AF may change properties reportForDomains and reportingCondition. HTTP cache control headers are set on the response message in accordance with clause 5.3.2.1.

##### 4.3.2.3.3 DataReportingSession updated in response to data reporting

See clause 4.3.3.

#### 4.3.2.4 Direct Data Collection Client destroys Data Reporting Session

The Direct Data Collection Client may destroy a Data Reporting Session and the data collection and reporting configuration it represents by invoking the Ndcaf\_DataReporting\_DestroySession service operation.



Figure 4.3.2.3-1: Direct Data Collection Client destroys DataReportingSession

The steps in this procedure are as follows:

1. The Direct Data Collection Client invokes the Ndcaf\_DataReporting\_DestroySession service operation by sending an HTTP DELETE request to the Data Collection AF (see clauses 7.2.2.2 and 7.2.3.3.3).

2. The Data Collection AF acknowledges the destruction of the session and its configuration with a 204 No Content response.

### 4.3.3 Direct data reporting

After acquiring its data collection and configuration from the Data Collection AF, and in accordance with this configuration, the Direct Data Collection Client shall send domain-specific data reports to the Data Collection AF by invoking the Ndcaf\_DataReporting\_Report service operation across reference point R2 as described under clause 7.2.3.4.1. The data reports shall be supplied in a generic data report envelope that includes at minimum the baseline information for data reporting defined in clause 4.6.4 of TS 26.531 [7].

The call flow in figure 4.3.3‑1 shows the procedure for direct data reporting.

NOTE: It is assumed that the Direct Data Collection Client is already configured per the procedures specified in clause 4.3.2.



Figure 4.3.3-1: Direct data reporting

1. When the reportCondition of a DataReportingSession is fulfilled, the Direct Data Collection Client invokes the Ndcaf\_DataReporting\_Report service operation (see clauses 7.2.2.2 and 7.2.3.4.1) by issuing an HTTP POST request to the Data Collection AF. The request message body is a DataReport (see clause 7.3.2.3).

2. In the HTTP response the Data Collection AF may provide an up-to-date DataReportingSession. The Direct Data Collection Client shall take note of any changes and act accordingly.

## 4.4 UE-internal procedures

### 4.4.1 General

This clause specifies the procedures used by internal UE entities, namely a UE Application and the associated Direct Data Collection Client, in support of UE data collection by the Direct DC-Client for subsequent reporting to the DC-AF.

As described in clause 4.2 of TS 26.531 [7], the UE Application shares relevant data with the Direct Data Collection Client via reference point R7 using the API specified in clause 8. In this release, such data sharing is enabled by UE Application configuration via R7 as specified in the subsequent clauses.

The Direct Data Collection Client is presumed to operate as a background service, and its functionality is invoked upon activation of the UE Application (whose role or task is domain-specific).

Each running instance of a UE Application compliant with the present document shall be associated with a dedicated instance of the Direct Data Collection Client, i.e., a separate logical *data collection and reporting context* exists for each pair of UE Application instance and Data Collection Client instance. If there are multiple UE Applications running concurrently on a UE, each UE Application requires a unique data collection and reporting context mapped to a separate Data Reporting Session at reference point R2.

### 4.4.2 Application registration procedure

Upon activation, the UE Application requests its UE data collection and reporting configuration from the Direct Data Collection Client by invoking the registerUeApplication method at reference point R7. The UE Application provides as input parameters its External Application Identifier, Application Service Provider identifier, and information on its callback listener (for receiving notifications from the Direct Data Collection Client). Using another input parameter, the UE Application also indicates its consent for the UE identity (i.e. GPSI) to be included in Data Reports sent to the Data Collection AF.

As a consequence, the Direct Data Collection Client establishes a new Data Reporting Session with the Data Collection AF using the procedure specified in clause 4.3.2.2. The Ndcaf\_DataReporting\_CreateSession invocation includes the GPSI of the UE (if consent is given by the UE Application) or otherwise the Direct Data Collection Client shall instead generate an opaque client reporting identifier that is globally unique and stable (e.g. a UUID) and include this in the invocation of the service operation.

If successful, the Direct Data Collection Client returns a UE data collection and reporting configuration to the UE Application based on the information returned by the Data Collection AF in the newly created Data Reporting Session resource. As indicated in TS 26.531 [7], a generic envelope containing that data collection and reporting configuration information is employed and its content, as indicated in table 4.6.3-1 of [7], is reporting domain-specific.

### 4.4.4 Data reporting procedure

The UE Application reports data to the Direct Data Collection Client by invoking the reportUeData method on the Direct Data Collection Client at reference point R7.

As a consequence, the Direct Data Collection Client may report the UE data provided by invoking the procedure specified in clause 4.3.3. Depending on the Data Reporting Configuration, the Direct Data Collection Client may instead store the UE data and forward it later. If the UE Application has instructed the Direct Data Collection Client to prioritise immediate delivery of a UE data report by setting the expedite directive, the Direct Data Collection Client forwards the UE data by invoking the procedure specified in clause 4.3.3 on the basis that the reporting condition for the data domain in question has been fulfilled.

### 4.4.5 Configuration update procedure

The Direct Data Collection Client notifies the UE Application of changes to the UE data collection and reporting configuration by sending a dataCollectionAndReporting‌Configuration‌Changed callback notification.

The UE Application responds by invoking the getDataCollectionAnd‌ReportingConfiguration method at reference point R7 to obtain the new configuration and acts upon it accordingly.

### 4.4.6 Procedure for changing consent to report the UE identifier

The UE Application can change its consent to reveal the GPSI of the UE in Data Reports sent to the Data Collection AF during the course of a data reporting session by invoking the setUserConsent method on the Direct Data Collection Client at reference point R7.

As a consequence, the Direct Data Collection Client shall destroy the current Data Reporting Session and create a new one that includes either the GPSI of the UE or the opaque client reporting identifier, according to whether consent is granted or withdrawn.

### 4.4.7 Procedure for changing the opaque client reporting identifier

The UE Application may reset the opaque client reporting identifier at any time by invoking the resetClientReporting‌Identifier method at reference point R7.

As a consequence, the Direct Data Reporting Client shall destroy the current Data Reporting Session. It shall generate a new opaque client reporting identifier (e.g. UUID) and shall include this value when invoking the procedure to create a replacement Data Reporting Session specified in clause 4.3.2.2.

### 4.4.8 Application deregistration procedure

Upon deactivation, the UE Application revokes its data collection and reporting context by invoking the deregisterUe‌Application method at reference point R7.

As a consequence, the Direct Data Collection Client shall destroy the Data Reporting Session using the procedure specified in clause 4.3.2.4 after first flushing any unreported UE data using the procedure specified in clause 4.3.3.

# 5 General Aspects of APIs for Data Collection and Reporting

## 5.1 Overview

## 5.2 HTTP resource URIs and paths

The resource URI used in each HTTP request to the API provider shall have the structure defined in subclause 4.4.1 of TS 29.501 [17], i.e.:

{apiRoot}/{apiName}/{apiVersion}/{apiSpecificResourceUriPart}

with the following components:

- {apiRoot} shall be set as described in TS 29.501 [17].

- {apiName}shall be set as defined by the following clauses.

- {apiVersion} shall be set to "v1".

- {apiSpecificResourceUriPart} shall be set as described in the following clauses.

## 5.3 Usage of HTTP

### 5.3.1 HTTP protocol version

The version-independent semantics of HTTP specified in RFC 9110 [20] shall be followed.

For interfaces internal to 5GC, HTTP/2, RFC 9113 [18], shall be used as specified in clause 5.2 of TS 29.500 [9].

For other interfaces, support of HTTP/1.1 (per RFC 9112 [19]) over TLS is mandatory and support of HTTP/2 (per RFC 9113 [18]) over TLS is recommended.

### 5.3.2 HTTP standard headers

#### 5.3.2.1 General

See clause 5.2.2 of TS 29.500 [9] for the usage of HTTP standard headers.

#### 5.3.2.2 Origin

The Origin header shall be supported by the Data Collection AF at reference points R1, R2, R3 and R4.

#### 5.3.2.3 Content type

The format of HTTP message bodies specified in the present document shall be JSON as specified in clause 5.4 of 3GPP TS 29.500 [9]. The use of the JSON format shall be signalled by the content type "application/json", as specified in section 11 of IETF RFC 8259 [12].

#### 5.3.2.4 Access-Control-Allow-Origin

The Access-Control-Allow-Origin header shall be supported by the Data Collection AF at reference points R1, R2, R3, R4.

#### 5.3.2.5 Access-Control-Allow-Methods

The Access-Control-Allow-Methods header shall be supported by the Data Collection AF at reference points R1, R2, R3 and R4.

#### 5.3.2.6 Access-Control-Allow-Headers

The Access-Control-Allow-Headers header shall be supported by the Data Collection AF at reference points R1, R2, R3 and R4.

#### 5.3.2.7 Cache-Control

The caching semantics specified in RFC 9110 [20] and RFC 9111 [23] shall be followed.

### 5.3.3 HTTP response codes

Guidelines for HTTP 4xx (Client Error) status codes in response to the invocation of the UE data collection and reporting APIs defined in clauses 6 and 7 are specified in clause 4.8 of TS 29.501 [17].

## 5.4 Common API data types

### 5.4.0 General

Table 5.4.0‑1 specifies data types re-used from other specifications by the common API data types defined in clause 5.4, including a reference to their respective specifications.

Table 5.4.0‑1: Externally defined data types used by common data types

|  |  |  |
| --- | --- | --- |
| Data type | Comments | Reference |
| Float | A floating-point number. | TS 29.571 [12] |
| Uri | A Uniform Resource Identifier. |  |
| Percentage | A proportion represented as a floating-point number between 0.0 and 100.0. | TS 26.510 [13] |
| LocationArea5G | A list of areas where the UE is located. | TS 29.122 [14] |

### 5.4.1 Simple data types

### 5.4.2 Structured data types

#### 5.4.2.1 DataSamplingRule type

Table 5.4.2.1‑1 Definition of DataSamplingRule type

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Property name | Data type | Cardinality | Usage | Description |
| samplingPeriod | Float | 0..1 | C: RW  U: RW | How often (expressed in seconds) the UE data parameter(s) are to be measured and logged by the data collection client. |
| locationFilter | array(LocationArea5G) | 0..1 | C: RW  U: RW | Indication of the UE location(s) at which UE data parameter(s) are to be collected by the data collection client. |
| NOTE: A logical conjunction (i.e., Boolean AND) is meant when more than one property is present in the same information element – i.e., data is to be collected at the indicated sampling frequency when the UE is present at any of the indicated locations. | | | | |

#### 5.4.2.1A DataReportingCondition type

Table 5.4.2.1A-1: Definition of DataReportingCondition type

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Property name | Data type | P | Cardinality | Description |
| type | ReportingConditionType | M | 1 | Type of reporting condition (see clause 5.4.3.2). |
| period | DurationSec | C | 0..1 | The time period between UE data reports.  Only present when type is INTERVAL. |
| parameter | string | C | 0..1 | Identifies the parameter that triggers a UE data report when it crosses the value threshold.  Only present when type is THRESHOLD. |
| threshold | Double, Float, Int32, Int64, Uint16, Uint32, Uint64, or Uinteger | C | 0..1 | The value that parameter must cross to trigger a UE data report.  Only present when type is THRESHOLD. |
| reportWhenBelow | boolean | C | 0..1 | The direction in which the threshold must be crossed to trigger a UE data report.  If true, a report is triggered when the value of parameter drops below threshold.  If false, a report is triggered when the value of parameter exceeds threshold.  Only present when type is THRESHOLD. |
| eventTrigger | ReportingEventTrigger | C | 0..1 | The type of event that triggers a UE data report (see clause 5.4.3.3).  Only present when type is EVENT. |

#### 5.4.2.2 DataReportingRule type

Table 5.4.2.2‑1 Definition of DataReportingRule type

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Property name | Data type | Cardinality | Usage | Description |
| reporting‌Probability | Percentage | 0..1 | C: RW  U: RW | The probability of reporting by the data collection client of the UE data parameter(s) it has logged.  If omitted, the default value of this parameter shall be 100 percent.  On each occasion the reporting condition (see clause 7.3.2.2) is met, the data collection client shall use a random number generator to produce an integer value between 0 and 100, and a report is sent to the Data Collection AF if the random value is less than or equal to this parameter. |
| reporting‌Format | Uri | 0..1 | C: RW  U: RW | Deprecated in this release.  A default reporting format for the data domain in question shall be assumed. |
| data‌Packaging‌Strategy | string | 0..1 | C: RW  U: RW | Strategy for packaging UE data into reports sent to the Data Collection AF (e.g., maximum number of data records per report, maximum report size). See clause 10.  If absent, the data collection client should employ the default data packaging strategy specified by the indicated reporting format or, in the absence of such specification, any reasonable data packaging strategy. |
| NOTE: A logical conjunction (i.e., Boolean AND) is meant when more than one property is present in the same information element – i.e., data is to be reported with the indicated probability, according to the indicated reporting format and data packaging strategy. | | | | |

### 5.4.3 Enumerated data types

#### 5.4.3.1 DataCollectionClientType enumeration

Enumeration of the DataCollectionClientType is defined in table 5.4.3.1-1.

Table 5.4.3.1-1 Enumeration of DataCollectionClientType

|  |  |
| --- | --- |
| Enumeration value | Description |
| DIRECT | Direct Data Collection Client. |
| INDIRECT | Indirect Data Collection Client. |
| APPLICATION\_SERVER | Application Server performing the role of a data collection client. |

#### 5.4.3.2 DataReportingConditionType enumeration

Table 5.4.3.2-1: DataReportingConditionType enumeration

|  |  |
| --- | --- |
| Enumeration value | Description |
| INTERVAL | Report at a regular interval. |
| THRESHOLD | Report when a threshold is passed. |
| EVENT | Report on event. |

#### 5.4.3.3 DataReportingEventTrigger enumeration

This enumeration lists the possible events (EVENT in table 5.4.3.2-1) that may be used to trigger the submission of a UE data report to the Data Collection AF.

Table 5.4.3.3-1: DataReportingEventTrigger enumeration

|  |  |
| --- | --- |
| Enumeration value | Description |
| LOCATION | A new location has been entered (refer to clause A.3). |
| DESTINATION | A new destination has been recorded (refer to clause A.7). |

## 5.5 Explanation of API data model notation

The data models in the following API clauses are specified using the following notational conventions:

1. Data models are expressed as an unordered list of JSON properties [28] with one property defined in each row of the data model table.

2. The *Data type* column defines the type of the property, according to JSON notation [28].

3. The keyword Array in the *Data type* column indicates that zero or more elements of the data type in brackets are included. The number of elements in the array may additionally be constrained by normative text in the *Description* column.

4. The *Cardinality* column defines whether a property is optional or mandatory. An array with cardinality 0 indicates that the array property is optional in the data structure. An array with cardinality 1 indicates that the property is mandatory in the data structure, even when the array is empty.

5. The keyword Object in the *Data type* column indicates a structured sub-object of an unnamed type whose properties are defined inline in the indented table rows immediately afterwards. The Object type may be combined with the Array type.

6. In the case of data types specifying RESTful resources, the additional *Usage* column defines the property behaviour for each CRUD Operation as follows:

- "C" (Create), "R" (Retrieve) and "U" (Update) refers to the CRUD procedure during which the property is present in the resource type. (The Delete operation never takes any input data type.)

- "RO" signifies a read-only property. Only the API provider function is permitted to modify the property value. The API invoker is only permitted to read the value. Any attempt by the API invoker to set the value in a Create or Update operation is ignored by the API provider.

- "WO" signifies a write-only property. The API invoker is permitted to include the property in Create or Update request messages, but the property is not present in responses to Retrieve operations.

- "RW" signifies a read/write property. The API provider and API invoker may both modify the property value.

7. An additional read-only property (denoted "C: RO" and "R: RO") is included at the start of all data models defining resources that are members of a RESTful collection. This property is populated by the API provider at the point of creation with the unique identifier of the resource within its parent collection, and the value of this property corresponds to the leaf path element in the RESTful URL of the created resource.

