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Contents

| | |
|--|----|
| Intellectual Property Rights | 2 |
| Legal Notice | 2 |
| Modal verbs terminology..... | 2 |
| Foreword..... | 7 |
| 1 Scope | 9 |
| 2 References | 9 |
| 3 Definitions, symbols and abbreviations | 10 |
| 3.1 Definitions | 10 |
| 3.2 Symbols..... | 10 |
| 3.3 Abbreviations | 10 |
| 4 Services offered by the DCCF..... | 11 |
| 4.1 Introduction | 11 |
| 4.2 Ndcf_DataManagement Service | 11 |
| 4.2.1 Service Description..... | 11 |
| 4.2.1.1 Overview..... | 11 |
| 4.2.1.2 Service Architecture..... | 12 |
| 4.2.1.3 Network Functions | 12 |
| 4.2.1.3.1 Data Collection Coordination Function (DCCF)..... | 12 |
| 4.2.1.3.2 NF Service Consumers | 13 |
| 4.2.2 Service Operations | 13 |
| 4.2.2.1 Introduction..... | 13 |
| 4.2.2.2 Ndcf_DataManagement_Subscribe service operation..... | 13 |
| 4.2.2.2.1 General | 13 |
| 4.2.2.2.2 Subscription for analytics notifications | 13 |
| 4.2.2.2.3 Update subscription for analytic notifications | 15 |
| 4.2.2.2.4 Subscription for data notifications..... | 16 |
| 4.2.2.2.5 Update subscription for data notifications | 18 |
| 4.2.2.3 Ndcf_DataManagement_Unsubscribe service operation..... | 19 |
| 4.2.2.3.1 General | 19 |
| 4.2.2.3.2 Unsubscribe from analytics notifications | 19 |
| 4.2.2.3.3 Unsubscribe from data notifications | 19 |
| 4.2.2.4 Ndcf_DataManagement_Notify service operation | 20 |
| 4.2.2.4.1 General | 20 |
| 4.2.2.4.2 Notification about subscribed analytics | 20 |
| 4.2.2.4.3 Notification about subscribed data event..... | 21 |
| 4.2.2.5 Ndcf_DataManagement_Fetch service operation..... | 22 |
| 4.2.2.5.1 General | 22 |
| 4.2.2.5.2 Retrieve notified analytics and data..... | 22 |
| 4.3 Ndcf_ContextManagement Service | 23 |
| 4.3.1 Service Description..... | 23 |
| 4.3.1.1 Overview..... | 23 |
| 4.3.1.2 Service Architecture..... | 24 |
| 4.3.1.3 Network Functions | 24 |
| 4.3.1.3.1 Data Collection Coordination Function (DCCF)..... | 24 |
| 4.3.1.3.2 NF Service Consumers | 24 |
| 4.3.2 Service Operations | 24 |
| 4.3.2.1 Introduction..... | 24 |
| 4.3.2.2 Ndcf_ContextManagement_Register service operation | 25 |
| 4.3.2.2.1 General | 25 |
| 4.3.2.2.2 Register data collection profile to DCCF | 25 |
| 4.3.2.3 Ndcf_ContextManagement_Update service operation..... | 26 |
| 4.3.2.3.1 General | 26 |
| 4.3.2.3.2 Update registered data collection profile | 26 |
| 4.3.2.4 Ndcf_ContextManagement_Deregister service operation..... | 27 |

| | | |
|-------------|---|----|
| 4.3.2.4.1 | General | 27 |
| 4.3.2.4.2 | Deregister Data collection profile..... | 27 |
| 5 | API Definitions | 28 |
| 5.1 | Ndcf_DataManagement Service API..... | 28 |
| 5.1.1 | Introduction..... | 28 |
| 5.1.2 | Usage of HTTP | 28 |
| 5.1.2.1 | General | 28 |
| 5.1.2.2 | HTTP standard headers | 28 |
| 5.1.2.2.1 | General | 28 |
| 5.1.2.2.2 | Content type | 28 |
| 5.1.2.3 | HTTP custom headers | 29 |
| 5.1.3 | Resources..... | 29 |
| 5.1.3.1 | Overview..... | 29 |
| 5.1.3.2 | Resource: DCCF Analytics Subscriptions | 30 |
| 5.1.3.2.1 | Description | 30 |
| 5.1.3.2.2 | Resource Definition..... | 30 |
| 5.1.3.2.3 | Resource Standard Methods | 30 |
| 5.1.3.2.3.1 | POST..... | 30 |
| 5.1.3.2.4 | Resource Custom Operations | 31 |
| 5.1.3.3 | Resource: Individual DCCF Analytics Subscription..... | 31 |
| 5.1.3.3.1 | Description | 31 |
| 5.1.3.3.2 | Resource Definition..... | 31 |
| 5.1.3.3.3 | Resource Standard Methods | 31 |
| 5.1.3.3.3.1 | PUT | 31 |
| 5.1.3.3.3.2 | DELETE | 32 |
| 5.1.3.3.4 | Resource Custom Operations | 33 |
| 5.1.3.4 | Resource: DCCF Data Subscriptions | 33 |
| 5.1.3.4.1 | Description | 33 |
| 5.1.3.4.2 | Resource Definition..... | 33 |
| 5.1.3.4.3 | Resource Standard Methods | 34 |
| 5.1.3.4.3.1 | POST..... | 34 |
| 5.1.3.4.4 | Resource Custom Operations | 34 |
| 5.1.3.5 | Resource: Individual DCCF Data Subscription | 34 |
| 5.1.3.5.1 | Description | 34 |
| 5.1.3.5.2 | Resource Definition..... | 34 |
| 5.1.3.5.3 | Resource Standard Methods | 35 |
| 5.1.3.5.3.1 | PUT | 35 |
| 5.1.3.5.3.2 | DELETE | 36 |
| 5.1.3.5.4 | Resource Custom Operations | 37 |
| 5.1.4 | Custom Operations without associated resources | 37 |
| 5.1.5 | Notifications | 37 |
| 5.1.5.1 | General | 37 |
| 5.1.5.2 | Analytics Notification | 37 |
| 5.1.5.2.1 | Description | 37 |
| 5.1.5.2.2 | Target URI..... | 37 |
| 5.1.5.2.3 | Standard Methods | 37 |
| 5.1.5.3 | Data Notification..... | 38 |
| 5.1.5.3.1 | Description | 38 |
| 5.1.5.3.2 | Target URI..... | 38 |
| 5.1.5.3.3 | Standard Methods | 39 |
| 5.1.5.4 | Fetch Notification | 40 |
| 5.1.5.4.1 | Description | 40 |
| 5.1.5.4.2 | Target URI..... | 40 |
| 5.1.5.4.3 | Standard Methods | 40 |
| 5.1.5.4.3.1 | POST..... | 40 |
| 5.1.6 | Data Model | 41 |
| 5.1.6.1 | General | 41 |
| 5.1.6.2 | Structured data types | 43 |
| 5.1.6.2.1 | Introduction | 43 |
| 5.1.6.2.2 | Type NdcfAnalyticsSubscription..... | 44 |
| 5.1.6.2.3 | Type NdcfDataSubscription | 46 |

| | | |
|-------------|--|----|
| 5.1.6.2.4 | Type NdcfAnalyticsSubscriptionNotification..... | 48 |
| 5.1.6.2.5 | Type NdcfDataSubscriptionNotification | 49 |
| 5.1.6.2.6 | Type FormattingInstruction | 49 |
| 5.1.6.2.7 | Type ProcessingInstruction | 50 |
| 5.1.6.2.8 | Type ParameterProcessingInstruction | 50 |
| 5.1.6.2.9 | Type NotifSummaryReport | 51 |
| 5.1.6.2.10 | Type EventParamReport..... | 52 |
| 5.1.6.2.11 | Type ReportingOptions | 54 |
| 5.1.6.2.12 | Void | 55 |
| 5.1.6.2.13 | DccfEvent | 55 |
| 5.1.6.3 | Simple data types and enumerations | 55 |
| 5.1.6.3.1 | Introduction | 55 |
| 5.1.6.3.2 | Simple data types..... | 55 |
| 5.1.6.3.3 | Enumeration: SummarizationAttribute..... | 56 |
| 5.1.6.3.4 | Enumeration: AggregationLevel | 56 |
| 5.1.6.3.5 | Enumeration: DataCollectionPurpose | 56 |
| 5.1.6.4 | Data types describing alternative data types or combinations of data types | 56 |
| 5.1.6.5 | Binary data | 56 |
| 5.1.7 | Error Handling | 56 |
| 5.1.7.1 | General | 56 |
| 5.1.7.2 | Protocol Errors | 56 |
| 5.1.7.3 | Application Errors..... | 57 |
| 5.1.8 | Feature negotiation | 57 |
| 5.1.9 | Security | 57 |
| 5.2 | Ndcf_ContextManagement Service API | 57 |
| 5.2.1 | Introduction..... | 57 |
| 5.2.2 | Usage of HTTP | 58 |
| 5.2.2.1 | General | 58 |
| 5.2.2.2 | HTTP standard headers | 58 |
| 5.2.2.2.1 | General | 58 |
| 5.2.2.2.2 | Content type | 58 |
| 5.2.2.3 | HTTP custom headers | 58 |
| 5.2.3 | Resources..... | 58 |
| 5.2.3.1 | Overview..... | 58 |
| 5.2.3.2 | Resource: DCCF Data Collection Profiles | 59 |
| 5.2.3.2.1 | Description | 59 |
| 5.2.3.2.2 | Resource Definition..... | 59 |
| 5.2.3.2.3 | Resource Standard Methods | 59 |
| 5.2.3.2.4 | Resource Custom Operations | 60 |
| 5.2.3.3 | Resource: Individual DCCF Data Collection Profile | 60 |
| 5.2.3.3.1 | Description | 60 |
| 5.2.3.3.2 | Resource Definition..... | 60 |
| 5.2.3.3.3 | Resource Standard Methods | 60 |
| 5.2.3.3.3.1 | PUT..... | 60 |
| 5.2.3.3.3.2 | DELETE | 61 |
| 5.2.3.3.4 | Resource Custom Operations | 62 |
| 5.2.4 | Custom Operations without associated resources | 62 |
| 5.2.5 | Notifications | 62 |
| 5.2.6 | Data Model | 63 |
| 5.2.6.1 | General | 63 |
| 5.2.6.2 | Structured data types | 63 |
| 5.2.6.2.1 | Introduction | 63 |
| 5.2.6.2.2 | Type: NdcfDataCollectionProfile | 64 |
| 5.2.6.3 | Simple data types and enumerations | 64 |
| 5.2.6.3.1 | Introduction | 64 |
| 5.2.6.3.2 | Simple data types..... | 64 |
| 5.2.6.4 | Data types describing alternative data types or combinations of data types | 64 |
| 5.2.6.5 | Binary data | 64 |
| 5.2.7 | Error Handling | 65 |
| 5.2.7.1 | General | 65 |
| 5.2.7.2 | Protocol Errors | 65 |
| 5.2.7.3 | Application Errors..... | 65 |

| | | |
|---|-----------------------------------|-----------|
| 5.2.8 | Feature negotiation | 65 |
| 5.2.9 | Security | 65 |
| Annex A (normative): OpenAPI specification | | 66 |
| A.1 | General | 66 |
| A.2 | Ndccf_DataManagement API | 66 |
| A.3 | Ndccf_ContextManagement API | 78 |
| Annex B (informative): Change history | | 81 |
| History | | 82 |

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- need not** indicates permission not to do something

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- cannot** indicates that something is impossible

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

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

In addition:

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

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

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

1 Scope

The present document specifies the stage 3 protocol and data model for the Ndccf Service Based Interface. It provides stage 3 protocol definitions and message flows, and specifies the API for each service offered by the Data Collection Coordination Function (DCCF).

The 5G System stage 2 architecture and procedures are specified in 3GPP TS 23.501 [2], 3GPP TS 23.502 [3] and 3GPP TS 23.288 [14].

The Technical Realization of the Service Based Architecture and the Principles and Guidelines for Services Definition are specified in 3GPP TS 29.500 [4] and 3GPP TS 29.501 [5].

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; Stage 2".
- [3] 3GPP TS 23.502: "Procedures for the 5G System; Stage 2".
- [4] 3GPP TS 29.500: "5G System; Technical Realization of Service Based Architecture; Stage 3".
- [5] 3GPP TS 29.501: "5G System; Principles and Guidelines for Services Definition; Stage 3".
- [6] OpenAPI: "OpenAPI Specification Version 3.0.0", <https://spec.openapis.org/oas/v3.0.0>.
- [7] 3GPP TR 21.900: "Technical Specification Group working methods".
- [8] 3GPP TS 33.501: "Security architecture and procedures for 5G system".
- [9] IETF RFC 6749: "The OAuth 2.0 Authorization Framework".
- [10] 3GPP TS 29.510: "5G System; Network Function Repository Services; Stage 3".
- [11] IETF RFC 7540: "Hypertext Transfer Protocol Version 2 (HTTP/2)".
- [12] IETF RFC 8259: "The JavaScript Object Notation (JSON) Data Interchange Format".
- [13] IETF RFC 7807: "Problem Details for HTTP APIs".
- [14] 3GPP TS 23.288: "Architecture enhancements for 5G System (5GS) to support network data analytics services".
- [15] 3GPP TS 29.520: "5G System; Network Data Analytics Services; Stage 3".
- [16] Void.
- [17] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces; Stage 3".
- [18] Void.
- [19] Void.

- [20] Void.
- [21] Void.
- [22] Void.
- [23] 3GPP TS 29.122: "T8 reference point for Northbound APIs".
- [24] IETF RFC 6901: "JavaScript Object Notation (JSON) Pointer".
- [25] 3GPP TS 29.575: "5G System; Analytics Data Repository Services; Stage 3".
- [26] 3GPP TS 29.576: "5G System; Messaging Framework Adaptor Services; Stage 3".
- [27] 3GPP TS 29.536: "5G System; Network Slice Admission Control Services; Stage 3".
- [28] 3GPP TS 29.554: "5G System; Background Data Transfer Policy Control Service; Stage 3".

3 Definitions, symbols and abbreviations

3.1 Definitions

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

None.

3.2 Symbols

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

None.

3.3 Abbreviations

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

| | |
|-----------------------|--|
| ADRF | Analytics Data Repository Function |
| AF | Application Function |
| AMF | Access and Mobility Management Function |
| DCCF | Data Collection Coordination Function |
| NF | Network Function |
| NRF | Network Repository Function |
| NEF | Network Exposure Function |
| NSACF | Network Slice Admission Control Function |
| NSSF | Network Slice Selection Function |
| NWDAF | Network Data Analytics Function |
| PCF | Policy Control Function |
| SMF | Session Management Function |
| UDM | Unified Data Management |

4 Services offered by the DCCF

4.1 Introduction

The Ndcf services are used for the DCCF to provide collected data.

The following services are specified for the DCCF:

Table 4.1-1: Services provided by DCCF

| Service Name | Description | Service Operations | Operation Semantics | Example Consumer(s) |
|------------------------|--|--------------------|---------------------|---|
| Ndcf_DataManagement | This service enables the NF service consumers to subscribe to/unsubscribe from notifications for different collected data from the DCCF. | Subscribe | Subscribe / Notify | NWDAF, PCF, NSSF, AMF, SMF, NEF, AF, ADRF |
| | | Unsubscribe | | |
| | | Notify | Request / Response | |
| | | Fetch | | |
| Ndcf_ContextManagement | This service enables the NF service consumers to register/deregister collected data in the DCCF. | Register | Request / Response | NWDAF, ADRF |
| | | Update | | |
| | | Deregister | | |

Table 4.1-2 summarizes the corresponding APIs defined for this specification.

Table 4.1-2: API Descriptions

| Service Name | Clause | Description | OpenAPI Specification File | apiName | Annex |
|------------------------|--------|---------------------------------|-------------------------------------|------------------|-------|
| Ndcf_DataManagement | 5.1 | DCCF Data Management Service | TS29574_Ndcf_DataManagement.yaml | ndcf-datamngt | A.2 |
| Ndcf_ContextManagement | 5.2 | DCCF Context Management Service | TS29574_Ndcf_ContextManagement.yaml | ndcf-contextmngt | A.3 |

4.2 Ndcf_DataManagement Service

4.2.1 Service Description

4.2.1.1 Overview

The Ndcf_DataManagement service, as defined in 3GPP TS 23.288 [14], is provided by the Data Collection Coordination Function (DCCF).

This service:

- allows NF service consumers to subscribe, modify and unsubscribe for analytics or data related events;
- notifies NF service consumers with a corresponding subscription about observed events; and
- allows NF service consumers to retrieve analytics or data according to the Fetch Instructions provided by DCCF.

4.2.1.2 Service Architecture

The 5G System Architecture is defined in 3GPP TS 23.501 [2]. The Network Data Analytics Exposure architecture, including the DCCF architecture, is defined in 3GPP TS 23.288 [14].

Known consumers of the Ndccf_DataManagement service are:

- Policy Control Function (PCF)
- Network Slice Selection Function (NSSF)
- Access and Mobility Management Function (AMF)
- Session Management Function (SMF)
- Network Exposure Function (NEF)
- Application Function (AF)
- Network Data Analytics Function (NWDAF)
- Analytics Data Repository Function (ADRF)

The Ndccf_DataManagement service is provided by the DCCF and consumed by the NF service consumers as shown in figure 4.2.1.2-1 for the SBI representation model and in figure 4.2.1.2-2 for the reference point representation model.

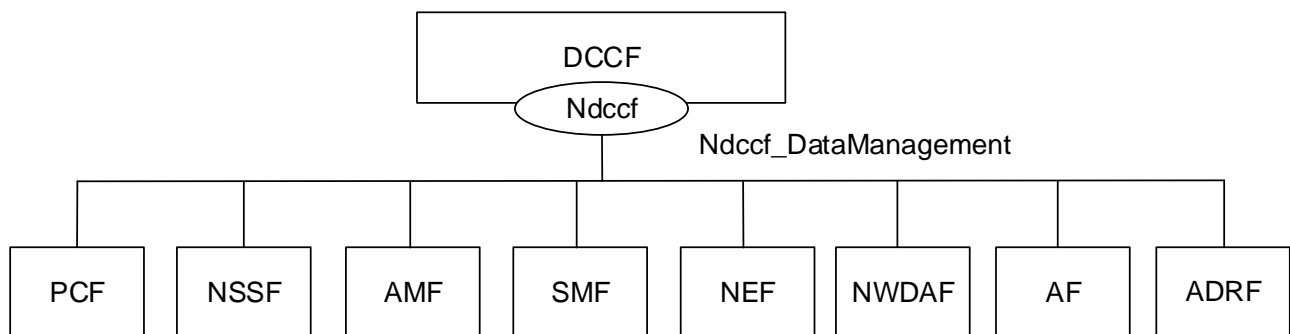


Figure 4.2.1.2-1: Ndccf_DataManagement service architecture, SBI representation

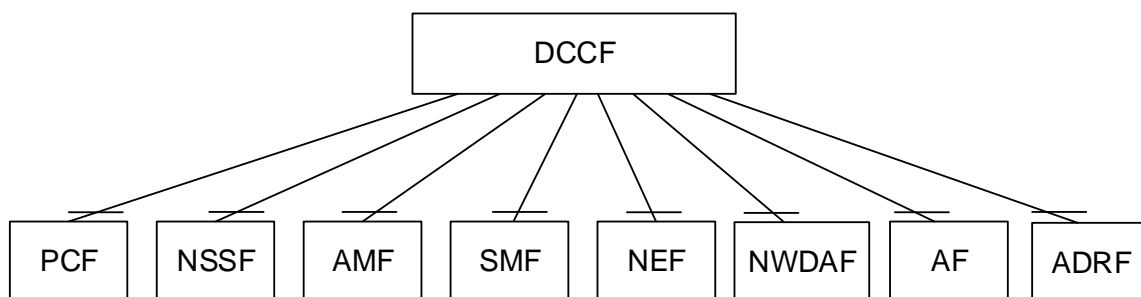


Figure 4.2.1.2-2: Ndccf_DataManagement service architecture, reference point representation

4.2.1.3 Network Functions

4.2.1.3.1 Data Collection Coordination Function (DCCF)

The DCCF (Data Collection Coordination Function) provides the functionality to coordinate collection of analytics and/or data from one or more NFs based on requests from one or more NF service consumers.

4.2.1.3.2 NF Service Consumers

The NF service consumers for the Ndcf_DataManagement service are as specified in 3GPP TS 29.520 [15] clause 4.2.1.3.2 for the Nnwdf_EventsSubscription service, with the following additions:

- The NWDAF as a service consumer supports also (un)subscription to the notification of data collection events from the DCCF.

4.2.2 Service Operations

4.2.2.1 Introduction

Service operations defined for the Ndcf_DataManagement Service are shown in table 4.2.2.1-1.

