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Contents

Foreword

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

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Version x.y.z

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2 presented to TSG for approval;

3 or greater indicates TSG approved document under change control.

y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z the third digit is incremented when editorial only changes have been incorporated in the document.

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

shall indicates a mandatory requirement to do something

shall not indicates an interdiction (prohibition) to do something

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

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

should indicates a recommendation to do something

should not indicates a recommendation not to do something

may indicates permission to do something

need not indicates permission not to do something

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

can indicates that something is possible

cannot indicates that something is impossible

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

will indicates that something is certain or expected to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document

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

might indicates a likelihood that something will happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

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

In addition:

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

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

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

Introduction

This clause is optional. If it exists, it is always the second unnumbered clause.

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] 3GPP TS 29.508: "5G System; Session Management Event Exposure Service; Stage 3".

[19] 3GPP TS 29.518: "5G System; Access and Mobility Management Services; Stage 3".

[20] 3GPP TS 29.503: "5G System; Unified Data Management Services; Stage 3".

[21] 3GPP TS 29.517: "5G System; Application Function Event Exposure Services; Stage 3".

[22] 3GPP TS 29.591: "5G System; Network Exposure Function Southbound Services; Stage 3".

[23] 3GPP TS 29.122: "T8 reference point for Northbound APIs".

[24] IETF RFC 6901: "JavaScript Object Notation (JSON) Pointer".

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].

Definition format (Normal)

<defined term>: *<definition>.*

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

3.2 Symbols

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

Symbol format (EW)

<symbol> <Explanation>

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
NEF	Network Exposure Function
NSSF	Network Slice Selection Function
NWDAF	Network Data Analytics Function
PCF	Policy Control Function
SMF	Session Management Function

4 Services offered by the DCCF

4.1 Introduction

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

The following services are specified for the NWDAF:

Table 4.1-1: Services provided by DCCF

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

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
Ndccf_DataManagement	5.1	DCCF Data Management Service	TS29574_Ndccf_DataManagement.yaml	ndccf-datamgnt	A.2
Ndccf_ContextManagement	5.2	DCCF Context Management Service	TS29574_Ndccf_ContextManagement.yaml	ndccf-contextmgnt	A.3

4.2 Ndccf_DataManagement Service

4.2.1 Service Description

4.2.1.1 Overview

The Ndccf_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 releated events; and
- notifies NF service consumers with a corresponding subscription about observed events.

Editor's Note: It is FFS to add information and contents related to the Ndccf_DataManagement_Fetch service operation throughout the specification, because some of its aspects are unclear in stage 2 (e.g. based on which inputs does the DCCF decide to trigger fetching and how can fetch be used by the consumer to request delivery of buffered information).

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)
- Unified Data Management (UDM)
- Application Function (AF)
- Operation, Administration, and Maintenance (OAM)
- Charging Enablement Function (CEF)
- Network Data Analytics Function (NWDAF)

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.

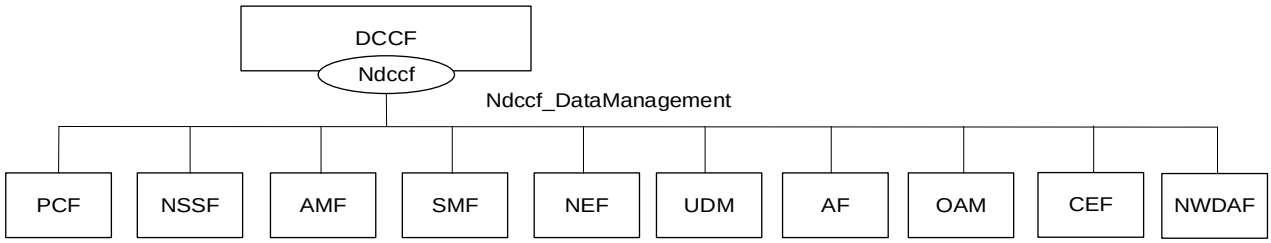

Figure 4.2.1.2-1: Ndccf_DataManagement service architecture, SBI representation

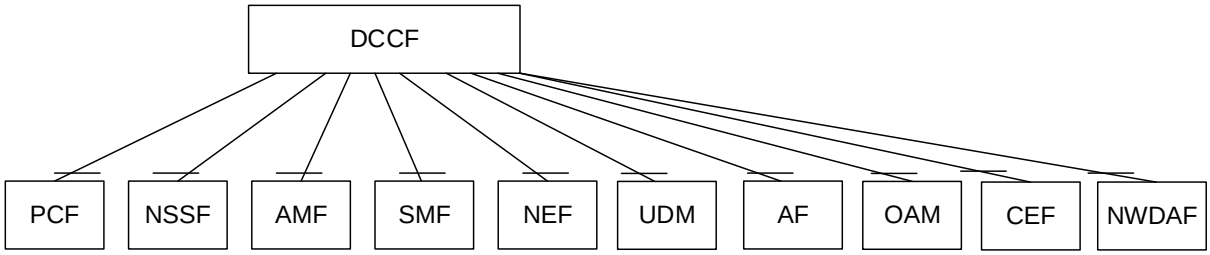

Figure 4.2.1.2-2: Ndccf_DataManagement service architecture, reference point representation

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 Ndccf_DataManagement service are as specified in 3GPP TS 29.520 [15] subclause 4.2.1.3.2 for the Nnwdaf_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 Ndccf_DataManagement Service are shown in table 4.2.2.1-1.