# 6 Ndcaf\_DataReportingProvisioning service

## 6.1 General

This clause specifies the API used by the Provisioning AF of an Application Service Provider to create and manage one or more Data Reporting Provisioning Session resources in the Data Collection AF, and for each Data Reporting Provisioning Session, to create and manipulate its subordinate Data Reporting Configuration resource.

## 6.2 Resources

### 6.2.1 Resource structure

Figure 6.2.1-1 depicts the URL path model for the Ndcaf\_DataReportingProvisioning service.



Figure 6.2.1‑1: URL path model of Ndcaf\_DataReportingProvisioning service API

Table 6.2.1-1 provides an overview of the resources and applicable HTTP methods.

Table 6.2.1‑1: Resources and methods overview

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Service name | Operation name | Resource name | Resource path suffix | HTTP method | Description |
| Ndcaf\_DataReporting‌Provisioning | CreateSession | Data Reporting Provisioning Sessions collection | /sessions | POST | Provisioning AF establishes a Data Reporting Provisioning Session resource at the Data Collection AF. |
|  | RetrieveSession | Data Reporting Provisioning Session | /sessions/{sessionId} | GET | Retrieves an existing Data Reporting Provisioning Session resource from the Data Collection AF. |
| DestroySession |  |  | DELETE | Destroys a Data Reporting Provisioning Session resource. |
|  | CreateConfiguration | Data Reporting Configurations collection | /sessions/‌*{sessionId}*/‌configurations | POST | Creates a Data Reporting Configuration resource at the Data Collection AF. |
| RetrieveConfiguration | Data Reporting Configuration | /sessions/‌*{sessionId}*/‌configurations/‌*{configurationId}* | GET | Retrieves an existing Data Reporting Configuration resource from the Data Collection AF. |
|  | UpdateConfiguration | PUT,  PATCH | Modifies an existing Data Reporting Configuration resource at the Data Collection AF. |
| DestroyConfiguration | DELETE | Destroys a Data Reporting Configuration resource at the Data Collection AF. |

### 6.2.2 Data Reporting Provisioning Sessions resource collection

#### 6.2.2.1 Description

The Data Reporting Provisioning Sessions resource collection represents the set of all Data Reporting Provisioning Sessions at a given Data Collection AF (service) instance. The resource collection enables a Provisioning AF to create and manage individual Data Reporting Provisioning Session resources at the Data Collection AF.

#### 6.2.2.2 Resource definition

Resource URL: **{apiRoot}/3gpp-ndcaf\_data-reporting-provisioning/{apiVersion}/sessions**

This resource shall support the resource URL variables defined in table 6.2.2.2-1.

Table 6.2.2.2-1: Resource URL variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 5.2. |
| apiVersion |  | See clause 5.2. |

#### 6.2.2.3 Resource Standard Methods

##### 6.2.2.3.1 Ndcaf\_DataReportingProvisioning\_CreateSession operation using POST method

This service operation shall support the URL query parameters specified in table 6.2.2.3.1-1.

Table 6.2.2.3.1-1: URL query parameters supported by the POST method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Data type | P | Cardinality | Description |
|  |  |  |  |  |

This service operation shall support the request data structures specified in table 6.2.2.3.1-2, the request headers specified in table 6.2.2.3.1-3. and the response data structures and response codes specified in table 6.2.2.3.1-4.

Table 6.2.2.3.1-2: Data structures supported by the POST request body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| DataReportingProvisioning‌Session | M | 1 | Data supplied by the Provisioning AF to enable creation of a new Data Reporting Provisioning Session at the Data Collection AF. |

Table 6.2.2.3.1-3: Headers supported for POST requests on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| HTTP request  header | Data type | P | Cardinality | Description |
| Authorization | string | M | 1 | For authentication of the Provisioning AF (see NOTE). |
| Origin | string | O | 0..1 | Indicates the origin of the requester. |
| NOTE: If OAuth 2.0 authorization is used the value is Bearer followed by a string representing the access token, see section 2.1 of RFC 6750 [8]. | | | | |

Table 6.2.2.3.1-4: Data structures supported by the POST response body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| DataReportingProvisioningSession | M | 1 | 201 Created | The creation of a Data Reporting Provisioning Session resource is confirmed by the Data Collection AF. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.7.1-1 of TS 29.500 [9] also apply. | | | | |

Table 6.2.2.3.1-5: Headers supported by the *201* (*Created*) response code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| HTTP response header | Data type | P | Cardinality | Description |
| Location | string | M | 1 | The URL of the newly created resource at the Data Collection AF, according to the structure: {apiRoot}/ndcaf-data-reporting-provisioning/{apiVersion}/sessions/{sessionId} |
| Access-Control-Allow-Origin | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header. |
| Access-Control-Allow-Methods | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header.  Valid values: POST, PUT, DELETE |
| Access-Control-Expose-Headers | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header.  Valid values: Location |

NOTE: Standard HTTP redirection using a 3xx response code with the Location header as well as Alt-Svc are allowed.

### 6.2.3 Data Reporting Provisioning Session resource

#### 6.2.3.1 Description

The Data Reporting Provisioning Session resource represents a single session within the collection of Data Reporting Provisioning Sessions at a given Data Collection AF service instance.

#### 6.2.3.2 Resource definition

Resource URL: **{apiRoot}/3gpp-ndcaf\_data-reporting-provisioning/{apiVersion}/sessions/{sessionionId}**

This resource shall support the resource URI variables defined in table 6.2.3.2-1.

Table 6.2.3.2-1: Resource URL variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 5.2. |
| apiVersion | String | See clause 5.2 |
| sessionId | string | Identifier of the Data Reporting Provisioning Session at the Data Collection AF. |

#### 6.2.3.3 Resource standard methods

##### 6.2.3.3.1 Ndcaf\_DataReportingProvisioning\_RetrieveSession operation using GET method

This method shall support the URL query parameters specified in table 6.2.3.3.1-1 and the request headers specified in table 6.2.3.3.1-2.

Table 6.2.3.3.1-1: URL query parameters supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
|  |  |  |  |  |

Table 6.2.3.3.1-2: Headers supported for GET requests on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| HTTP request header | Data type | P | Cardinality | Description |
| Authorization | string | M | 1 | For authentication of the Provisioning AF (see NOTE). |
| Origin | string | O | 0..1 | Indicates the origin of the requester. |
| NOTE: If OAuth 2.0 authorization is used, the value is Bearer followed by a string representing the access token, see section 2.1 RFC 6750 [8]. | | | | |

This method shall support the response data structures and response codes specified in table 6.2.3.3.1-3.

Table 6.2.3.3.1-3: Data structures supported by the GET response body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response codes | Description |
| DataReportingProvisioningSession | M | 1 | 200 OK | The requested Data Reporting Provisioning Session resource is returned to the Provisioning AF by the Data Collection AF. |
| ProblemDetails | O | 0..1 | 307 Temporary Redirect | Temporary redirection during a Data Reporting Session Provisioning session retrieval procedure. The response shall include a Location header field containing an alternative URL of the resource located in another Data Collection AF (service) instance.  Applicable if the feature "ES3XX" (Extended Support of HTTP 307/308 redirection as defined in TS 29.502 [11]) is supported. |
| ProblemDetails | O | 0..1 | 308 Permanent Redirect | Permanent redirection during a Data Reporting Session Provisioning session retrieval procedure. The response shall include a Location header field containing an alternative URL of the resource located in another Data Collection AF (service) instance.  Applicable if the feature "ES3XX" is supported. |
| ProblemDetails | O | 0..1 | 404 Not Found | This Data Reporting Provisioning Session resource does not exist (see NOTE 2). |
| NOTE 1: The mandatory HTTP error status codes for the GET method as listed in table 5.2.7.1-1 of TS 29.500 [9] also apply.  NOTE 2: Failure cases are described in subclause 6.2.4. | | | | |

Table 6.2.3.3.1-4: Headers supported by the 200 response code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| HTTP response header | Data type | P | Cardinality | Description |
| Access-Control-Allow-Origin | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header. |
| Access-Control-Allow-Methods | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header.  Valid values: POST, PUT, DELETE. |
| Access-Control-Expose-Headers | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header.  Valid values: Location. |

Table 6.2.3.3.1-5: Headers supported by the 307 and 308 response codes on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| HTTP response header | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URL of the resource located in another Data Collection AF (service) instance. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the request is redirected |
| Access-Control-Allow-Origin | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header. |
| Access-Control-Allow-Methods | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header.  Valid values: POST, PUT, DELETE |
| Access-Control-Expose-Headers | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header.  Valid values: Location |

##### 6.2.3.3.2 Ndcaf\_DataReportingProvisioning\_UpdateSession operation

The PUT or PATCH method shall not be used as the update operation is not permitted on the Data Reporting Provisioning Session resource.

##### 6.2.3.3.3 Ndcaf\_DataReportingProvisioning\_DestroySession operation using DELETE method

This service operation shall support the URL query parameters specified in table 6.2.3.3.3-1.

Table 6.2.3.3.3-1: URL query parameters supported by the DELETE method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
|  |  |  |  |  |

This method shall support the request data structures and headers as specified in tables 6.2.3.3.3-2 and 6.2.3.3.3-3, respectively. Furthermore, this method shall support the response data structures as specified in table 6.2.3.3.3-4, and the different response codes as specified in tables 6.2.3.3.3-5 and 6.2.3.3.3-6, respectively.

Table 6.2.3.3.3-2: Data structures supported by the DELETE request body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
|  |  |  |  |

Table 6.2.3.3.3-3: Headers supported for DELETE requests on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| HTTP request header | Data type | P | Cardinality | Description |
| Authorization | string | M | 1 | For authentication of the Provisioning AF (see NOTE). |
| Origin | string | O | 0..1 | Indicates the origin of the requester.) |
| NOTE: If OAuth 2.0 authorization is used the value is *Bearer* followed by a string representing the access token, see section 2.1 of RFC 6750 [8]. | | | | |

Table 6.2.3.3.3-4: Data structures supported by the DELETE response body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| n/a |  |  | 204 No Content | Success case: The Data Reporting Provisioning Session resource matching the sessionId was destroyed at the Data Collection AF. |
| ProblemDetails | O | 0..1 | 307 Temporary Redirect | Temporary redirection during Data Reporting Provisioning Session destruction. The response shall include a Location header field containing an alternative URL of the resource located in another Data Collection AF (service) instance.  Applicable if the feature "ES3XX" as defined in TS 29.502 [11] is supported. |
| ProblemDetails | O | 0..1 | 308 Permanent Redirect | Permanent redirection during Data Reporting Provisioning Session destruction. The response shall include a Location header field containing an alternative URL of the resource located in another Data Collection AF (service) instance.  Applicable if the feature "ES3XX" is supported. |
| ProblemDetails | O | 0..1 | 404 Not Found | The Data Reporting Provisioning Session resource does not exist (see NOTE 2). |
| NOTE 1: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.7.1-1 of TS 29.500 [9] also apply.  NOTE 2: Failure cases are described in subclause 6.2.4. | | | | |

Table 6.2.3.3.3-5: Headers supported by the 204 response code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| HTTP response header | Data type | P | Cardinality | Description |
| Access-Control-Allow-Origin | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header. |
| Access-Control-Allow-Methods | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header.  Valid values: POST, PUT, DELETE. |
| Access-Control-Expose-Headers | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header.  Valid values: Location. |

Table 6.2.3.3.3-6 Headers supported by the 307 and 308 response codes on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| HTTP response header | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URL of the resource located in another Data Collection AF (service) instance. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the request is redirected |
| Access-Control-Allow-Origin | string | O | 0..1 | Part of CORS [10].Supplied if the request included the Origin header. |
| Access-Control-Allow-Methods | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header.  Valid values: POST, PUT, *PATCH,* DELETE. |
| Access-Control-Expose-Headers | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header.  Valid values: Location. |

### 6.2.4 Data Reporting Configurations resource collection

#### 6.2.4.1 Description

The Data Reporting Configurations resource collection represents the set of all Data Reporting Configurations that have been created within the scope of a particular Data Reporting Provisioning Session at a given Data CollectionAF (service) instance. The resource collection enables a Provisioning AF to create and manage individual Data Reporting Configuration resources at the Data Collection AF.

#### 6.2.4.2 Resource definition

Resource URL: **{apiRoot}/3gpp-ndcaf\_data-reporting-provisioning/{apiVersion}/sessions/{sessionId}/‌configurations/**

This resource shall support the resource URL variables defined in table 6.2.4.2-1.

Table 6.2.4.2-1: Resource URL variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 5.2. |
| apiVersion |  | See clause 5.2. |
| sessionId | ResourceId | Identifier of the Data Reporting Provisioning Session resource at the Data Collection AF. |

#### 6.2.4.3 Resource standard methods

##### 6.2.4.3.1 Ndcaf\_DataReportingProvisioning\_CreateConfiguration operation using POST method

This service operation shall support the URL query parameters specified in table 6.2.4.3.1-1.

Table 6.2.4.3.1-1: URL query parameters supported by the POST method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Data type | P | Cardinality | Description |
|  |  |  |  |  |

This service operation shall support the request data structures and headers specified in tables 6.2.4.3.1-2 and 6.2.4.3.1‑3, respectively, and the response data structures and response codes specified in table 6.2.4.3.1-4.

Table 6.2.4.3.1-2: Data structures supported by the POST request body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| DataReportingConfiguration | M | 1 | Configuration data supplied by the Provisioning AF to the Data Collection AF regarding UE data collection and reporting by data collection clients, and subsequent event exposure by the Data Collection AF. |

Table 6.2.4.3.1-3: Headers supported for POST requests on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| HTTP request  header | Data type | P | Cardinality | Description |
| Authorization | string | M | 1 | For authentication of the Provisioning AF (see NOTE). |
| Origin | string | O | 0..1 | Indicates the origin of the requester. |
| NOTE: If OAuth 2.0 authorization is used the value is Bearer followed by a string representing the access token, see section 2.1 of RFC 6750 [8]. | | | | |

Table 6.2.4.3.1-4: Data structures supported by the POST response body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| DataReportingConfiguration | M | 1 | 201 Created | The creation of a Data Reporting Configuration resource is confirmed by the Data Collection AF. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.7.1-1 of TS 29.500 [9] also apply. | | | | |

### 6.2.5 Data Reporting Configuration resource

#### 6.2.5.1 Description

A Data Reporting Configuration represents a subordinate resource of a single Data Reporting Provisioning Session resource within the scope of an individual application of an Application Service Provider and associated event. As described in clause 4.2.3.3.2, it contains instructions for data collection clients regarding the collection, processing and reporting of UE data to the Data Collection AF, and may include data exposure restriction rules to be followed by the Data Collection AF for controlling event exposure by to subscriber entities.

#### 6.2.5.2 Resource definition

Resource URL: **{apiRoot}/3gpp-ndcaf\_data-reporting-provisioning/{apiVersion}/sessions/{sessionId}/‌configurations/{configurationId}**

This resource shall support the resource URL variables defined in table 6.2.5.2-1.

Table 6.2.5.2-1: Resource URL variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 5.2. |
| apiVersion |  | See clause 5.2. |
| sessionId | ResourceId | Identifier of the Data Reporting Provisioning Session resource at the Data Collection AF. |
| configurationId | ResourceId | Identifier of the Data Reporting Configuration resource at the Data Collection AF. |

#### 6.2.5.3 Resource standard methods

##### 6.2.5.3.1 Ndcaf\_DataReportingProvisioning\_RetrieveConfiguration operation using GET method

This method shall support the URL query parameters specified in table 6.2.5.3.1-1 and the headers specified in table 6.2.5.3.1-2.

Table 6.2.5.3.1-1: URL query parameters supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
|  |  |  |  |  |

Table 6.2.5.3.1-2: Headers supported for GET requests on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| HTTP request header | Data type | P | Cardinality | Description |
| Authorization | string | M | 1 | For authentication of the Provisioning AF (see NOTE). |
| Origin | string | O | 0..1 | Indicates the origin of the requester. |
| NOTE: If OAuth 2.0 authorization is used, the value is Bearer followed by a string representing the access token, see section 2.1 RFC 6750 [8]. | | | | |

This method shall support the response data structures and response codes specified in table 6.2.5.3.1-3.