Table 4.2.2.1-1: Ndcf_DataManagement Service Operations

| Service Operation Name | Description | Initiated by |
|---------------------------------|---|---|
| Ndcf_DataManagement_Subscribe | This service operation is used by an NF service consumer to subscribe to, or modify a subscription in the DCCF for event notifications. | NF service consumer (NWDAF, PCF, NSSF, AMF, SMF, NEF, AF, ADRF) |
| Ndcf_DataManagement_Unsubscribe | This service operation is used by an NF service consumer to unsubscribe from event notifications. | NF service consumer (NWDAF, PCF, NSSF, AMF, SMF, NEF, AF, ADRF) |
| Ndcf_DataManagement_Notify | This service operation is used by the DCCF to report the detected event(s) to the NF service consumer if subscribed before. | DCCF |
| Ndcf_DataManagement_Fetch | This service operation is used by an NF service consumer to retrieve collected data from the DCCF. | NF service consumer (NWDAF, PCF, NSSF, AMF, SMF, NEF, AF) |

4.2.2.2 Ndcf_DataManagement_Subscribe service operation

4.2.2.2.1 General

The Ndcf_DataManagement_Subscribe service operation is used by an NF service consumer to create or update a subscription for analytics or data notifications from the DCCF.

4.2.2.2.2 Subscription for analytics notifications

Figure 4.2.2.2.2-1 shows a scenario where the NF service consumer sends a request to the DCCF to subscribe for analytics notifications.

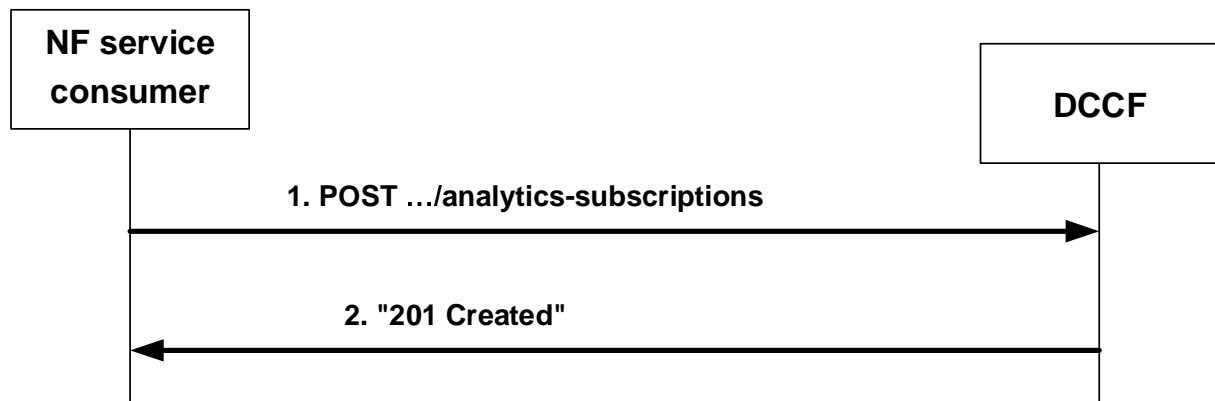


Figure 4.2.2.2-1: NF service consumer subscribes to analytics notifications

The NF service consumer shall invoke the `Ndccf_DataManagement_Subscribe` service operation to subscribe to analytics notification(s). The NF service consumer shall send an HTTP POST request with "`{apiRoot}/ndccf-datamanagement/<apiVersion>/analytics-subscriptions`" as Resource URI representing the "DCCF Analytics Subscriptions", as shown in figure 4.2.2.2-1, step 1, to create an "Individual DCCF Analytics Subscription" according to the information in the message body. The `NdccfAnalyticsSubscription` data structure provided in the request body shall include:

- analytics subscription information within the "anaSub" attribute;
- a notification target address within the "anaNotifUri" attribute; and
- a notification correlation identifier in the "anaNotifCorrId" attribute;

and may include:

- formatting instructions within the "formatInstruct" attribute;
- processing instructions within the "procInstruct" attribute;
- a target NWDAF identifier within the "targetNfId" attribute or a target NWDAF set identifier within the "targetNfSetId" attribute;
- an ADRF identifier within the "adrfId" attribute or an ADRF set identifier within the "adrfSetId" attribute; and/or
- time window of performing the requested analytics within the "timePeriod" attribute.

NOTE: This time window, over which the requested data collection or analytics was performed or to be performed, is different from the analytics target period, over which the statistics or predictions are requested. For example, in a subscription that requests "predictions that are performed during the month of May about UE_MOBILITY analytics during the month of July", this time window is "May" while the analytics target period is "July". The DCCF can use the provided time window e.g. to determine when to (un)subscribe to the NWDAF and/or what subscription duration to indicate to it.

- the purpose of data collection within the "dataCollectPurposes" attribute.

Upon the reception of an HTTP POST request with "`{apiRoot}/ndccf-datamanagement/<apiVersion>/subscriptions`" as Resource URI and `NdccfAnalyticsSubscription` data structure as request body, the DCCF shall use the contents of the request (e.g. "anaSub" attribute in `NdccfAnalyticsSubscription` data structure) to determine whether the subscription can already be served or interactions with the NWDAF and/or ADRF (e.g. creation or modification of analytics subscription for `Nnwdaf_AnalyticsSubscription` service) are required. If the DCCF cannot use the contents of the request to determine this, the DCCF shall send an HTTP "400 Bad Request" error response including the "cause" attribute set to "SUBSCRIPTION_CANNOT_BE_SERVED".

NOTE: The "SUBSCRIPTION_CANNOT_BE_SERVED" error can occur, for example, when the request is syntactically valid and there is no DCCF internal error, but the DCCF can neither find an existing subscription to an NWDAF nor construct one based on the received subscription contents.

If the DCCF determines that the subscription can already be served (without requiring further interactions with NWDAF and/or ADRF) or a successful response from the NWDAF and/or ADRF is received for the creation or modification of subscription(s) to serve this subscription, the DCCF shall:

- create a new subscription;
- assign a subscriptionId;
- store the subscription.

If the DCCF created an "Individual DCCF Analytics Subscription" resource, the DCCF shall respond with "201 Created" with the message body containing a representation of the created subscription, as shown in figure 4.2.2.2.2-1, step 2. If not all the requested analytics events in the subscription are accepted, then the DCCF may include the "failEventReports" attribute indicating the event(s) for which the subscription failed and the associated reason(s). The DCCF shall include a Location HTTP header field. The Location header field shall contain the URI of the created subscription i.e. "{apiRoot}/ndccf-datamanagement/<apiVersion>/analytics-subscriptions/{subscriptionId}". If the immediate reporting indication in the "immRep" attribute within the "evtReq" attribute sets to true in the event subscription, the DCCF shall include the reports of the events subscribed, if available, in the HTTP POST response.

If an error occurs when processing the HTTP POST request, the DCCF shall send an HTTP error response as specified in clause 5.1.7.

4.2.2.2.3 Update subscription for analytic notifications

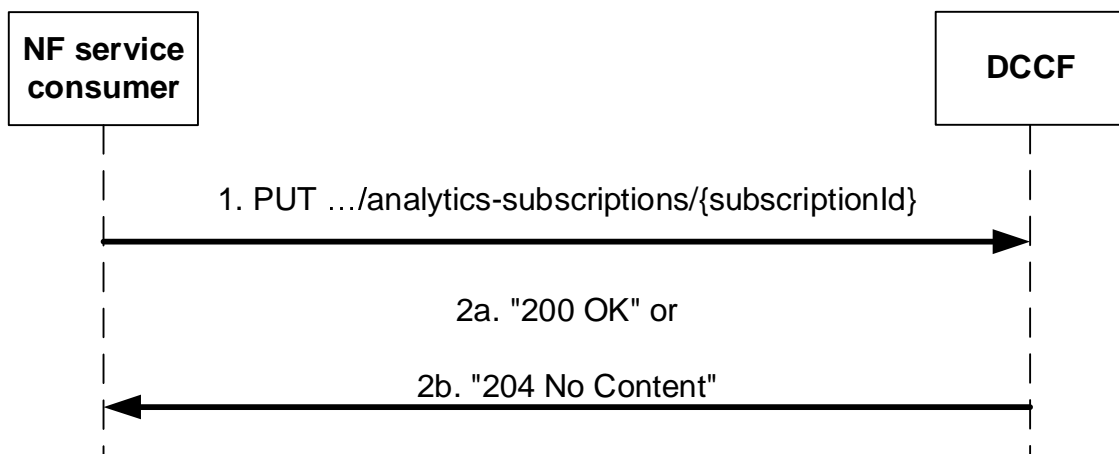


Figure 4.2.2.2.3-1: NF service consumer updates subscription to analytics notifications

The NF service consumer shall invoke the `Ndccf_DataManagement_Subscribe` service operation to update a subscription to analytics notifications. The NF service consumer shall send an HTTP PUT request with "{apiRoot}/ndccf-datamanagement/<apiVersion>/analytics-subscriptions/{subscriptionId}" as Resource URI, as shown in figure 4.2.2.2.3-1, step 1, to update the subscription for an "Individual DCCF Analytics Subscription" resource identified by the {subscriptionId}. The `NdccfAnalyticsSubscription` data structure provided in the request body shall include the same contents as described in clause 4.2.2.2.2.

Upon the reception of an HTTP PUT request with "{apiRoot}/ndccf-datamanagement/<apiVersion>/analytics-subscriptions/{subscriptionId}" as Resource URI and `NdccfAnalyticsSubscription` data structure as request body, the DCCF shall use the contents of the request to determine whether the updated subscription can already be served or interactions with the NWDAF and/or ADRF (e.g. modification of analytics subscriptions with the NWDAF) are required. If the DCCF cannot use the contents of the request to determine this, the DCCF shall send an HTTP "400 Bad Request" error response including the "cause" attribute set to "SUBSCRIPTION_CANNOT_BE_SERVED".

NOTE: The "SUBSCRIPTION_CANNOT_BE_SERVED" error can occur, for example, when the request is syntactically valid and there is no DCCF internal error, but the DCCF can neither find an existing subscription to an NWDAF nor construct one based on the received subscription contents.

If the DCCF determines that the updated subscription can already be served (without requiring further interactions with NWDAF and/or ADRF) or a successful response from the NWDAF and/or ADRF is received for the creation or modification of subscription(s) to serve this subscription, the DCCF shall:

- update the subscription of corresponding subscriptionId; and
- store the subscription.

If the DCCF successfully updated the "Individual DCCF Analytics Subscription" resource, the DCCF shall respond with:

- a) HTTP "200 OK" status code with the message body containing a representation of the updated subscription, as shown in figure 4.2.2.2.3-1, step 2a. If not all the requested analytics events in the subscription are modified successfully, then the DCCF may include the "failEventReports" attribute indicating the event(s) for which the modification failed and the associated reason(s); or
- b) HTTP "204 No Content" status code, as shown in figure 4.2.2.2.3-1, step 2b.

If an error occurs when processing the HTTP PUT request, the DCCF shall send an HTTP error response as specified in clause 5.1.7.

If the DCCF determines the received HTTP PUT request needs to be redirected, the DCCF shall send an HTTP redirect response as specified in clause 6.10.9 of 3GPP TS 29.500 [4].

4.2.2.2.4 Subscription for data notifications

Figure 4.2.2.2.4-1 shows a scenario where the NF service consumer sends a request to the DCCF to subscribe for data notifications.

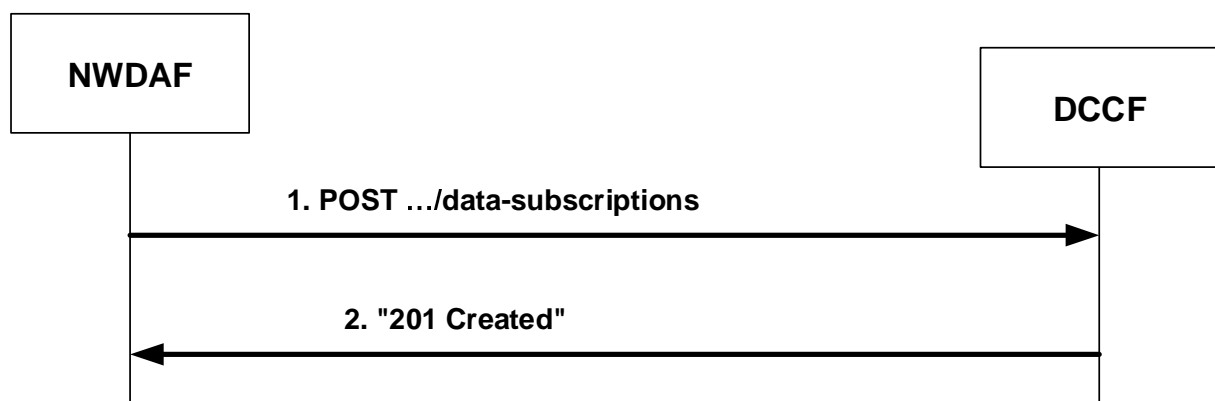


Figure 4.2.2.2.4-1: NF service consumer subscribes to data notifications

The NF service consumer (i.e. NWDAF) shall invoke the `Ndccf_DataManagement_Subscribe` service operation to subscribe to data notification(s). The NF service consumer shall send an HTTP POST request with "`{apiRoot}/ndccf-datamanagement/<apiVersion>/data-subscriptions`" as Resource URI, as shown in figure 4.2.2.2.4-1, step 1, to create a subscription for an "Individual DCCF Data Subscription" resource according to the information in message body. The `NdccfDataSubscription` data structure provided in the request body shall include:

- a notification target address within the "dataNotifUri" attribute;
- a notification correlation identifier within the "dataNotifCorrId" attribute; and
- a data subscription within the "dataSub" attribute, which contains one of the following:
 - AMF event exposure subscription within the "amfDataSub" attribute;
 - SMF event exposure subscription within the "smfDataSub" attribute;
 - UDM event exposure subscription within the "udmDataSub" attribute;
 - NEF event exposure subscription within the "nefDataSub" attribute;
 - AF event exposure subscription within the "afDataSub" attribute;
 - NRF event exposure subscription within the "nrfDataSub" attribute;

- NSACF event exposure subscription within the "nsacfDataSub" attribute;

and may include:

- formatting instructions within the "formatInstruct" attribute;
- processing instructions within the "procInstrct" attribute;
- a target NF identifier within the "targetNfId" attribute" or a target NF set identifier within the "targetNfSetId" attribute";
- an ADRF identifier within the "adrfId" attribute or an ADRF set identifier within the "adrfSetId" attribute; and/or
- time window of the occurrence of the requested data collection within the "timePeriod" attribute.

NOTE: The DCCF can use the provided time window e.g. to determine when to (un)subscribe to the data source NF and/or what subscription duration to indicate to it.

- the purpose of data collection within the "dataCollectPurposes" attribute.

Upon the reception of an HTTP POST request with: "{apiRoot}/ndccf-datamanagement/<apiVersion>/subscriptions" as Resource URI and NdccfDataSubscription data structure as request body, the DCCF shall use the contents (e.g. "smfDataSub" attribute in NdccfDataSubscription data structure) of the request to determine whether the subscription can already be served or interactions with data sources (e.g. creation or modification of event exposure subscription for Nsmf_EventExposure service) are required. If the DCCF cannot use the contents of the request to determine this, the DCCF shall send an HTTP "400 Bad Request" error response including the "cause" attribute set to "SUBSCRIPTION_CANNOT_BE_SERVED".

NOTE: The "SUBSCRIPTION_CANNOT_BE_SERVED" error can occur, for example, when the request is syntactically valid and there is no DCCF internal error, but the DCCF can neither find an existing subscription to a data source nor construct one based on the received subscription contents.

If the DCCF determines that the subscription can already be served (without requiring further interactions with the data sources) or a successful response from the data source(s) is received for the creation or modification of subscription(s) to serve this subscription, the DCCF shall:

- create a new subscription;
- assign a subscriptionId;
- store the subscription.

If the DCCF created an "Individual DCCF Data Subscription" resource, the DCCF shall respond with "201 Created" with the message body containing a representation of the created subscription, as shown in figure 4.2.2.2.4-1, step 2. The DCCF shall include a Location HTTP header field. The Location header field shall contain the URI of the created subscription i.e. "{apiRoot}/ndccf-datamanagement/<apiVersion>/data-subscriptions/{subscriptionId}".

If an error occurs when processing the HTTP POST request, the DCCF shall send an HTTP error response as specified in clause 5.1.7.

4.2.2.2.5 Update subscription for data notifications

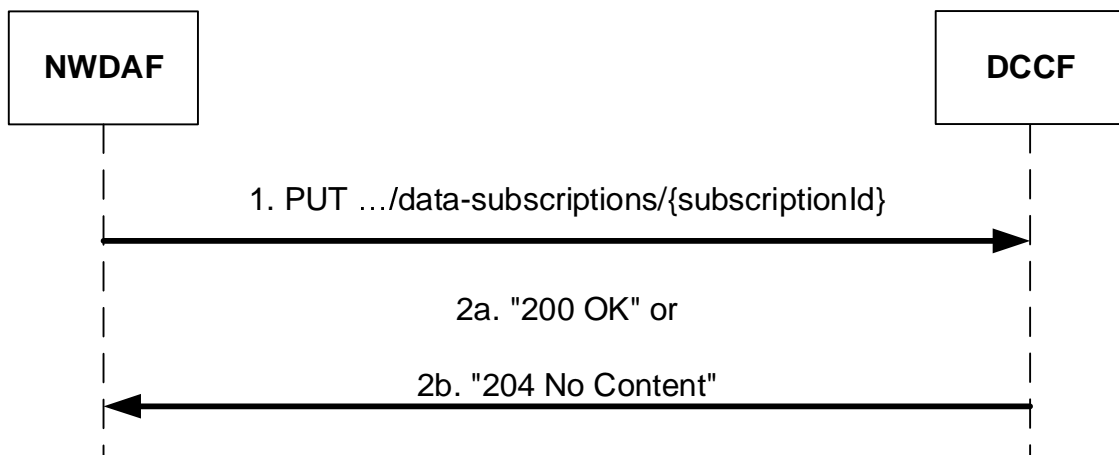


Figure 4.2.2.2.5-1: NF service consumer updates subscription to data notifications

The NF service consumer (i.e. NWDAF) shall invoke the `Ndccf_DataManagement_Subscribe` service operation to update a subscription to data notifications. The NF service consumer shall send an HTTP PUT request with `"{apiRoot}/ndccf-datamanagement/<apiVersion>/data-subscriptions/{subscriptionId}"` as Resource URI, as shown in figure 4.2.2.2.5-1, step 1, to update the subscription for an "Individual DCCF Data Subscription" resource identified by the `{subscriptionId}`. The `NdccfDataSubscription` data structure provided in the request body shall include the same contents as described in clause 4.2.2.2.4.

Upon the reception of an HTTP PUT request with `"{apiRoot}/ndccf-datamanagement/<apiVersion>/data-subscriptions/{subscriptionId}"` as Resource URI and `NdccfDataSubscription` data structure as request body, the DCCF shall use the contents of the request to determine whether the updated subscription can already be served or interactions with the data sources (e.g. modification of event exposure subscriptions) are required. If the DCCF cannot use the contents of the request to determine this, the DCCF shall send an HTTP "400 Bad Request" error response including the "cause" attribute set to "SUBSCRIPTION_CANNOT_BE_SERVED".

NOTE: The "SUBSCRIPTION_CANNOT_BE_SERVED" error can occur, for example, when the request is syntactically valid and there is no DCCF internal error, but the DCCF can neither find an existing event exposure subscription nor construct one based on the received subscription contents.

If the DCCF determines that the updated subscription can already be served (without requiring further interactions with the data sources) or a successful response from the data source(s) is received for the creation or modification of subscription(s) to serve this subscription, the DCCF shall:

- update the subscription of the corresponding `subscriptionId`; and
- store the subscription.

If the DCCF successfully updated the "Individual DCCF Data Subscription" resource, the DCCF shall respond with:

- a) HTTP "200 OK" status code with the message body containing a representation of the updated subscription, as shown in figure 4.2.2.2.5-1, step 2a; or
- b) HTTP "204 No Content" status code, as shown in figure 4.2.2.2.5-1, step 2b.

If an error occurs when processing the HTTP PUT request, the DCCF shall send an HTTP error response as specified in clause 5.1.7.

If the DCCF determines the received HTTP PUT request needs to be redirected, the DCCF shall send an HTTP redirect response as specified in clause 6.10.9 of 3GPP TS 29.500 [4].

4.2.2.3 Ndcf_DataManagement_Unsubscribe service operation

4.2.2.3.1 General

The Ndcf_DataManagement_Unsubscribe service operation is used by an NF service consumer to remove a subscription for analytics or data notifications from the DCCF.

4.2.2.3.2 Unsubscribe from analytics notifications

Figure 4.2.2.3.2-1 shows a scenario where the NF service consumer sends a request to the DCCF to unsubscribe from analytics notifications.