Table 4.2.2.1-1: Ndccf_DataManagement Service Operations

Service Operation Name	Description	Initiated by
Ndccf_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)
Ndccf_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)
Ndccf_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
Ndccf_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 Ndccf_DataManagement_Subscribe service operation

4.2.2.2.1 General

The Ndccf_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.

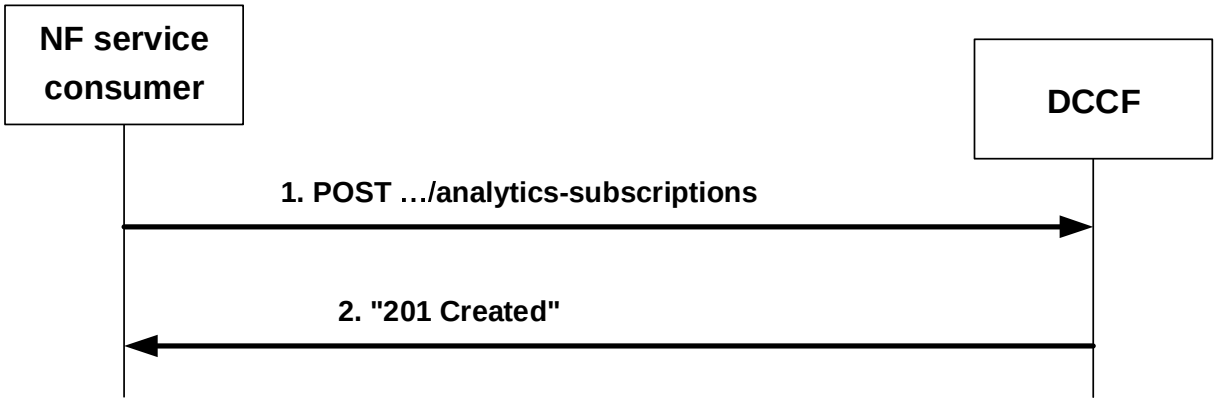

Figure 4.2.2.2.2-1: NF service consumer subscribes to analytics notifications

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/v1/analytics-subscriptions" as Resource URI representing the "DCCF Analytics Subscriptions", as shown in figure 4.2.2.2.2-1, 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 "procInstrct" attribute; and/or
- a target NWDAF/ADRF identifier within the "targetNfId" attribute or a target NWDAF/ADRF set identifier within the "targetNfSetId" attribute.

Upon the reception of an HTTP POST request with "{apiRoot}/ndccf-datamanagement/v1/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.

Editor's Note: Whether DCCF needs to wait for the response from the NWDAF/ADRF when creating the resource is FFS.

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/v1/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

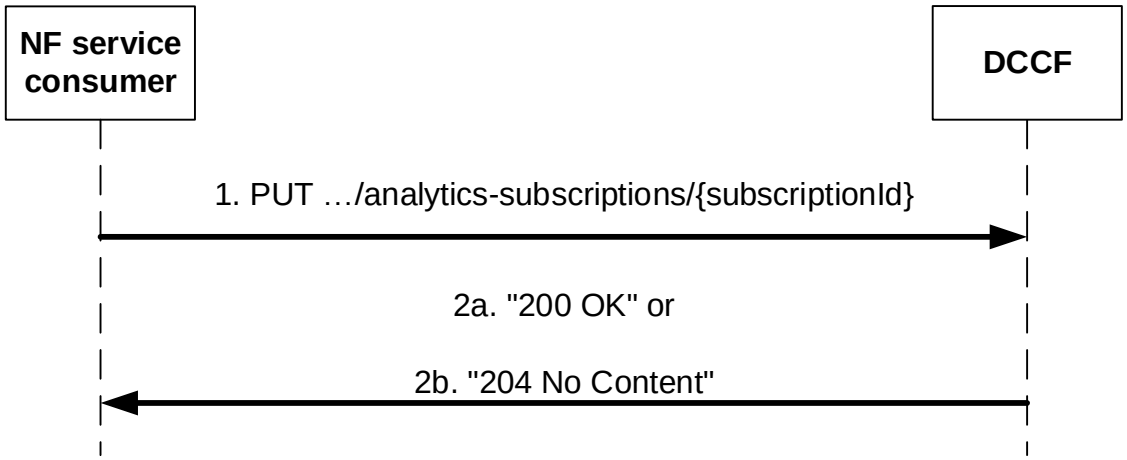

Figure 4.2.2.2.3-1: NF service consumer updates subscription to analytics notifications

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/v1/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/v1/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.

