**3GPP TSG-SA4#118-e *S4-220387r01***

**Online, 6-14 April 2022**

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| *CR-Form-v12.0* | | | | | | | | |
| **Pseudo CHANGE REQUEST** | | | | | | | | |
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|  | **TS 26.532** | **CR** |  | **rev** |  | **Current version:** | **1.0.0** |  |
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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network | **X** |

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| ***Title:*** | Updates and corrections to 26.532 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Ericsson LM, BBC, Qualcomm Incorporated | | | | | | | | | |
| ***Source to TSG:*** | S4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | EVEX | | | | |  | ***Date:*** | | | 2022-03-30 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-17 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) Rel-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Updates and corrections to the specification | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | -Fixed spellings and other editorials -Updated references and abbreviations -Added more text and diagrams to clause 4 for the Direct Data Collection Client -Added a generic URI syntax in clause 5 (and corresponding changes where appropriate in rest of doc) -Added a validity time to the collection configuration in clause 7 | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Less complete specification | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 2, 3, 4, 5, 7 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
| ***56*** | |  | | | | | | | | |
| ***This CR's revision history:*** | | This is a re-submit of S4 aI221337, which was agreed at the MBS telco March 25 | | | | | | | | |

FIRST CHANGE

# 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>.

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

[A] IETF RFC 7540: “Hypertext Transfer Protocol Version 2 (HTTP/2)”.

[B] IETF RFC 7230: “Hypertext Transfer Protocol (HTTP/1.1): Message Syntax and Routing”.

[C] IETF RFC 7231: “Hypertext Transfer Protocol (HTTP/1.1): Semantics and Content”.

[D] IETF RFC 7232: “Hypertext Transfer Protocol (HTTP/1.1): Conditional Requests”.

[E] IETF RFC 7233: “Hypertext Transfer Protocol (HTTP/1.1): Range Requests”.

[F] IETF RFC 7234: “Hypertext Transfer Protocol (HTTP/1.1): Caching”.

[G] IETF RFC 7235: “Hypertext Transfer Protocol (HTTP/1.1): Authentication”.

# 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

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 of UE data for the associated application service and Event ID(s).

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, including definition of the *Provisioning Sessions API,* are provided under clause 6.2.

##### 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.

Editor’s Note: Describe key attributes of the Provisioning Session resource here, especially the access controls that realise the data exposure restrictions affecting all Data Reporting Configuration children of the Provisioning Session.

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 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, including definition of the *Data Reporting* *Configuration API* are provided under clause 6.3.

##### 4.2.3.3.2 Data Reporting Configuration

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 6.3.3.1.

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 may contain one or more sets of data exposure restrictions, expressed as Data Access Profiles (see clause 6.3.3.2), each one determining the level of access to the collected event data. A Data Access Profile defines the granularity of access to a particular subset of collected event data parameters for the Event ID in question. This granularity is expressed as a set of data aggregation functions along the time, user, and location dimensions. 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.

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 a response code as defined in clause 5.3.

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 a response code as defined in clause 5.3.

##### 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.

##### 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 a response code as defined in clause 5.3.

### 4.2.4 Configuration of Indirect Data Collection Client

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 Collection 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 Data Collection and Reporting Configuration API associated with the Ndcaf\_DataReporting service, as described under clause 7.2.

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.

### 4.2.5 Configuration of Application Server

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 *Data Collection and Reporting Configuration API* associated with the Ndcaf\_DataReporting service, as described under clause 7.2.

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.

### 4.2.6 Indirect data reporting

### 4.2.7 Reporting by Application Server

### 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 Collection Client

#### 4.3.2.1 General

A Direct Data Collection 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 Collection Client shall obtain its configuration by invoking the *Data Collection and Reporting Configuration API* associated with the Ndcaf\_DataReporting service, as described under clause 7.2.

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 7.2.2.1 and 7.2.2.2.3.1). A DataReportingSession resource entity (see clause 7.2.3.2.1) 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 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. The validUntil property of the provided DataReportingSession should be a time in the future.

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. 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 validUntil property of 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 \_RetreiveSession service operation (see clauses 7.2.2.1 and 7.2.2.3.3.1).

2. The Data Collection AF provides the latest DataReportingSession in the message body of a 200 OK response. The validUntil property of the provided DataReportingSession should be a time in the future. In addition, the Data Collection AF may change properties reportForDomains and reportingCondition.