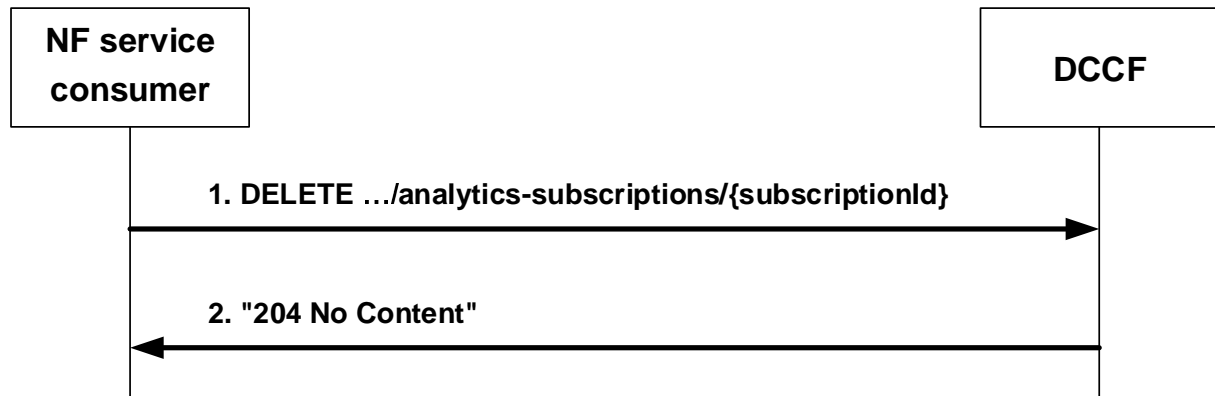


Figure 4.2.2.3.2-1: NF service consumer unsubscribes from analytics notifications

The NF service consumer shall invoke the Ndcf_DataManagement_Unsubscribe service operation to unsubscribe from analytics notifications. The NF service consumer shall send an HTTP DELETE request with "{apiRoot}/ndccf-datamanagement /<apiVersion>/analytics-subscriptions/{subscriptionId}" as Resource URI representing an "Individual DCCF Analytics Subscription" resource, as shown in figure 4.2.2.3.2-1, step 1, where "{subscriptionId}" is the identifier of the existing analytics subscription that is to be deleted.

Upon the reception of an HTTP DELETE request with "{apiRoot}/ndccf-datamanagement/<apiVersion>/analytics-subscriptions /{subscriptionId}" as Resource URI, if the DCCF successfully processed and accepted the received HTTP DELETE request, the DCCF shall:

- remove the corresponding subscription;
- respond with HTTP "204 No Content" status.

If errors occur when processing the HTTP DELETE request, the DCCF shall send an HTTP error response as specified in clause 5.1.7.

If the DCCF determines the received HTTP DELETE request needs to be redirected, the DCCF shall send an HTTP redirect response as specified in clause 6.10.9 of 3GPP TS 29.500 [4].

4.2.2.3.3 Unsubscribe from data notifications

Figure 4.2.2.3.3-1 shows a scenario where the NF service consumer sends a request to the DCCF to unsubscribe from data notifications.

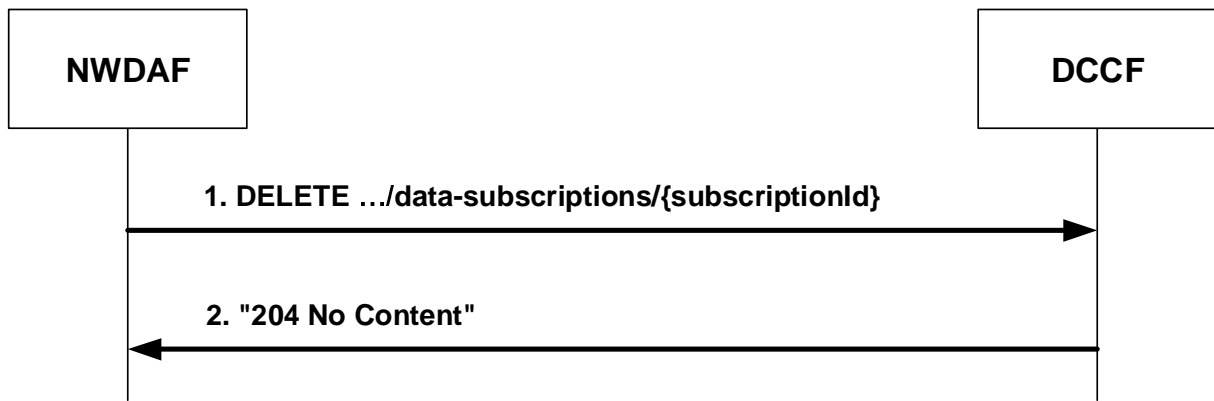


Figure 4.2.2.3.3-1: NWDAF unsubscribes from data notifications

The NWDAF shall invoke the `Ndccf_DataManagement_Unsubscribe` service operation to unsubscribe to data notifications. The NWDAF shall send an HTTP DELETE request with "`{apiRoot}/ndccf-datamanagement/<apiVersion>/data-subscriptions/{subscriptionId}`" as Resource URI representing an "Individual DCCF Data Subscription" resource, as shown in figure 4.2.2.3.3-1, step 1, where "`{subscriptionId}`" is the identifier of the existing data subscription that is to be deleted.

Upon the reception of an HTTP DELETE request with "`{apiRoot}/ndccf-datamanagement/<apiVersion>/data-subscriptions/{subscriptionId}`" as Resource URI, if the DCCF successfully processed and accepted the received HTTP DELETE request, the DCCF shall:

- remove the corresponding subscription;
- respond with HTTP "204 No Content" status.

If errors occur when processing the HTTP DELETE request, the DCCF shall send an HTTP error response as specified in clause 5.1.7.

If the DCCF determines the received HTTP DELETE request needs to be redirected, the DCCF shall send an HTTP redirect response as specified in clause 6.10.9 of 3GPP TS 29.500 [4].

4.2.2.4 `Ndccf_DataManagement_Notify` service operation

4.2.2.4.1 General

The `Ndccf_DataManagement_Notify` service operation is used by DCCF to notify NF service consumers about subscribed events related to analytics or data.

4.2.2.4.2 Notification about subscribed analytics

Figure 4.2.2.4.2-1 shows a scenario where the DCCF sends a request to the NF Service Consumer to notify it about analytics event(s).

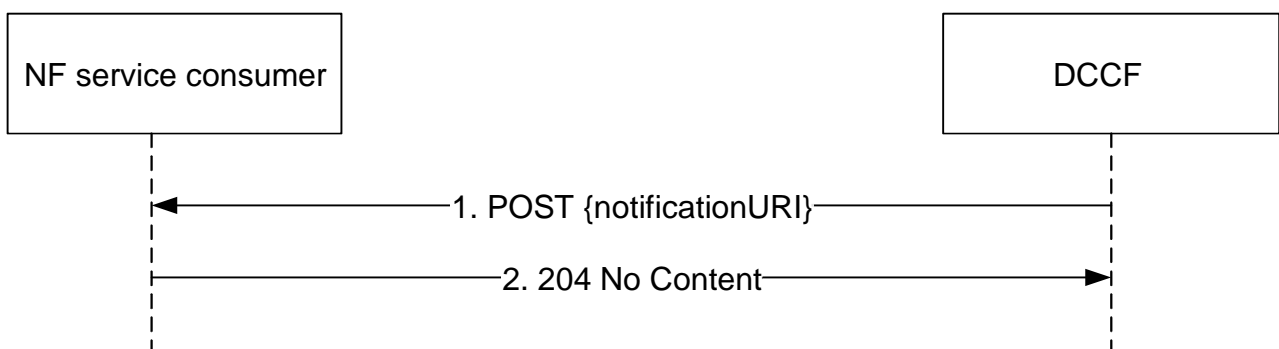


Figure 4.2.2.4.2-1: DCCF notifies the NF service consumer about a subscribed analytics event

The DCCF shall invoke the `Ndpcf_DataManagement_Notify` service operation to notify about a subscribed analytics event. The DCCF shall send an HTTP POST request with "{notificationURI}" as Resource URI (where "{notificationURI}" has the value of the notification URI received in the `NdpcfAnalyticsSubscription` data structure of the `Ndpcf_DataManagement_Subscribe` service operation, see clause 5.1.5 for the definition of this notification URI), as shown in figure 4.2.2.4.2-1, step 1. The `NdpcfAnalyticsSubscriptionNotification` data structure provided in the request body shall include:

- the analytics notification correlation identifier within the "anaNotifCorrId" attribute;
- the time stamp which represents the time when DCCF completes preparation of the requested analytics within the "timeStamp" attribute;
- one of the following:
 - information about network data analytics function events that occurred in the "anaNotifications" attribute;
 - summarized analytics derived from events based on processing instructions and formatting instructions that occurred in the "anaReports" attribute;
 - information for fetching the contents of the notification in the "fetchInstruct" attribute.

The `NdpcfAnalyticsSubscriptionNotification` data structure provided in the request body may include:

- a termination request provided by the DCCF within the "terminationReq" attribute.

If the NF service consumer successfully processed and accepted the received HTTP POST request, the NF service consumer shall:

- store the notification;
- respond with HTTP "204 No Content" status code.

If errors occur when processing the HTTP POST request, the NF service consumer shall send an HTTP error response as specified in clause 5.1.7.

If NF service consumer determines the received HTTP POST request needs to be redirected, the NF service consumer shall send an HTTP redirect response as specified in clause 6.10.9 of 3GPP TS 29.500 [4].

4.2.2.4.3 Notification about subscribed data event

Figure 4.2.2.4.3-1 shows a scenario where the DCCF sends a request to the NF Service Consumer to notify it about data event(s).

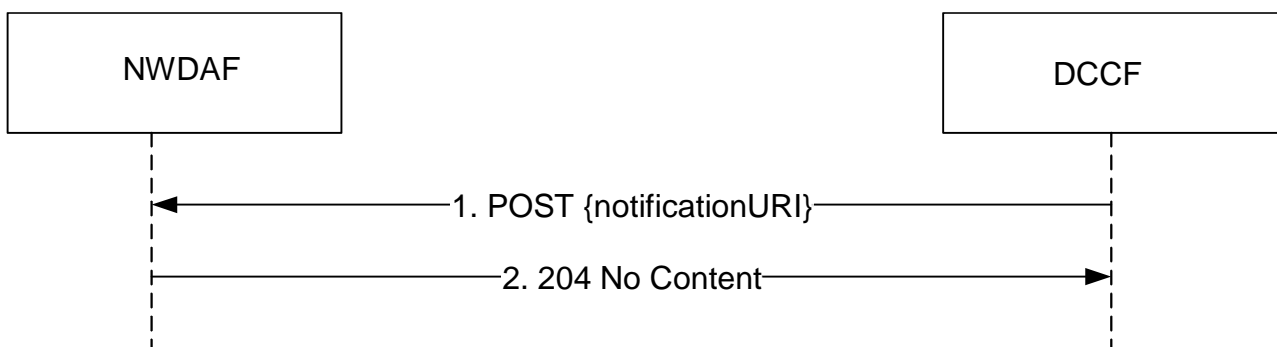


Figure 4.2.2.4.3-1: DCCF notifies the NF service consumer about a subscribed data event

The DCCF shall invoke the `Ndpcf_DataManagement_Notify` service operation to notify about a subscribed data event. The DCCF shall send an HTTP POST request with "{notificationURI}" as Resource URI (where "{notificationURI}" has the value of the notification URI received in the `NdpcfDataSubscription` data structure of the `Ndpcf_DataManagement_Subscribe` service operation, see clause 5.1.5 for the definition of this notification URI), as shown in figure 4.2.2.4.3-1, step 1. The `NdpcfDataSubscriptionNotification` data structure provided in the request body shall include:

- the data notification correlation identifier within the "dataNotifCorrId" attribute;
- the time stamp which represents the time when DCCF completes preparation of the requested data within the "timeStamp" attribute;
- the data notification within the "dataNotif" attribute, which contains one of the following:
 - NEF event(s) that occurred in the "nefEventNotifs" attribute;
 - AF event(s) that occurred in the "afEventNotifs" attribute;
 - AMF event(s) that occurred in the "amfEventNotifs" attribute;
 - SMF event(s) that occurred in the "smfEventNotifs" attribute;
 - UDM event(s) that occurred in the "udmEventNotifs" attribute;
 - NRF event(s) that occurred in the "nrfEventNotifs" attribute;
 - NSACF event(s) that occurred in the "nsacfEventNotifs" attribute;
 - summarized data derived from events based on processing instructions and formatting instructions that occurred in the "dataReports" attribute;
 - information for fetching the contents of the notification in the "fetchInstruct" attribute.

The NdccfDataSubscriptionNotification data structure provided in the request body may include:

- a termination request provided by the DCCF within the "terminationReq" attribute.

If the NF service consumer successfully processed and accepted the received HTTP POST request, the NF service consumer shall:

- store the notification;
- respond with HTTP "204 No Content" status code.

If errors occur when processing the HTTP POST request, the NF service consumer shall send an HTTP error response as specified in clause 5.1.7.

If the NWDAF determines the received HTTP POST request needs to be redirected, the NWDAF shall send an HTTP redirect response as specified in clause 6.10.9 of 3GPP TS 29.500 [4].

4.2.2.5 Ndccf_DataManagement_Fetch service operation

4.2.2.5.1 General

The Ndccf_DataManagement_Fetch service operation is used by an NF service consumer to retrieve analytics or data notifications indicated by fetch instructions from the DCCF.

4.2.2.5.2 Retrieve notified analytics and data

Figure 4.2.2.5.2-1 shows a scenario where the NF service consumer sends a request to the DCCF to retrieve notified analytics or data.

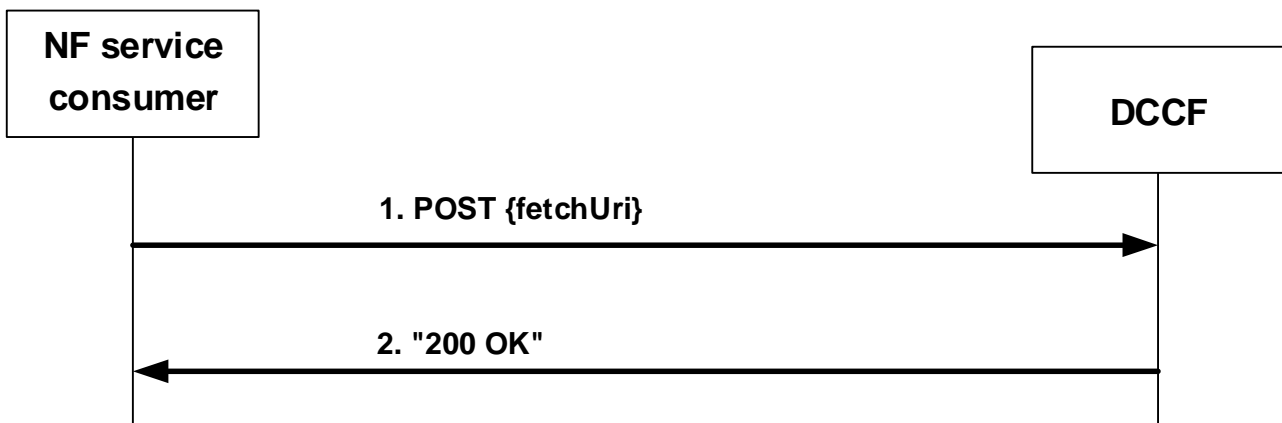


Figure 4.2.2.5.2-1: NF service consumer requesting to retrieve notified analytics or data

The NF service consumer shall invoke the `Ndccf_DataManagement_Fetch` service operation to retrieve notified analytics or data. The NF service consumer shall send an HTTP POST request to the URI "`{fetchUri}`" which was previously provided by the DCCF within a `FetchInstruction` data structure in a DCCF notification, as shown in figure 4.2.2.5.2-1, step 1, to request notified analytics or data from the DCCF.

The request body shall include fetch correlation identifiers, which were previously provided by the DCCF in the "`fetchCorrIds`" attribute within `FetchInstruction` data structure in the DCCF notification.

Upon the reception of the HTTP POST request, the DCCF shall:

- find the analytics or data according to the request.

If requested analytics is found, the DCCF shall respond with "200 OK" status code with the message body containing the `NdccfAnalyticsSubscriptionNotification` data structure. The `NdccfAnalyticsSubscriptionNotification` data structure in the response body shall include the same contents as described in clause 4.2.2.4.2 with the difference that the "`fetchInstruct`" attribute shall not be included.

If requested data is found, the DCCF shall respond with "200 OK" status code with the message body containing the `NdccfDataSubscriptionNotification` data structure. The `NdccfDataSubscriptionNotification` data structure in the response body shall include the same contents as described in clause 4.2.2.4.3 with the difference that the "`fetchInstruct`" attribute shall not be included.

If the requested analytics or data does not exist, the DCCF shall respond with "204 No Content".

If an error occurs when processing the HTTP POST request, the DCCF shall send an HTTP error response as specified in clause 5.1.7.

If the DCCF determines the received HTTP POST request needs to be redirected, the DCCF shall send an HTTP redirect response as specified in clause 6.10.9 of 3GPP TS 29.500 [4].

4.3 Ndccf_ContextManagement Service

4.3.1 Service Description

4.3.1.1 Overview

The `Ndccf_ContextManagement` service, as defined in 3GPP TS 23.288 [14], is provided by the Data Collection Coordination Function (DCCF).

This service:

- allows NF service consumers to register, update or deregister the collected data or analytics information in the DCCF.

4.3.1.2 Service Architecture

The 5G System Architecture is defined in 3GPP TS 23.501 [2]. The Network Data Analytics Exposure architecture, including the DCCF architecture, is defined in 3GPP TS 23.288 [14].

Known consumers of the `Ndccf_ContextManagement` service are:

- Network Data Analytics Function (NWDAF)
- Analytics Data Repository Function (ADRF)

The `Ndccf_ContextManagement` service is provided by the DCCF and consumed by the NF service consumers (e.g. NWDAF, ADRF) as shown in figure 4.3.1.2-1 for the SBI representation model and in figure 4.3.1.2-2 for the reference point representation model.

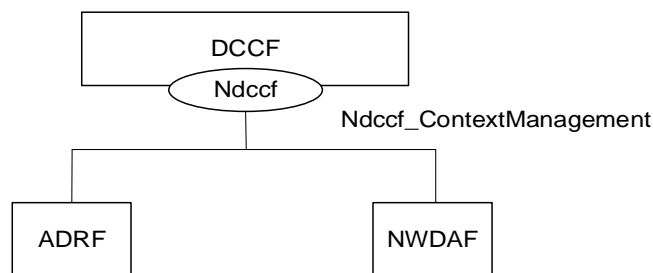


Figure 4.3.1.2-1: Ndccf_ContextManagement service architecture, SBI representation

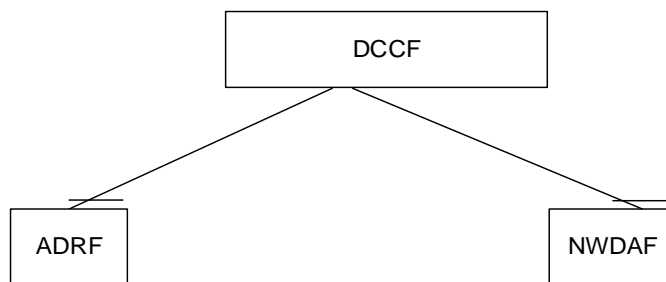


Figure 4.3.1.2-2: Ndccf_ContextManagement service architecture, reference point representation

4.3.1.3 Network Functions

4.3.1.3.1 Data Collection Coordination Function (DCCF)

The DCCF (Data Collection Coordination Function) provides functionality to create, update, and delete data collection profiles.

4.3.1.3.2 NF Service Consumers

The NWDAF and ADRF may register and/or update a data collection profile to the DCCF to enable data consumers to get the data which has been collected by NWDAF or ADRF directly (i.e. not via DCCF).

4.3.2 Service Operations

4.3.2.1 Introduction

Service operations defined for the `Ndccf_ContextManagement` Service are shown in table 4.3.2.1-1.

Table 4.3.2.1-1: Ndcf_ContextManagement Service Operations

| Service Operation Name | Description | Initiated by |
|-----------------------------------|--|-----------------------------------|
| Ndcf_ContextManagement_Register | This service operation is used by an NF service consumer to register data or analytics it is collecting in the DCCF. | NF service consumer (NWDAF, ADRF) |
| Ndcf_ContextManagement_Update | This service operation is used by an NF service consumer to update an existing data or analytics registration. | NF service consumer (NWDAF, ADRF) |
| Ndcf_ContextManagement_Deregister | This service operation is used by an NF service consumer to delete an existing data or analytics registration. | NF service consumer (NWDAF, ADRF) |

4.3.2.2 Ndcf_ContextManagement_Register service operation

4.3.2.2.1 General

4.3.2.2.2 Register data collection profile to DCCF

Figure 4.3.2.2.2-1 shows a scenario where the NF service consumer sends a request to the DCCF to register data or analytics it is collecting to the DCCF.