Editor's Note: Whether DCCF needs to wait for the response from the NWDAF/ADRF when updating the resource is FFS.

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.

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.

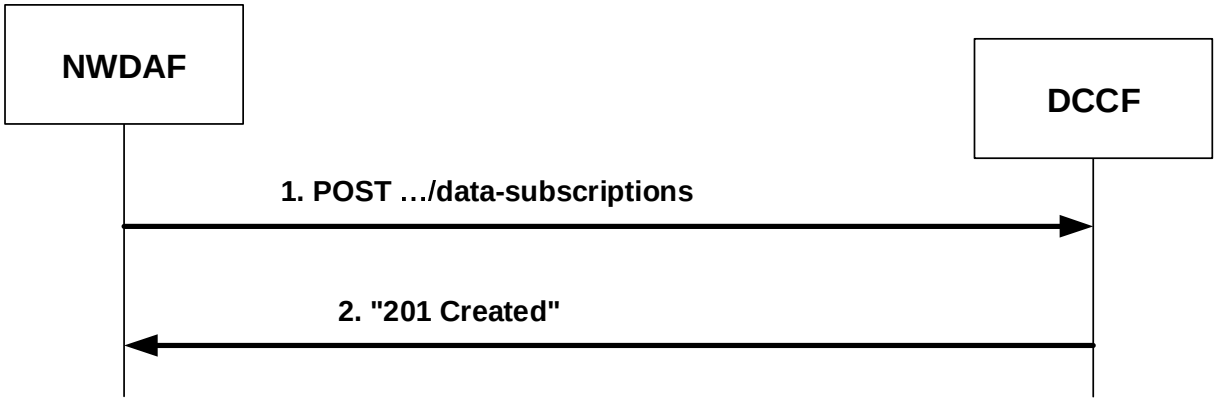

Figure 4.2.2.2.4-1: NF service consumer subscribes to data notifications

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/v1/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
- one of the following:
  - access and mobility function event exposure subscription within the "amfDataSub" attribute;
  - session management function event exposure subscription within the "smfDataSub" attribute;
  - unified data management event exposure subscription within the "udmDataSub" attribute;
  - network exposure function event exposure subscription within the "nefDataSub" attribute;
  - application function event exposure subscription within the "afDataSub" attribute;

and may include:

- formatting instructions within the "formatInstruct" attribute;
- processing instructions within the "procInstrct" attribute; and/or
- a target NF identifier within the "targetNfId" attribute" or a target NF set identifier within the "targetNfSetId" attribute".

Upon the reception of an HTTP POST request with: "{apiRoot}/ndccf-datamanagement/v1/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.

Editor's Note: Whether DCCF needs to wait for the response from the data sources when creating the resource is FFS.

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/v1/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

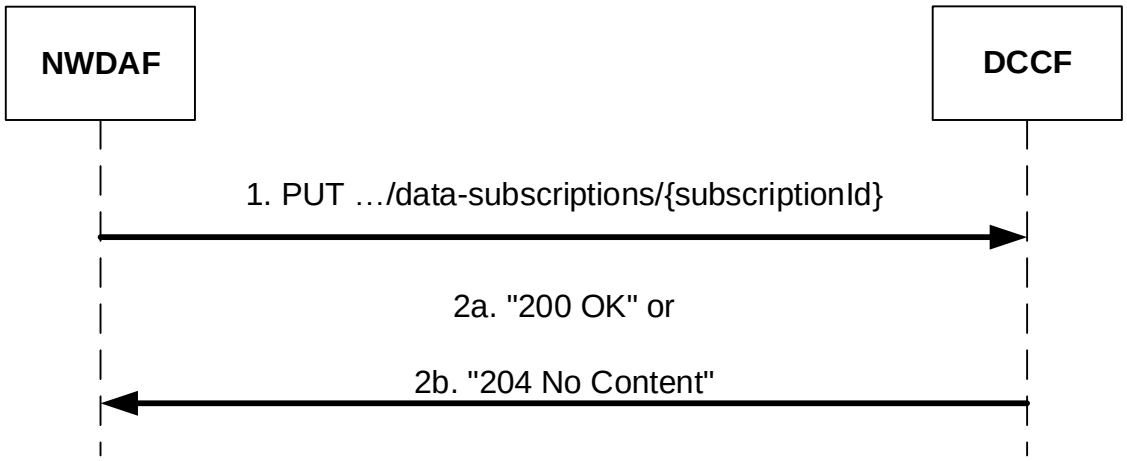

Figure 4.2.2.2.5-1: NF service consumer updates subscription to data notifications

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/v1/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/v1/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.

Editor's Note: Whether DCCF needs to wait for the response from the data sources when creating the resource is FFS.

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.

4.2.2.3 Ndccf_DataManagement_Unsubscribe service operation

4.2.2.3.1 General

The Ndccf_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.