##### 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 7.2.2.1 and 7.2.2.3.3.2).

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 *Data Reporting API* associated with Ndcaf\_DataReporting service across reference point R2 as described under clause 7.3. 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 7.3.2.1 and 7.3.2.2.3.1) by issuing an HTTP POST request to the Data Collection AF. The request message body is a DataReport (see clause 7.3.3.2.1).

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 Data Collection Client for subsequent reporting to the Data Collection AF.

# 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 [X], i.e.:

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

with the following components:

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

- {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

For interfaces internal to 5GC, HTTP/2, IETF RFC 7540 [A], shall be used as specified in clause 5.2 of TS 29.500 [9].

For other interfaces, support of HTTP/1.1 (IETF RFC 7230 [B], IETF RFC 7231 [C], IETF RFC 7232 [D], IETF RFC 7233 [E], IETF RFC 7234 [F] and IETF RFC 7235 [G]) over TLS is mandatory and support of HTTP/2 (IETF RFC 7540 [A]) over TLS is recommended.

Editor’s Note: Which interfaces are internal to 5GC depends on deployment configuration. Notably, R2 is always considered external to 5GC.

### 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 at reference point R2.

#### 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].

### 5.3.3 HTTP response codes

Guidelines for error responses to the invocation of APIs of NF services are specified in clause 4.8 of TS 29.501 [X]. API-specific error responses are specified in the respective technical specifications.

## 5.4 Common API data types

### 5.4.1 Simple data types

### 5.4.2 Structured data types

### 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. |

## 5.5 Explanation of API data model notation

NEXT CHANGE

# 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 Data Collection and Reporting Configuration API

### 7.2.1 Overview

This clause specifies the configuration API used by data collection clients to obtain their data collection and reporting configurations from the Data Collection AF.

### 7.2.2 Resources

#### 7.2.2.1 Resource Structure

Figure 7.2.2.1-1 depicts the URL path model for the Data Reporting Sessions resource collection and the Data Reporting Session resources of the *Ndcaf\_DataReporting* service.



Figure 7.2.2.1‑1: URL path model of Data Reporting Session related resources

Table 7.2.2.1-1 provides an overview of the resources and applicable HTTP methods.

Table 7.2.2.1-1: Resources and methods overview

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Service name | Operation name | Resource name | Resource path suffix | HTTP method | 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. |

#### 7.2.2.2 Data Reporting Sessions resource collection

##### 7.2.2.2.1 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.

##### 7.2.2.2.2 Resource definition

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

This resource shall support the resource URL variables defined in table 7.2.2.2.2-1.

Table 7.2.2.2.2-1: Resource URL variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | Fully-Qualified Doman Name of the Data Collection AF and path prefix. |

##### 7.2.2.2.3 Resource Standard Methods

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

This service operation shall support the URL query parameters specified in table 7.2.2.2.3.1-1.

Table 7.2.2.2.3.1-1: 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 7.2.2.2.3.1-2 and the response data structures and response codes specified in table 7.2.2.2.3.1-4.

Table 7.2.2.2.3.1-2: 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 7.2.2.2.3.1-3: 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 OAuth2.0 authorization is used the value would be “Bearer” followed by a string representing the 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 7.2.2.2.3.1-4: 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 3GPP TS 29.500 [9] also apply. | | | | |

Table 7.2.2.2.3.1-5: 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/v1/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.

#### 7.2.2.3 Data Reporting Session resource

##### 7.2.2.3.1 Description

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

##### 7.2.2.3.2 Resource definition

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

This resource shall support the resource URI variables defined in table 7.2.2.3.2-1.

Table 7.2.2.3.2-1: Resource URL variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 7.2.2.2.2 |
| sessionId | string | Identifies a session to the Ndcaf\_DataReporting\_Sessions Service |

##### 7.2.2.3.3 Resource standard methods

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

Editor’s Note: To be added.

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

The update operation is not permitted.























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

This service operation shall support the URL query parameters specified in table 7.2.2.3.3.3-1.

Table 7.2.2.3.3.3-1: 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 specified in table 7.2.2.3.3.3-2 and the response data structures and response codes specified in table 7.2.2.3.3.3-4.

Table 7.2.2.3.3.3-2: Data structures supported by the DELETE request body on this resource

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

Table 7.2.2.3.3.3-3: 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 OAuth2.0 authorization is used the value would be “Bearer” followed by a string representing the 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 7.2.2.3.3.3-4: 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 3GPP TS 29.500 [9] also apply.  NOTE 2: Failure cases are described in subclause 7.2.4. | | | | |

Table 7.2.2.3.3.3-5: 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 7.2.2.3.3.1-6 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 Data Model

#### 7.2.3.1 General

Table 7.2.3.1-1 specifies the data types used by the Ndcaf\_DataReporting\_CreateSession, Ndcaf\_DataReporting\_‌Retrieve‌Session and Ndcaf\_DataReporting\_DestroySession operations.