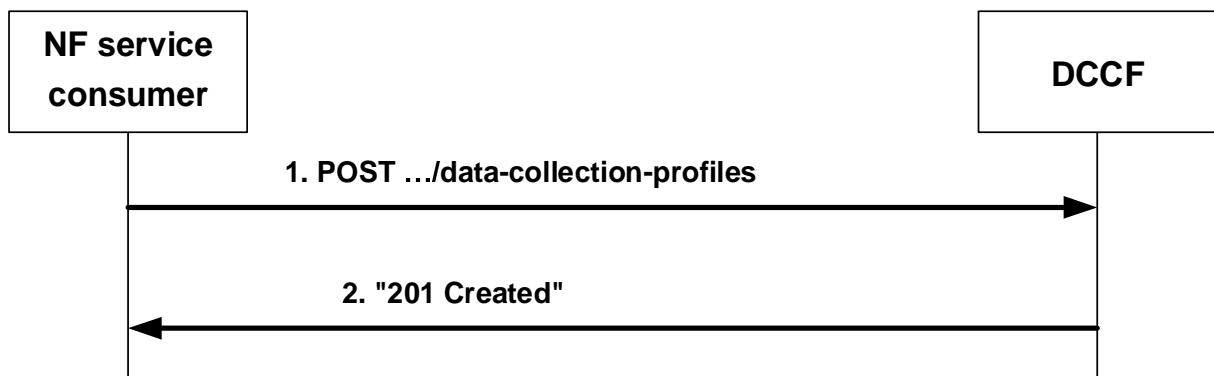


Figure 4.3.2.2.2-1: NF service consumer registers data collection profile

The NF service consumer shall invoke the Ndcf_ContextManagement_Register service operation to register data or analytics it is collecting to the DCCF. The NF service consumer shall send an HTTP POST request with "{apiRoot}/ndcf-contextmanagement/<apiVersion>/data-collection-profiles" as Resource URI representing the "DCCF Data Collection Profiles", as shown in figure 4.3.2.2.2-1, step 1, to create an "Individual DCCF Data Collection Profile" according to the information in the message body. The NdcfDataCollectionProfile data structure provided in the request body shall include:

- one of the following data or analytics collection information:
 - analytics subscription information within the "anaSub" attribute;
 - data subscription information within the "dataSub" attribute, which contains one of the following:
 - AMF event exposure subscription within the "amfDataSub" attribute;
 - SMF event exposure subscription within the "smfDataSub" attribute;
 - UDM event exposure subscription within the "udmDataSub" attribute;
 - NEF event exposure subscription within the "nefDataSub" attribute;
 - AF event exposure subscription within the "afDataSub" attribute;
 - NRF event exposure subscription within the "nrfDataSub" attribute;

- NSACF event exposure subscription within the "nsacfDataSub" attribute;
- one of the following identifiers related to the NF service consumer:
 - NWDAF instance identifier within the "nwdaId" attribute;
 - ADRF instance identifier within the "adrfId" attribute;
 - NWDAF set identifier within the "nwdaSetId" attribute;
 - ADRF set identifier within the "adrfSetId" attribute;

Upon the reception of an HTTP POST request with "{apiRoot}/ndccf-contextmanagement/<apiVersion>/data-collection-profiles" as Resource URI and NdccfDataCollectionProfile data structure as request body, the DCCF shall:

- create a new profile;
- assign a profileId;
- store the profile.

If the DCCF created an "Individual DCCF Data Collection Profile" resource, the DCCF shall respond with "201 Created" with the message body containing a representation of the created profile, as shown in figure 4.3.2.2.2-1, step 2. The DCCF shall include a Location HTTP header field. The Location header field shall contain the URI of the created profile, i.e. "{apiRoot}/ndccf-contextmanagement/<apiVersion>/data-collection-profiles/{profileId}".

If an error occurs when processing the HTTP POST request, the DCCF shall send an HTTP error response as specified in clause 5.2.7.

4.3.2.3 Ndccf_ContextManagement_Update service operation

4.3.2.3.1 General

4.3.2.3.2 Update registered data collection profile

Figure 4.3.2.3.2-1 shows a scenario where the NF service consumer sends a request to the DCCF to update a registration of a data collection profile to the DCCF.

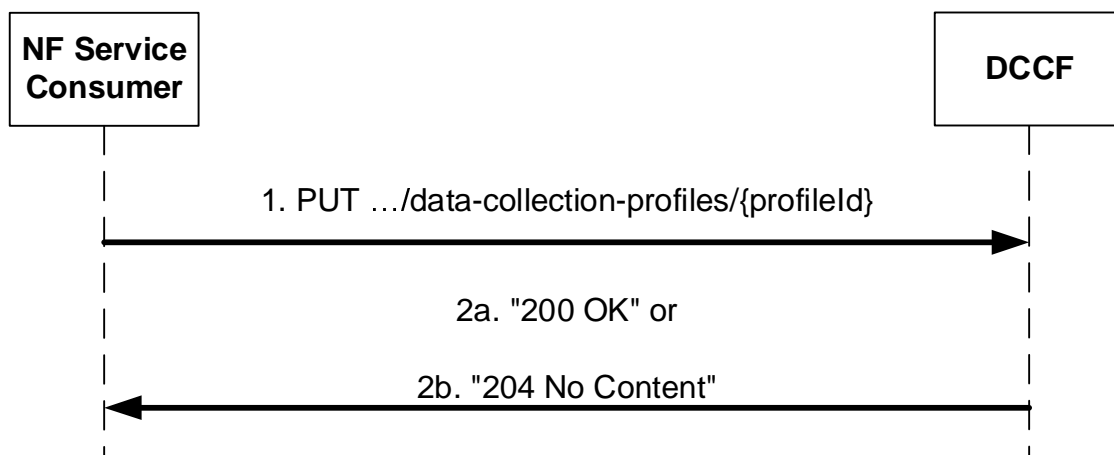


Figure 4.3.2.3.2-1: NF service consumer updates registered data collection profile

The NF service consumer (e.g. NWDAF or ADRF) shall invoke the Ndccf_ContextManagement_Update service operation to update a registration of data or analytics collection to DCCF. The NF service consumer shall send an HTTP PUT request with "{apiRoot}/ndccf-contextmanagement/<apiVersion>/data-collection-profiles/{profileId}" as Resource URI, as shown in figure 4.3.2.3.2-1, step 1, to update the registration of data or analytics for an "Individual DCCF Data Collection Profile" resource identified by the {profileId}. The NdccfDataCollectionProfile data structure provided in the request body shall include the same contents as described in clause 4.3.2.2.

Upon the reception of an HTTP PUT request with "{apiRoot}/ndccf-contextmanagement/<apiVersion>/data-collection-profiles/{profileId}" as Resource URI and NdccfDataCollectionProfile data structure as request body, the DCCF shall:

- update the profile of the corresponding profileId; and
- store the profile.

If the DCCF successfully processed and accepted the received HTTP PUT request, the DCCF shall update an "Individual DCCF Data Collection Profile" resource, and shall respond with:

- a) HTTP "200 OK" status code with the message body containing a representation of the updated profile, as shown in figure 4.3.2.3.2-1, step 2a; or
- b) HTTP "204 No Content" status code, as shown in figure 4.3.2.3.2-1, step 2b.

If an error occurs when processing the HTTP PUT request, the DCCF shall send an HTTP error response as specified in clause 5.2.7.

If the DCCF determines the received HTTP PUT request needs to be redirected, the DCCF shall send an HTTP redirect response as specified in clause 6.10.9 of 3GPP TS 29.500 [4].

4.3.2.4 Ndccf_ContextManagement_Deregister service operation

4.3.2.4.1 General

4.3.2.4.2 Deregister Data collection profile

Figure 4.3.2.4.2-1 shows a scenario where the NF service consumer sends a request to the DCCF to delete a registration of data collection profile.

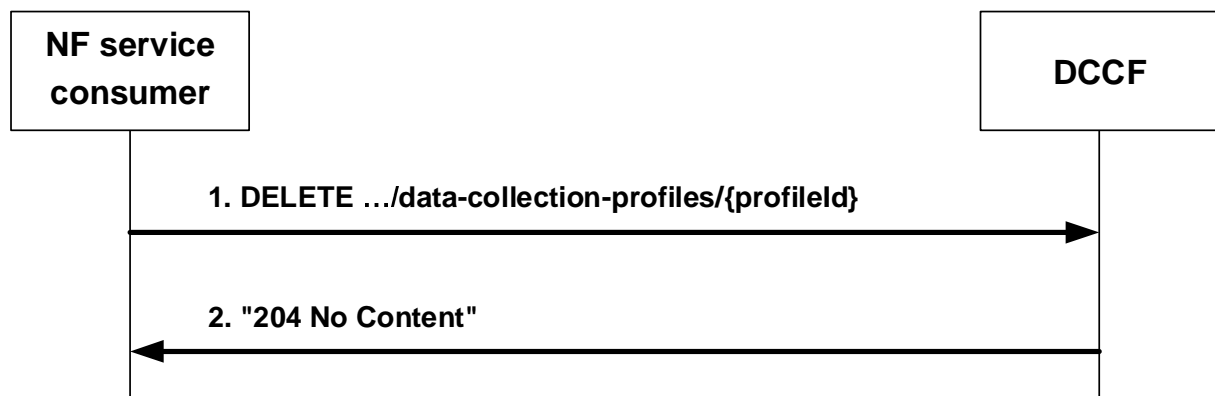


Figure 4.3.2.4.2-1: NF service consumer deregisters data collection profile

The NF service consumer shall invoke the Ndccf_ContextManagement_Deregister service operation to delete a registration of data or analytics collection profile to the DCCF. The NF service consumer shall send an HTTP DELETE request with "{apiRoot}/ndccf-contextmanagement/<apiVersion>/data-collection-profiles/{profileId}" as Resource URI representing an "Individual DCCF Data Collection Profile" resource, as shown in figure 4.3.2.4.2-1, step 1, where "{profileId}" is the identifier of the existing Data Collection Profile that is to be deleted.

Upon the reception of an HTTP DELETE request with "{apiRoot}/ndccf-contextmanagement/<apiVersion>/data-collection-profiles/{profileId}" as Resource URI, if the DCCF successfully processed and accepted the received HTTP DELETE request, the DCCF shall:

- remove the corresponding registered profile;
- respond with HTTP "204 No Content" status.

If errors occur when processing the HTTP DELETE request, the DCCF shall send an HTTP error response as specified in clause 5.2.7.

If the DCCF determines the received HTTP DELETE request needs to be redirected, the DCCF shall send an HTTP redirect response as specified in clause 6.10.9 of 3GPP TS 29.500 [4].

5 API Definitions

5.1 Ndccf_DataManagement Service API

5.1.1 Introduction

The Ndccf_DataManagement shall use the Ndccf_DataManagement API.

The API URI of the Ndccf_DataManagement API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests from the NF service consumer towards the NF service producer shall have the Resource URI structure defined in clause 4.4.1 of 3GPP TS 29.501 [5], i.e.:

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

with the following components:

- The {apiRoot} shall be set as described in 3GPP TS 29.501 [5].
- The <apiName> shall be "ndccf-datamngt".
- The <apiVersion> shall be "v1".
- The <apiSpecificResourceUriPart> shall be set as described in clause 5.1.3.

5.1.2 Usage of HTTP

5.1.2.1 General

HTTP/2, IETF RFC 7540 [11], shall be used as specified in clause 5 of 3GPP TS 29.500 [4].

HTTP/2 shall be transported as specified in clause 5.3 of 3GPP TS 29.500 [4].

The OpenAPI [6] specification of HTTP messages and content bodies for the Ndccf_DataManagement API is contained in Annex A.

5.1.2.2 HTTP standard headers

5.1.2.2.1 General

See clause 5.2.2 of 3GPP TS 29.500 [4] for the usage of HTTP standard headers.

5.1.2.2.2 Content type

JSON, IETF RFC 8259 [12], shall be used as content type of the HTTP bodies specified in the present specification as specified in clause 5.4 of 3GPP TS 29.500 [4]. The use of the JSON format shall be signalled by the content type "application/json".

"Problem Details" JSON object shall be used to indicate additional details of the error in a HTTP response body and shall be signalled by the content type "application/problem+json", as defined in IETF RFC 7807 [13].

5.1.2.3 HTTP custom headers

The mandatory HTTP custom header fields specified in clause 5.2.3.2 of 3GPP TS 29.500 [4] shall be supported, and the optional HTTP custom header fields specified in clause 5.2.3.3 of 3GPP TS 29.500 [4] may be supported.

5.1.3 Resources

5.1.3.1 Overview

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

Figure 5.1.3.1-1 depicts the resource URIs structure for the Ndcf_DataManagement API.

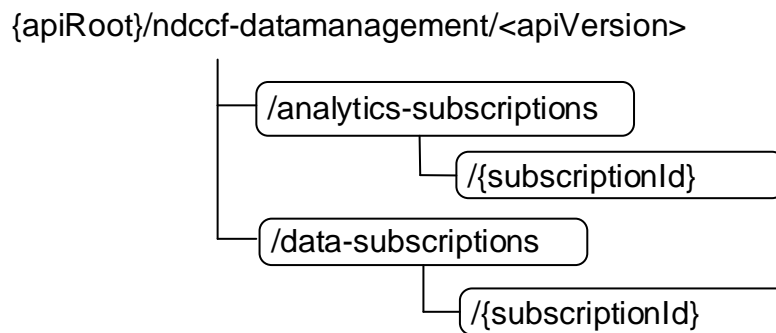


Figure 5.1.3.1-1: Resource URI structure of the Ndcf_DataManagement API

Table 5.1.3.1-1 provides an overview of the resources and applicable HTTP methods.

Table 5.1.3.1-1: Resources and methods overview

| Resource name | Resource URI | HTTP method or custom operation | Description |
|--|---|---------------------------------|---|
| DCCF Analytics Subscriptions | /analytics-subscriptions | POST | Creates a new Individual DCCF Analytics Subscription resource. |
| Individual DCCF Analytics Subscription | /analytics-subscriptions/{subscriptionId} | PUT | Modifies an existing Individual DCCF Analytics Subscription resource. |
| | | DELETE | Deletes an Individual DCCF Analytics Subscription identified by {subscriptionId}. |
| DCCF Data Subscriptions | /data-subscriptions | POST | Creates a new Individual DCCF Data Subscription resource. |
| Individual DCCF Data Subscription | /data-subscriptions/{subscriptionId} | PUT | Modifies an existing DCCF Data Subscription resource. |
| | | DELETE | Deletes an Individual DCCF Data Subscription identified by {subscriptionId}. |

5.1.3.2 Resource: DCCF Analytics Subscriptions

5.1.3.2.1 Description

The DCCF Analytics Subscriptions resource represents all Analytics subscriptions to the Ndccf_DataManagement Service at a given DCCF. The resource allows an NF service consumer to create a new Individual DCCF Analytics Subscription resource.

5.1.3.2.2 Resource Definition

Resource URI: {apiRoot}/ndccf-datamanagement/<apiVersion>/analytics-subscriptions

This resource shall support the resource URI variables defined in table 5.1.3.2.2-1.

Table 5.1.3.2.2-1: Resource URI variables for this resource

| Name | Data type | Definition |
|---------|-----------|------------------|
| apiRoot | string | See clause 5.1.1 |

5.1.3.2.3 Resource Standard Methods

5.1.3.2.3.1 POST

This method shall support the URI query parameters specified in table 5.1.3.2.3.1-1.

Table 5.1.3.2.3.1-1: URI query parameters supported by the POST method on this resource

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a | | | | | |

This method shall support the request data structures specified in table 5.1.3.2.3.1-2 and the response data structures and response codes specified in table 5.1.3.2.3.1-3.

Table 5.1.3.2.3.1-2: Data structures supported by the POST Request Body on this resource

| Data type | P | Cardinality | Description |
|----------------------------|---|-------------|--|
| NdccfAnalyticsSubscription | M | 1 | New Individual DCCF Analytics Subscription resource to be created. |

Table 5.1.3.2.3.1-3: Data structures supported by the POST Response Body on this resource

| Data type | P | Cardinality | Response codes | Description |
|----------------------------|---|-------------|-----------------|--|
| NdccfAnalyticsSubscription | M | 1 | 201 Created | The creation of an Individual DCCF Analytics Subscription resource is confirmed and a representation of that resource is returned. |
| ProblemDetails | O | 0..1 | 400 Bad Request | (NOTE 2) |

NOTE 1: The mandatory HTTP error status code for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply.

NOTE 2: Failure cases are described in clause 5.1.7.

Table 5.1.3.2.3.1-4: Headers supported by the 201 response code on this resource

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

5.1.3.2.4 Resource Custom Operations

None in this release of the specification.

5.1.3.3 Resource: Individual DCCF Analytics Subscription

5.1.3.3.1 Description

The Individual DCCF Analytics Subscription resource represents a single Analytics Subscription to the Ndccf_DataManagement Service at a given DCCF.

5.1.3.3.2 Resource Definition

Resource URI: {apiRoot}/ndccf-datamanagement/<apiVersion>/analytics-subscriptions/{subscriptionId}

This resource shall support the resource URI variables defined in table 5.1.3.3.2-1.

Table 5.1.3.3.2-1: Resource URI variables for this resource

| Name | Data type | Definition |
|----------------|-----------|--|
| apiRoot | string | See clause 5.1.1 |
| subscriptionId | string | Identifies an analytics subscription to the Ndccf_DataManagement Service |

5.1.3.3.3 Resource Standard Methods

5.1.3.3.3.1 PUT

This method shall support the URI query parameters specified in table 5.1.3.3.3.1-1.

Table 5.1.3.3.3.1-1: URI query parameters supported by the PUT method on this resource

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a | | | | | |

This method shall support the request data structures specified in table 5.1.3.3.3.1-2 and the response data structures and response codes specified in table 5.1.3.3.3.1-3.

Table 5.1.3.3.3.1-2: Data structures supported by the PUT Request Body on this resource

| Data type | P | Cardinality | Description |
|----------------------------|---|-------------|---|
| NdccfAnalyticsSubscription | M | 1 | Parameters to replace a subscription to DCCF Analytics Subscription resource. |

Table 5.1.3.3.3.1-3: Data structures supported by the PUT Response Body on this resource

| Data type | P | Cardinality | Response codes | Description |
|----------------------------|---|-------------|------------------------|--|
| NdccfAnalyticsSubscription | M | 1 | 200 OK | The Individual DCCF Analytics Subscription resource was modified successfully and a representation of that resource is returned. |
| n/a | | | 204 No Content | The Individual DCCF Analytics Subscription resource was modified successfully. |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection, during Individual DCCF Analytics Subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative DCCF (service) instance. |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection, during Individual DCCF Analytics Subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative DCCF (service) instance. |
| ProblemDetails | O | 0..1 | 400 Bad Request | (NOTE 2) |

NOTE 1: The mandatory HTTP error status code for the PUT method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply.
 NOTE 2: Failure cases are described in clause 5.1.7.

Table 5.1.3.3.3.1-4: Headers supported by the 307 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|---|
| Location | string | M | 1 | An alternative URI of the resource located in an alternative DCCF (service) instance. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the request is redirected. |

Table 5.1.3.3.3.1-5: Headers supported by the 308 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|---|
| Location | string | M | 1 | An alternative URI of the resource located in an alternative DCCF (service) instance. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the request is redirected. |

5.1.3.3.3.2 DELETE

This method shall support the URI query parameters specified in table 5.1.3.3.3.2-1.

Table 5.1.3.3.3.2-1: URI query parameters supported by the DELETE method on this resource

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a | | | | | |

This method shall support the request data structures specified in table 5.1.3.3.3.2-2 and the response data structures and response codes specified in table 5.1.3.3.3.2-3.

Table 5.1.3.3.3.2-2: Data structures supported by the DELETE Request Body on this resource

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a | | | |

Table 5.1.3.3.2-3: Data structures supported by the DELETE Response Body on this resource

| Data type | P | Cardinality | Response codes | Description |
|------------------|---|-------------|------------------------|--|
| n/a | | | 204 No Content | The Individual DCCF Analytics Subscription resource was deleted successfully. |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection, during Individual DCCF Analytics Subscription deletion. The response shall include a Location header field containing an alternative URI of the resource located in an alternative DCCF (service) instance. |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection, during Individual DCCF Analytics Subscription deletion. The response shall include a Location header field containing an alternative URI of the resource located in an alternative DCCF (service) instance. |

NOTE: The mandatory HTTP error status code for the DELETE method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply.

Table 5.1.3.3.2-4: Headers supported by the 307 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|---|
| Location | String | M | 1 | An alternative URI of the resource located in an alternative DCCF (service) instance. |
| 3gpp-Sbi-Target-Nf-Id | String | O | 0..1 | Identifier of the target NF (service) instance towards which the request is redirected. |

Table 5.1.3.3.2-5: Headers supported by the 308 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|---|
| Location | String | M | 1 | An alternative URI of the resource located in an alternative DCCF (service) instance. |
| 3gpp-Sbi-Target-Nf-Id | String | O | 0..1 | Identifier of the target NF (service) instance towards which the request is redirected. |

5.1.3.3.4 Resource Custom Operations

None in this release of the specification.