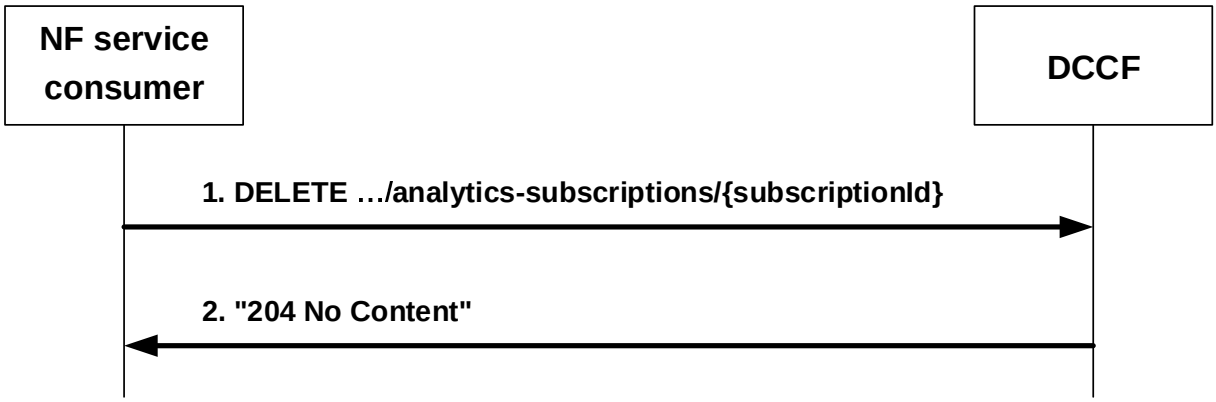

Figure 4.2.2.3.2-1: NF service consumer unsubscribes from analytics notifications

The NF service consumer shall invoke the Ndccf_DataManagement_Unsubscribe service operation to unsubscribe from analytics notifications. The NF service consumer shall send an HTTP DELETE request with "{apiRoot}/ndccf-datamanagement /v1/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 /v1/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 subclause 5.1.7.

If the Individual DCCF Analytics Subscription resource does not exist, the DCCF shall respond with "404 Not Found".

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.

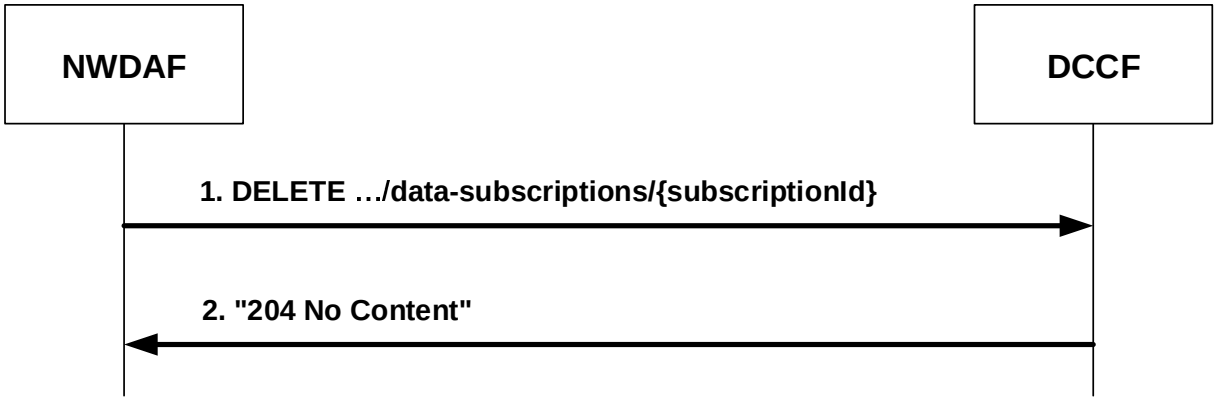

Figure 4.2.2.3.3-1: NWDAF unsubscribes from data notifications

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 /v1/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 /v1/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 subclause 5.1.7.

If the Individual DCCF Data Subscription resource does not exist, the DCCF shall respond with "404 Not Found".

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).

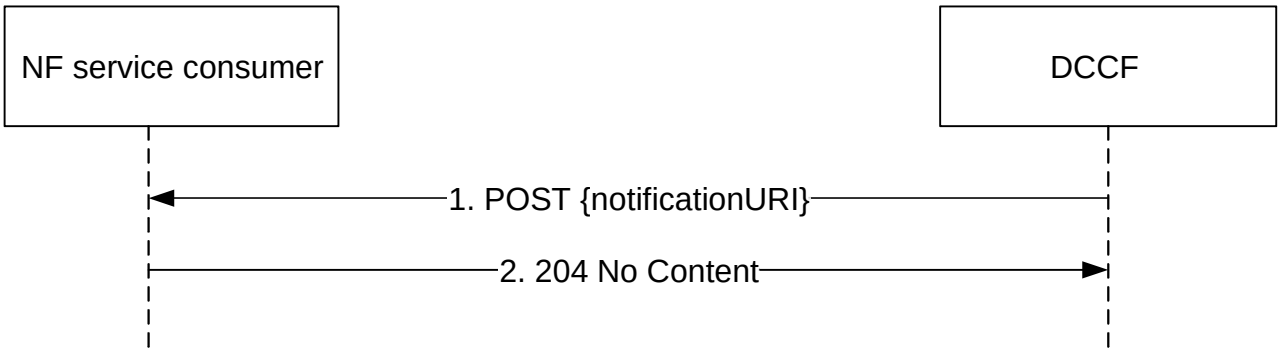

Figure 4.2.2.4.2-1: DCCF notifies the NF service consumer about a subscribed analytics event