Table 7.2.3.1-1: Data types specific to Ndcaf\_DataReporting\_CreateSession, Ndcaf\_DataReporting\_RetrieveSession and Ndcaf\_DataReporting\_DestroySession operations

|  |  |  |
| --- | --- | --- |
| Data type | Clause defined | Description |
| DataReportingSession | 7.2.3.2.1 | Configuration by the Data Collection AF of the data collection client, specifying the data to be reported. |

Table 7.2.3.1-2 specifies data types re-used from other specifications by the Ndcaf\_DataReporting\_CreateSessions, Ndcaf\_DataReporting\_RetrieveSession and Ndcaf\_DataReporting\_‌Destroy‌Session operations, including a reference to their respective specifications.

Table 7.2.3.1-2: Externally defined data types used by Ndcaf\_DataReporting\_CreateSession, Ndcaf\_DataReporting\_RetrieveSession and Ndcaf\_DataReporting\_DestroySession operations

|  |  |  |
| --- | --- | --- |
| Data type | Comments | Reference |
| ApplicationId | Identifies the reporting application. | 3GPP TS 29.571 [12] |
| DateTime |  |
| DurationSec |  |
| Double |  |
| Float |  |
| Int32 |  |
| Int64 |  |
| Uint16 |  |
| Uint32 |  |
| Uint64 |  |
| Uinteger |  |

#### 7.2.3.2 Structured data types

##### 7.2.3.2.1 DataReportingSession resource type

Table 7.2.3.2.1-1: Definition of DataReportingSession resource type

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Property name | Data type | Cardinality | Usage | Description |
| sessionId | string | 0..1 | C: RO R: RO | Unique identifier for this Data Reporting Session assigned by the Data Collection AF. |
| validUntil | DateTime | 0..1 | C: RO R: RO | The time when the information in this Data Reporting Session expires.  The data collection client, if still active, should request an up-to-date Data Reporting Session before this time. |
| externalApplicationId | ApplicationID | 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 | C: RW R: RO | Set of domains for which the data collection client declares that it is able to report UE data. (See clause 7.2.3.3.1).  An empty array indicates that no UE data can currently be reported. |
| reportForDomains | array(DataDomain) | 0..1 | C: RO R: RO | Subset of supportedDomains above for which the data collection client is requested to report UE data.  If the Data Collection AF signals an empty array, no UE data should be reported. |
| reportingCondition | ReportCondition | 0..1 | C: RO  R: RO | The condition for reporting, signalled by the Data Collection AF. (See clause 7.2.3.2.2.) |

##### 7.2.3.2.2 ReportCondition type

Table 7.2.3.2.2-1: Definition of ReportCondition type

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Property name | Data type | P | Cardinality | Description |
| type | ConditionType | M | 1 | Type of condition, see clause 7.2.3.3.2 |
| intervalLength | DurationSec | C | 0..1 | Only applicable when type is INTERVAL. (NOTE 1) |
| threshold | Double, Float, Int32, Int64, Uint16, Uint32, Uint64, or Uinteger | C | 0..1 | Only applicable when type is THRESHOLD. (NOTE 1) |
| parameter | string | C | 0..1 | Only applicable when type is THRESHOLD. (NOTE 1) |
| reportWhenBelow | boolean | C | 0..1 | Only applicable when type is THRESHOLD. (NOTE 1) |
| event | Event | C | 0..1 | Only applicable when type is EVENT. (NOTE 2) |
| NOTE 1: See clause 7.2.3.3.2 and table 7.2.3.1-2.  NOTE 2: See clauses 7.2.3.3.2 and 7.2.3.3.3. | | | | |

#### 7.2.3.3 Simple data types and enumerations

##### 7.2.3.3.1 DataDomain enumeration

Table 7.2.3.3.1-1: DataDomain enumeration

|  |  |  |
| --- | --- | --- |
| Enumeration value | Description | Applicability (refer to Table 7.3.3.2.1-1) |
| 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\_ACCESS\_ACTIVITY | 5GMS access activity data. | mediaStreamingAccessRecords |
| PLANNED\_TRIPS | Data related to planned trips. | tripPlanRecords |

##### 7.2.3.3.2 ConditionType enumeration

Table 7.2.3.3.2-1: ConditionType enumeration

|  |  |
| --- | --- |
| Enumeration value | Description |
| INTERVAL | Report at a regular interval. |
| THRESHOLD | Report when a threshold is passed. |
| EVENT | Report on event. |
| OFF | Do not report. |

##### 7.2.3.3.3 Event enumeration

This clause lists the possible events (EVENT in table 7.2.3.3.2-1) that can be used to trigger a report.