Table 6.2.5.3.1-3: Data structures supported by the GET response body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response codes | Description |
| DataReportingConfiguration | M | 1 | 200 OK | The requested Data Reporting Configuration resource is returned to the Provisioning AF by the Data Collection AF. |
| ProblemDetails | O | 0..1 | 307 Temporary Redirect | Temporary redirection during a Data Reporting Configuration retrieval procedure. The response shall include a Location header field containing an alternative URL of the resource located in another Data Collection AF (service) instance.  Applicable if the feature "ES3XX" (Extended Support of HTTP 307/308 redirection as defined in TS 29.502 [11]) is supported. |
| ProblemDetails | O | 0..1 | 308 Permanent Redirect | Permanent redirection during a Data Reporting Session Configuration retrieval procedure. The response shall include a Location header field containing an alternative URL of the resource located in another Data Collection AF (service) instance.  Applicable if the feature "ES3XX" is supported. |
| ProblemDetails | O | 0..1 | 404 Not Found | This Data Reporting Provisioning Session resource does not exist (see NOTE 2). |
| NOTE 1: The mandatory HTTP error status codes for the GET method as listed in table 5.2.7.1-1 of TS 29.500 [9] also apply.  NOTE 2: Failure cases are described in clause 6.4. | | | | |

Table 6.2.5.3.1-4: Headers supported by the 200 response code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| HTTP response header | Data type | P | Cardinality | Description |
| Access-Control-Allow-Origin | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header. |
| Access-Control-Allow-Methods | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header.  Valid values: POST, PUT, DELETE. |
| Access-Control-Expose-Headers | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header.  Valid values: Location. |

Table 6.2.5.3.1-5: Headers supported by the 307 and 308 response codes on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| HTTP response header | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URL of the resource located in another Data Collection AF (service) instance. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the request is redirected |
| Access-Control-Allow-Origin | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header. |
| Access-Control-Allow-Methods | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header.  Valid values: POST, PUT, DELETE |
| Access-Control-Expose-Headers | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header.  Valid values: Location |

##### 6.2.5.3.2 Ndcaf\_DataReportingProvisioning\_UpdateConfiguration operation using PUT or PATCH method

This method shall support the URL query parameters specified in table 6.2.5.3.2-1.

Table 6.2.5.3.2-1: URL query parameters supported by the PUT or PATCH method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
|  |  |  |  |  |

The PUT and PATCH methods shall support the request data structures specified in tables 6.2.5.3.2-2 and 6.2.5.3.2-2a, respectively, the request headers specified in 6.2.5.3.2-3, and the response data structures and response codes specified in tables 6.2.5.3.2-4 and 6.2.5.3.2-5, respectively.

Table 6.2.5.3.2-2: Data structures supported by the PUT request body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| DataReportingConfiguration | M | 1 | Parameters to replace an existing Data Reporting Configuration resource. |

Table 6.2.5.3.2-2a: Data structures supported by the PATCH request body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| DataReportingConfigurationPatch | M | 1 | Parameters to modify an existing Data Reporting Configuration resource. |

Table 6.2.5.3.2-3: Headers supported for PUT or PATCH requests on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| HTTP request header | Data type | P | Cardinality | Description |
| Authorization | string | M | 1 | For authentication of the Provisioning AF (see NOTE). |
| Origin | string | O | 0..1 | Indicates the origin of the requester. |
| NOTE : If OAuth 2.0 authorization is used the value is *Bearer* followed by a string representing the access token, see section 2.1 RFC 6750 [8] | | | | |

Table 6.2.5.3.2-4: Data structures supported by the PUT or PATCH response body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response codes | Description |
| DataReportingConfiguration | M | 1 | 200 OK | Confirmation of successful replacement or modification of a Data Reporting Configuration resource, along with a representation of the status of the update operation, carried in the response body, is returned by the Data Collection AF. |
| n/a |  | 0 | 204 No Content | Confirmation of successful replacement or modification of a Data Reporting Configuration resource is returned by the Data Collection AF, without an associated response body. |
| ProblemDetails | O | 0..1 | 307 Temporary Redirect | Temporary redirection, during a Data Reporting Configuration update operation. The response shall include a Location header field containing an alternative URL of the resource located in another Data Collection AF (service) instance.  Applicable if the feature "ES3XX" (Extended Support of HTTP 307/308 redirection as defined in TS 29.502 [11]) is supported. |
| ProblemDetails | O | 0..1 | 308 Permanent Redirect | Permanent redirection, during a Data Reporting Configuration update operation. The response shall include a Location header field containing an alternative URL of the resource located in another Data Collection AF (service) instance.  Applicable if the feature "ES3XX" is supported. |
| ProblemDetails | O | 0..1 | 404 Not Found | This Data Reporting Configuration resource does not exist (see NOTE 2). |
| NOTE 1: The mandatory HTTP error status codes for the PUT and PATCH methods listed in table 5.2.7.1-1 of TS 29.500 [9] also apply.  NOTE 2: Failure cases are described in clause 6.4. | | | | |

Table 6.2.5.3.2-5: Headers supported by the 200 or 204 response code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| HTTP response header | Data type | P | Cardinality | Description |
| Access-Control-Allow-Origin | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header. |
| Access-Control-Allow-Methods | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header.  Valid values: POST, PUT, DELETE. |
| Access-Control-Expose-Headers | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header.  Valid values: Location. |

Table 6.2.5.3.2-6: Headers supported by the 307 and 308 response codes on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| HTTP response header | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URL of the resource located in another Data Collection AF (service) instance. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the request is redirected |
| Access-Control-Allow-Origin | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header. |
| Access-Control-Allow-Methods | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header.  Valid values: POST, PUT, *PATCH,* DELETE |
| Access-Control-Expose-Headers | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header.  Valid values: Location |

##### 6.2.5.3.3 Ndcaf\_DataReportingProvisioning\_DestroyConfiguration operation using DELETE method

This service operation shall support the URL query parameters specified in table 6.2.5.3.3-1.

Table 6.2.5.3.3-1: URL query parameters supported by the DELETE method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
|  |  |  |  |  |

This method shall support the request data structures and headers specified in tables 6.2.5.3.3-2 and 6.2.5.3.3-3, respectively. Furthermore, this method shall support the response data structures specified in table 6.2.5.3.3-4, and the different response codes specified in tables 6.2.5.3.3-5 and 6.2.5.3.3-6, respectively.

Table 6.2.5.3.3-2: Data structures supported by the DELETE request body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
|  |  |  |  |

Table 6.2.5.3.3-3: Headers supported for DELETE requests on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| HTTP request header | Data type | P | Cardinality | Description |
| Authorization | string | M | 1 | For authentication of the Provisioning AF (see NOTE). |
| Origin | string | O | 0..1 | Indicates the origin of the requester.) |
| NOTE: If OAuth 2.0 authorization is used the value is *Bearer* followed by a string representing the access token, see section 2.1 of RFC 6750 [8]. | | | | |

Table 6.2.5.3.3-4: Data structures supported by the DELETE response body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| n/a |  |  | 204 No Content | Success case: The Data Reporting Configuration resource matching the configurationId was destroyed at the Data Collection AF. |
| ProblemDetails | O | 0..1 | 307 Temporary Redirect | Temporary redirection during Data Reporting Configuration destruction. The response shall include a Location header field containing an alternative URL of the resource located in another Data Collection AF (service) instance.  Applicable if the feature "ES3XX" as defined in TS 29.502 [11] is supported. |
| ProblemDetails | O | 0..1 | 308 Permanent Redirect | Permanent redirection during Data Reporting Configuration destruction. The response shall include a Location header field containing an alternative URL of the resource located in another Data Collection AF (service) instance.  Applicable if the feature "ES3XX" is supported. |
| ProblemDetails | O | 0..1 | 404 Not Found | The Data Reporting Configuration resource does not exist (see NOTE 2). |
| NOTE 1: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.7.1-1 of TS 29.500 [9] also apply.  NOTE 2: Failure cases are described in clause 6.4. | | | | |

Table 6.2.5.3.3-5: Headers supported by the 204 response code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| HTTP response header | Data type | P | Cardinality | Description |
| Access-Control-Allow-Origin | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header. |
| Access-Control-Allow-Methods | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header.  Valid values: POST, PUT, DELETE. |
| Access-Control-Expose-Headers | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header.  Valid values: Location. |

Table 6.2.5.3.3-6 Headers supported by the 307 and 308 response codes on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| HTTP response header | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URL of the resource located in another Data Collection AF (service) instance. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the request is redirected |
| Access-Control-Allow-Origin | string | O | 0..1 | Part of CORS [10].Supplied if the request included the Origin header. |
| Access-Control-Allow-Methods | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header.  Valid values: POST, PUT, *PATCH,* DELETE. |
| Access-Control-Expose-Headers | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header.  Valid values: Location. |

## 6.3 Data model

### 6.3.1 General

Table 6.3.1-1 specifies the data types used by the Ndcaf\_DataReportingProvisioning service operations.

Table 6.3.1-1: Data types specific to Ndcaf\_DataReportingProvisioning service operations

|  |  |  |
| --- | --- | --- |
| Data type | Clause defined | Description |
| DataReportingProvisioningSession | 6.3.2.1 | A session provisioned in the Data Collection AF for the purpose of collecting, reporting and exposing UE data for a particular type of Event. |
| DataReportingConfiguration | 6.3.2.2 | The provisioned configuration for one type of data collection client within the scope of a Data Reporting Provisioning Session. |
| DataReportingConfigurationPatch | 6.3.2.2A | Parameters to be modified in an existing provisioned configuration for one type of data collection client within the scope of a Data Reporting Provisioning Session. |

Table 6.3.1-2 specifies data types re-used from other specifications by the Ndcaf\_DataReportingProvisioning service operations, including a reference to their respective specifications.

Table 6.3.1-2: Externally defined data types used by Ndcaf\_DataReportingProvisioning service operations

|  |  |  |
| --- | --- | --- |
| Data type | Comments | Reference |
| AfEvent | Identifies a type of event. | TS 29.517 [5] |
| ApplicationId | Identifies the reporting application. | TS 29.571 [12] |
| DateTime | A point in time, expressed as an ISO 8601 [25] date and time. |
| DurationSec | A period of time, expressed in seconds. |
| Double |  |
| Float |  |
| Int32 |  |
| Int64 |  |
| Uint16 |  |
| Uint32 |  |
| Uint64 |  |
| Uinteger |  |

### 6.3.2 Structured data types

#### 6.3.2.1 DataReportingProvisioningSession resource type

Table 6.3.2.1-1: Definition of DataReportingProvisioningSession resource type

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Property name | Data type | Cardinality | Usage | Description |
| provisioningSessionId | string | 1..1 | C: RO R: RO U: RO | A unique identifier for this Data Reporting Provisioning Session assigned by the Data Collection AF when the resource is created. |
| aspId | AspId | 1..1 | C: W R: RO U: RO | The identity of the Application Service Provider (as specified in clause 5.6.2.3 of TS 29.514 [26]) whose Provisioning AF is responsible for this Data Reporting Provisioning Session. |
| externalApplicationId | ApplicationID | 1..1 | C: RW R: RO U: RO | The external application identifier (see TS 29.571 [12]), nominated by the Provisioning AF, to which this Data Reporting Provisioning Session pertains, and which is present in data reports submitted to the Data Collection AF.  This property may also be used by the Event Consumer AF (located outside trusted domain) to subscribe to events in the Data Collection AF (located inside trusted domain). |
| internalApplicationId | ApplicationID | 0..1 | C: RW R: RO U: RO | The internal application identifier (see TS 29.571 [12]) to be used by event consumers inside the trusted domain (including the NWDAF, the Event Consumer AF and the NEF) when subscribing to events in the Data Collection AF.  This shall be provided by a Provisioning AF deployed inside the trusted domain when it creates a Data Reporting Provisioning Session. When the Provisioning AF is deployed outside the trusted domain, the NEF shall supply this property on behalf of the Provisioning AF by translating the externalApplicationId value supplied above into the corresponding internal application identifier here.  Always present when this Data Reporting Provisioning Session is returned to an entity inside the trusted domain. Never present when the Data Reporting Provisioning Session is returned to an entity outside the trusted domain. |
| eventId | AfEvent | 1..1 | C: RW R: RO U: RO | The type of event to which this Data Reporting Provisioning Session pertains. (See clause 5.6.3.3 of TS 29.517 [5].) |
| dataReportingConfigurationIds | array(ResourceId) | 0..1 | C: RO R: RO U: RO | A set of identifiers for Data Reporting Configurations currently associated with this Data Reporting Provisioning Session.  Always present in responses from the Data Collection AF, but may be an empty array if there is no Data Reporting Configurations currently. |

#### 6.3.2.2 DataReportingConfiguration resource type

Table 6.3.2.2-1: Definition of DataReportingConfiguration resource type

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Property name | Data type | Cardinality | Usage | Description |
| dataReportingConfigurationId | ResourceId | 1..1 | C: RO  U: – | A unique identifier for this Data Reporting Configuration assigned by the Data Collection AF when the resource is created.. |
| dataCollectionClientType | DataCollection‌Client‌Type | 1..1 | C: RW  U: – | The type of data collection client to which this Data Reporting Configuration pertains (see clause 5.4.3.1). |
| authorizationURL | Url | 0..1 | C: RW  U: RW | A URL that may be used to authorize the consumer entity prior to a data reporting subscription. |
| dataSamplingRules | array(Data  SamplingRule) | 0..1 | C: RW  U: RW | A set of definitions (see clause 5.4.2.1), each pertaining to the domain-specific parameters associated with the Event ID of the parent Data Reporting Provisioning Session, representing instructions on how UE data is to be sampled by the data collection client.  If omitted or empty, each parameter shall be sampled at its default frequency in all locations. |
| dataReporting‌Conditions | array(Data‌Reporting‌Condition) | 1..1 | C: RW U: RW | A set of conditions (see clause 5.4.2.1A), each pertaining to the domain-specific parameters associated with the Event ID of the parent Data Reporting Provisioning Session, under which the data collection client reports UE data. |
| dataReportingRules | array(Data  ReportingRule) | 0..1 | C: RW  U: RW | A set of definitions (see clause 5.4.2.2), each pertaining to the domain-specific parameters associated with the Event ID of the parent Data Reporting Provisioning Session and logged by the data collection client, representing instructions on how collected UE data is to be reported by the data collection client to the Data Collection AF.  If omitted or empty, UE data shall be reported whenever the relevant reporting condition (see above) is met, using a default reporting format and data packaging strategy for the data domain associated with the Event ID of the parent Data Reporting Provisioning Session. |
| dataAccessProfiles | array(Data‌Access‌Profile) | 1..1 | C: RW  U: RW | One or more Data Access Profile definitions, each describing a set of data processing instructions, applied by the Data Collection AF when exposing events. |

#### 6.3.2.2A DataReportingConfigurationPatch resource type

Table 6.3.2.2A-1: Definition of DataReportingConfigurationPatch resource type

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Property name | Data type | Cardinality | Usage | Description |
| authorizationURL | Url | 0..1 | C: RW  U: RW | A URL that may be used to authorize the consumer entity prior to a data reporting subscription. |
| dataSamplingRules | array(Data  SamplingRule) | 0..1 | C: RW  U: RW | A set of definitions (see clause 5.4.2.1), each pertaining to the domain-specific parameters associated with the Event ID of the parent Data Reporting Provisioning Session, representing instructions on how UE data is to be sampled by the data collection client.  If omitted or empty, each parameter shall be sampled at its default frequency in all locations. |
| dataReportingConditions | array(Data‌Reporting‌Condition) | 1..1 | C: RW U: RW | A set of conditions (see clause 5.4.2.1A), each pertaining to the domain-specific parameters associated with the Event ID of the parent Data Reporting Provisioning Session, under which the data collection client reports UE data. |
| dataReportingRules | array(Data  ReportingRule) | 0..1 | C: RW  U: RW | A set of definitions (see clause 5.4.2.2), each pertaining to the domain-specific parameters associated with the Event ID of the parent Data Reporting Provisioning Session and logged by the data collection client, representing instructions on how collected UE data is to be reported by the data collection client to the Data Collection AF.  If omitted or empty, UE data shall be reported whenever the relevant reporting condition (see above) is met, using a default reporting format and data packaging strategy for the data domain associated with the Event ID of the parent Data Reporting Provisioning Session. |
| dataAccessProfiles | array(Data‌Access‌Profile) | 0..1 | C: RW  U: RW | One or more Data Access Profile definitions, each describing a set of data processing instructions, applied by the Data Collection AF when exposing events. |