The DCCF shall invoke the Ndccf_DataManagement_Notify service operation to notify about a subscribed analytics event. The DCCF shall send an HTTP POST request with "{notificationURI}" received in the NdccfAnalyticsSubscription data structure of the Ndccf_DataManagement_Subscribe service operation as Resource URI (see subclause 5.1.5 for the definition of this notificationURI), as shown in figure 4.2.2.4.2-1, step 1. The NdccfAnalyticsSubscriptionNotification data structure provided in the request body shall include:

- the analytics notification correlation identifier within the "anaNotifCorrId" 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.

Upon the reception of an HTTP POST request with "{notificationURI}" as Resource URI and NddcfAnalyticsSubscriptionNotification data structure as request body, 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 subclause 5.1.7.

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).

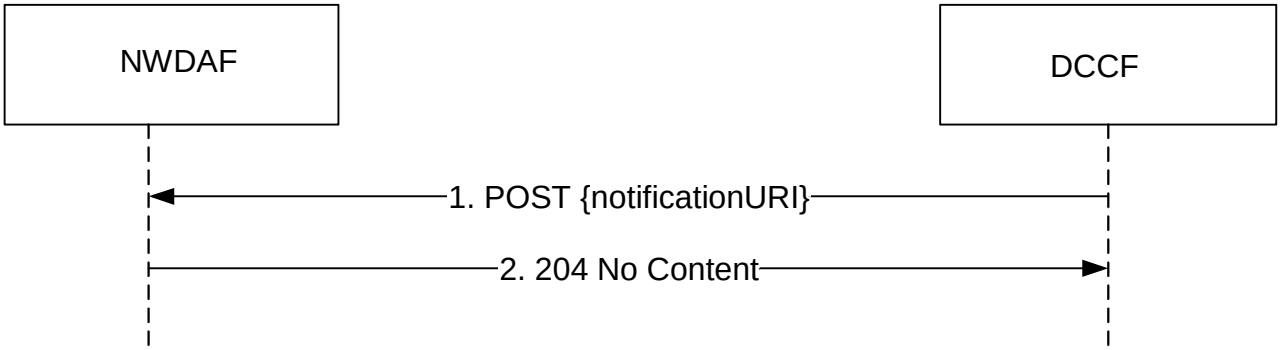

Figure 4.2.2.4.3-1: DCCF notifies the NF service consumer about a subscribed data event

The DCCF shall invoke the Ndccf_DataManagement_Notify service operation to notify about a subscribed data event. The DCCF shall send an HTTP POST request with "{notificationURI}" received in the NdccfDataSubscription data

structure of the Ndccf_DataManagement_Subscribe service operation as Resource URI (see subclause 5.1.5 for the definition of this notificationURI), as shown in figure 4.2.2.4.3-1, step 1. The NdccfDataSubscriptionNotification data structure provided in the request body shall include:

- the data notification correlation identifier within the "dataNotifCorrId" attribute;
- one of the following:
  - network exposure events that occurred in the "nefEventNotifs" attribute;
  - application function events that occurred in the "afEventNotifs" attribute;
  - access and mobility function events that occurred in the "amfEventNotifs" attribute;
  - session management function events that occurred in the "smfEventNotifs" attribute;
  - monitoring report events that occurred in the "udmEventNotifs" 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.

Upon the reception of an HTTP POST request with "{notificationURI}" as Resource URI and NdccfDataSubscriptionNotification data structure as request body, 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 subclause 5.1.7.

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 and data.