Table 7.2.3.3.3-1: Event enumeration

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

### 7.2.4 Error handling

Editor’s Note: TBA

### 7.2.5 Mediation by NEF

Editor’s Note: TBA

## 7.3 Data Reporting API

### 7.3.1 Overview

This clause specifies the reporting API used by a data collection client to report UE data that has been collected to the Data Collection AF.

### 7.3.2 Resources

#### 7.3.2.1 Resource structure

Figure 7.3.2.1-1 depicts the URL path model for the Data Report resource pertaining to an established Data Reporting Session of the *Ndcaf\_DataReporting* service.



Figure 7.3.2.1‑1: URL path model of Data Report resource

Table 7.3.2.1-1 provides an overview of the resources and applicable HTTP methods.

Table 7.3.2.1-1: Resources and methods overview

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Service name | Operation name | Resource name | Resource path suffix | HTTP method | Description |
| Ndcaf\_DataReporting | Report | Data Report | /sessions/{sessionId}/report | POST | Data collection client reports data to the Data Collection AF via the established session. |

#### 7.3.2.2 Data Report resource

##### 7.3.2.2.1 Description

The Data Report resource allows a data collection client to report data pertaining to an established Data Reporting Session to the Data Collection AF. The Data Collection AF can provide an updated configuration in the response.

##### 7.3.2.2.2 Resource definition

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

This resource shall support the resource URL variables defined in table 7.3.2.2.2-1.

Table 7.3.2.2.2-1: Resource URL variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | Fully-Qualified Domain Name of the Data Collection AF and path prefix. |
| sessionId | string | Identifier of the Data Reporting Session unique within the scope of the Data Collection AF. |

##### 7.3.2.2.3 Resource Standard Methods

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

This method shall support the URI query parameters specified in table 7.3.2.2.3.1-1.

Table 7.3.2.2.3.1-1: URI query parameters supported by the POST method on this resource

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

This method shall support the request data structures specified in table 7.3.2.2.3.1-2 and the response data structures and response codes specified in table 7.3.2.2.3.1-4.

Table 7.3.2.2.3.1-2: Data structures supported by the POST request body on this resource

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

Table 7.3.2.2.3.1-3: 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 OAuth2.0 authorization is used the value would be “Bearer” followed by a string representing the 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 7.3.2.2.3.1-4: Data structures supported by the POST response body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 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) may optionally be provided in the response. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [9] also apply. | | | | |

Table 7.3.2.2.3.1-5: 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. 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.

### 7.3.3 Data Model

#### 7.3.3.1 General

Table 7.3.3.1-1 specifies the data types used by the Ndcaf\_DataReporting\_Report operation.

Table 7.3.3.1-1: Data types specific to Ndcaf\_DataReporting\_Report operation

|  |  |  |
| --- | --- | --- |
| Data type | Clause defined | Description |
| DataReport | 7.3.3.2.1 | Reported data by the data collection client to the Data Collection AF. |
| DataReportingSession | 7.2.3.2.1 | Configuration of the data collection client. |

Table 7.3.3.1-2 specifies data types re-used from other specifications by the Ndcaf\_DataReporting\_Report operation, including a reference to their respective specifications.

Table 7.3.3.1-2: Externally defined data types used by Ndcaf\_DataReporting\_Report operation

|  |  |  |
| --- | --- | --- |
| Data type | Comments | Reference |
| ApplicationId | Identifies the reporting application. | 3GPP TS 29.571 [12] |

#### 7.3.3.2 Structured data types

##### 7.3.3.2.1 DataReport type

Table 7.3.3.2.1-1: Definition of DataReport type

|  |  |  |  |
| --- | --- | --- | --- |
| Property name | Data type | Cardinality | Description |
| externalApplicationId | ApplicationID | 1 | External application identifier. |
| serviceExperienceRecords | array(ServiceExperienceRecord) | 0..1 (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. |
| NOTE: Exactly one of these properties must be present in a DataReport. | | | |

#### 7.3.3.3 Simple data types and enumerations

There are no simple data types and enumerations specified in this release.

### 7.3.4 Mediation by NEF