#### 6.3.2.3 DataAccessProfile type

Table 6.3.2.3-1 Definition of DataAccessProfile type

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Property name | Data type | Cardinality | Usage | Description |
| dataAccessProfileId | string | 1..1 | C: RW  U: RW | A unique identifier for this Data Access Profile. |
| *targetEventConsumer‌Types* | Array(Event‌Consumer‌Type) | 1..1 | C:RW  U:RW | The set of Event consumer types (see clause 6.3.3.1) to which this Data Access Profile is targeted.  If the set is empty, this Data Access Profile applies to all types of Event consumer. |
| parameters | Array(String) | 1..1 | C:RW  U:RW | The set of UE data parameters to be collected by the data collection client, and for which the restrictions specified by this Data Access Profile apply.  The parameters are uniquely identified by a controlled vocabulary specific to the Event ID indicated by the parent Data Reporting Provisioning Session.  If the set is empty, the restrictions apply to all parameters for the Event ID of the parent Data Reporting Provisioning Session. |
| timeAccessRestrictions | Object | 0..1 | C:RW  U:RW | Configuration for access restrictions along the time dimension. |
| duration | DurationSec | 1..1 | C:RW  U:RW | The period of time over which access is to be aggregated. |
| aggregationFunctions | Array(Data‌Aggregation‌Function‌Type) | 1..1 | C:RW  U:RW | An ordered, non-empty list of aggregation functions (see clause 6.3.3.2) applied to the event data prior to exposure to event consumers. |
| userAccessRestrictions | Object | 0..1 | C:RW  U:RW | Configuration for access restrictions along the user dimension. |
| groupIds | Array(GroupId) | 1..1 | C:RW  U:RW | Identifiers of the UE groups over which access is to be aggregated. |
| userIds | Array(Gpsi) or Array(Supi) | 1..1 | C:RW  U:RW | Identifiers of the UEs comprising a group over which access is to be aggregated. |
| aggregationFunctions | Array(Data‌Aggregation‌Function‌Type) | 1..1 | C:RW  U:RW | An ordered, non-empty list of aggregation functions (see clause 6.3.3.2) applied to the event data prior to exposure to event consumers. |
| locationAccessRestrictions | Object | 0..1 | C:RW  U:RW | Configuration for access restrictions along the location dimension |
| locationAreas | Array(Location‌Area‌5G) | 1..1 | C:RW  U:RW | Identifiers of geographical areas over which access is to be aggregated. Event data is grouped by the location of the UE during the data collection. |
| aggregationFunctions | Array(Data‌Aggregation‌Function‌Type) | 1..1 | C:RW  U:RW | An ordered, non-empty list of aggregation functions (see clause 6.3.3.2) applied to the event data prior to exposure to event consumers. |
| NOTE: Data types DurationSec, GroupId, Gpsi, Supi and LocationArea5G are defined in TS29.571[13]. | | | | |

### 6.3.3 Simple data types and enumerations

#### 6.3.3.1 EventConsumerType enumeration

Table 6.3.3.1‑1: Definition of EventConsumerType enumeration

|  |  |
| --- | --- |
| Enumeration value | Description |
| NWDAF | The Network Data Analytics Function is the Event Consumer. |
| EVENT\_CONSUMER\_AF | The Event Consumer AF is the Event Consumer. |
| NEF | The Network Exposure Function is the Event Consumer. |

#### 6.3.3.2 DataAggregationFunctionType enumeration

Table 6.3.3.2-1 Definition of DataAggregationFunctionType enumeration

|  |  |
| --- | --- |
| Enumeration value | Description |
| NONE | No aggregation is applied: all values of the UE data parameter(s) are exposed to event consumers. |
| COUNT | The number of observed events over the indicated time period or the indicated set of users or the indicated set of locations is exposed to event consumers. |
| MEAN | The mean average of the values of the UE data parameter(s) over the indicated time period or the indicated set of users or the indicated set of locations is exposed to event consumers. |
| MAXIMUM | The maximum observed value of the UE data parameter(s) over the indicated time period or the indicated set of users or the indicated set of locations is exposed to event consumers. |
| MINIMUM | The minimum observed value of the UE data parameter(s) over the indicated time period or the indicated set of users or the indicated set of locations is exposed to event consumers. |
| SUM | The sum of the values of the UE data parameter(s) over the indicated time period or the indicated set of users or the indicated set of locations is exposed to event consumers. |

## 6.4 Error handling

Guidelines regarding error handling of API invocation associated with the *Ndcaf\_DataReportingProvisioning* service are defined in clause 5.3.3.

## 6.5 Mediation by NEF

In the event that the Provisioning AF and the Data Collection AF are located in different trust domains, e.g., the former entity resides within the trusted domain and the latter entity resides outside the trusted domain (as in clause A.3 or A 4 of TS 26.531 [7]), the NEF shall be employed to mediate the interactions between them, via the *Nnef\_DataReporting‌Provisioning* service API specified in TS 29.522 [27].

# 7 Ndcaf\_DataReporting service

## 7.1 General

This clause specifies the APIs used by clients of the Data Collection AF to obtain a data collection and reporting configuration from, and then report data to, the Data Collection AF.

## 7.2 Resources

### 7.2.1 Resource structure

Figure 7.2.1‑1 depicts the URL path model for the *Ndcaf\_DataReporting* service.



Figure 7.2.1‑1: URL path model of Ndcaf\_DataReporting service API

Table 7.2.1-1 provides an overview of the resources and applicable HTTP methods.

Table 7.2.1-1: Resources and methods overview

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Service name | Operation name | Resource name | Resource path suffix | HTTP method or custom operation path suffix | Description |
| Ndcaf\_DataReporting | CreateSession | Data Reporting Sessions | /sessions | POST | Data collection client establishes a UE data reporting session with the Data Collection AF, providing information about what UE data it can report, and is provided with a configuration in response. |
| RetrieveSession | Data Reporting Session | /sessions/{sessionId} | GET | Retrieves a Data Reporting Session resource from the Data Collection AF. |
| DestroySession | DELETE | Destroys a Data Reporting Session resource. |
| Report | /report (POST) | Data collection client reports data to the Data Collection AF via the established Data Reporting Session. |

### 7.2.2 Data Reporting Sessions resource collection

#### 7.2.2.1 Description

The Data Reporting Sessions resource collection represents the set of all Data Collection Sessions at a given Data Collection AF (service) instance. The resource collection allows a data collection client to create a new Data Reporting Session resource at, and to receive configuration details for that session from, the Data Collection AF.

#### 7.2.2.2 Resource definition

Resource URL: **{apiRoot}/3gpp-ndcaf\_data-reporting/{apiVersion}/sessions**

This resource shall support the resource URL variables defined in table 7.2.2.2-1.

Table 7.2.2.2-1: Resource URL variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 5.2 |
| apiVersion | string | See clause 5.2. |

#### 7.2.2.3 Resource standard methods

##### 7.2.2.3.1 Ndcaf\_DataReporting\_CreateSession operation using POST method

This service operation shall support the URL query parameters specified in table 7.2.2.3.1-1.

Table 7.2.2.3.1-1: URL query parameters supported by the POST method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Data type | P | Cardinality | Description |
|  |  |  |  |  |

This service operation shall support the request data structures specified in table 7.2.2.3.1-2 and the response data structures and response codes specified in table 7.2.2.3.1-4.

Table 7.2.2.3.1-2: Data structures supported by the POST request body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| DataReportingSession | M | 1 | Data supplied by the data collection client to enable creation of a new Data Reporting Session at the Data Collection AF. |

Table 7.2.2.3.1-3: Headers supported for POST requests on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| HTTP request  header | Data type | P | Cardinality | Description |
| Authorization | string | M | 1 | For authentication of the data collection client. (NOTE 1) |
| Origin | string | O | 0..1 | Indicates the origin of the requester. (NOTE 2) |
| NOTE 1: If OAuth 2.0 authorization is used the value is *Bearer* followed by a string representing the access token, see section 2.1 of RFC 6750 [8].  NOTE 2: The Origin header is always supplied if the data collection client is deployed in a web browser. | | | | |

Table 7.2.2.3.1-4: Data structures supported by the POST response body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| DataReportingSession | M | 1 | 201 Created | The creation of a Data Reporting Session is confirmed and configuration data for the data collection client for the session is provided by the Data Collection AF. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.7.1-1 of TS 29.500 [9] also apply. | | | | |

Table 7.2.2.3.1-5: Headers supported by the *201* (*Created*) response code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| HTTP response header | Data type | P | Cardinality | Description |
| Location | string | M | 1 | The URL of the newly created resource at the Data Collection AF. |
| Access-Control-Allow-Origin | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header. |
| Access-Control-Allow-Methods | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header.  Valid values: POST, PUT, DELETE |
| Access-Control-Expose-Headers | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header.  Valid values: Location |

NOTE: Standard HTTP redirection using a 3xx response code with the Location header as well as Alt-Svc are allowed.

### 7.2.3 Data Reporting Session resource

#### 7.2.3.1 Description

The Data Reporting Session resource represents a single session within the collection of Data Reporting Sessions at a given Data Collection AF.

#### 7.2.3.2 Resource definition

Resource URL: **{apiRoot}/3gpp-ndcaf\_data-reporting/{apiVersion}/sessions/{sessionId}**

This resource shall support the resource URI variables defined in table 7.2.3.2-1.

Table 7.2.3.2-1: Resource URL variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 5.2 |
| apiVersion | string | See clause 5.2. |
| sessionId | string | Identifies a Data Reporting Session at the Data Collection AF. |

#### 7.2.3.3 Resource standard methods

##### 7.2.3.3.1 Ndcaf\_DataReporting\_RetrieveSession operation using GET method

This service operation shall support the URL query parameters specified in table 7.2.3.3.1-1 and the request headers specified in table 7.2.3.3.1-2.

Table 7.2.3.3.1-1: URL query parameters supported by the GET method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
|  |  |  |  |  |

Table 7.2.3.3.1-2: Headers supported for GET requests on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| HTTP request header | Data type | P | Cardinality | Description |
| Authorization | string | M | 1 | For authentication of the data collection client. NOTE1 |
| Origin | string | O | 0..1 | Indicates the origin of the requester. NOTE2 |
| NOTE 1: If OAuth 2.0 authorization is used, the value is Bearer followed by a string representing the access token, see section 2.1 of RFC 6750 [8].  NOTE 2: The Origin header is always supplied if the data collection client is deployed in a Web Browser. | | | | |

This service operation shall support the response data structures and response codes specified in table 7.2.3.3.1-3.

Table 7.2.3.3.1-3: Data structures supported by the GET response body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response codes | Description |
| DataReportingSession | M | 1 | 200 OK | The requested Data Reporting Session resource is returned to the Provisioning AF by the Data Collection AF. |
| ProblemDetails | O | 0..1 | 307 Temporary Redirect | Temporary redirection during a Data Reporting Session retrieval procedure. The response shall include a Location header field containing an alternative URL of the resource located in another Data Collection AF (service) instance.  Applicable if the feature "ES3XX" (Extended Support of HTTP 307/308 redirection as defined in TS 29.502 [11]) is supported. |
| ProblemDetails | O | 0..1 | 308 Permanent Redirect | Permanent redirection during a Data Reporting Session retrieval procedure. The response shall include a Location header field containing an alternative URL of the resource located in another Data Collection AF (service) instance.  Applicable if the feature "ES3XX" is supported. |
| ProblemDetails | O | 0..1 | 404 Not Found | This Data Reporting Session resource does not exist. (NOTE 2) |
| NOTE 1: The mandatory HTTP error status codes for the GET method as listed in table 5.2.7.1-1 of TS 29.500 [9] also apply.  NOTE 2: Failure cases are described in clause 7.4. | | | | |

Table 7.2.3.3.1-4: Headers supported by the 200 response code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| HTTP response header | Data type | P | Cardinality | Description |
| Access-Control-Allow-Origin | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header. |
| Access-Control-Allow-Methods | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header.  Valid values: POST, PUT, DELETE. |
| Access-Control-Expose-Headers | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header.  Valid values: Location. |

Table 7.2.3.3.1-5: Headers supported by the 307 and 308 response codes on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| HTTP response header | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URL of the resource located in another Data Collection AF (service) instance. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the request is redirected |
| Access-Control-Allow-Origin | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header. |
| Access-Control-Allow-Methods | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header.  Valid values: POST, PUT, DELETE |
| Access-Control-Expose-Headers | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header.  Valid values: Location |

##### 7.2.3.3.2 Ndcaf\_DataReporting\_UpdateSession operation using PUT method

The update operation is not permitted on the Data Reporting Session resource.

##### 7.2.3.3.3 Ndcaf\_DataReporting\_DestroySession operation using DELETE method

This service operation shall support the URL query parameters specified in table 7.2.3.3.3-1.

Table 7.2.3.3.3-1: URL query parameters supported by the DELETE method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
|  |  |  |  |  |

This service operation shall support the request data structures and headers as specified in tables 7.2.3.3.3-2 and 7.2.3.3.3-3, respectively. Furthermore, this service operation shall support the response data structures as specified in table 7.2.3.3.3-4, and the different response codes as specified in tables 7.2.3.3.3-5 and 7.2.3.3.3-6, respectively.

Table 7.2.3.3.3-2: Data structures supported by the DELETE request body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
|  |  |  |  |

Table 7.2.3.3.3-3: Headers supported for DELETE requests on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| HTTP request header | Data type | P | Cardinality | Description |
| Authorization | string | M | 1 | For authentication of the data collection client. (NOTE 1) |
| Origin | string | O | 0..1 | Indicates the origin of the requester. (NOTE 2) |
| NOTE 1: If OAuth 2.0 authorization is used the value is *Bearer* followed by a string representing the access token, see section 2.1 of RFC 6750 [8].  NOTE 2: The Origin header is always supplied if the data collection client is deployed in a web browser. | | | | |

Table 7.2.3.3.3-4: 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 Data Reporting Session resource matching the sessionId was destroyed at the Data Collection AF. |
| ProblemDetails | O | 0..1 | 307 Temporary Redirect | Temporary redirection during Data Reporting Session destruction. The response shall include a Location header field containing an alternative URL of the resource located in another Data Collection AF (service) instance.  Applicable if the feature "ES3XX" as defined in TS 29.502 [11] is supported. |
| ProblemDetails | O | 0..1 | 308 Permanent Redirect | Permanent redirection during Data Reporting Session destruction. The response shall include a Location header field containing an alternative URL of the resource located in another Data Collection AF (service) instance.  Applicable if the feature "ES3XX" is supported. |
| ProblemDetails | O | 0..1 | 404 Not Found | The Data Reporting Session resource does not exist. (NOTE 2) |
| NOTE 1: The mandatory HTTP error status codes for the DELETE method listed in table 5.2.7.1-1 of TS 29.500 [9] also apply.  NOTE 2: Failure cases are described in clause 7.4. | | | | |

Table 7.2.3.3.3-5: Headers supported by the 204 response code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| HTTP response header | Data type | P | Cardinality | Description |
| Access-Control-Allow-Origin | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header. |
| Access-Control-Allow-Methods | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header.  Valid values: POST, PUT, DELETE. |
| Access-Control-Expose-Headers | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header.  Valid values: Location. |

Table 7.2.2.3.3.3-6 Headers supported by the 307 and 308 response codes on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| HTTP response header | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URL of the resource located in another Data Collection AF (service) instance. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the request is redirected |
| Access-Control-Allow-Origin | string | O | 0..1 | Part of CORS [10].Supplied if the request included the Origin header. |
| Access-Control-Allow-Methods | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header.  Valid values: POST, PUT, DELETE. |
| Access-Control-Expose-Headers | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header.  Valid values: Location. |

#### 7.2.3.4 Resource custom operations

##### 7.2.3.4.1 Ndcaf\_DataReporting\_Report operation using POST method

This operation shall support the URI query parameters specified in table 7.2.3.4.1-1.