5.1.3.4 Resource: DCCF Data Subscriptions

5.1.3.4.1 Description

The DCCF Data Subscriptions resource represents all data subscriptions to the Ndccf_DataManagement Service at a given DCCF. The resource allows an NF service consumer to create a new Individual DCCF Data Subscription resource.

5.1.3.4.2 Resource Definition

Resource URI: {apiRoot}/ndccf-datamanagement/<apiVersion>/data-subscriptions

This resource shall support the resource URI variables defined in table 5.1.3.4.2-1.

Table 5.1.3.3.2-1: Resource URI variables for this resource

| Name | Data type | Definition |
|---------|-----------|------------------|
| apiRoot | string | See clause 5.1.1 |

5.1.3.4.3 Resource Standard Methods

5.1.3.4.3.1 POST

This method shall support the URI query parameters specified in table 5.1.3.4.3.1-1.

Table 5.1.3.4.3.1-1: URI query parameters supported by the POST method on this resource

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a | | | | | |

This method shall support the request data structures specified in table 5.1.3.4.3.1-2 and the response data structures and response codes specified in table 5.1.3.4.3.1-3.

Table 5.1.3.4.3.1-2: Data structures supported by the POST Request Body on this resource

| Data type | P | Cardinality | Description |
|-----------------------|---|-------------|---|
| NdccfDataSubscription | M | 1 | Individual DCCF Data Subscription resource to be created. |

Table 5.1.3.4.3.1-3: Data structures supported by the POST Response Body on this resource

| Data type | P | Cardinality | Response codes | Description |
|-----------------------|---|-------------|-----------------|---|
| NdccfDataSubscription | M | 1 | 201 Created | The creation of an Individual DCCF Data Subscription resource is confirmed and a representation of that resource is returned. |
| ProblemDetails | O | 0..1 | 400 Bad Request | (NOTE 2) |

NOTE 1: The mandatory HTTP error status code for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply.
NOTE 2: Failure cases are described in clause 5.1.7.

Table 5.1.3.4.3.1-4: Headers supported by the 201 response code on this resource

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

5.1.3.4.4 Resource Custom Operations

None in this release of the specification.

5.1.3.5 Resource: Individual DCCF Data Subscription

5.1.3.5.1 Description

The Individual DCCF Data Subscription resource represents a single data subscription to the Ndccf_DataManagement Service at a given DCCF.

5.1.3.5.2 Resource Definition

Resource URI: {apiRoot}/ndccf-datamanagement/<apiVersion>/data-subscriptions/{subscriptionId}

This resource shall support the resource URI variables defined in table 5.1.3.5.2-1.

Table 5.1.3.5.2-1: Resource URI variables for this resource

| Name | Data type | Definition |
|----------------|-----------|---|
| apiRoot | string | See clause 5.1.1 |
| subscriptionId | string | Identifies a data subscription to the Ndcf_DataManagement Service |

5.1.3.5.3 Resource Standard Methods

5.1.3.5.3.1 PUT

This method shall support the URI query parameters specified in table 5.1.3.5.3.1-1.

Table 5.1.3.5.3.1-1: URI query parameters supported by the PUT method on this resource

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a | | | | | |

This method shall support the request data structures specified in table 5.1.3.5.3.1-2 and the response data structures and response codes specified in table 5.1.3.5.3.1-3.

Table 5.1.3.5.3.1-2: Data structures supported by the PUT Request Body on this resource

| Data type | P | Cardinality | Description |
|----------------------|---|-------------|--|
| NdcfDataSubscription | M | 1 | Parameters to replace a subscription to DCCF Data Subscription resource. |

Table 5.1.3.5.3.1-3: Data structures supported by the PUT Response Body on this resource

| Data type | P | Cardinality | Response codes | Description |
|---|---|-------------|------------------------|---|
| NdcfDataSubscription | M | 1 | 200 OK | The Individual DCCF Data Subscription resource was modified successfully and a representation of that resource is returned. |
| n/a | | | 204 No Content | The Individual DCCF Data Subscription resource was modified successfully. |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection, during Individual DCCF Data Subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative DCCF (service) instance. |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection, during Individual DCCF Data Subscription modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative DCCF (service) instance. |
| ProblemDetails | O | 0..1 | 400 Bad Request | (NOTE 2) |
| NOTE 1: The mandatory HTTP error status code for the PUT method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply. | | | | |
| NOTE 2: Failure cases are described in clause 5.1.7. | | | | |

Table 5.1.3.5.3.1-4: Headers supported by the 307 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|---|
| Location | string | M | 1 | An alternative URI of the resource located in an alternative DCCF (service) instance. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the request is redirected. |

Table 5.1.3.5.3.1-5: Headers supported by the 308 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|---|
| Location | string | M | 1 | An alternative URI of the resource located in an alternative DCCF (service) instance. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the request is redirected. |

5.1.3.5.3.2 DELETE

This method shall support the URI query parameters specified in table 5.1.3.5.3.2-1.

Table 5.1.3.5.3.2-1: URI query parameters supported by the DELETE method on this resource

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a | | | | | |

This method shall support the request data structures specified in table 5.1.3.5.3.2-2 and the response data structures and response codes specified in table 5.1.3.5.3.2-3.

Table 5.1.3.5.3.2-2: Data structures supported by the DELETE Request Body on this resource

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a | | | |

Table 5.1.3.5.3.2-3: Data structures supported by the PUT Response Body on this resource

| Data type | P | Cardinality | Response codes | Description |
|--|---|-------------|------------------------|---|
| n/a | | | 204 No Content | The Individual DCCF Data Subscription resource was deleted successfully. |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection, during Individual DCCF Data Subscription deletion. The response shall include a Location header field containing an alternative URI of the resource located in an alternative DCCF (service) instance. |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection, during Individual DCCF Data Subscription deletion. The response shall include a Location header field containing an alternative URI of the resource located in an alternative DCCF (service) instance. |
| NOTE: The mandatory HTTP error status code for the DELETE method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply. | | | | |

Table 5.1.3.5.3.2-4: Headers supported by the 307 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|---|
| Location | string | M | 1 | An alternative URI of the resource located in an alternative DCCF (service) instance. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the request is redirected. |

Table 5.1.3.5.3.2-5: Headers supported by the 308 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|---|
| Location | string | M | 1 | An alternative URI of the resource located in an alternative DCCF (service) instance. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the request is redirected. |

5.1.3.5.4 Resource Custom Operations

None in this release of the specification.

5.1.4 Custom Operations without associated resources

None in this release of the specification.

5.1.5 Notifications

5.1.5.1 General

Notifications shall comply to clause 6.2 of 3GPP TS 29.500 [4] and clause 4.6.2.3 of 3GPP TS 29.501 [5].

Table 5.1.5.1-1: Notifications overview

| Notification | Callback URI | HTTP method or custom operation | Description (service operation) |
|------------------------------|----------------|---------------------------------|--|
| Analytics Event Notification | {anaNotifUri} | POST | Report one or several observed analytics events. |
| Data Event Notification | {dataNotifUri} | POST | Report one or several observed data collection events. |
| Fetch Notification | {fetchUri} | POST | Fetch one or several notified data or analytics. |

5.1.5.2 Analytics Notification

5.1.5.2.1 Description

The Analytics Notification is used by the NF service producer to report one or several observed analytics events to an NF service consumer that has subscribed to such notifications.

5.1.5.2.2 Target URI

The Callback URI "{anaNotifUri}" shall be used with the callback URI variables defined in table 5.1.5.2.2-1.

Table 5.1.5.2.2-1: Callback URI variables

| Name | Definition |
|-------------|---|
| anaNotifUri | String formatted as URI with the Callback Uri. The Callback Uri is assigned within the Individual DCCF Analytics Subscription resource and described within the NdccfAnalyticsSubscription type (see table 5.1.6.2.2-1). |

5.1.5.2.3 Standard Methods

5.1.5.2.3.1 POST

This method shall support the request data structures specified in table 5.1.5.2.3.1-1 and the response data structures and response codes specified in table 5.1.5.2.3.2-1.

Table 5.1.5.2.3.1-1: Data structures supported by the POST Request Body

| Data type | P | Cardinality | Description |
|--|---|-------------|--|
| NddcfAnalyticsSubscriptionNotification | M | 1 | Provides information about observed analytics events |

Table 5.1.5.2.3.1-2: Data structures supported by the POST Response Body

| Data type | P | Cardinality | Response codes | Description |
|------------------|---|-------------|------------------------|---|
| n/a | | | 204 No Content | The receipt of the Notification is acknowledged. |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection, during the analytics event notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative NF consumer (service) instance where the notification should be sent. |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection, during the analytics event notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative NF consumer (service) instance where the notification should be sent. |

NOTE: The mandatory HTTP error status codes for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply.

Table 5.1.5.2.3.1-3: Headers supported by the 307 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|---|
| Location | string | M | 1 | An alternative URI representing the end point of an alternative NF consumer (service) instance towards which the notification should be redirected. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the notification request is redirected. |

Table 5.1.5.2.3.1-4: Headers supported by the 308 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|---|
| Location | string | M | 1 | An alternative URI representing the end point of an alternative NF consumer (service) instance towards which the notification should be redirected. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the notification request is redirected. |

5.1.5.3 Data Notification

5.1.5.3.1 Description

The Data Notification is used by the NF service producer to report one or several observed data collection events to an NF service consumer that has subscribed to such notifications.

5.1.5.3.2 Target URI

The Callback URI "{dataNotifUri}" shall be used with the callback URI variables defined in table 5.1.5.3.2-1.

Table 5.1.5.3.2-1: Callback URI variables

| Name | Definition |
|--------------|---|
| dataNotifUri | String formatted as URI with the Callback Uri. The Callback Uri is assigned within the Individual DCCF Data Subscription resource and described within the NdccfDataSubscription type (see table 5.1.6.3.2-1). |

5.1.5.3.3 Standard Methods

5.1.5.3.3.1 POST

This method shall support the request data structures specified in table 5.1.5.3.3.1-1 and the response data structures and response codes specified in table 5.1.5.3.3.1-2.

Table 5.1.5.3.3.1-1: Data structures supported by the POST Request Body

| Data type | P | Cardinality | Description |
|-----------------------------------|---|-------------|---|
| NdccfDataSubscriptionNotification | M | 1 | Provides Information about observed data collection events. |

Table 5.1.5.3.3.1-2: Data structures supported by the POST Response Body

| Data type | P | Cardinality | Response codes | Description |
|---|---|-------------|------------------------|--|
| n/a | | | 204 No Content | The receipt of the notification is acknowledged. |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection, during the data event notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative NF consumer (service) instance where the notification should be sent. |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection, during the data event notification. The response shall include a Location header field containing an alternative URI representing the end point of an alternative NF consumer (service) instance where the notification should be sent. |
| NOTE: The mandatory HTTP error status codes for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply. | | | | |

Table 5.1.5.3.3.1-3: Headers supported by the 307 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|---|
| Location | string | M | 1 | An alternative URI representing the end point of an alternative NF consumer (service) instance towards which the notification should be redirected. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the notification request is redirected. |

Table 5.1.5.3.3.1-4: Headers supported by the 308 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|---|
| Location | string | M | 1 | An alternative URI representing the end point of an alternative NF consumer (service) instance towards which the notification should be redirected. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the notification request is redirected. |

5.1.5.4 Fetch Notification

5.1.5.4.1 Description

The Fetch Notification is used by the NF service consumer to retrieve data or analytics from the DCCF.

5.1.5.4.2 Target URI

The Callback URI "{fetchUri}" shall be used with the callback URI variables defined in table 5.1.5.4.2-1.

Table 5.1.5.4.2-1: Callback URI variables

| Name | Data type | Definition |
|----------|-----------|--|
| fetchUri | Uri | Fetch Uri as assigned during the procedure of notification about the subscribed data or analytics within the FetchInstruction data type. |

5.1.5.4.3 Standard Methods

5.1.5.4.3.1 POST

This method shall support the URI query parameters specified in table 5.1.5.4.3.1-1.

Table 5.1.5.4.3.1-1: URI query parameters supported by the POST method on this resource

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a | | | | | |

This method shall support the request data structures specified in table 5.1.5.4.3.1-2 and the response data structures and response codes specified in table 5.1.5.4.3.1-3.

Table 5.1.5.4.3.1-2: Data structures supported by the POST Request Body on this resource

| Data type | P | Cardinality | Description |
|---------------|---|-------------|---|
| array(string) | M | 1..N | Indicate the fetch correlation identifier(s). |

Table 5.1.5.4.3.1-3: Data structures supported by the POST Response Body on this resource

| Data type | P | Cardinality | Response codes | Description |
|--|---|-------------|------------------------|--|
| NdccfAnalyticsSubscriptionNotification | C | 0..1 | 200 OK | The stored analytics related to the fetch correlation identifier(s). (NOTE 2) |
| NdccfDataSubscriptionNotification | C | 0..1 | 200 OK | The stored data related to the fetch correlation identifier(s). (NOTE 2) |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative DCCF. |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection, during subscription retrieval. The response shall include a Location header field containing an alternative URI of the resource located in an alternative DCCF. |
| NOTE 1: The mandatory HTTP error status code for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply. | | | | |
| NOTE 2: One of NdccfAnalyticsSubscriptionNotification data structure and NdccfDataSubscriptionNotification data structure shall be included, depending on if the Fetch Notification included fetch correlation identifiers from an analytics notification or from a data notification. | | | | |

Table 5.1.5.4.3.1-4: Headers supported by the by the 307 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|---|
| Location | string | M | 1 | An alternative URI of the resource located in an alternative DCCF. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the request is redirected. |

Table 5.1.5.4.3.1-5: Headers supported by the 308 response code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|---|
| Location | string | M | 1 | An alternative URI of the resource located in an alternative DCCF. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the request is redirected. |

5.1.6 Data Model

5.1.6.1 General

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

Table 5.1.6.1-1 specifies the data types defined for the Ndcf_DataManagement service based interface protocol.

Table 5.1.6.1-1: Ndcf_DataManagement specific Data Types

| Data type | Clause defined | Description | Applicability |
|---------------------------------------|-----------------------|---|----------------------|
| AggregationLevel | 5.1.6.3.4 | Contains an aggregation level for processing instructions (e.g. per UE, per Area of Interest). | |
| DataCollectionPurpose | 5.1.6.3.5 | Represents the purpose for data collection. | |
| DccfEvent | 5.1.6.2.13 | Represents the event type exposed by DCCF | |
| EventParamReport | 5.1.6.2.10 | Represents a summarized report for one event parameter. | |
| FormattingInstruction | 5.1.6.2.6 | Contains data or analytics formatting Instructions. | |
| NdcfAnalyticsSubscription | 5.1.6.2.2 | Represents an Individual DCCF Analytics Subscription resource. | |
| NdcfAnalyticsSubscriptionNotification | 5.1.6.2.4 | Represents a notification that corresponds with an Individual DCCF Analytics Subscription resource. | |
| NdcfDataSubscription | 5.1.6.2.3 | Represents an Individual DCCF Data Subscription resource. | |
| NdcfDataSubscriptionNotification | 5.1.6.2.5 | Represents a notification that corresponds with an Individual DCCF Data Subscription resource. | |
| NotifSummaryReport | 5.1.6.2.9 | Represents summarized notifications based on processing instructions. | |
| ParameterProcessingInstruction | 5.1.6.2.8 | Contains an event parameter name and the respective event parameter values and sets of attributes to be used in summarized reports. | |
| ProcessingInstruction | 5.1.6.2.7 | Contains instructions related to the processing (e.g. clubbing) of notifications. | |
| ReportingOptions | 5.1.6.2.11 | Represents reporting options for notifications that are processed. | |
| SummarizationAttribute | 5.1.6.3.3 | Represents attribute in the summarized report. | |

Table 5.1.6.1-2 specifies data types re-used by the Ndcf_DataManagement service based interface protocol from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the Ndcf_DataManagement service based interface.

Table 5.1.6.1-2: Ndcf_DataManagement re-used Data Types

| Data type | Reference | Comments | Applicability |
|--------------------------------------|---------------------|---|---------------|
| AfEvent | 3GPP TS 29.517 [21] | Represents an AF Event id | |
| AmfEventType | 3GPP TS 29.518 [19] | Represents an AMF Event id | |
| DataSubscription | 3GPP TS 29.575 [25] | Represents a data subscription to one of various possible data sources. | |
| DataNotification | 3GPP TS 29.575 [25] | Represents a data subscription notification of one of various possible data sources. | |
| DateTime | 3GPP TS 29.571 [17] | Identifies the time. | |
| DurationSec | 3GPP TS 29.571 [17] | Time in seconds. | |
| EventType | 3GPP TS 29.503 [20] | Represents an UDM Event id | |
| FetchInstruction | 3GPP TS 29.576 [26] | The fetch instruction indicates whether the data or analytics can be fetched by the consumer. | |
| NefEvent | 3GPP TS 29.591 [22] | Represents a NEF Event id | |
| NetworkAreaInfo | 3GPP TS 29.554 [28] | Identifies a network area. | |
| NfInstanceId | 3GPP TS 29.571 [17] | NF instance identifier. | |
| NfSetId | 3GPP TS 29.571 [17] | NF set identifier. | |
| NnwdafEventsSubscription | 3GPP TS 29.520 [15] | Represents a NWDAF analytics subscription. | |
| NnwdafEventsSubscriptionNotification | 3GPP TS 29.520 [15] | Represents a NWDAF analytics subscription notification. | |
| NumberAverage | 3GPP TS 29.520 [15] | Represents average and variance of a parameter value. | |
| SACEvent | 3GPP TS 29.536 [27] | Represents a NSAC Event id | |
| SmfEvent | 3GPP TS 29.508 [18] | Represents a SMF Event id | |
| Supi | 3GPP TS 29.571 [17] | Contains a SUPI. | |
| SupportedFeatures | 3GPP TS 29.571 [17] | Used to negotiate the applicability of the optional features defined in table 5.1.8-1. | |
| TimeWindow | 3GPP TS 29.122 [23] | Represents a time window. | |
| UInteger | 3GPP TS 29.571 [17] | Unsigned Integer. | |
| Uri | 3GPP TS 29.571 [17] | URI. | |

5.1.6.2 Structured data types

5.1.6.2.1 Introduction

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

5.1.6.2.2 Type NdcfAnalyticsSubscription

Table 5.1.6.2.2-1: Definition of type NdcfAnalyticsSubscription

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|------------------------------|---|-------------|--|---------------|
| anaSub | NnwdafEventsSubscription | M | 1 | Subscribed analytics events. (NOTE 1) | |
| anaNotifUri | Uri | M | 1 | Notification target address. | |
| anaNotifCorrId | string | M | 1 | Notification correlation identifier. | |
| formatInstruct | FormattingInstruction | O | 0..1 | Formatting instructions to be used for sending event notifications. | |
| procInstructs | array(ProcessingInstruction) | O | 1..N | Processing instructions to be used for sending event notifications. | |
| targetNfId | NfInstanceId | O | 0..1 | NF instance identifier to which the DCCF shall create the requested subscription. (NOTE 3) | |
| targetNfSetId | NfSetId | O | 0..1 | NF set identifier to which the DCCF shall create the requested subscription. (NOTE 3) | |
| adrfId | NfInstanceId | O | 0..1 | Identifier of the ADRF to be used by the DCCF. If the subscription is for runtime analytics (i.e. the "timePeriod" attribute is either absent or contains a time window in the future) then the DCCF shall store the notifications in this ADRF. If the subscription is for historical analytics (i.e. the "timePeriod" attribute contains a time window in the past) then the DCCF shall retrieve the data from this ADRF. (NOTE 3) | |
| adrfSetId | NfSetId | O | 0..1 | Identifier of the ADRF Set to be used by the DCCF. If the subscription is for runtime analytics (i.e. the "timePeriod" attribute is either absent or contains a time window in the future) then the DCCF shall store the notifications in this ADRF Set. If the subscription is for historical analytics (i.e. the "timePeriod" attribute contains a time window in the past) then the DCCF shall retrieve the data from this ADRF Set. (NOTE 3) | |
| suppFeat | SupportedFeatures | C | 0..1 | This IE represents a list of Supported features as described in clause 5.1.8. It shall be present if at least one feature defined in clause 5.1.8 is supported. | |
| timePeriod | TimeWindow | O | 0..1 | Represents a start time and a stop time during which the analytics was performed or is requested to be performed. If this attribute is provided, then the attribute "monDur" within the reporting information of the attribute "anaSub" shall not be provided. (NOTE 2) | |
| dataCollectPurposes | array(DataCollectionPurpose) | O | 1..N | The purposes of data collection. This attribute may only be provided if the consumer has checked user consent. | |
| NOTE 1: The "notificationURI" and "notifCorrId" attributes of NnwdafEventsSubscription data type shall be ignored by the DCCF. The DCCF will provide the notification target address and the notification correlation ID of the DCCF itself in the NnwdafEventsSubscription data type during the event subscription request to the NWDAF. | | | | | |
| NOTE 2: It includes the time period either in the past or in the future (i.e., start time as past time and stop time as future time is not allowed). | | | | | |
| NOTE 3: "targetNfId" and "targetNfSetId" are mutually exclusive. "adrfId" and "adrfSetId" are also mutually exclusive. | | | | | |