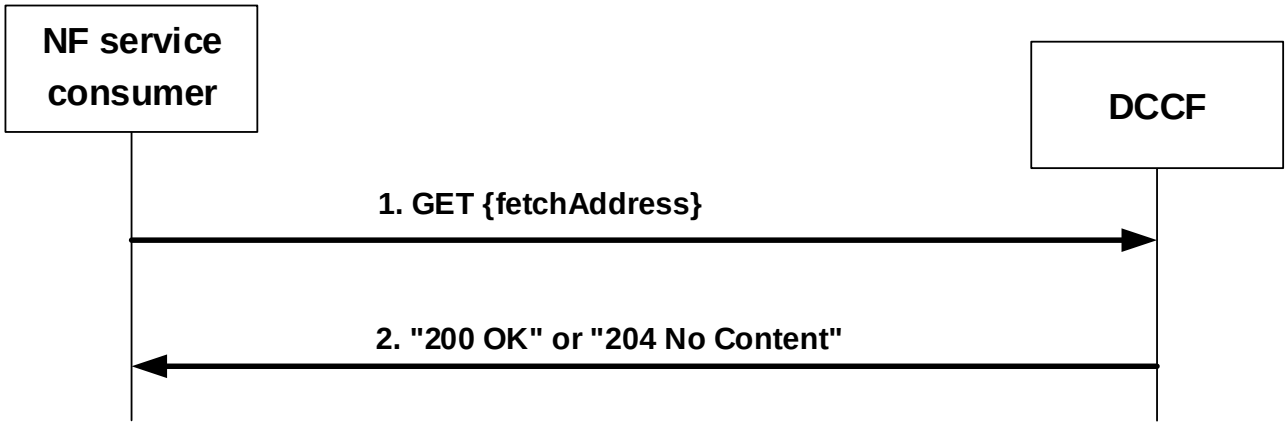

Figure 4.2.2.5.2-1: NF service consumer requesting to retrieve notified analytics

The NF service consumer shall invoke the Ndccf_DataManagement_Fetch service operation to retrieve notified analytics. The NF service consumer shall send an HTTP GET request to the Resource URI "{fetchAddress}" as previously provided by the DCCF in fetchAdress attribute within FetchInstruction as shown in figure 4.2.2.5.2-1, step 1, to request DCCF notified analytics/data.

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

- find the analytics/data according to the requested Uri.

If the 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 the 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 subclause 4.2.2.4.3 with the difference that the "fetchInstruct" attribute shall not be included.

If the requested data does not exist, the DCCF shall respond with "204 No Content". If an error occurs when processing the HTTP GET request, the DCCF shall send an HTTP error response as specified in clause 5.1.7.

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.

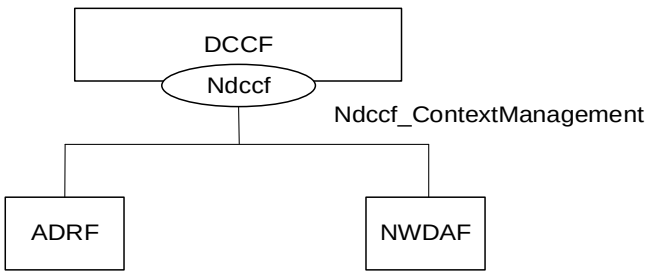

Figure 4.3.1.2-1: Ndccf_ContextManagement service architecture, SBI representation

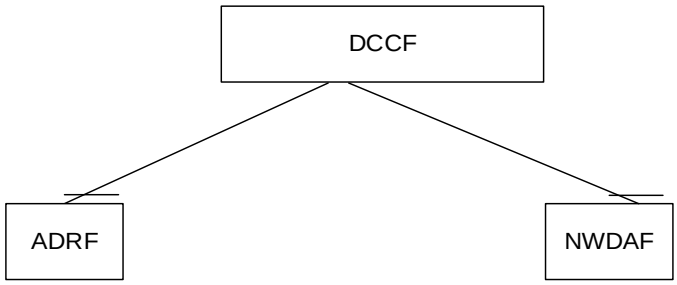

Figure 4.3.1.2-2: Ndccf_ContexManagement service architecture, reference point representation

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: Ndccf_ContextManagement Service Operations

Service Operation Name	Description	Initiated by
Ndccf_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)
Ndccf_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)
Ndccf_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 Ndccf_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.