Table 7.2.3.4.1-1: URI query parameters supported by the POST method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Data type | P | Cardinality | Description |
|  |  |  |  |  |

This operation shall support the request data structures specified in table 7.2.3.4.1-2 and the request headers specified in table 7.2.3.4.1‑3.

Table 7.2.3.4.1-2: Data structures supported by the POST request body

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| DataReport | M | 1 | UE data reported by the data collection client. |

Table 7.2.3.4.1-3: Headers supported for POST requests

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| HTTP request header | Data type | P | Cardinality | Description |
| Authorization | string | M | 1 | For authentication of the data collection client. (NOTE 1) |
| Origin | string | O | 0..1 | Indicates the origin of the requester. (NOTE 2) |
| NOTE 1: If OAuth 2.0 authorization is used the value is *Bearer* followed by a string representing the access token, see section 2.1 of RFC 6750 [8].  NOTE 2: The Origin header is always supplied if the data collection client is deployed in a web browser. | | | | |

This operation shall support the response data structures and response codes specified in table 7.2.3.4.1-4 and the response headers specified in table  7.2.3.4.1‑5.

Table 7.2.3.4.1-4: Data structures supported by the POST response body

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| DataReportingSession | O | 0..1 | 200 OK | The report was accepted by the Data Collection AF.  A data collection client configuration (updated or unchanged) is provided in the response. |
| n/a |  |  | 204 No Content | The report was accepted by the Data Collection AF and no content is returned in the response body. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.7.1-1 of TS 29.500 [9] also apply. | | | | |

Table 7.2.3.4.1-5: Headers supported by the 200 response code

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| HTTP response header | Data type | P | Cardinality | Description |
| Access-Control-Allow-Origin | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header. |
| Access-Control-Allow-Methods | string | O | 0..1 | Part of CORS [10]. Supplied if the request included the Origin header.  Value: POST |

NOTE: Standard HTTP redirection (using a 3xx response with a Location response header) as well as Alt-Svc are allowed for this method.

## 7.3 Data model

### 7.3.1 General

Table 7.3.1-1 specifies the data types used by the Ndcaf\_DataReporting service operations.

Table 7.3.1-1: Data types used by Ndcaf\_DataReporting service operations

|  |  |  |
| --- | --- | --- |
| Data type | Clause defined | Description |
| DataReportingSession | 7.3.2.1 | Configuration exposed by the Data Collection AF to a data collection client, specifying the UE data to be reported. |
| DataReport | 7.3.2.3 | A set of UE data reported by the data collection client to the Data Collection AF. |

Table 7.3.1-2 specifies data types re-used from other specifications by the Ndcaf\_DataReporting service operations, including a reference to their respective specifications.

Table 7.3.1-2: Externally defined data types used by Ndcaf\_DataReporting service operations

|  |  |  |
| --- | --- | --- |
| Data type | Comments | Reference |
| ApplicationId | Identifies the reporting application. | TS 29.571 [12] |
| DateTime | A point in time, expressed as an ISO 8601 [25] date and time. |
| DurationSec | A period of time, expressed in seconds. |
| Double |  |
| Float |  |
| Int32 |  |
| Int64 |  |
| Uint16 |  |
| Uint32 |  |
| Uint64 |  |
| Uinteger |  |

### 7.3.2 Structured data types

#### 7.3.2.1 DataReportingSession resource type

Table 7.3.2.1-1: Definition of DataReportingSession resource type

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Property name | Data type | Cardinality | Usage | Description |
| sessionId | string | 1..1 | C: RO R: RO | Unique identifier for this Data Reporting Session assigned by the Data Collection AF. |
| validUntil | DateTime | 1..1 | C: RO R: RO | This property is deprecated and should be omitted. If present, it shall be ignored.  HTTP cache control headers should instead be used to indicate the validity of the Data Reporting Session resource. |
| externalApplicationId | ApplicationID | 1..1 | C: RW R: RO | The external application identifier, nominated by the data collection client, to which this Data Reporting Session pertains. |
| supportedDomains | array(DataDomain) | 1..1 | C: RW R: RO | Set of domains for which the data collection client declares that it is able to report UE data. (See clause 7.3.3.1).  An empty array indicates that no UE data can currently be reported. |
| samplingRules | map(DataDomain ->  array(Data‌Sampling‌Rule)) | 1..1 | C: RO R: RO | A map specifying for each reporting domain listed a set of rules for sampling UE data (see clause 5.4.2.1).  The indices of the map shall be a subset of the reporting domains declared by the data collection client in supportedDomains.  If the array for a particular index in the map is empty, UE data collection shall be disabled for the indicated domain. |
| reportingConditions | map(DataDomain ->  array(Data‌Reporting‌Condition)) | 1..1 | C: RO R: RO | A map specifying for each reporting domain listed the set of conditions (see clause 5.4.2.1A) under which the data collection client reports UE data.  The indices of the map shall be a subset of the reporting domains declared by the data collection client in supportedDomains.  If the array for a particular index in the map is empty, UE data reporting shall be disabled for the indicated domain. |
| reportingRules | map(DataDomain ->  array(Data‌Reporting‌Rule) | 1..1 | C: RO R: RO | A map specifying for each reporting domain listed a set of rules for reporting collected UE data (see clause 5.4.2.2).  The indices of the map shall be a subset of the reporting domains declared by the data collection client in supportedDomains.  If the array for a particular index in the map is empty, UE data reporting shall be disabled for the indicated domain. |

#### 7.3.2.2 Void

#### 7.3.2.3 DataReport type

Table 7.3.2.3-1: Definition of DataReport type

|  |  |  |  |
| --- | --- | --- | --- |
| Property name | Data type | Cardinality | Description |
| externalApplicationId | ApplicationID | 1 | External application identifier. |
| expedite | boolean | 0..1 | If present and true, this data report contains UE data requiring expedited processing by the recipient. |
| serviceExperienceRecords | array(ServiceExperienceRecord) | 0..1 (see NOTE) | See clause A.2. |
| locationRecords | array(LocationRecord) | See clause A.3. |
| communicationRecords | array(CommunicationRecord) | See clause A.4. |
| performanceDataRecords | array(PerformanceDataRecord) | See clause A.5. |
| applicationSpecificRecords | array(ApplicationSpecificRecord) | See clause A.6. |
| tripPlanRecords | array(TripPlanRecord) | See clause A.7. |
| mediaStreaming‌Access‌Records | array(MediaStreaming‌AccessRecord) | See TS 26.512 [13] clause 17.2. |
| aNBR‌NetworkAssistance‌Invocation‌Records | array(NetworkAssistanceInvocationRecord) | See TS 26.512 [13] clause 17A.2. |
| NOTE: Exactly one of these properties must be present in a DataReport. | | | |

### 7.3.3 Simple data types and enumerations

#### 7.3.3.1 DataDomain enumeration

Table 7.3.3.1-1: DataDomain enumeration

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability (refer to Table 7.3.2.3-1) |
| SERVICE\_EXPERIENCE | Service Experience data. | serviceExperienceRecords |
| LOCATION | Location data. | locationRecords |
| COMMUNICATION | Communication data. | communicationRecords |
| PERFORMANCE | Performance data. | performanceDataRecords |
| APPLICATION\_SPECIFIC | Combination of QoE metrics and application service-specific data. | applicationSpecificRecords |
| MS\_ANBR\_NETWORK\_ASSISTANCE | ANBR-based Network Assistance invocation data. | aNBRNetworkAssistanceInvocationRecords |
| MS\_ACCESS\_ACTIVITY | 5GMS access activity data. | mediaStreamingAccessRecords |
| PLANNED\_TRIPS | Data related to planned trips. | tripPlanRecords |

#### 7.3.3.2 Void

#### 7.3.3.3 Void

## 7.4 Error handling

Guidelines regarding error handling of API invocation associated with the *Ndcaf\_DataReporting* service are defined in clause 5.3.3.

## 7.5 Mediation by NEF

NEF mediation of data collection client access to the data collection and reporting configuration API exposed by the Data Collection AF is applicable strictly to the Indirect Data Collection Client and the AS.

- In the event that the Indirect Data Collection Client and the Data Collection AF are located in different trust domains, e.g., the former entity resides within the trusted domain and the latter entity resides outside the trusted domain (as in clause A.3 or A 4 of TS 26.531 [7]), the NEF shall be employed to mediate the interactions between them, via the *Nnef\_DataReporting* service API specified in TS 29.522 [27].

- In the event that the AS and the Data Collection AF are located in different trust domains, e.g., the former entity resides within the trusted domain and the latter entity resides outside the trusted domain (as in clause A.4 of TS 26.531 [7]), the NEF shall be employed to mediate the interactions between them, via the *Nnef\_Data‌Reporting* service API specified in TS 29.522 [27].

# 8 UE Data Collection, Reporting and Notification API

## 8.1 Overview

This clause specifies the UE Data Collection, Reporting and Notification API used by internal UE entities, namely a UE Application and the associated Direct Data Collection Client, in support of UE data collection by the Direct Data Collection Client for subsequent reporting to the Data Collection AF, and related exchange of notifications.

As noted in clause 4.3 of TS 26.531 [7] this API is not used when the Direct Data Collection Client is embedded in the UE Application (i.e., Collaboration E according to clause A.6 of [7]). However, this clause can serve as guidance to the design of the internal APIs for a UE Application with an embedded Direct Data Collection Client.

The UE architecture depicting the overall interactions between the UE Application and the Direct Data Collection Client is shown in figure 8.1-1.



Figure 8.1‑1: UE architecture for data collection, reporting and notification via R7 API

## 8.2 Direct Data Collection Client state model

### 8.2.1 Overview

Figure 8.2.1-1 represents an informative Direct Data Collection Client state model in order to properly describe the methods invoked on the R7 API. Five different states as indicated in the diagram are described in table 8.2.1-1.



Figure 8.2.1-1: State model diagram

The depicted Direct Data Collection Client is dedicated to a corresponding UE Application and would correspond to a context-specific instance in the case where a single logical Direct Data Collection Client supports multiple UE Applications in the UE. The state model does not imply any implementation requirements for an instance of the Direct Data Collection Client, but rather is intended for use as a model to support the description of the R7 API.

State changes may occur as result of:

- Registration or deregistration of the UE Application at the Direct Data Collection Client.

- Data collection and reporting configuration request by the UE Application.

- Data report received by the Direct Data Collection Client.

- Notification received by the Direct Data Collection Client (e.g., of a busy condition at, or impending failure/crash of, the UE Application).

- Timeout at the Direct Data Collection Client due to inactivity or prolonged busy state of the UE Application.

Table 8.2.1-1 defines the states of the Direct Data Collection Client.

Table 8.2.1-1: States of Direct Data Collection Client

| State | Definition |
| --- | --- |
| IDLE | The Direct Data Collection Client has not yet registered a UE Application, or a previous registration has been revoked due to explicit deregistration request from that UE Application, or upon receiving notification of an impending fatal error condition at the UE Application, or upon local timer expiration due to inactivity or prolonged busy state of the UE Application. |
| REGISTERED | The Direct Data Collection Client has received valid registration from a UE Application. Having obtained the UE data collection and reporting configuration for that UE Application, it is now ready to provide the UE data collection and reporting configuration to the UE Application. |
| READY | The Direct Data Collection Client has received a valid request from and returns a UE data collection and reporting configuration to, the registered UE Application. |
| ACTIVE | The Direct Data Collection Client has received a UE data report, or a notification from the registered UE Application that the latter has recovered from a previously busy/stalled condition and is ready to send UE data reports to the Data Collection AF. |
| BUSY | The Direct Data Collection Client enters this state upon having received notification that its registered UE Application is in a temporarily busy state and unable to perform UE data reporting. |

### 8.2.2 Direct Data Collection Client internal operations

This aspect is for further study.

### 8.2.3 Starting and stopping the Direct Data Collection Client

The Direct Data Collection Client (instance) shall be started (i.e., transition from IDLE to REGISTERED state) upon receiving a valid registration over R7 from a UE Application. Correspondingly, the Direct Data Collection Client shall be stopped (transition to IDLE state from one of several possible operating states) due to occurrence of one of the corresponding conditions as described in table 8.2.1-1.

## 8.3 Methods

### 8.3.1 Overview

Table 8.3.1-1 provides an overview of the methods and notifications defined for the UE Data Collection, Reporting and Notification API at reference point R7. Different types of method are indicated, namely:

1. State change of the Direct Data Collection Client triggered by the UE Application action (registration or deregistration).

2. Request from the UE Application to the Direct Data Collection Client for a UE data collection and reporting configuration.

3. Acknowledgment and related response information returned by the Direct Data Collection Client to the UE Application for a successful UE Application registration event.

4. Data report by the UE Application to the Direct Data Collection Client according to the previously obtained configuration.

5. Notification from the UE Application to the Direct Data Collection Client.

Table 8.3.1-1: Methods invoked by the UE Application on the Direct Data Collection Client

| Method name | Type | Description |
| --- | --- | --- |
| registerUeApplication | State change | UE Application registers with the Direct Data Collection Client, including a callback listener for receiving event notifications. |
| deregisterUeApplication | State change | UE Application deregisters with the Direct Data Collection Client. |
| setUserConsent |  | UE Application grants permission for the Direct Data Reporting Client to include the GPSI when creating Data Reporting Sessions. |
| getDataCollectionAnd‌ReportingConfiguration | Configuration request | UE Application obtains its UE data collection and reporting configuration from the Direct Data Collection Client. |
| reportUeData | Data report | UE Application reports collected UE data to the Direct Data Collection Client according to its configuration.  The UE Application may indicate (by setting a Boolean method parameter to true) that the data report includes UE data requiring expedited processing by the Direct Data Collection Client and, consequently, by the Data Collection AF. |
| resetClientReportingIdentifier |  | UE Application requests that the Direct Data Collection Client generates a new opaque client reporting identifier for use in data reporting until further notice.  This requires any existing Data Reporting Session to be destroyed and a new one (including the replacement client reporting identifier) to be created. |
| uEApplicationBusy | Notification | UE Application notifies the Direct Data Collection Client that it is temporarily unable to perform UE data collection and reporting due to a busy or stalled condition. |
| impendingUeApplication‌Failure | Notification | UE Application notifies the Direct Data Collection Client of an impending fatal error condition that will cause abrupt shutdown of the UE Application. |

Table 8.3.1‑2 lists the different callback notifications from the Direct Data Collection Client to the UE Application.

Table 8.3.1-2: Notifications from the Direct Data Collection Client to the UE Application

| Callback notification name | Description |
| --- | --- |
| dataCollectionAndReporting‌Configuration‌Changed | Direct Data Collection Client notifies the UE Application that the data collection and reporting configuration has changed. |
| dataCollectionClientBusy | Direct Data Collection Client notifies the UE Application that it is temporarily unable to support UE data collection and reporting due to a busy or stalled condition. |
| impendingDataCollectionClient‌Failure | Direct Data Collection Client notifies the UE Application of an impending fatal error condition that will cause abrupt shutdown of the Direct Data Collection Client. |

# 9 Security and Access Control

Security and access control functionality associated with UE data collection, reporting and exposure are described in other clauses of the present document, namely:

1. TLS-based authentication for HTTP/S operations associated with invocation of UE data collection, reporting and event exposure APIs is specified in clause 5.3.1.

2. Cross-Origin Resource Sharing (CORS [10]) HTTP response headers pertaining to access control.

3. Authentication or authorization by the Data Collection AF of network entities when invoking the UE data collection, reporting and event exposure APIs specified in clauses 6 and 7 including:

a) Authentication of the Provisioning AF via use of the Authorization HTTP request header.

b) Authorization of resource access requests using OAuth 2.0 [8] access tokens.

c) Use of the authorizationURL property of the DataReportingConfiguration resource for authorizing subscription requests by consumer entities to event exposure services.