5.1.6.2.3 Type NdccfDataSubscription

Table 5.1.6.2.3-1: Definition of type NdccfDataSubscription

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---------------------|------------------------------|---|-------------|--|---------------|
| dataSub | DataSubscription | M | 1 | Represents the requested events subscription. (NOTE 1) | |
| dataNotifUri | Uri | M | 1 | Notification target address. | |
| dataNotifCorrId | string | M | 1 | Notification correlation identifier. | |
| formatInstruct | FormattingInstruction | O | 0..1 | Formatting instructions to be used for sending event notifications. | |
| proclInstructs | array(ProcessingInstruction) | O | 1..N | Processing instructions to be used for sending event notifications. | |
| targetNfId | NfInstanceId | O | 0..1 | Data Producer NF instance identifier to which the DCCF shall create the requested subscription. (NOTE 3) | |
| targetNfSetId | NfSetId | O | 0..1 | Data Producer NF set identifier to which the DCCF shall create the requested subscription. (NOTE 3) | |
| adrfId | NfInstanceId | O | 0..1 | Identifier of the ADRF to be used by the DCCF. If the subscription is for runtime data (i.e. the "timePeriod" attribute is either absent or contains a time window in the future) then the DCCF shall store the notifications in this ADRF. If the subscription is for historical data (i.e. the "timePeriod" attribute contains a time window in the past) then the DCCF shall retrieve the data from this ADRF. (NOTE 3) | |
| adrfSetId | NfSetId | O | 0..1 | Identifier of the ADRF Set to be used by the DCCF. If the subscription is for runtime data (i.e. the "timePeriod" attribute is either absent or contains a time window in the future) then the DCCF shall store the notifications in this ADRF Set. If the subscription is for historical data (i.e. the "timePeriod" attribute contains a time window in the past) then the DCCF shall retrieve the data from this ADRF Set. (NOTE 3) | |
| suppFeat | SupportedFeatures | C | 0..1 | This IE represents a list of Supported features as described in clause 5.1.8. It shall be present if at least one feature defined in clause 5.1.8 is supported. | |
| timePeriod | TimeWindow | O | 0..1 | Represents a start time and a stop time during which data was collected or is requested to be collected. If this attribute is included, then the internal attributes of the data subscription that indicate a subscription duration (e.g. the "targetPeriod" attribute of an "eventSubs" attribute of an "smfDataSub" attribute, or the "monDur" attribute of the ReportingInformation data type) shall not be provided. (NOTE 2) | |
| dataCollectPurposes | array(DataCollectionPurpose) | O | 1..N | The purposes of data collection. This attribute may only be provided if the consumer has checked user consent. | |

NOTE 1: The notification target address contained in the subscription attribute that is provided within the "dataSub" attribute (i.e. "eventNotifyUri" of "amfDataSub", "notifUri" of "smfDataSub", "callbackReference" of "udmDataSub", "notifUri" of "nefDataSub", "notifUri" of "afDataSub", "nfStatusNotificationUri" of "nrfDataSub", or "eventNotifyUri" of "nsacfDataSub") and the notification correlation ID contained in the subscription attribute that is provided within the "dataSub" attribute (i.e. the "notifyCorrelationId" of "amfDataSub", "notifId" of "smfDataSub", "notifyCorrelationId" of "udmDataSub", "notifId" of "nefDataSub", "notifId" of "afDataSub", or "notifyCorrelationId" of "nsacfDataSub") shall be ignored by the DCCF. The DCCF will provide the notification target address and the notification correlation ID of the DCCF itself in the data type during the event subscription request to each NF.

NOTE 2: It includes the time period either in the past or in the future (i.e., start time as past time and stop time as future time is not allowed).

NOTE 3: "targetNfId" and "targetNfSetId" are mutually exclusive. "adrflId" and "adrflSetId" are also mutually exclusive.

5.1.6.2.4 Type NdcfAnalyticsSubscriptionNotification

Table 5.1.6.2.4-1: Definition of type NdcfAnalyticsSubscriptionNotification

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|------------------|---|---|-------------|---|---------------|
| anaNotifications | array(NnwdafEventsSubscriptionNotification) | C | 1..N | List of analytics subscription notifications. (NOTE 1) | |
| anaReports | array(NotifSummaryReport) | C | 1..N | List of reports with summarized data from multiple analytics notifications that the DCCF has received from NWDAF. (NOTE 1) | |
| fetchInstruct | FetchInstruction | C | 0..1 | Instructions for the NF service consumer to fetch the notifications itself. (NOTE 1, NOTE 2) | |
| anaNotifCorrId | string | M | 1 | Notification correlation identifier. | |
| terminationReq | boolean | O | 0..1 | If provided and set to "true", it indicates that the subscription is requested to be terminated, i.e. no further notifications related to this subscription will be provided. The default value is "false". | |
| timeStamp | DateTime | M | 1 | It represents the time when DCCF completed preparation of the requested analytics. | |

NOTE 1: Exactly one of these attributes shall be provided.
NOTE 2: The "fetchInstruct" attribute shall not be included in Ndcf_DataManagement_Fetch response body.

5.1.6.2.5 Type NdcfDataSubscriptionNotification

Table 5.1.6.2.5-1: Definition of type NdcfDataSubscriptionNotification

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|--|---------------------------|---|-------------|---|---------------|
| dataNotif | DataNotification | C | 0..1 | Data subscription notification. (NOTE 1) | |
| dataReports | array(NotifSummaryReport) | C | 1..N | List of reports with summarized data from multiple notifications received from data producer. (NOTE 1) | |
| fetchInstruct | FetchInstruction | C | 0..1 | Instructions for the NF service consumer to fetch the notifications itself. (NOTE 1, NOTE 2) | |
| dataNotifCorrId | string | M | 1 | Notification correlation identifier. | |
| terminationReq | string | O | 0..1 | If provided and set to "true", it indicates that the subscription is requested to be terminated, i.e. no further notifications related to this subscription will be provided. The default value is "false". | |
| timeStamp | DateTime | M | 1 | It represents the time when DCCF completed preparation of the requested analytics. | |
| NOTE 1: Exactly one of these attributes shall be provided. | | | | | |
| NOTE 2: The "fetchInstruct" attribute shall not be included in the response body of a Fetch operation. | | | | | |

5.1.6.2.6 Type FormattingInstruction

Table 5.1.6.2.6-1: Definition of type FormattingInstruction

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|------------------|------------------|---|-------------|---|---------------|
| consTrigNotif | boolean | O | 0..1 | Indicates that notifications shall be buffered (sending only fetch instructions to the NF service consumer) until the NF service consumer requests their delivery using Ndcf_DataManagement or Nmfaf_3caDataManagement Service. | |
| reportingOptions | ReportingOptions | O | 0..1 | This attribute is provided if the NF service consumer requires clubbing of notifications and its contents describe how the notifications shall be clubbed, i.e. when they should be sent. | |

5.1.6.2.7 Type ProcessingInstruction

Table 5.1.6.2.7-1: Definition of type ProcessingInstruction

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|-------------------|--|---|-------------|--|---------------|
| eventId | DccfEvent | M | 1 | Identifies the (event exposure or analytics) event that the processing instructions apply to. | |
| proInterval | DurationSec | M | 1 | Indicates the interval (in seconds) over which the processing of data for inclusion in each notification sent to consumers shall occur. | |
| paramProInstructs | array(Parameter ProcessingInstruction) | O | 1..N | List of event parameter name(s), and for each event parameter name, respective event parameter values and sets of the attributes to be used in the summarized reports. | |

5.1.6.2.8 Type ParameterProcessingInstruction

Table 5.1.6.2.8-1: Definition of type ParameterProcessingInstruction

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------|-------------------------------|---|-------------|--|---------------|
| name | string | M | 1 | This attribute contains a JSON pointer value (as defined in IETF RFC 6901 [24]) that references an attribute, i.e. a target location, within the notification object (e.g. of NefEventExposureNotif, AfEventExposureNotif, AmfEventNotification, NsmfEventExposureNotification, MonitoringReport, NotificationData, or SACEventReport data type) to which the processing instruction is applied. | |
| values | array(Any type) | M | 1..N | A list of values for the attribute identified by the "name" attribute, which shall be matched with values contained in the notifications received and summarized by the DCCF. The data type of the elements of the list shall be the same as the type of the attribute identified by the "name" attribute. | |
| sumAttrs | array(SummarizationAttribute) | M | 1..N | Attributes requested to be used in the summarized reports. | |
| aggrLevel | AggregationLevel | O | 0..1 | Indicates the aggregation level to which the processing instructions shall apply. | |
| supis | array(Supi) | O | 1..N | Indicates the UEs for which processed reports are requested. It may be provided only if "aggrLevel" is provided and is set to the value "UE". | |
| areas | array(NetworkAreaInfo) | C | 1..N | Indicates the Areas of Interest for which processed reports are requested. It shall be provided only if "aggrLevel" is provided and is set to the value "AOI". | |

5.1.6.2.9 Type NotifSummaryReport

Table 5.1.6.2.9-1: Definition of type NotifSummaryReport

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------|-------------------------|---|-------------|--|---------------|
| eventId | DccfEvent | M | 1 | Identifies the (event exposure or analytics) event that this report applies to. | |
| proInterval | DurationSec | M | 1 | Indicates the interval (in seconds) over which the processing of data for inclusion in this report occurred. | |
| eventReports | array(EventParamReport) | M | 1..N | List of event parameter reports. | |

5.1.6.2.10 Type EventParamReport

Table 5.1.6.2.10-1: Definition of type EventParamReport

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------|-----------------|---|-------------|---|---------------|
| name | string | M | 1 | The name of the reported parameter. | |
| values | array(Any type) | M | 1..N | The list of values of the reported parameter. | |
| supi | Supi | C | 0..1 | Indicates the UE that this report is for. It shall be provided if the "aggrLevel" of the instructions had the value "UE". | |
| area | NetworkAreaInfo | C | 0..1 | Indicates the Area of Interest that this report is for. It shall be provided if the "aggrLevel" of the instructions had the value "AOI". | |
| spacing | NumberAverage | C | 0..1 | Contains the average and variance of the time interval separating two consecutive occurrences of the same event and parameter value. It shall be provided if available and the "SPACING" value was contained in the "paramProclnstructs" attribute of the instructions. | |
| duration | NumberAverage | C | 0..1 | Contains the average and variance of time for which the parameter value applies. It shall be provided if available and the "DURATION" value was contained in the "paramProclnstructs" attribute of the instructions. | |
| count | UInteger | C | 0..1 | Represents the number of countable occurrences for the parameter. It shall be provided if available and the "OCCURRENCES" value was contained in the "paramProclnstructs" attribute of the instructions. | |
| avgAndVar | NumberAverage | C | 0..1 | Contains the average and variance of the parameter value. It shall be provided if available and the "AVG_VAR" value was contained in the "paramProclnstructs" attribute of the instructions. | |
| mostFreqVal | Any type | C | 0..1 | Contains the most frequent value among the elements of the reported "values" attribute. It shall be provided if available and the "FREQ_VAL" value was contained in the "paramProclnstructs" attribute of the instructions. | |
| leastFreqVal | Any type | C | 0..1 | Contains the least frequent value among the elements of the reported "values" attribute. It shall be provided if available and the "FREQ_VAL" value was contained in the "paramProclnstructs" attribute of the instructions. | |
| minValue | string | C | 0..1 | Identifies the minimum value of the parameter. It shall be provided if available and the "MIN_MAX" value was contained in the "paramProclnstructs" attribute of the instructions. | |

| | | | | | |
|----------|--------|---|------|---|--|
| maxValue | string | C | 0..1 | Identifies the maximum value of the parameter. It shall be provided if available and the "MIN_MAX" value was contained in the "paramProclnstructs" attribute of the instructions. | |
|----------|--------|---|------|---|--|

5.1.6.2.11 Type ReportingOptions

Table 5.1.6.2.11-1: Definition of type ReportingOptions

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|-----------------|-------------|---|-------------|---|---------------|
| notifyWindow | TimeWindow | C | 0..1 | Represents a start time and a stop time during which notifications shall be sent. (NOTE) | |
| notifyPeriod | DurationSec | C | 0..1 | Indicates the period (in seconds) with which notifications are sent to the consumer, irrespective of whether the event occurs (e.g. every 30 minutes). (NOTE) | |
| notifyPeriodInc | DurationSec | C | 0..1 | Indicates the time interval (in seconds) between the first two notifications (where the first one is sent upon event occurrence), and that the time interval between subsequent notifications shall be increased each time by the value of this attribute. (NOTE) | |
| depEventSubId | string | C | 0..1 | Notifications for the present subscription are sent only upon occurrence of events of the subscription with identifier that matches this attribute. (NOTE) | |
| minClubbedNotif | UInteger | O | 0..1 | Indicates the minimum number of clubbed notifications. | |
| maxClubbedNotif | UInteger | O | 0..1 | Indicates the maximum number of clubbed notifications. | |

NOTE: Exactly one of these attributes shall be provided.

5.1.6.2.12 Void

5.1.6.2.13 DccfEvent

Table 5.1.6.2.13-1: Definition of type DccfEvent

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|----------------|------------------------|---|-------------|---|---------------|
| nwdafEvent | NwdafEvent | C | 0..1 | Identifies the (event exposure or analytics) NWDAF event ID that the processing instructions apply to. (NOTE) | |
| smfEvent | SmfEvent | C | 0..1 | Identifies the (event exposure or analytics) SMF event ID that the processing instructions apply to. (NOTE) | |
| amfEvent | AmfEventType | C | 0..1 | Identifies the (event exposure or analytics) AMF event ID that the processing instructions apply to. (NOTE) | |
| nefEvent | NefEvent | C | 0..1 | Identifies the (event exposure or analytics) NEF event ID that the processing instructions apply to. (NOTE) | |
| udmEvent | EventType | C | 0..1 | Identifies the (event exposure or analytics) UDM event ID that the processing instructions apply to. (NOTE) | |
| afEvent | AfEvent | C | 0..1 | Identifies the (event exposure or analytics) AF event ID that the processing instructions apply to. (NOTE) | |
| sacEvent | SACEvent | C | 0..1 | Identifies the (event exposure or analytics) NSACF event ID that the processing instructions apply to. (NOTE) | |
| nrfEvent | NotificationEvent Type | C | 0..1 | Identifies the (event exposure or analytics) NRF event ID that the processing instructions apply to. (NOTE) | |

NOTE: Exactly one of these attributes shall be provided.

5.1.6.3 Simple data types and enumerations

5.1.6.3.1 Introduction

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

5.1.6.3.2 Simple data types

The simple data types defined in table 5.1.6.3.2-1 shall be supported.

Table 5.1.6.3.2-1: Simple data types

| Type Name | Type Definition | Description | Applicability |
|-----------|-----------------|-------------|---------------|
| n/a | | | |

5.1.6.3.3 Enumeration: SummarizationAttribute

Table 5.1.6.3.3-1: Enumeration SummarizationAttribute

| Enumeration value | Description | Applicability |
|-------------------|--|---------------|
| SPACING | Average and variance of the time interval separating two consecutive occurrences of the same event and parameter value, or periodicity for periodic reporting. | |
| DURATION | Average and variance of the time for which the parameter value applies. | |
| OCCURRENCES | Number of countable occurrences for the parameter. | |
| AVG_VAR | Average and variance of the parameter. | |
| FREQ_VAL | Most and least frequent values. | |
| MIN_MAX | Maximum and minimum parameter values. | |

5.1.6.3.4 Enumeration: AggregationLevel

Table 5.1.6.3.X-1: Enumeration AggregationLevel

| Enumeration value | Description | Applicability |
|-------------------|---|---------------|
| UE | Indicates that the summarized reports shall be provided per UE. | |
| AOI | Indicates that the summarized reports shall be provided per Area of Interest. | |

5.1.6.3.5 Enumeration: DataCollectionPurpose

Table 5.1.6.3.x-1: Enumeration DataCollectionPurpose

| Enumeration value | Description | Applicability |
|----------------------|---|---------------|
| ANALYTICS_GENERATION | The data is collected for generating the analytics. | |
| MODEL_TRAINING | The data is collected for ML model training. | |

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

None in this release of the specification.

5.1.6.5 Binary data

None in this release of the specification.

5.1.7 Error Handling

5.1.7.1 General

For the Ndcf_DataManagement API, HTTP error responses shall be supported as specified in clause 4.8 of 3GPP TS 29.501 [5]. Protocol errors and application errors specified in table 5.2.7.2-1 of 3GPP TS 29.500 [4] shall be supported for an HTTP method if the corresponding HTTP status codes are specified as mandatory for that HTTP method in table 5.2.7.1-1 of 3GPP TS 29.500 [4].

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

5.1.7.2 Protocol Errors

No specific procedures for the Ndcf_DataManagement service are specified.

5.1.7.3 Application Errors

The application errors defined for the Ndcf_DataManagement service are listed in Table 5.1.7.3-1.

Table 5.1.7.3-1: Application errors

| Application Error | HTTP status code | Description |
|-------------------------------|------------------|---|
| SUBSCRIPTION_CANNOT_BE_SERVED | 400 Bad Request | Indicates that the DCCF cannot use the contents of the request to either a) determine whether the subscription can already be served or interactions with the NWDAF and/or ADRF are required or b) determine what interactions with the NWDAF and/or ADRF are required (if it has determined that they are required). |

5.1.8 Feature negotiation

The optional features in table 5.1.8-1 are defined for the Ndcf_DataManagement API. They shall be negotiated using the extensibility mechanism defined in clause 6.6 of 3GPP TS 29.500 [4].

Table 5.1.8-1: Supported Features

| Feature number | Feature Name | Description |
|----------------|--------------|-------------|
| | | |

5.1.9 Security

As indicated in 3GPP TS 33.501 [8] and 3GPP TS 29.500 [4], the access to the Ndcf_DataManagement API may be authorized by means of the OAuth2 protocol (see IETF RFC 6749 [9]), based on local configuration, using the "Client Credentials" authorization grant, where the NRF (see 3GPP TS 29.510 [10]) plays the role of the authorization server.

If OAuth2 is used, an NF Service Consumer, prior to consuming services offered by the Ndcf_DataManagement API, shall obtain a "token" from the authorization server, by invoking the Access Token Request service, as described in 3GPP TS 29.510 [10], clause 5.4.2.2.

NOTE: When multiple NRFs are deployed in a network, the NRF used as authorization server is the same NRF that the NF Service Consumer used for discovering the Ndcf_DataManagement service.

The Ndcf_DataManagement API defines a single scope "ndccf-datamgt" for the entire service, and it does not define any additional scopes at resource or operation level.

5.2 Ndcf_ContextManagement Service API

5.2.1 Introduction

The Ndcf_ContextManagement shall use the Ndcf_ContextManagement API.

The API URI of the Ndcf_ContextManagement API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests from the NF service consumer towards the NF service producer shall have the Resource URI structure defined in clause 4.4.1 of 3GPP TS 29.501 [5], i.e.:

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

with the following components:

- The {apiRoot} shall be set as described in 3GPP TS 29.501 [5].

- The <apiName> shall be "ndccf-contextmgnt".
- The <apiVersion> shall be "v1".
- The <apiSpecificResourceUriPart> shall be set as described in clause 5.2.3.

5.2.2 Usage of HTTP

5.2.2.1 General

HTTP/2, IETF RFC 7540 [11], shall be used as specified in clause 5 of 3GPP TS 29.500 [4].

HTTP/2 shall be transported as specified in clause 5.3 of 3GPP TS 29.500 [4].

The OpenAPI [6] specification of HTTP messages and content bodies for the Ndccf_ContextManagement API is contained in Annex A.

5.2.2.2 HTTP standard headers

5.2.2.2.1 General

See clause 5.2.2 of 3GPP TS 29.500 [4] for the usage of HTTP standard headers.

5.2.2.2.2 Content type

JSON, IETF RFC 8259 [12], shall be used as content type of the HTTP bodies specified in the present specification as specified in clause 5.4 of 3GPP TS 29.500 [4]. The use of the JSON format shall be signalled by the content type "application/json".

"Problem Details" JSON object shall be used to indicate additional details of the error in a HTTP response body and shall be signalled by the content type "application/problem+json", as defined in IETF RFC 7807 [13].

5.2.2.3 HTTP custom headers

The mandatory HTTP custom header fields specified in clause 5.2.3.2 of 3GPP TS 29.500 [4] shall be supported, and the optional HTTP custom header fields specified in clause 5.2.3.3 of 3GPP TS 29.500 [4] may be supported.

5.2.3 Resources

5.2.3.1 Overview

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

Figure 5.2.3.1-1 depicts the resource URIs structure for the Ndccf_ContextManagement API.