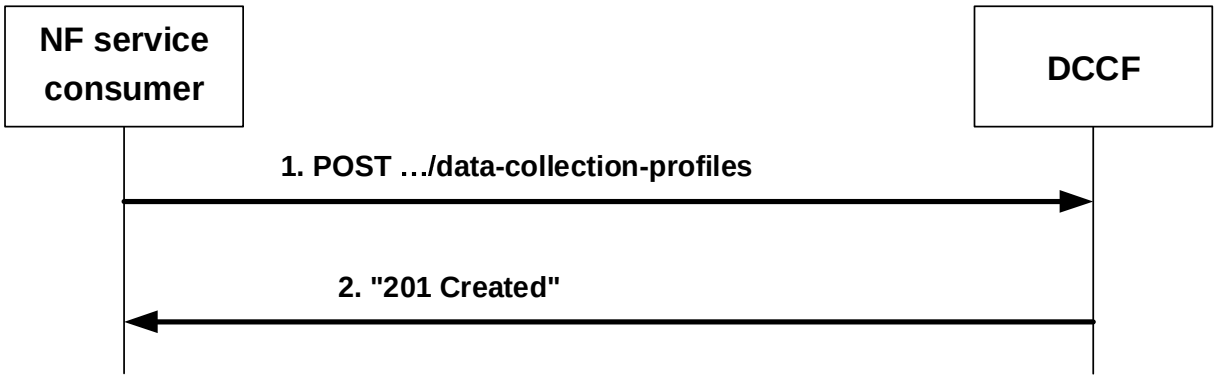

Figure 4.3.2.2.2-1: NF service consumer registers data collection profile

The NF service consumer shall invoke the Ndccf_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}/ndccf-contextmanagement/v1/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 NdccfDataCollectionProfile 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;
  - access and mobility function event exposure subscription within the "amfDataSub" attribute;
  - session management function event exposure subscription within the "smfDataSub" attribute;
  - unified data management event exposure subscription within the "udmDataSub" attribute;
  - network exposure function event exposure subscription within the "nefDataSub" attribute;
  - application function event exposure subscription within the "afDataSub" attribute;
- one of the following identifiers related to the NF service consumer:
  - NWDAF instance identifier within the "nwdafId" attribute;
  - ADRF instance identifier within the "adrfId" attribute;
  - NWDAF set identifier within the "nwdafSetId" attribute;
  - ADRF set identifier within the "adrfSetId" attribute;

Upon the reception of an HTTP POST request with "{apiRoot}/ndccf-contextmanagement/v1/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/v1/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 subclause 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.

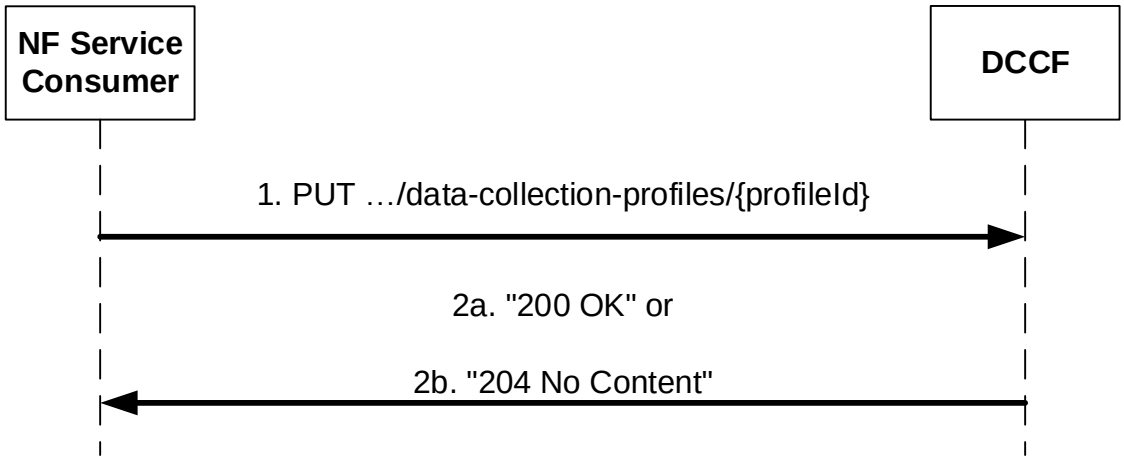

Figure 4.3.2.3.2-1: NF service consumer updates registered data collection profile

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/v1/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 subclause 4.3.2.2.

Upon the reception of an HTTP PUT request with "{apiRoot}/ndccf-contextmanagement/v1/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 subclause 5.2.7.

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.

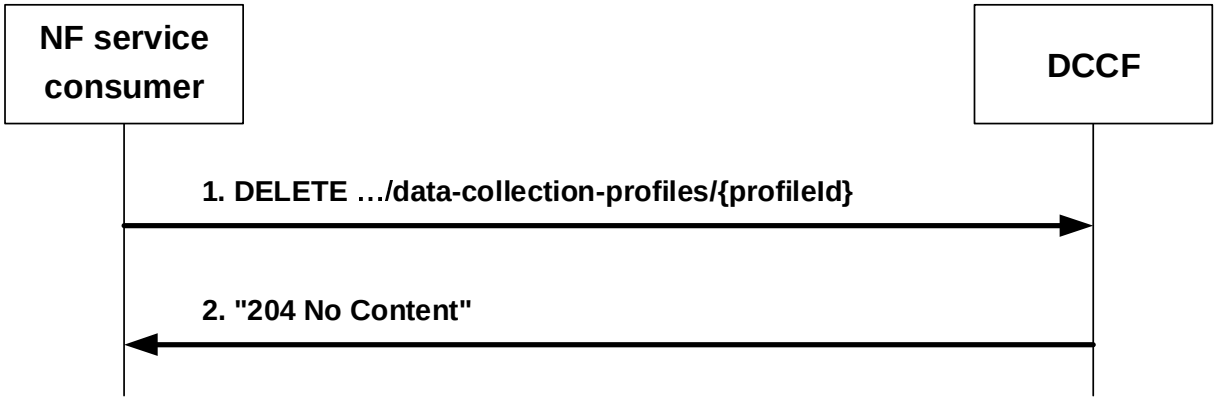

Figure 4.3.2.4.2-1: NF service consumer deregisters data collection profile

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/v1/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/v1/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 subclause 5.2.7.