4. Provisioning AF specification of Data Access Profiles associated with the Data Reporting Configuration resource, for controlling event exposure by the Data Collection AF to different event consumer entities is specified in clause 4.2.3.3.2.

# 10 Data packaging strategies

## 10.1 General

This clause specifies data packaging strategies for each of the UE data domains defined in the present document, including a default data packaging strategy for each. When a specific data packaging strategy is provisioned in a Data‌Reporting‌Rule (see clause 5.4.2.2) this is also included in the configuration information provided to data collection clients.

No data packaging strategies applicable to all UE data domains are specified in this release.

A default data packaging strategy applicable to all UE data domains is not specified in this release.

Data packaging strategies for the following UE data domains are not specified in the present document:

- Media streaming access activity. See clause 4.11.2 of TS 26.512 [13].

- RAN-based Network Assistance invocations. See clause 4.11A.2 of TS 26.512 [13].

## 10.2 Service Experience data packaging strategies

No data packaging strategies are specified in this release for the Service Experience UE data domain.

A default data packaging strategy for the Service Experience UE data domain is not specified in this release.

## 10.3 Location data packaging strategies

No data packaging strategies are specified in this release for the Location UE data domain.

A default data packaging strategy for the Location UE data domain is not specified in this release.

## 10.4 Communication data packaging strategies

No data packaging strategies are specified in this release for the Communication UE data domain.

A default data packaging strategy for the Communication UE data domain is not specified in this release.

## 10.5 Performance data packaging strategies

No data packaging strategies are specified in this release for the Performance UE data domain.

A default data packaging strategy for the Performance UE data domain is not specified in this release.

## 10.6 Application-specific data packaging strategies

No data packaging strategies are specified in this release for the Application-specific UE data domain.

A default data packaging strategy for the Application-specific UE data domain is not specified in this release.

## 10.7 Planned trips data packaging strategies

No data packaging strategies are specified in this release for the Planned trips UE data domain.

A default data packaging strategy for the Planned trips UE data domain is not specified in this release.

Annex A (normative):  
Data reporting data models

# A.1 Introduction

This annex describes the format of the data reports submitted to the Data Collection AF, as required by TS 23.288 [4].

Table A.1-1 specifies data types re-used from other specifications, including a reference to their respective specifications.

Table A.1-1: Externally defined data types used by Ndcaf\_DataReporting\_Report operation

|  |  |  |
| --- | --- | --- |
| Data type | Comments | Reference |
| BitRate |  | 3GPP TS 29.571 [12] |
| PacketDelBudget |  |
| PacketLossRate |  |
| DateTime |  |
| DurationSec |  |
| SvcExperience |  | 3GPP TS 29.517 [5] |
| AddrFqdn |  |
| TimeWindow |  | 3GPP TS 29.122 [14] |
| Volume |  |
| FlowInfo |  |
| LocationArea5G |  |
| LocationData |  | 3GPP TS 29.572 [15] |
| HorizontalSpeed |  |

# A.2 Service Experience reporting

## A.2.1 ServiceExperienceRecord type

Table A.2.1-1: Definition of ServiceExperienceRecord type

|  |  |  |  |
| --- | --- | --- | --- |
| Property name | Data type | Cardinality | Description |
| timestamp | DateTime | 1 | Time stamp of this record. |
| serviceExperienceInfos | array(PerFlowServiceExperienceInfo) | 1 | See clause A.2.2. |

## A.2.2 PerFlowServiceExperienceInfo type

Table A.2.2-1: Definition of PerFlowServiceExperienceInfo type

|  |  |  |  |
| --- | --- | --- | --- |
| Property name | Data type | Cardinality | Description |
| serviceExperience | SvcExperience | 1 |  |
| timeInterval | TimeWindow | 1 |  |
| remoteEndpoint | array(AddrFqdn) | 1 | FQDN or IP Address of remote endpoint (e.g., server). |

# A.3 UE Location reporting

## A.3.1 LocationRecord type

Table A.3.1-1: Definition of type LocationRecord

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| *timestamp* | *DateTime* | 1 | Time stamp of this record. |
| *location* | *LocationData5G* | 1 | Represents the UE location. |

# A.4 Communication reporting

## A.4.1 CommunicationRecord type

Table A.4.1-1: Definition of type CommunicationRecord

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| *timestamp* | *DateTime* | 1 | Time stamp of this record. |
| *timeInterval* | *TimeWindow* | 1 | The time period over which the data volume was measured. |
| sliceInfo | Snssai | 0..1 | Identifying the network slice over which UE communication occurred during timeInterval. |
| dataNetworkName | Dnn | 0..1 | The name of the Data Network over which UE communication occurred during timeInterval. |
| locations | array(LocationArea5G) | 0..1 | The locations of the UE during timeInterval.  If present, the array shall have at least one member. |
| *uplinkVolume* | *Volume* | 0..1 | Volume of uplink data during timeInterval.  If this property is omitted, downlinkVolume shall be present. |
| *downlinkVolume* | *Volume* | 0..1 | Volume of downlink data during timeInterval.  If this property is omitted, uplinkVolume shall be present. |

# A.5 Network performance Data reporting

## A.5.1 PerformanceDataRecord type

Table A.5.1-1: Definition of type PerformanceDataRecord

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Cardinality | Description |
| *timestamp* | *DateTime* | 1 | Time stamp of this record. |
| *timeInterval* | *TimeWindow* | 1 | The time period over which network performance was measured. |
| *location* | *LocationArea5G* | 0..1 | Represents the UE location. |
| *remoteEndpoint* | *AddrFqdn* | 0..1 | FQDN or IP Address of remote endpoint (e.g., server) |
| *packetDelayBudget* | *PacketDelayBudget* | 0..1 | Indicates average Packet Delay. |
| *packetLossRate* | *PacketLossRate* | 0..1 | Indicates average Packet Loss Rate. |
| *uplinkThroughput* | *BitRate* | 0..1 | Indicates the average uplink throughput. |
| *downlinkThroughput* | *BitRate* | 0..1 | Indicates the average downlink throughput. |

# A.6 Application-specific reporting

## A.6.0 Introduction

Application-specific reporting is intended to allow reporting of any application-specific data.

## A.6.1 ApplicationSpecificRecord type

Different services will have different data that are of interest (depending on the service type). The ApplicationSpecificRecord type is intended to enable services to report data specific for the service or application.

Table A.6.1-1: Definition of ApplicationSpecificRecord type

|  |  |  |  |
| --- | --- | --- | --- |
| Property name | Data type | Cardinality | Description |
| timestamp | DateTime | 1 | Time stamp of this record. |
| recordType | Uri | 1 | A controlled term in form of a URI that uniquely identifies the type of record that follows. |
| recordContainer | Object container or array container | 1 | Container with the actual application-specific data. |

# A.7 Trip Plan reporting

## A.7.0 Introduction

Trip Plan(s) enable the Data Collection AF to identify collective behavior amongst UEs. See tables 6.5.2‑4 and 6.5.2‑5 in 3GPP TS 23.288 [4].

## A.7.1 TripPlanRecord type

Table A.7.1-1: Definition of TripPlanRecord type

|  |  |  |  |
| --- | --- | --- | --- |
| Property name | Data type | Cardinality | Description |
| timestamp | DateTime | 1 | Time stamp of this record. |
| startingPoint | LocationData | 1 | The starting point of the planned trip. |
| waypoints | array(LocationData) | 0..1 | The route of the planned trip. |
| destination | LocationData | 1 | The destination of the planned trip. |
| estimatedAverageSpeed | HorizontalSpeed | 0..1 | Estimated average speed of the planned trip. |
| EstimatedArrivalTime | DateTime | 0..1 | Estimated time of arrival at the destination of the planned trip. |

Annex B (normative):  
OpenAPI representation of REST APIs for data collection and reporting

# B.1 General

This annex is based on the OpenAPI 3.0.0 specification [16] and provides corresponding representations of all APIs defined in the present document.

NOTE 1: An OpenAPIs representation embeds JSON Schema representations of HTTP message bodies.

This annex shall take precedence when being discrepant to other parts of the present document with respect to the encoding of information elements and methods within the API(s).

NOTE 2: 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.

# B.2 Data types applicable to multiple services

For the purpose of referencing entities defined in this clause, it shall be assumed that the OpenAPI definitions below are contained in a physical file named "TS26532\_CommonData.yaml".

|  |
| --- |
| openapi: 3.0.0  info:  title: Data Collection and Reporting Common Data Types  version: 2.0.0  description: |  Data Collection and Reporting Common Data Types  © 2024, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).  All rights reserved.  tags:  - name: Data Collection and Reporting Common Data Types  description: 'Data Collection and Reporting: Common Data Types'  externalDocs:  description: 'TS 26.532 V18.2.0; Data Collection and Reporting; Protocols and Formats'  url: 'https://www.3gpp.org/ftp/Specs/archive/26\_series/26.532/'  paths: {}  components:  schemas:  #################################  # Clause 5.4.1: Simple data types  #################################  #####################################  # Clause 5.4.2: Structured data types  #####################################  DataSamplingRule:  description: "Instructions on how UE data is to be sampled by the data collection client."  type: object  properties:  samplingPeriod:  $ref: 'TS29571\_CommonData.yaml#/components/schemas/Float'  locationFilter:  $ref: 'TS29122\_CommonData.yaml#/components/schemas/LocationArea5G'  DataReportingCondition:  description: "A condition that triggers data reporting by a data collection client to the Data Collection AF."  type: object  properties:  type:  $ref: '#/components/schemas/DataReportingConditionType'  period:  $ref: 'TS29571\_CommonData.yaml#/components/schemas/DurationSec'  parameter:  type: string  threshold:  anyOf:  - $ref: 'TS29571\_CommonData.yaml#/components/schemas/Double'  - $ref: 'TS29571\_CommonData.yaml#/components/schemas/Float'  - $ref: 'TS29571\_CommonData.yaml#/components/schemas/Int32'  - $ref: 'TS29571\_CommonData.yaml#/components/schemas/Int64'  - $ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint16'  - $ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint32'  - $ref: 'TS29571\_CommonData.yaml#/components/schemas/Uint64'  - $ref: 'TS29571\_CommonData.yaml#/components/schemas/Uinteger'  reportWhenBelow:  type: boolean  eventTrigger:  $ref: '#/components/schemas/DataReportingEventTrigger'  required:  - type  DataReportingRule:  description: "Instructions on how collected UE data is to be reported by the data collection client to the Data Collection AF."  type: object  properties:  reportingProbability:  $ref: 'TS26510\_CommonData.yaml#/components/schemas/Percentage'  reportingFormat:  deprecated: true  $ref: 'TS29571\_CommonData.yaml#/components/schemas/Uri'  dataPackagingStrategy:  type: string  #####################################  # Clause 5.4.3: Enumerated data types  #####################################  DataCollectionClientType:  description: "Indicating a type of data collection client that reports UE data to the Data Collection AF."  anyOf:  - type: string  enum:  - DIRECT  - INDIRECT  - APPLICATION\_SERVER  - type: string  description: >  This string provides forward-compatibility with future  extensions to the enumeration but is not used to encode  content defined in the present version of this API.  DataReportingConditionType:  description: "The type of condition that triggers reporting by a data collection client to the Data Collection AF."  anyOf:  - type: string  enum:  - INTERVAL  - THRESHOLD  - EVENT  - type: string  description: >  This string provides forward-compatibility with future  extensions to the enumeration but is not used to encode  content defined in the present version of this API.  DataReportingEventTrigger:  description: "The type of event that triggers reporting by a data collection client to the Data Collection AF."  anyOf:  - type: string  enum:  - LOCATION  - DESTINATION  - type: string  description: >  This string provides forward-compatibility with future  extensions to the enumeration but is not used to encode  content defined in the present version of this API. |

# B.3 Ndcaf\_DataReportingProvisioning service API

For the purpose of referencing entities defined in this clause, it shall be assumed that the OpenAPI definitions below are contained in a physical file named "TS26532\_Ndcaf\_DataReportingProvisioning.yaml".