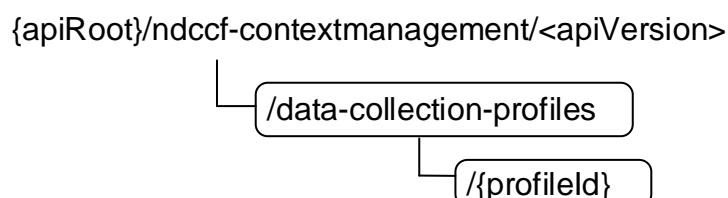


Figure 5.2.3.1-1: Resource URI structure of the Ndccf_ContextManagement API

Table 5.2.3.1-1 provides an overview of the resources and applicable HTTP methods.

Table 5.2.3.1-1: Resources and methods overview

| Resource name | Resource URI | HTTP method or custom operation | Description |
|---|---------------------------------------|---------------------------------|---|
| DCCF Data Collection Profiles | /data-collection-profiles | POST | Creates a new Individual DCCF Data Collection Profile resource. |
| Individual DCCF Data Collection Profile | /data-collection-profiles/{profileId} | PUT | Modifies an existing Individual DCCF Data Collection Profile resource. |
| | | DELETE | Deletes an Individual DCCF Data Collection Profile identified by {profileId}. |

5.2.3.2 Resource: DCCF Data Collection Profiles

5.2.3.2.1 Description

The DCCF Data Collection Profiles resource represents all data collection profiles that exist in the Ndccf_ContextManagement service at a given DCCF.

5.2.3.2.2 Resource Definition

Resource URI: {apiRoot}/ndccf-contextmanagement/v<apiVersion>/data-collection-profiles

This resource shall support the resource URI variables defined in table 5.2.3.2.2-1.

Table 5.2.3.2.2-1: Resource URI variables for this resource

| Name | Data type | Definition |
|---------|-----------|------------------|
| apiRoot | string | See clause 5.2.1 |

5.2.3.2.3 Resource Standard Methods

5.2.3.2.3.1 POST

This method shall support the URI query parameters specified in table 5.2.3.2.3.1-1.

Table 5.2.3.2.3.1-1: URI query parameters supported by the POST method on this resource

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a | | | | | |

This method shall support the request data structures specified in table 5.2.3.2.3.1-2 and the response data structures and response codes specified in table 5.2.3.2.3.1-3.

Table 5.2.3.2.3.1-2: Data structures supported by the POST Request Body on this resource

| Data type | P | Cardinality | Description |
|----------------------------|---|-------------|--|
| NdccfDataCollectionProfile | M | 1 | New Individual DCCF Data Collection Profile resource to be created |

Table 5.2.3.2.3.1-3: Data structures supported by the POST Response Body on this resource

| Data type | P | Cardinality | Response codes | Description |
|--|---|-------------|----------------|---|
| NdccfDataCollectionProfile | M | 1 | 201 Created | The creation of an Individual DCCF Data Collection Profile resource is confirmed and a representation of that resource is returned. |
| NOTE: The mandatory HTTP error status code for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply. | | | | |

Table 5.2.3.2.3.1-4: Headers supported by the 201 response code on this resource

| Name | Data type | P | Cardinality | Description |
|----------|-----------|---|-------------|---|
| Location | string | M | 1 | Contains the URI of the newly created resource, according to the structure: {apiRoot}/ndccf-contextmanagement/<apiVersion>/data-collection-profiles/{profileId} |

5.2.3.2.4 Resource Custom Operations

None in this release of the specification.

5.2.3.3 Resource: Individual DCCF Data Collection Profile

5.2.3.3.1 Description

The Individual DCCF Data Collection Profile resource represents a single data collection profile to the Ndccf_ContextManagement service at a given DCCF.

5.2.3.3.2 Resource Definition

Resource URI: {apiRoot}/ndccf-contextmanagement/<apiVersion>/data-collection-profiles/{profileId}

This resource shall support the resource URI variables defined in table 5.2.3.3.2-1.

Table 5.2.3.3.2-1: Resource URI variables for this resource

| Name | Data type | Definition |
|-----------|-----------|---|
| apiRoot | string | See clause 5.1.1 |
| profileId | string | Identifies a data collection profile to the Ndccf_ContextManagement Service |

5.2.3.3.3 Resource Standard Methods

5.2.3.3.3.1 PUT

This method shall support the URI query parameters specified in table 5.2.3.3.3.1-1.

Table 5.2.3.3.3.1-1: URI query parameters supported by the PUT method on this resource

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a | | | | | |

This method shall support the request data structures specified in table 5.2.3.3.3.1-2 and the response data structures and response codes specified in table 5.2.3.3.3.1-3.

Table 5.2.3.3.3.1-2: Data structures supported by the PUT Request Body on this resource

| Data type | P | Cardinality | Description |
|----------------------------|---|-------------|---|
| NdccfDataCollectionProfile | M | 1 | Parameters to replace Individual DCCF Data Collection Profile resource. |

Table 5.2.3.3.3.1-3: Data structures supported by the PUT Response Body on this resource

| Data type | P | Cardinality | Response codes | Description |
|----------------------------|---|-------------|------------------------|---|
| NdccfDataCollectionProfile | M | 1 | 200 OK | The Individual DCCF Data Collection Profile resource was modified successfully, and a representation of that resource is returned. |
| n/a | | | 204 No Content | The Individual DCCF Data Collection Profile resource was modified successfully. |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection, during Individual DCCF Data Collection Profile modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative DCCF (service) instance. |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection, during Individual DCCF Data Collection Profile modification. The response shall include a Location header field containing an alternative URI of the resource located in an alternative DCCF (service) instance. |

NOTE: The mandatory HTTP error status code for the PUT method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply.

Table 5.2.3.3.3.1-4: Headers supported by the 307 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|---|
| Location | string | M | 1 | An alternative URI of the resource located in an alternative DCCF (service) instance. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the request is redirected. |

Table 5.2.3.3.3.1-5: Headers supported by the 308 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|---|
| Location | string | M | 1 | An alternative URI of the resource located in an alternative DCCF (service) instance. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target NF (service) instance towards which the request is redirected. |

5.2.3.3.3.2 DELETE

This method shall support the URI query parameters specified in table 5.2.3.3.3.2-1.

Table 5.2.3.3.3.2-1: URI query parameters supported by the DELETE method on this resource

| Name | Data type | P | Cardinality | Description | Applicability |
|------|-----------|---|-------------|-------------|---------------|
| n/a | | | | | |

This method shall support the request data structures specified in table 5.2.3.3.3.2-2 and the response data structures and response codes specified in table 5.2.3.3.3.2-3.

Table 5.2.3.3.3.2-2: Data structures supported by the DELETE Request Body on this resource

| Data type | P | Cardinality | Description |
|-----------|---|-------------|-------------|
| n/a | | | |

Table 5.2.3.3.3.2-3: Data structures supported by the DELETE Response Body on this resource

| Data type | P | Cardinality | Response codes | Description |
|--|---|-------------|------------------------|---|
| n/a | | | 204 No Content | The Individual DCCF Data Collection Profile resource was deleted successfully. |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection, during Individual DCCF Data Collection Profile deletion. The response shall include a Location header field containing an alternative URI of the resource located in an alternative DCCF (service) instance. |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection, during Individual DCCF Data Collection Profile deletion. The response shall include a Location header field containing an alternative URI of the resource located in an alternative DCCF (service) instance. |
| NOTE: The mandatory HTTP error status code for the DELETE method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply. | | | | |

Table 5.2.3.3.3.2-4: Headers supported by the 307 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|---|
| Location | String | M | 1 | An alternative URI of the resource located in an alternative DCCF (service) instance. |
| 3gpp-Sbi-Target-Nf-Id | String | O | 0..1 | Identifier of the target NF (service) instance towards which the request is redirected. |

Table 5.2.3.3.3.2-5: Headers supported by the 308 Response Code on this resource

| Name | Data type | P | Cardinality | Description |
|-----------------------|-----------|---|-------------|---|
| Location | String | M | 1 | An alternative URI of the resource located in an alternative DCCF (service) instance. |
| 3gpp-Sbi-Target-Nf-Id | String | O | 0..1 | Identifier of the target NF (service) instance towards which the request is redirected. |

5.2.3.3.4 Resource Custom Operations

None in this release of the specification.

5.2.4 Custom Operations without associated resources

None in this release of the specification.

5.2.5 Notifications

None in this release of the specification.

5.2.6 Data Model

5.2.6.1 General

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

Table 5.2.6.1-1 specifies the data types defined for the Ndcf_ContextManagement service based interface protocol.

Table 5.2.6.1-1: Ndcf_ContextManagement specific Data Types

| Data type | Clause defined | Description | Applicability |
|---------------------------|----------------|---|---------------|
| NdcfDataCollectionProfile | 5.2.6.2.2 | Represents an Individual DCCF Data Collection Profile resource. | |

Table 5.2.6.1-2 specifies data types re-used by the Ndcf_ContextManagement service based interface protocol from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the Ndcf_ContextManagement service based interface.

Table 5.2.6.1-2: Ndcf_ContextManagement re-used Data Types

| Data type | Reference | Comments | Applicability |
|--------------------------|---------------------|---|---------------|
| DataSubscription | 3GPP TS 29.575 [25] | Represents a data subscription to one of various possible data sources. | |
| NfInstancelid | 3GPP TS 29.571 [17] | NF instance identifier. | |
| NfSetId | 3GPP TS 29.571 [17] | NF Set identifier. | |
| NnwdafEventsSubscription | 3GPP TS 29.520 [15] | Represents an NWDAF analytics subscription. | |

5.2.6.2 Structured data types

5.2.6.2.1 Introduction

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

5.2.6.2.2 Type: NdcfDataCollectionProfile

Table 5.2.6.2.2-1: Definition of type NdcfDataCollectionProfile

| Attribute name | Data type | P | Cardinality | Description | Applicability |
|---|--------------------------|---|-------------|--|---------------|
| anaSub | NnwdafEventsSubscription | C | 0..1 | Representation of the analytics events subscription that is used to collect analytics. (NOTE 1) | |
| dataSub | DataSubscription | C | 0..1 | Representation of the data subscription that is used to collect data. (NOTE 1) | |
| nwdafId | NfInstanceId | C | 0..1 | NF instance identifier of the NWDAF that this data collection profile belongs to. (NOTE 2) | |
| adrfId | NfInstanceId | C | 0..1 | NF instance identifier of the ADRF that this data collection profile belongs to. (NOTE 2) | |
| nwdafSetId | NfSetId | C | 0..1 | Identifier of the set of the NWDAF that this data collection profile belongs to. (NOTE 2) | |
| adrfSetId | NfSetId | C | 0..1 | Identifier of the set of the ADRF that this data collection profile belongs to. (NOTE 2) | |
| NOTE 1: Only one of these attributes shall be provided. | | | | | |
| NOTE 2: Only one of these attributes shall be provided. | | | | | |

5.2.6.3 Simple data types and enumerations

5.2.6.3.1 Introduction

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

5.2.6.3.2 Simple data types

The simple data types defined in table 5.2.6.3.2-1 shall be supported.

Table 5.2.6.3.2-1: Simple data types

| Type Name | Type Definition | Description | Applicability |
|-----------|-----------------|-------------|---------------|
| | | | |

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

None in this release of the specification.

5.2.6.5 Binary data

None in this release of the specification.

5.2.7 Error Handling

5.2.7.1 General

For the Ndcf_ContextManagement API, HTTP error responses shall be supported as specified in clause 4.8 of 3GPP TS 29.501 [5]. Protocol errors and application errors specified in table 5.2.7.2-1 of 3GPP TS 29.500 [4] shall be supported for an HTTP method if the corresponding HTTP status codes are specified as mandatory for that HTTP method in table 5.2.7.1-1 of 3GPP TS 29.500 [4].

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

5.2.7.2 Protocol Errors

No specific procedures for the Ndcf_ContextManagement service are specified.

5.2.7.3 Application Errors

The application errors defined for the Ndcf_ContextManagement service are listed in Table 5.2.7.3-1.

Table 5.2.7.3-1: Application errors

| Application Error | HTTP status code | Description |
|-------------------|------------------|-------------|
| | | |

5.2.8 Feature negotiation

The optional features in table 5.2.8-1 are defined for the Ndcf_ContextManagement API. They shall be negotiated using the extensibility mechanism defined in clause 6.6 of 3GPP TS 29.500 [4].

Table 5.2.8-1: Supported Features

| Feature number | Feature Name | Description |
|----------------|--------------|-------------|
| | | |

5.2.9 Security

As indicated in 3GPP TS 33.501 [8] and 3GPP TS 29.500 [4], the access to the Ndcf_ContextManagement API may be authorized by means of the OAuth2 protocol (see IETF RFC 6749 [9]), based on local configuration, using the "Client Credentials" authorization grant, where the NRF (see 3GPP TS 29.510 [10]) plays the role of the authorization server.

If OAuth2 is used, an NF Service Consumer, prior to consuming services offered by the Ndcf_ContextManagement API, shall obtain a "token" from the authorization server, by invoking the Access Token Request service, as described in 3GPP TS 29.510 [10], clause 5.4.2.2.

NOTE: When multiple NRFs are deployed in a network, the NRF used as authorization server is the same NRF that the NF Service Consumer used for discovering the Ndcf_ContextManagement service.

The Ndcf_ContextManagement API defines a single scope "ndccf-contextmgnt" for the entire service, and it does not define any additional scopes at resource or operation level.

Annex A (normative): OpenAPI specification

A.1 General

This Annex specifies the formal definition of the API(s) defined in the present specification. It consists of OpenAPI specifications in YAML format.

This Annex takes precedence when being discrepant to other parts of the specification with respect to the encoding of information elements and methods within the API(s).

NOTE: The semantics and procedures, as well as conditions, e.g. for the applicability and allowed combinations of attributes or values, not expressed in the OpenAPI definitions but defined in other parts of the specification also apply.

Informative copies of the OpenAPI specification files contained in this 3GPP Technical Specification are available on a Git-based repository that uses the GitLab software version control system (see 3GPP TS 29.501 [5] clause 5.3.1 and 3GPP TR 21.900 [7] clause 5B).

A.2 Ndccf_DataManagement API

```

openapi: 3.0.0
info:
  version: 1.0.1
  title: Ndccf_DataManagement
  description: |
    DCCF Data Management Service.
    © 2022, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.
externalDocs:
  description: 3GPP TS 29.574 V17.2.0; 5G System; Data Collection Coordination Services; Stage 3.
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.574/'
#
servers:
- url: '{apiRoot}/ndccf-datamanagement/v1'
  variables:
    apiRoot:
      default: https://example.com
      description: apiRoot as defined in clause 4.4 of 3GPP TS 29.501.
#
security:
- oAuth2ClientCredentials:
  - ndccf-datamanagement
- {}
#
paths:
  /analytics-subscriptions:
    post:
      summary: Creates a new Individual DCCF Analytics Subscription resource.
      operationId: CreateDCCFAnalyticsSubscription
      tags:
        - DCCF Analytics Subscriptions (Collection)
      requestBody:
        description: Contains the information for the creation the resource.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/NdccfAnalyticsSubscription'
            required: true
      responses:
        '201':
          description: Create a new Individual DCCF Analytics Subscription resource.
          headers:
            Location:
              description: >
                Contains the URI of the newly created resource, according to the structure
                {apiRoot}/ndccf-datamanagement/<apiVersion>/analytics-subscriptions/{subscriptionId}
              required: true
              schema:

```

```

      type: string
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/NdpcfAnalyticsSubscription'
    '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:
      $ref: 'TS29571_CommonData.yaml#/components/responses/default'
  callbacks:
    dccfAnalyticsNotification:
      '{$request.body#/anaNotifUri}':
        post:
          requestBody:
            required: true
            content:
              application/json:
                schema:
                  $ref: '#/components/schemas/NdpcfAnalyticsSubscriptionNotification'
  responses:
    '204':
      description: The receipt of the notification is acknowledged.
    '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'
    '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:
      $ref: 'TS29571_CommonData.yaml#/components/responses/default'
  callbacks:
    Fetch:
      '{$request.body#/fetchInstruct/fetchUri}':
        post:
          requestBody:
            required: true
            content:
              application/json:
                schema:
                  type: array
                  items:
                    type: string

```

```

        minItems: 1
        description: Fetch correlation identifiers.
    responses:
        '200':
            description: Expected response to a valid request
            content:
                application/json:
                    schema:
                        $ref: '#/components/schemas/NdccfAnalyticsSubscriptionNotification'
        '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'
        '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'
/analytics-subscriptions/{subscriptionId}:
    delete:
        summary: Deletes an existing Individual DCCF Data Subscription.
        operationId: DeleteDCCFAnalyticsSubscription
        tags:
            - Individual DCCF Analytics Subscription (Document)
        parameters:
            - name: subscriptionId
              in: path
              description: >
                String identifying an analytics subscription to the Ndccf_DataManagement Service.
              required: true
              schema:
                  type: string
        responses:
            '204':
                description: >
                    No Content. The Individual DCCF Analytics Subscription resource matching the
                    subscriptionId was deleted.
            '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'
    put:
        summary: Updates an existing Individual DCCF Analytics Subscription resource.

```

```

operationId: UpdateDCCFAnalyticsSubscription
tags:
  - Individual DCCF Analytics Subscription (Document)
requestBody:
  required: true
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/NdccfAnalyticsSubscription'
parameters:
  - name: subscriptionId
    in: path
    description: >
      String identifying an analytics subscription to the Ndccf_DataManagement Service.
    required: true
    schema:
      type: string
responses:
  '200':
    description: >
      The Individual DCCF Analytics Subscription resource was modified successfully and a
      representation of that resource is returned.
    content:
      application/json:
        schema:
          $ref: '#/components/schemas/NdccfAnalyticsSubscription'
  '204':
    description: >
      The Individual DCCF Analytics Subscription resource was modified successfully.
  '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'
  '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'
/data-subscriptions:
  post:
    summary: Creates a new Individual DCCF Data Subscription resource.
    operationId: CreateDCCFDataSubscription
    tags:
      - DCCF Data Subscriptions (Collection)
    requestBody:
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/NdccfDataSubscription'
      required: true
    responses:
      '201':
        description: Creates a new Individual DCCF Data Subscription resource.
        headers:
          Location:
            description: >
              Contains the URI of the newly created resource, according to the structure
              {apiRoot}/ndccf-datamanagement/<apiVersion>/data-subscriptions/{subscriptionId}
            required: true
            schema:
              type: string

```

```

    content:
      application/json:
        schema:
          $ref: '#/components/schemas/NdccfDataSubscription'
    '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:
    $ref: 'TS29571_CommonData.yaml#/components/responses/default'
  callbacks:
    dccfDataNotification:
      '{$request.body#/dataNotifUri}':
        post:
          requestBody:
            required: true
            content:
              application/json:
                schema:
                  $ref: '#/components/schemas/NdccfDataSubscriptionNotification'
  responses:
    '204':
      description: The receipt of the notification is acknowledged.
    '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'
    '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:
    $ref: 'TS29571_CommonData.yaml#/components/responses/default'
  callbacks:
    Fetch:
      '{$request.body#/fetchInstruct/fetchUri}':
        post:
          requestBody:
            required: true
            content:
              application/json:
                schema:
                  type: array
                  items:
                    type: string
                  minItems: 1

```

```

        description: Fetch correlation identifiers.
    responses:
        '200':
            description: Expected response to a valid request
            content:
                application/json:
                    schema:
                        $ref: '#/components/schemas/NdccfAnalyticsSubscriptionNotification'
        '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'
        '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'
/data-subscriptions/{subscriptionId}:
    delete:
        summary: Deletes an existing Individual DCCF Data Subscription resource.
        operationId: DeletedCCFDataSubscription
        tags:
            - Individual DCCF Data Subscription (Document)
        parameters:
            - name: subscriptionId
              in: path
              description: String identifying a data subscription to the Ndccf_DataManagement Service.
              required: true
              schema:
                  type: string
        responses:
            '204':
                description: >
                    No Content. The Individual DCCF Data Subscription resource matching the subscriptionId
                    was deleted.
            '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'
    put:
        summary: Updates an existing Individual DCCF Data Subscription resource.
        operationId: UpdateDCCFDataSubscription
        tags:

```



```

- Individual DCCF Data Subscription (Document)
requestBody:
  required: true
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/NdccfDataSubscription'
parameters:
- name: subscriptionId
  in: path
  description: >
    String identifying a data subscription to the Ndccf_DataManagement Service.
  required: true
  schema:
    type: string
responses:
'200':
  description: >
    The Individual DCCF Data Subscription resource was modified successfully and a
    representation of that resource is returned.
  content:
    application/json:
      schema:
        $ref: '#/components/schemas/NdccfDataSubscription'
'204':
  description: >
    The Individual DCCF Data Subscription resource was modified successfully.
'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'
'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: '{nrfApiRoot}/oauth2/token'
          scopes:
            ndccf-datamanagement: Access to the ndccf-datamanagement API
#
schemas:
#
  NdccfAnalyticsSubscription:
    description: Represents an Individual DCCF Analytics Subscription.
    type: object
    required:
      - anaSub
      - anaNotifUri
      - anaNotifCorrId
    properties:
      anaSub:
        $ref:
'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/NnwdafEventsSubscription'
      anaNotifUri:

```

```

    $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
  anaNotifCorrId:
    type: string
    description: Notification correlation identifier.
  formatInstruct:
    $ref: '#/components/schemas/FormattingInstruction'
  procInstructs:
    type: array
    items:
      $ref: '#/components/schemas/ProcessingInstruction'
    minItems: 1
    description: Processing instructions to be used for sending event notifications.
  targetNfId:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
  targetNfSetId:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/NfSetId'
  adrfId:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
  ardfSetId:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/NfSetId'
  suppFeat:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
  timePeriod:
    $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
  dataCollectPurposes:
    type: array
    items:
      $ref: '#/components/schemas/DataCollectionPurpose'
    minItems: 1
    description: >
      The purposes of data collection. This attribute may only be provided if the consumer has
      checked user consent.