|  |
| --- |
| openapi: 3.0.0  info:  title: Ndcaf\_DataReportingProvisioning  version: 2.0.0  description: |  Data Collection AF: Provisioning Sessions API  © 2024, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).  All rights reserved.  tags:  - name: Ndcaf\_DataReportingProvisioning  description: 'Data Collection and Reporting: Application Service Provider Provisioning (R1) APIs'  externalDocs:  description: 'TS 26.532 V18.2.0; Data Collection and Reporting; Protocols and Formats'  url: 'https://www.3gpp.org/ftp/Specs/archive/26\_series/26.532/'  servers:  - url: '{apiRoot}/3gpp-ndcaf\_data-reporting-provisioning/v1'  variables:  apiRoot:  default: https://example.com  description: See 3GPP TS 29.532 clause 5.2.  security:  - {}  - oAuth2ClientCredentials: []  paths:  /sessions:  post:  operationId: CreateSession  summary: 'Create a new Data Reporting Provisioning Session'  requestBody:  required: true  content:  application/json:  schema:  $ref: '#/components/schemas/DataReportingProvisioningSession'  responses:  '201':  description: 'Data Reporting Provisioning Session successfully created'  headers:  Location:  description: 'URL including the resource identifier of the newly created Data Reporting Provisioning Session.'  required: true  schema:  $ref: 'TS26510\_CommonData.yaml#/components/schemas/Url'  content:  application/json:  schema:  $ref: '#/components/schemas/DataReportingProvisioningSession'  '400':  $ref: 'TS29571\_CommonData.yaml#/components/responses/400'  '401':  $ref: 'TS29571\_CommonData.yaml#/components/responses/401'  '403':  $ref: 'TS29571\_CommonData.yaml#/components/responses/403'  '404':  $ref: 'TS29571\_CommonData.yaml#/components/responses/404'  '411':  $ref: 'TS29571\_CommonData.yaml#/components/responses/411'  '413':  $ref: 'TS29571\_CommonData.yaml#/components/responses/413'  '415':  $ref: 'TS29571\_CommonData.yaml#/components/responses/415'  '429':  $ref: 'TS29571\_CommonData.yaml#/components/responses/429'  '500':  $ref: 'TS29571\_CommonData.yaml#/components/responses/500'  '503':  $ref: 'TS29571\_CommonData.yaml#/components/responses/503'  default:  $ref: 'TS29571\_CommonData.yaml#/components/responses/default'  /sessions/{sessionId}:  parameters:  - name: sessionId  in: path  required: true  schema:  $ref: 'TS26510\_CommonData.yaml#/components/schemas/ResourceId'  description: 'The resource identifier of an existing Data Reporting Provisioning Session.'  get:  operationId: RetrieveSession  summary: 'Retrieve an existing Data Reporting Provisioning Session'  responses:  '200':  description: 'Representation of Data Reporting Provisioning Session is returned'  content:  application/json:  schema:  $ref: '#/components/schemas/DataReportingProvisioningSession'  '307':  $ref: 'TS29571\_CommonData.yaml#/components/responses/307'  '308':  $ref: 'TS29571\_CommonData.yaml#/components/responses/308'  '400':  $ref: 'TS29571\_CommonData.yaml#/components/responses/400'  '401':  $ref: 'TS29571\_CommonData.yaml#/components/responses/401'  '403':  $ref: 'TS29571\_CommonData.yaml#/components/responses/403'  '404':  $ref: 'TS29571\_CommonData.yaml#/components/responses/404'  '406':  $ref: 'TS29571\_CommonData.yaml#/components/responses/406'  '429':  $ref: 'TS29571\_CommonData.yaml#/components/responses/429'  '500':  $ref: 'TS29571\_CommonData.yaml#/components/responses/500'  '503':  $ref: 'TS29571\_CommonData.yaml#/components/responses/503'  default:  $ref: 'TS29571\_CommonData.yaml#/components/responses/default'  delete:  operationId: DestroySession  summary: 'Destroy an existing Data Reporting Provisioning Session'  responses:  '204':  description: 'Data Reporting Provisioning Session resource successfully destroyed'  # No Content  '307':  $ref: 'TS29571\_CommonData.yaml#/components/responses/307'  '308':  $ref: 'TS29571\_CommonData.yaml#/components/responses/308'  '400':  $ref: 'TS29571\_CommonData.yaml#/components/responses/400'  '401':  $ref: 'TS29571\_CommonData.yaml#/components/responses/401'  '403':  $ref: 'TS29571\_CommonData.yaml#/components/responses/403'  '404':  $ref: 'TS29571\_CommonData.yaml#/components/responses/404'  '429':  $ref: 'TS29571\_CommonData.yaml#/components/responses/429'  '500':  $ref: 'TS29571\_CommonData.yaml#/components/responses/500'  '503':  $ref: 'TS29571\_CommonData.yaml#/components/responses/503'  default:  $ref: 'TS29571\_CommonData.yaml#/components/responses/default'  /sessions/{sessionId}/configurations:  parameters:  - name: sessionId  in: path  required: true  schema:  $ref: 'TS26510\_CommonData.yaml#/components/schemas/ResourceId'  description: 'The resource identifier of an existing Data Reporting Provisioning Session.'  post:  operationId: CreateConfiguration  summary: 'Create a new Data Reporting Configuration subresource within the scope of an existing Data Reporting Provisioning Session'  requestBody:  required: true  content:  application/json:  schema:  $ref: '#/components/schemas/DataReportingConfiguration'  responses:  '201':  description: 'Data Reporting Configuration successfully created'  headers:  Location:  description: 'URL including the resource identifier of the newly created Data Reporting Configuration.'  required: true  schema:  $ref: 'TS26510\_CommonData.yaml#/components/schemas/Url'  content:  application/json:  schema:  $ref: '#/components/schemas/DataReportingConfiguration'  '400':  $ref: 'TS29571\_CommonData.yaml#/components/responses/400'  '401':  $ref: 'TS29571\_CommonData.yaml#/components/responses/401'  '403':  $ref: 'TS29571\_CommonData.yaml#/components/responses/403'  '404':  $ref: 'TS29571\_CommonData.yaml#/components/responses/404'  '411':  $ref: 'TS29571\_CommonData.yaml#/components/responses/411'  '413':  $ref: 'TS29571\_CommonData.yaml#/components/responses/413'  '415':  $ref: 'TS29571\_CommonData.yaml#/components/responses/415'  '429':  $ref: 'TS29571\_CommonData.yaml#/components/responses/429'  '500':  $ref: 'TS29571\_CommonData.yaml#/components/responses/500'  '503':  $ref: 'TS29571\_CommonData.yaml#/components/responses/503'  default:  $ref: 'TS29571\_CommonData.yaml#/components/responses/default'  /sessions/{sessionId}/configurations/{configurationId}:  parameters:  - name: sessionId  in: path  required: true  schema:  $ref: 'TS26510\_CommonData.yaml#/components/schemas/ResourceId'  description: 'The resource identifier of an existing Data Reporting Provisioning Session.'  - name: configurationId  in: path  required: true  schema:  $ref: 'TS26510\_CommonData.yaml#/components/schemas/ResourceId'  description: 'The resource identifier of an existing Data Reporting Configuration.'  get:  operationId: RetrieveConfiguration  summary: 'Retrieve an existing Data Reporting Configuration'  responses:  '200':  description: 'Representation of Data Reporting Configuration is returned'  content:  application/json:  schema:  $ref: '#/components/schemas/DataReportingConfiguration'  '307':  $ref: 'TS29571\_CommonData.yaml#/components/responses/307'  '308':  $ref: 'TS29571\_CommonData.yaml#/components/responses/308'  '400':  $ref: 'TS29571\_CommonData.yaml#/components/responses/400'  '401':  $ref: 'TS29571\_CommonData.yaml#/components/responses/401'  '403':  $ref: 'TS29571\_CommonData.yaml#/components/responses/403'  '404':  $ref: 'TS29571\_CommonData.yaml#/components/responses/404'  '406':  $ref: 'TS29571\_CommonData.yaml#/components/responses/406'  '429':  $ref: 'TS29571\_CommonData.yaml#/components/responses/429'  '500':  $ref: 'TS29571\_CommonData.yaml#/components/responses/500'  '503':  $ref: 'TS29571\_CommonData.yaml#/components/responses/503'  default:  $ref: 'TS29571\_CommonData.yaml#/components/responses/default'  put:  operationId: UpdateConfiguration  summary: 'Replace an existing Data Reporting Configuration subresource'  requestBody:  required: true  content:  application/json:  schema:  $ref: '#/components/schemas/DataReportingConfiguration'  responses:  '200':  description: 'Data Reporting Configuration successfully replaced and updated resource representation is returned'  content:  application/json:  schema:  $ref: '#/components/schemas/DataReportingConfiguration'  '204':  description: 'Data Reporting Configuration successfully replaced'  # No Content.  '307':  $ref: 'TS29122\_CommonData.yaml#/components/responses/307'  '308':  $ref: 'TS29122\_CommonData.yaml#/components/responses/308'  '400':  $ref: 'TS29571\_CommonData.yaml#/components/responses/400'  '401':  $ref: 'TS29571\_CommonData.yaml#/components/responses/401'  '403':  $ref: 'TS29571\_CommonData.yaml#/components/responses/403'  '404':  $ref: 'TS29571\_CommonData.yaml#/components/responses/404'  '411':  $ref: 'TS29571\_CommonData.yaml#/components/responses/411'  '413':  $ref: 'TS29571\_CommonData.yaml#/components/responses/413'  '415':  $ref: 'TS29571\_CommonData.yaml#/components/responses/415'  '429':  $ref: 'TS29571\_CommonData.yaml#/components/responses/429'  '500':  $ref: 'TS29571\_CommonData.yaml#/components/responses/500'  '503':  $ref: 'TS29571\_CommonData.yaml#/components/responses/503'  default:  $ref: 'TS29571\_CommonData.yaml#/components/responses/default'  patch:  operationId: ModifyConfiguration  summary: 'Modify an existing Data Reporting Configuration subresource'  requestBody:  required: true  content:  application/merge-patch+json:  schema:  $ref: '#/components/schemas/DataReportingConfigurationPatch'  responses:  '200':  description: 'Data Reporting Configuration successfully replaced and updated resource representation is returned'  content:  application/json:  schema:  $ref: '#/components/schemas/DataReportingConfiguration'  '204':  description: 'Data Reporting Configuration successfully replaced'  # No Content.  '307':  $ref: 'TS29122\_CommonData.yaml#/components/responses/307'  '308':  $ref: 'TS29122\_CommonData.yaml#/components/responses/308'  '400':  $ref: 'TS29571\_CommonData.yaml#/components/responses/400'  '401':  $ref: 'TS29571\_CommonData.yaml#/components/responses/401'  '403':  $ref: 'TS29571\_CommonData.yaml#/components/responses/403'  '404':  $ref: 'TS29571\_CommonData.yaml#/components/responses/404'  '411':  $ref: 'TS29571\_CommonData.yaml#/components/responses/411'  '413':  $ref: 'TS29571\_CommonData.yaml#/components/responses/413'  '415':  $ref: 'TS29571\_CommonData.yaml#/components/responses/415'  '429':  $ref: 'TS29571\_CommonData.yaml#/components/responses/429'  '500':  $ref: 'TS29571\_CommonData.yaml#/components/responses/500'  '503':  $ref: 'TS29571\_CommonData.yaml#/components/responses/503'  default:  $ref: 'TS29571\_CommonData.yaml#/components/responses/default'  delete:  operationId: DestroyConfiguration  summary: 'Destroy an existing Data Reporting Configuration'  responses:  '204':  description: 'Data Reporting Configuration resource successfully destroyed'  # No Content  '307':  $ref: 'TS29571\_CommonData.yaml#/components/responses/307'  '308':  $ref: 'TS29571\_CommonData.yaml#/components/responses/308'  '400':  $ref: 'TS29571\_CommonData.yaml#/components/responses/400'  '401':  $ref: 'TS29571\_CommonData.yaml#/components/responses/401'  '403':  $ref: 'TS29571\_CommonData.yaml#/components/responses/403'  '404':  $ref: 'TS29571\_CommonData.yaml#/components/responses/404'  '429':  $ref: 'TS29571\_CommonData.yaml#/components/responses/429'  '500':  $ref: 'TS29571\_CommonData.yaml#/components/responses/500'  '503':  $ref: 'TS29571\_CommonData.yaml#/components/responses/503'  default:  $ref: 'TS29571\_CommonData.yaml#/components/responses/default'  components:  securitySchemes:  oAuth2ClientCredentials:  type: oauth2  flows:  clientCredentials:  tokenUrl: '{tokenUri}'  scopes: {}  description: >  For a trusted Provisioning AF, 'ndcaf-datareportingprovisioning' shall be used  as 'scopes' and '{nrfApiRoot}/oauth2/token' shall be used as 'tokenUri'.  schemas:  DataReportingProvisioningSession:  description: "A representation of a Data Reporting Provisioning Session."  type: object  properties:  provisioningSessionId:  readOnly: true  allOf:  - $ref: 'TS26510\_CommonData.yaml#/components/schemas/ResourceId'  aspId:  $ref: 'TS29514\_Npcf\_PolicyAuthorization.yaml#/components/schemas/AspId'  externalApplicationId:  $ref: 'TS29571\_CommonData.yaml#/components/schemas/ApplicationId'  internalApplicationId:  $ref: 'TS29571\_CommonData.yaml#/components/schemas/ApplicationId'  eventId:  $ref: 'TS29517\_Naf\_EventExposure.yaml#/components/schemas/AfEvent'  dataReportingConfigurationIds:  readOnly: true  type: array  items:  $ref: 'TS26510\_CommonData.yaml#/components/schemas/ResourceId'  minItems: 0  required:  - provisioningSessionId  - aspId  - externalApplicationId  - eventId  - dataReportingConfigurationIds  DataReportingConfiguration:  description: "A Data Reporting Configuration subresource."  type: object  properties:  dataReportingConfigurationId:  readOnly: true  allOf:  - $ref: 'TS26510\_CommonData.yaml#/components/schemas/ResourceId'  dataCollectionClientType:  $ref: 'TS26532\_CommonData.yaml#/components/schemas/DataCollectionClientType'  authorizationURL:  $ref: 'TS26510\_CommonData.yaml#/components/schemas/Url'  dataSamplingRules:  type: array  items:  $ref: 'TS26532\_CommonData.yaml#/components/schemas/DataSamplingRule'  minItems: 0  dataReportingConditions:  type: array  items:  $ref: 'TS26532\_CommonData.yaml#/components/schemas/DataReportingCondition'  minItems: 1  dataReportingRules:  type: array  items:  $ref: 'TS26532\_CommonData.yaml#/components/schemas/DataReportingRule'  minItems: 0  dataAccessProfiles:  type: array  items:  $ref: '#/components/schemas/DataAccessProfile'  minItems: 1  required:  - dataReportingConfigurationId  - dataCollectionClientType  - dataReportingConditions  - dataAccessProfiles  DataReportingConfigurationPatch:  description: "A JSON patch for a Data Reporting Configuration."  type: object  properties:  authorizationURL:  $ref: 'TS26510\_CommonData.yaml#/components/schemas/Url'  dataSamplingRules:  type: array  items:  $ref: 'TS26532\_CommonData.yaml#/components/schemas/DataSamplingRule'  minItems: 0  dataReportingConditions:  type: array  items:  $ref: 'TS26532\_CommonData.yaml#/components/schemas/DataReportingCondition'  minItems: 1  dataReportingRules:  type: array  items:  $ref: 'TS26532\_CommonData.yaml#/components/schemas/DataReportingRule'  minItems: 0  dataAccessProfiles:  type: array  items:  $ref: '#/components/schemas/DataAccessProfile'  minItems: 1  DataAccessProfile:  description: "A data access profile."  type: object  properties:  dataAccessProfileId:  type: string  targetEventConsumerTypes:  type: array  items:  $ref: '#/components/schemas/EventConsumerType'  minItems: 0  uniqueItems: true  parameters:  type: array  items:  type: string  minItems: 0  uniqueItems: true  timeAccessRestrictions:  type: object  properties:  duration:  $ref: 'TS29571\_CommonData.yaml#/components/schemas/DurationSec'  aggregationFunctions:  type: array  items:  $ref: '#/components/schemas/DataAggregationFunctionType'  minItems: 0  uniqueItems: true  required:  - duration  - aggregationFunctions  userAccessRestrictions:  type: object  properties:  groupIds:  type: array  items:  $ref: 'TS29571\_CommonData.yaml#/components/schemas/GroupId'  minItems: 0  uniqueItems: true  userIds:  type: array  items:  anyOf:  - $ref: 'TS29571\_CommonData.yaml#/components/schemas/Gpsi'  - $ref: 'TS29571\_CommonData.yaml#/components/schemas/Supi'  minItems: 0  uniqueItems: true  aggregationFunctions:  type: array  items:  $ref: '#/components/schemas/DataAggregationFunctionType'  minItems: 0  uniqueItems: true  required:  - groupIds  - userIds  - aggregationFunctions  locationAccessRestrictions:  type: object  properties:  locationAreas:  type: array  items:  $ref: 'TS29122\_CommonData.yaml#/components/schemas/LocationArea5G'  minItems: 1  uniqueItems: true  aggregationFunctions:  type: array  items:  $ref: '#/components/schemas/DataAggregationFunctionType'  minItems: 0  uniqueItems: true  required:  - locationAreas  - aggregationFunctions  required:  - dataAccessProfileId  - targetEventConsumerTypes  - parameters  EventConsumerType:  description: "The type of event consumer."  anyOf:  - type: string  enum:  - NWDAF  - EVENT\_CONSUMER\_AF  - NEF  - type: string  description: >  This string provides forward-compatibility with future  extensions to the enumeration but is not used to encode  content defined in the present version of this API.  DataAggregationFunctionType:  description: "The type of data aggregation function."  anyOf:  - type: string  enum:  - NONE  - COUNT  - MEAN  - MAXIMUM  - MINIMUM  - SUM  - type: string  description: >  This string provides forward-compatibility with future  extensions to the enumeration but is not used to encode  content defined in the present version of this API. |

# B.4 Ndcaf\_DataReporting service API

For the purpose of referencing entities defined in this clause, it shall be assumed that the OpenAPI definitions below are contained in a physical file named "TS26532\_Ndcaf\_DataReporting.yaml".

|  |
| --- |
| openapi: 3.0.0  info:  title: Ndcaf\_DataReporting  version: 2.0.0  description: |  Data Collection AF: Data Collection and Reporting Configuration API and Data Reporting API  © 2024, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).  All rights reserved.  tags:  - name: Ndcaf\_DataReporting  description: 'Data Collection and Reporting: Client Configuration and Data Reporting (R2/R3/R4) APIs'  externalDocs:  description: 'TS 26.532 V18.2.0; Data Collection and Reporting; Protocols and Formats'  url: 'https://www.3gpp.org/ftp/Specs/archive/26\_series/26.532/'  servers:  - url: '{apiRoot}/3gpp-ndcaf\_data-reporting/v1'  variables:  apiRoot:  default: https://example.com  description: See 3GPP TS 29.532 clause 5.2.  security:  - {}  - oAuth2ClientCredentials: []  paths:  /sessions:  post:  operationId: CreateSession  summary: 'Create a new Data Reporting Session'  requestBody:  required: true  content:  application/json:  schema:  $ref: '#/components/schemas/DataReportingSession'  responses:  '201':  description: 'Data Reporting Session successfully created'  headers:  Location:  description: 'URL including the resource identifier of the newly created Data Reporting Session.'  required: true  schema:  $ref: 'TS26510\_CommonData.yaml#/components/schemas/Url'  content:  application/json:  schema:  $ref: '#/components/schemas/DataReportingSession'  '400':  $ref: 'TS29571\_CommonData.yaml#/components/responses/400'  '401':  $ref: 'TS29571\_CommonData.yaml#/components/responses/401'  '403':  $ref: 'TS29571\_CommonData.yaml#/components/responses/403'  '404':  $ref: 'TS29571\_CommonData.yaml#/components/responses/404'  '411':  $ref: 'TS29571\_CommonData.yaml#/components/responses/411'  '413':  $ref: 'TS29571\_CommonData.yaml#/components/responses/413'  '415':  $ref: 'TS29571\_CommonData.yaml#/components/responses/415'  '429':  $ref: 'TS29571\_CommonData.yaml#/components/responses/429'  '500':  $ref: 'TS29571\_CommonData.yaml#/components/responses/500'  '503':  $ref: 'TS29571\_CommonData.yaml#/components/responses/503'  default:  $ref: 'TS29571\_CommonData.yaml#/components/responses/default'  /sessions/{sessionId}:  parameters:  - name: sessionId  in: path  required: true  schema:  $ref: 'TS26510\_CommonData.yaml#/components/schemas/ResourceId'  description: 'The resource identifier of an existing Data Reporting Session.'  get:  operationId: RetrieveSession  summary: 'Retrieve an existing Data Reporting Session'  responses:  '200':  description: 'Representation of Data Reporting Session is returned'  content:  application/json:  schema:  $ref: '#/components/schemas/DataReportingSession'  '307':  $ref: 'TS29571\_CommonData.yaml#/components/responses/307'  '308':  $ref: 'TS29571\_CommonData.yaml#/components/responses/308'  '400':  $ref: 'TS29571\_CommonData.yaml#/components/responses/400'  '401':  $ref: 'TS29571\_CommonData.yaml#/components/responses/401'  '403':  $ref: 'TS29571\_CommonData.yaml#/components/responses/403'  '404':  $ref: 'TS29571\_CommonData.yaml#/components/responses/404'  '406':  $ref: 'TS29571\_CommonData.yaml#/components/responses/406'  '429':  $ref: 'TS29571\_CommonData.yaml#/components/responses/429'  '500':  $ref: 'TS29571\_CommonData.yaml#/components/responses/500'  '503':  $ref: 'TS29571\_CommonData.yaml#/components/responses/503'  default:  $ref: 'TS29571\_CommonData.yaml#/components/responses/default'  delete:  operationId: DestroySession  summary: 'Destroy an existing Data Reporting Session'  responses:  '204':  description: 'Data Reporting Session resource successfully destroyed'  # No Content  '307':  $ref: 'TS29571\_CommonData.yaml#/components/responses/307'  '308':  $ref: 'TS29571\_CommonData.yaml#/components/responses/308'  '400':  $ref: 'TS29571\_CommonData.yaml#/components/responses/400'  '401':  $ref: 'TS29571\_CommonData.yaml#/components/responses/401'  '403':  $ref: 'TS29571\_CommonData.yaml#/components/responses/403'  '404':  $ref: 'TS29571\_CommonData.yaml#/components/responses/404'  '429':  $ref: 'TS29571\_CommonData.yaml#/components/responses/429'  '500':  $ref: 'TS29571\_CommonData.yaml#/components/responses/500'  '503':  $ref: 'TS29571\_CommonData.yaml#/components/responses/503'  default:  $ref: 'TS29571\_CommonData.yaml#/components/responses/default'  /sessions/{sessionId}/report:  parameters:  - name: sessionId  in: path  required: true  schema:  $ref: 'TS26510\_CommonData.yaml#/components/schemas/ResourceId'  description: 'The resource identifier of an existing Data Reporting Session.'  post:  operationId: Report  summary: 'Report UE data in the context of an existing Data Reporting Session'  requestBody:  required: true  content:  application/json:  schema:  $ref: '#/components/schemas/DataReport'  responses:  '200':  description: 'Data Report accepted and updated Data Reporting Session is returned'  headers:  Location:  description: 'URL including the resource identifier of the returned Data Reporting Session.'  required: true  schema:  $ref: 'TS26510\_CommonData.yaml#/components/schemas/Url'  content:  application/json:  schema:  $ref: '#/components/schemas/DataReportingSession'  '204':  description: 'Data Report accepted'  # No Content  '400':  $ref: 'TS29571\_CommonData.yaml#/components/responses/400'  '401':  $ref: 'TS29571\_CommonData.yaml#/components/responses/401'  '403':  $ref: 'TS29571\_CommonData.yaml#/components/responses/403'  '404':  $ref: 'TS29571\_CommonData.yaml#/components/responses/404'  '411':  $ref: 'TS29571\_CommonData.yaml#/components/responses/411'  '413':  $ref: 'TS29571\_CommonData.yaml#/components/responses/413'  '415':  $ref: 'TS29571\_CommonData.yaml#/components/responses/415'  '429':  $ref: 'TS29571\_CommonData.yaml#/components/responses/429'  '500':  $ref: 'TS29571\_CommonData.yaml#/components/responses/500'  '503':  $ref: 'TS29571\_CommonData.yaml#/components/responses/503'  default:  $ref: 'TS29571\_CommonData.yaml#/components/responses/default'  components:  securitySchemes:  oAuth2ClientCredentials:  type: oauth2  flows:  clientCredentials:  tokenUrl: '{tokenUri}'  scopes: {}  description: >  For a trusted data collection client, 'ndcaf-datareporting' shall be used  as 'scopes' and '{nrfApiRoot}/oauth2/token' shall be used as 'tokenUri'.  schemas:  DataReportingSession:  description: "A representation of a Data Reporting Session."  type: object  properties:  sessionId:  readOnly: true  allOf:  - $ref: 'TS26510\_CommonData.yaml#/components/schemas/ResourceId'  validUntil:  deprecated: true  readOnly: true  allOf:  - $ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'  externalApplicationId:  $ref: 'TS29571\_CommonData.yaml#/components/schemas/ApplicationId'  supportedDomains:  type: array  items:  $ref: '#/components/schemas/DataDomain'  minItems: 0  samplingRules:  readOnly: true  type: object  additionalProperties:  type: array  items:  $ref: 'TS26532\_CommonData.yaml#/components/schemas/DataSamplingRule'  minItems: 0  reportingConditions:  readOnly: true  type: object  additionalProperties:  type: array  items:  $ref: 'TS26532\_CommonData.yaml#/components/schemas/DataReportingCondition'  minItems: 0  reportingRules:  readOnly: true  type: object  additionalProperties:  type: array  items:  $ref: 'TS26532\_CommonData.yaml#/components/schemas/DataReportingRule'  minItems: 0  required:  - sessionId  - externalApplicationId  - supportedDomains  - samplingRules  - reportingConditions  - reportingRules  DataReport:  description: "A data report sent by a data collection client to the Data Collection AF."  type: object  properties:  externalApplicationId:  $ref: 'TS29571\_CommonData.yaml#/components/schemas/ApplicationId'  expedite:  type: boolean  serviceExperienceRecords:  type: array  items:  $ref: '#/components/schemas/ServiceExperienceRecord'  minItems: 1  locationRecords:  type: array  items:  $ref: '#/components/schemas/LocationRecord'  minItems: 1  communicationRecords:  type: array  items:  $ref: '#/components/schemas/CommunicationRecord'  minItems: 1  performanceDataRecords:  type: array  items:  $ref: '#/components/schemas/PerformanceDataRecord'  minItems: 1  applicationSpecificRecords:  type: array  items:  $ref: '#/components/schemas/ApplicationSpecificRecord'  minItems: 1  tripPlanRecords:  type: array  items:  $ref: '#/components/schemas/TripPlanRecord'  minItems: 1  aNBRNetworkAssistanceInvocationRecords:  type: array  items:  $ref: 'TS26512\_R2\_DataReporting.yaml#/components/schemas/ANBRNetworkAssistanceInvocationRecord'  minItems: 1  mediaStreamingAccessRecords:  type: array  items:  $ref: 'TS26512\_R4\_DataReporting.yaml#/components/schemas/MediaStreamingAccessRecord'  minItems: 1  required:  - externalApplicationId  DataDomain:  description: "A data reporting domain."  anyOf:  - type: string  enum:  - SERVICE\_EXPERIENCE  - LOCATION  - COMMUNICATION  - PERFORMANCE  - APPLICATION\_SPECIFIC  - MS\_ANBR\_NETWORK\_ASSISTANCE  - MS\_ACCESS\_ACTIVITY  - PLANNED\_TRIPS  - type: string  description: >  This string provides forward-compatibility with future  extensions to the enumeration but is not used to encode  content defined in the present version of this API.  BaseRecord:  description: "Abstract base data type for UE data reporting records."  type: object  properties:  timestamp:  $ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'  required:  - timestamp  ServiceExperienceRecord:  description: "A data reporting record for UE service experience."  allOf:  - $ref: '#/components/schemas/BaseRecord'  - type: object  properties:  serviceExperienceInfos:  type: array  items:  $ref: '#/components/schemas/PerFlowServiceExperienceInfo'  required:  - serviceExperienceInfos    PerFlowServiceExperienceInfo:  description: "Information about the service experience of a single flow."  type: object  properties:  serviceExperience:  $ref: 'TS29517\_Naf\_EventExposure.yaml#/components/schemas/SvcExperience'  timeInterval:  $ref: 'TS29122\_CommonData.yaml#/components/schemas/TimeWindow'  remoteEndpoint:  $ref: 'TS29517\_Naf\_EventExposure.yaml#/components/schemas/AddrFqdn'  required:  - serviceExperience  - timeInterval  - remoteEndpoint  LocationRecord:  description: "A data reporting record for UE location."  allOf:  - $ref: '#/components/schemas/BaseRecord'  - type: object  properties:  location:  $ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/LocationData'  required:  - location    CommunicationRecord:  description: "A data reporting record for UE communication."  allOf:  - $ref: '#/components/schemas/BaseRecord'  - type: object  properties:  timeInterval:  $ref: 'TS29122\_CommonData.yaml#/components/schemas/TimeWindow'  sliceInfo:  $ref: 'TS29571\_CommonData.yaml#/components/schemas/Snssai'  dataNetworkName:  $ref: 'TS29571\_CommonData.yaml#/components/schemas/Dnn'  location:  type: array  minItems: 1  items:  $ref: 'TS29122\_CommonData.yaml#/components/schemas/LocationArea5G'  uplinkVolume:  $ref: 'TS29122\_CommonData.yaml#/components/schemas/Volume'  downlinkVolume:  $ref: 'TS29122\_CommonData.yaml#/components/schemas/Volume'  required:  - timeInterval    PerformanceDataRecord:  description: "A data reporting record for UE performance."  allOf:  - $ref: '#/components/schemas/BaseRecord'  - type: object  properties:  timeInterval:  $ref: 'TS29122\_CommonData.yaml#/components/schemas/TimeWindow'  location:  $ref: 'TS29122\_CommonData.yaml#/components/schemas/LocationArea5G'  remoteEndpoint:  $ref: 'TS29517\_Naf\_EventExposure.yaml#/components/schemas/AddrFqdn'  packetDelayBudget:  $ref: 'TS29571\_CommonData.yaml#/components/schemas/PacketDelBudget'  packetLossRate:  $ref: 'TS29571\_CommonData.yaml#/components/schemas/PacketLossRate'  uplinkThroughput:  $ref: 'TS29571\_CommonData.yaml#/components/schemas/BitRate'  downlinkThrougput:  $ref: 'TS29571\_CommonData.yaml#/components/schemas/BitRate'  required:  - timeInterval    ApplicationSpecificRecord:  description: "A typed application-specific UE data reporting record."  allOf:  - $ref: '#/components/schemas/BaseRecord'  - type: object  properties:  recordType:  $ref: 'TS29571\_CommonData.yaml#/components/schemas/Uri'  recordContainer:  {}  # (Syntax determined by recordType.)  required:  - recordType  - recordContainer    TripPlanRecord:  description: "A data reporting record for UE performance."  allOf:  - $ref: '#/components/schemas/BaseRecord'  - type: object  properties:  startingPoint:  $ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/LocationData'  waypoints:  type: array  items:  $ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/LocationData'  minItems: 1  destination:  $ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/LocationData'  estimatedAverageSpeed:  $ref: 'TS29572\_Nlmf\_Location.yaml#/components/schemas/HorizontalSpeed'  estimatedArrivalTime:  $ref: 'TS29571\_CommonData.yaml#/components/schemas/DateTime'  required:  - startingPoint  - destination |

Annex C (informative):  
Change history

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Change history** | | | | | | | |
| **Date** | **Meeting** | **TDoc** | **CR** | **Rev** | **Cat** | **Subject/Comment** | **New version** |
| 2021-08 | Sa4#115-e | S4-211220 |  |  |  | Initial specification skeleton | 0.1.0 |
| 2021-11 | SA4#116-e | S4-211422  S4-211578  S4-211593 |  |  |  | Document reorganization, and miscellaneous modifications and corrections to previous document outline.  Added text under clause previously empty clause 4.2.3.  Added text to previously empty clauses 4.2.4, 4.2.5, 4.2.6, 4.2.7, 4.3.2 and 4.3.3 | 0.2.0 |
| 2022-02 | SA4#117-e | S4-220233  S4-220241  S4-220242 |  |  |  | Additional references under clause 2, changes and added text under clause 4.2.3.3, changes and additions under clause 5.4, corrections and added text under clauses 7.2 and 7.3, new Annex A, and demoted existing Annexes A and B by one level, and added new subclause B.2. | 0.3.0 |
| 2022-03 | SA#95-e | SP-220248 |  |  |  | Presentation to SA for Information | 1.0.0 |
| 2022-04 | SA4#118-e | S4-220536  S4-220537  S4-220538  S4-220539 |  |  |  | Additional and corrective text to TS 26.532 V1.0.0 in accordance with agreed pCRs in S4-220536, S4-220537, S4-220538 and S4-220539. | 1.1.0 |
| 2022-05 | SA4#119-e | S4-220798 |  |  |  | Merger of various changes to TS 25.532 V1.1.0 which were made after SA4#118-e in the pCR SA-220716, reviewed/agreed at SA4#119-e. Also includes further modifications in accordance with pCRs in S4-220638, S4-220716 and S4-220721, agreed at SA4#119-e, and represented by S4-220798. | 1.3.0 |
| 2022-06 | SA4#119-3 | S4-220847 |  |  |  | Version agreed by SA4 to be sent to the SA#96 for approval | 2.0.0 |
| 2022-06 | SA#96 | SP-220604 |  |  |  | Under Change Control | 17.0.0 |
| 2022-07 | SA#96 |  |  |  |  | Editorials+Adding YAML files | 17.0.1 |
| 2022-09 | SA#97-e | SP-220757 | 0001 | 1 | F | [EVEX] TS 26.532 PUT/PATCH corrections | 17.1.0 |
| 2022-09 | SA#97-e | SP-220757 | 0002 | 1 | F | [EVEX] TS 26.532 Bug fixes regarding updating data collection and reporting configurations for data collection clients | 17.1.0 |
| 2023-06 | SA#100 | SP-230745 | 0003 | 6 | F | [EVEX] Data Reporting Configuration Inclusion of Data Sampling Rules and Data Reporting Rules | 17.2.0 |
| 2023-09 | SA#101 | SP-230920 | 0005 | 1 | B | [TEI18, ADAE, EVEX] UE Application instructing DDCC for immediate data report delivery | 18.0.0 |
| 2023-12 | SA#102 | SP-231364 | 0004 | 3 | B | [5GMS\_Pro\_Ph2] ANBR-based network assistance data reporting | 18.1.0 |
| 2024-06 | SA#104 | SP-240697 | 0006 | 2 | D | [EVEX, TEI18] HTTP reference uplift | 18.2.0 |
| 2024-06 | SA#104 | SP-240573 | 0009 | 3 | F | [EVEX, TEI18] Essential maintenance | 18.2.0 |
| 2024-06 | SA#104 | SP-240697 | 0010 |  | F | [EVEX, TEI18] Data packaging strategies | 18.2.0 |
| 2024-06 | SA#104 | SP-240572 | 0011 | 2 | F | [EVEX, TEI18] Essential corrections | 18.2.0 |
| 2024-07 |  |  |  |  |  | Fixing implementation of CR0011r2 | 18.2.1 |