```

#

```

NdccfDataSubscription:
  description: Represents an Individual DCCF Data Subscription.
  type: object
  required:
    - dataNotifUri
    - dataNotifCorrId
    - dataSub
  properties:
    dataSub:
      $ref: 'TS29575_Nadrf_DataManagement.yaml#/components/schemas/DataSubscription'
    dataNotifUri:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
    dataNotifCorrId:
      type: string
      description: Notification correlation identifier.
    formatInstruct:
      $ref: '#/components/schemas/FormattingInstruction'
    procInstructs:
      type: array
      items:
        $ref: '#/components/schemas/ProcessingInstruction'
      minItems: 1
      description: Processing instructions to be used for sending event notifications.
    targetNfId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
    targetNfSetId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/NfSetId'
    adrfId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
    ardfSetId:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/NfSetId'
    timePeriod:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
    suppFeat:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    dataCollectPurposes:
      type: array
      items:
        $ref: '#/components/schemas/DataCollectionPurpose'
      minItems: 1
      description: >
        The purposes of data collection. This attribute may only be provided if the consumer has
        checked user consent.

```

```

#
NdccfAnalyticsSubscriptionNotification:
  description: Represents a notification for a DCCF analytics subscription.
  type: object
  required:
    - anaNotifCorrId
    - timeStamp
  oneOf:
    - required: [anaNotifications]
    - required: [anaReports]
    - required: [fetchInstruct]
  properties:
    anaNotifCorrId:
      type: string
      description: Notification correlation identifier.
    anaNotifications:
      type: array
      items:
        $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/NnwdafEventsSubscriptionNotification'
    minItems: 1
      description: List of analytics subscription notifications.
    anaReports:
      type: array
      items:
        $ref: '#/components/schemas/NotifSummaryReport'
    minItems: 1
      description: >
        List of reports with summarized data from multiple analytics notifications that the DCCF
        has received from NWDAF.
    fetchInstruct:
      $ref: 'TS29576_Nmfaf_3caDataManagement.yaml#/components/schemas/FetchInstruction'
    terminationReq:
      type: boolean
      description: >
        It indicates the termination of the data management subscription that requested by the
        DCCF.
    timeStamp:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
#
NdccfDataSubscriptionNotification:
  description: Represents a notification for a DCCF data subscription.
  type: object
  required:
    - dataNotifCorrId
    - timeStamp
  oneOf:
    - required: [dataNotif]
    - required: [dataReports]
    - required: [fetchInstruct]
  properties:
    dataNotifCorrId:
      type: string
      description: Notification correlation identifier.
    dataNotif:
      $ref: 'TS29575_Nadrf_DataManagement.yaml#/components/schemas/DataNotification'
    dataReports:
      type: array
      items:
        $ref: '#/components/schemas/NotifSummaryReport'
    minItems: 1
      description: >
        List of reports with summarized data from multiple notifications received from data
        producer.
    fetchInstruct:
      $ref: 'TS29576_Nmfaf_3caDataManagement.yaml#/components/schemas/FetchInstruction'
    terminationReq:
      type: boolean
      description: >
        It indicates the termination of the data management subscription that requested by the
        DCCF.
    timeStamp:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
#
FormattingInstruction:
  description: Contains data or analytics formatting instructions.
  type: object
  properties:

```

```

    consTrigNotif:
      type: boolean
      description: >
        Indicates that notifications shall be buffered until the NF service consumer requests
        their delivery.
      reportingOptions:
        $ref: '#/components/schemas/ReportingOptions'
#
ReportingOptions:
  description: Represents reporting options for processed notifications.
  type: object
  oneOf:
    - required: [notifyWindow]
    - required: [notifyPeriod]
    - required: [notifyPeriodInc]
    - required: [depEventSubId]
  properties:
    notifyWindow:
      $ref: 'TS29122_CommonData.yaml#/components/schemas/TimeWindow'
    notifyPeriod:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
    notifyPeriodInc:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
    depEventSubId:
      type: string
      description: >
        Notifications for the present subscription are sent only upon occurrence of events of
the
        subscription with identifier that matches this attribute.
    minClubbedNotif:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
    maxClubbedNotif:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
#
ProcessingInstruction:
  description: Contains instructions related to the processing of notifications.
  type: object
  required:
    - eventId
    - procInterval
  properties:
    eventId:
      $ref: '#/components/schemas/DccfEvent'
    procInterval:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
    paramProcInstructs:
      type: array
      items:
        $ref: '#/components/schemas/ParameterProcessingInstruction'
      minItems: 1
      description: >
        List of event parameter names, and for each event parameter name, respective event
#
        parameter values and sets of the attributes to be used in the summarized reports.
#
DccfEvent:
  description: >
    Identifies the (event exposure or analytics) event that the processing instructions
    shall apply to. Contains all event IDs related to DCCF.
  type: object
  oneOf:
    - required: [nwdafEvent]
    - required: [smfEvent]
    - required: [amfEvent]
    - required: [nefEvent]
    - required: [afEvent]
    - required: [sacEvent]
    - required: [nrfEvent]
    - required: [udmEvent]
  properties:
    nwdafEvent:
      $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/NwdafEvent'
    smfEvent:
      $ref: 'TS29508_Nsmf_EventExposure.yaml#/components/schemas/SmfEvent'
    amfEvent:
      $ref: 'TS29518_Namf_EventExposure.yaml#/components/schemas/AmfEventType'
    nefEvent:
      $ref: 'TS29591_Nnef_EventExposure.yaml#/components/schemas/NefEvent'
    udmEvent:

```

```

    $ref: 'TS29503_Nudm_EE.yaml#/components/schemas/EventType'
  afEvent:
    $ref: 'TS29517_Naf_EventExposure.yaml#/components/schemas/AfEvent'
  sacEvent:
    $ref: 'TS29536_Nnsacf_SliceEventExposure.yaml#/components/schemas/SACEvent'
  nrfEvent:
    $ref: 'TS29510_Nnrf_NFManagement.yaml#/components/schemas/NotificationEventType'
#
ParameterProcessingInstruction:
  description: >
    Contains an event parameter name and the respective event parameter values and sets of
    attributes to be used in summarized reports.
  type: object
  required:
  - name
  - values
  - sumAttrs
  properties:
    name:
      type: string
      description: >
        A JSON pointer value that references an attribute within the notification object to
which
        the processing instruction is applied.
    values:
      type: array
      items: {}
      minItems: 1
      description: A list of values for the attribute identified by the name attribute.
    sumAttrs:
      type: array
      items:
        $ref: '#/components/schemas/SummarizationAttribute'
      minItems: 1
      description: Attributes requested to be used in the summarized reports.
    aggrLevel:
      $ref: '#/components/schemas/AggregationLevel'
    supis:
      type: array
      items:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Supi'
      minItems: 1
      description: Indicates the UEs for which processed reports are requested.
    areas:
      type: array
      items:
        $ref: 'TS29554_Npcf_BDTPolicyControl.yaml#/components/schemas/NetworkAreaInfo'
      minItems: 1
      description: Indicates the Areas of Interest for which processed reports are requested.
#
NotifSummaryReport:
  description: Represents summarized notifications based on processing instructions.
  type: object
  required:
  - eventId
  - procInterval
  - eventReports
  properties:
    eventId:
      $ref: '#/components/schemas/DccfEvent'
    procInterval:
      $ref: 'TS29571_CommonData.yaml#/components/schemas/DurationSec'
    eventReports:
      type: array
      items:
        $ref: '#/components/schemas/EventParamReport'
      minItems: 1
      description: List of event parameter reports.
#
EventParamReport:
  description: Represents a summarized report for one event parameter.
  type: object
  required:
  - name
  - values
  properties:
    name:
      type: string

```

```

    description: The name of the reported parameter.
  values:
    type: array
    items: {}
    minItems: 1
    description: The list of values of the reported parameter.
  supi:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/Supi'
  area:
    $ref: 'TS29554_Npcf_BDTPolicyControl.yaml#/components/schemas/NetworkAreaInfo'
  spacing:
    $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/NumberAverage'
  duration:
    $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/NumberAverage'
  avgAndVar:
    $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/NumberAverage'
  mostFreqVal: {}
  leastFreqVal: {}
  count:
    $ref: 'TS29571_CommonData.yaml#/components/schemas/UInteger'
  minValue:
    type: string
    description: The minimum value of the parameter.
  maxValue:
    type: string
    description: The maximum value of the parameter.
#
SummarizationAttribute:
  anyOf:
  - type: string
  - enum:
    - SPACING
    - DURATION
    - OCCURRENCES
    - AVG_VAR
    - FREQ_VAL
    - MIN_MAX
  - 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.
  description: |
    Possible values are:
    - SPACING: Average and variance of the time interval separating two consecutive occurrences
of the same event and parameter value, or periodicity for periodic reporting.
    - DURATION: Average and variance of the time for which the parameter value applies.
    - OCCURRENCES: Number of countable occurrences for the parameter.
    - AVG_VAR: Average and variance of the parameter.
    - FREQ_VAL: Most and least frequent values.
    - MIN_MAX: Maximum and minimum parameter values.
#
AggregationLevel:
  anyOf:
  - type: string
  - enum:
    - UE
    - AOI
  - 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.
  description: |
    Possible values are:
    - UE: Indicates that the summarized reports shall be provided per UE.
    - AOI: Indicates that the summarized reports shall be provided per Area of Interest.
#
DataCollectionPurpose:
  anyOf:
  - type: string
  - enum:
    - ANALYTICS_GENERATION
    - MODEL_TRAINING
  - 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.
  description: |

```

Possible values are:

- ANALYTICS_GENERATION: The data is collected for generating the analytics.
- MODEL_TRAINING: The data is collected for ML model training.

A.3 Ndccf_ContextManagement API

```

openapi: 3.0.0
info:
  version: 1.0.0
  title: Ndccf_ContextManagement
  description: |
    DCCF Context Management Service.
    © 2022, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.
externalDocs:
  description: 3GPP TS 29.574 V17.1.0; 5G System; Data Collection Coordination Services; Stage 3.
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.574/'
#
servers:
  - url: '{apiRoot}/ndccf-contextmanagement/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 4.4 of 3GPP TS 29.501.
#
security:
  - oAuth2ClientCredentials:
    - ndccf-contextmanagement
  - {}
#
paths:
  /data-collection-profiles:
    post:
      summary: Creates a new Individual DCCF Data Collection Profile resource.
      operationId: CreatedCCFDataCollectionProfile
      tags:
        - DCCF Data Collection Profiles (Collection)
      requestBody:
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/NdccfDataCollectionProfile'
            required: true
      responses:
        '201':
          description: A new Individual DCCF Data Collection Profile resource created.
          headers:
            Location:
              description: >
                Contains the URI of the newly created resource, according to the structure
                {apiRoot}/ndccf-contextmanagement/<apiVersion>/data-collection-profiles/{profileId}'
              required: true
              schema:
                type: string
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/NdccfDataCollectionProfile'
        '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'
/data-collection-profiles/{profileId}:
  delete:
    summary: Deletes an existing Individual DCCF Data Subscription resource.
    operationId: DeleteDCCFDataCollectionProfile
    tags:
      - Individual DCCF Data Collection Profile (Document)
    parameters:
      - name: profileId
        in: path
        description: >
          String identifying a data collection profile at the Ndccf_ContextManagement Service.
        required: true
        schema:
          type: string
    responses:
      '204':
        description: >
          No Content. The Individual DCCF Data Collection Profile resource matching the profileId
          was deleted.
      '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'
  put:
    summary: Updates an existing Individual DCCF Data Collection Profile resource.
    operationId: UpdatedDCCFDataCollectionProfile
    tags:
      - Individual DCCF Data Collection Profile (Document)
    requestBody:
      required: true
      content:
        application/json:
          schema:
            $ref: '#/components/schemas/NdccfDataCollectionProfile'
    parameters:
      - name: profileId
        in: path
        description: >
          String identifying a data collection profile at the Ndccf_ContextManagement Service.
        required: true
        schema:
          type: string
    responses:
      '200':
        description: >
          The Individual DCCF Data Collection Profile resource was modified successfully and a
          representation of that resource is returned.
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/NdccfDataCollectionProfile'
      '204':
        description: >
          The Individual DCCF Data Collection Profile resource was modified successfully.
      '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'
'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: '{nrfApiRoot}/oauth2/token'
          scopes:
            ndccf-contextmanagement: Access to the ndccf-contextmanagement API
#
schemas:
  NdccfDataCollectionProfile:
    description: Represents an Individual DCCF Data Collection Profile.
    type: object
    allOf:
      - oneOf:
          - required: [anaSub]
          - required: [dataSub]
      - oneOf:
          - required: [nwdafId]
          - required: [adrfId]
          - required: [nwdafSetId]
          - required: [adrfSetId]
    properties:
      anaSub:
        $ref: 'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/NnwdafEventsSubscription'
      dataSub:
        $ref: 'TS29575_Ndrf_DataManagement.yaml#/components/schemas/DataNotification'
      nwdafId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
      nwdafSetId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NfSetId'
      adrfId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
      adrfSetId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NfSetId'
#
```

Annex B (informative): Change history

| Change history | | | | | | | |
|----------------|--------------|-----------|------|-----|-----|--|-------------|
| Date | Meeting | TDoc | CR | Rev | Cat | Subject/Comment | New version |
| 2021-05 | CT3#116e | | | | | Skeleton of TS on 5G System; Data Collection Coordination Services; Stage 3. | 0.0.0 |
| 2021-05 | CT3#116e | | | | | Inclusion of documents agreed in CT3#116e: C3-213235, C3-213236, C3-213237, C3-213238 and C3-213239. | 0.1.0 |
| 2021-08 | CT3#117e | | | | | Inclusion of document agreed in CT3#117e: C3-214167. | 0.2.0 |
| 2021-10 | CT3#118e | | | | | Inclusion of document agreed in CT3#118e: C3-215182, C3-215480, C3-215184, C3-215185, C3-215186, C3-215187, C3-215188. | 0.3.0 |
| 2021-11 | CT3#119e | | | | | Inclusion of document agreed in CT3#119e: C3-216452, C3-216453, C3-216454, C3-216057, C3-216058, C3-216601 | 0.4.0 |
| 2022-01 | CT3#119bis-e | | | | | Inclusion of document agreed in CT3#119bis-e: C3-220506, C3-220507, C3-220508, C3-220497, C3-220509, C3-220498, C3-220050, C3-220368, C3-220301. | 0.5.0 |
| 2022-02 | CT3#120-e | | | | | Inclusion of document agreed in CT3#120e: C3-221619, C3-221281, C3-221287, C3-221682, C3-221301. | 0.6.0 |
| 2022-03 | CT#95e | CP-220159 | | | | Presentation to TSG CT for approval | 1.0.0 |
| 2022-03 | CT#95e | CP-220159 | | | | Approved by TSG CT | 17.0.0 |
| 2022-06 | CT#96 | CP-221132 | 0001 | 1 | F | Adding 3XX response handling support for DCCF services | 17.1.0 |
| 2022-06 | CT#96 | CP-221132 | 0003 | 1 | F | Corrections in the Ndcf_DataManagement API | 17.1.0 |
| 2022-06 | CT#96 | CP-221132 | 0004 | 1 | F | Removing ENs about possible further data sources and attributes | 17.1.0 |
| 2022-06 | CT#96 | CP-221132 | 0005 | 1 | B | Update Ndcf_DataManagement_Fetch service operation | 17.1.0 |
| 2022-06 | CT#96 | CP-221131 | 0009 | 1 | F | Ndcf_DataManagement API corrections | 17.1.0 |
| 2022-06 | CT#96 | CP-221130 | 0010 | - | F | Ndcf_DataManagement API: responses on DELETE method | 17.1.0 |
| 2022-06 | CT#96 | CP-221130 | 0011 | - | F | Ndcf_DataManagement API: responses on DELETE method | 17.1.0 |
| 2022-06 | CT#96 | CP-221130 | 0012 | - | B | Remove the unused sections from TS skeleton | 17.1.0 |
| 2022-06 | CT#96 | CP-221131 | 0013 | 1 | F | Miscellaneous corrections and updates | 17.1.0 |
| 2022-06 | CT#96 | C3-223520 | 0020 | 1 | F | Update the apiVersion in the specification | 17.1.0 |
| 2022-06 | CT#96 | CP-221133 | 0015 | - | F | Removing UDM from the list of service consumers for DCCF subscriptions | 17.1.0 |
| 2022-06 | CT#96 | CP-221136 | 0002 | 3 | B | Cleanup of the Ndcf_DataManagement data model | 17.1.0 |
| 2022-06 | CT#96 | CP-221133 | 0016 | - | F | Removal of repetitive description in HTTP error response | 17.1.0 |
| 2022-06 | CT#96 | CP-221136 | 0006 | 3 | B | Support carrying Time Window in Ndcf_DataManagement_Subscribe service operation | 17.1.0 |
| 2022-06 | CT#96 | CP-221134 | 0018 | - | B | Remove the ENs about when the DCCF sends the response to the consumer | 17.1.0 |
| 2022-06 | CT#96 | CP-221134 | 0019 | 1 | B | Update the Notification Correlation ID for Ndcf_DataManagement_Subscribe | 17.1.0 |
| 2022-06 | CT#96 | CP-221134 | 0007 | 1 | F | add ADRF as a consumer of Ndcf_DataManagement service | 17.1.0 |
| 2022-06 | CT#96 | CP-221135 | 0021 | 1 | F | remove CEF and OAM from the list of consumers of Ndcf_DataManagement Service | 17.1.0 |
| 2022-06 | CT#96 | CP-221135 | 0022 | 1 | F | update of Abbreviations | 17.1.0 |
| 2022-06 | CT#96 | CP-221152 | 0023 | - | F | Update of info and externalDocs fields | 17.1.0 |
| 2022-09 | CT#97e | CP-222101 | 0032 | - | F | Corrections to Fetch service operation | 17.2.0 |
| 2022-09 | CT#97e | CP-222102 | 0034 | 1 | F | Add Headers supported by 3xx Response Code for Analytics and Data Notification | 17.2.0 |
| 2022-09 | CT#97e | CP-222102 | 0035 | 1 | F | Add the missing data types for 3xx response codes | 17.2.0 |
| 2022-09 | CT#97e | CP-222102 | 0036 | 1 | F | Missing description field for enumeration data types | 17.2.0 |
| 2022-09 | CT#97e | CP-222103 | 0031 | 1 | F | Corrections to fetch correlation identifiers | 17.2.0 |
| 2022-09 | CT#97e | CP-222103 | 0033 | 1 | F | Corrections in the error handling of DCCF subscription | 17.2.0 |
| 2022-09 | CT#97e | CP-222104 | 0026 | 1 | F | Corrections related to callback functions in DCCF | 17.2.0 |
| 2022-09 | CT#97e | CP-222104 | 0027 | 1 | F | Add ADRF information in DCCF subscriptions | 17.2.0 |
| 2022-09 | CT#97e | CP-222104 | 0029 | 1 | F | Updates of formatting and processing instructions | 17.2.0 |
| 2022-09 | CT#97e | CP-222104 | 0030 | 1 | F | Adding NRF and NSACF as data sources | 17.2.0 |
| 2022-09 | CT#97e | CP-222104 | 0017 | 2 | F | Update inputs of Ndcf_DataManagement_Notify service | 17.2.0 |
| 2022-09 | CT#97e | CP-222104 | 0038 | 1 | F | Support user consent indication and data collection purpose | 17.2.0 |
| 2022-09 | CT#97e | CP-222104 | 0024 | 2 | F | eventId attribute editors note removal | 17.2.0 |
| 2022-09 | CT#97e | CP-222121 | 0039 | - | F | Update of info and externalDocs fields | 17.2.0 |

History

| Document history | | |
|-------------------------|----------------|-------------|
| V17.0.0 | May 2022 | Publication |
| V17.1.0 | July 2022 | Publication |
| V17.2.0 | September 2022 | Publication |
| | | |
| | | |