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-datamgnt".
- 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.

Add specific information for the API if applicable.

5.1.3 Resources

5.1.3.1 Overview

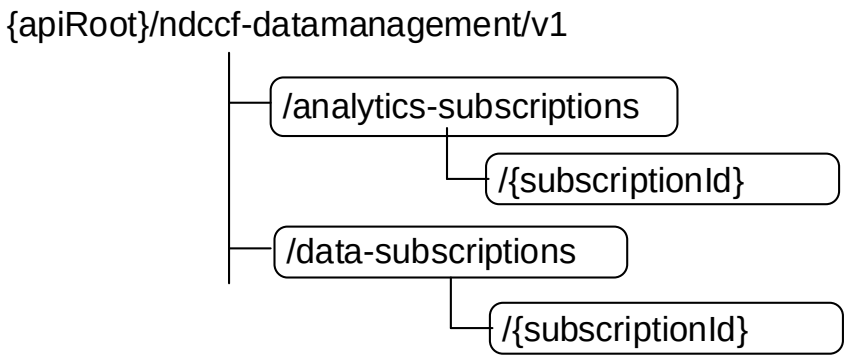

Figure 5.1.3.1-1: Resource URI structure of the Ndccf_DataManagement API

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/v1/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.
NOTE: The manadatory HTTP error status code for the <method 1> method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply.				

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/v1/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/v1/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.
NOTE: The manadatory 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 5.1.3.3.3.1-4: 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 5.1.3.3.3.2-3: 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 manadatory 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 5.1.3.3.3.2-4: 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 5.1.3.3.3.2-5: 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/v1/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.
NOTE: The manadatory 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 5.1.3.4.3.1-4: 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/v1/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/v1/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 Ndccf_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
NdccfDataSubscription	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
NdccfDataSubscription	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.
NOTE: The manadatory 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 5.1.3.5.3.1-4: 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 manadatory 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

5.1.4.1 Overview

This clause will specify custom operations without any associated resource (i.e. RPC) supported by this API.

Table 5.1.4.1-1: Custom operations without associated resources

Custom operation URI	Mapped HTTP method	Description
<custom operation URI>	e.g.POST	<Operation executed by Custom operation>

5.1.4.2 Operation: <operation 1>

Where <operation 1> is to be replaced by the name of the custom operation, e.g. Authentication_Information_Request.

It will describe, for each custom operation, the use and the URI of the operation, the HTTP method on which it is mapped, request and response data structures and response codes, and if applicable, HTTP headers specific to the operation.

5.1.4.2.1 Description

This sublause will describe the custom operation and what it is used for, and the custom operation's URI.

5.1.4.2.2 Operation Definition

This clause will specify the custom operation and the HTTP method on which it is mapped.

This operation shall support the response data structures and response codes specified in tables 5.1.4.2.2-1 and 5.1.4.2.2-2.

Table 5.1.4.2.2-1: Data structures supported by the <e.g. POST> Request Body on this resource

Data type	P	Cardinality	Description
"*<type>*" or "array(*<type>*)" or "map(*<type>*)"	"M", "C" or "O"	"0..1", "1", or "M..N", or <leave empty>	<only if applicable>

Table 5.1.4.2.2-2: Data structures supported by the <e.g. POST> Response Body on this resource

Data type	P	Cardinality	Response codes	Description
"*<type>*" or "array(*<type>*)" or "map(*<type>*)"	"M", "C" or "O"	"0..1", "1" or "M..N", or <leave empty>	<list applicable codes with name from the applicable RFCs>	<Meaning of the success case> or <Meaning of the error case with additional statement regarding error handling>
NOTE: The manadatory HTTP error status code for the <e.g. POST> method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply.				

5.1.4.3 Operation: < operation 2>

And so on if there are more than one custom operations supported by the service. Same structure as in clause 5.1.4.2.

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.

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.				

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.				

5.1.6 Data Model

5.1.6.1 General

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

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

Table 5.1.6.1-1: Ndccf_DataManagement specific Data Types

Data type	Clause defined	Description	Applicability
EventParamReport	5.1.6.2.10	Represents a summarized report for one event parameter.	
FetchInstruction	5.1.6.2.12	Contains instructions for fetching notifications.	
FormattingInstruction	5.1.6.2.6	Contains data or analytics formatting Instructions.	
NdccfAnalyticsSubscription	5.1.6.2.2	Represents an Individual DCCF Analytics Subscription resource.	
NdccfAnalyticsSubscriptionNotification	5.1.6.2.4	Represents a notification that corresponds with an Individual DCCF Analytics 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.	
NdccfDataSubscription	5.1.6.2.3	Represents an Individual DCCF Data Subscription resource.	
NdccfDataSubscriptionNotification	5.1.6.2.5	Represents a notification that corresponds with an Individual DCCF Data Subscription resource.	
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.	

Table 5.1.6.1-2 specifies data types re-used by the Ndccf_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 Ndccf_DataManagement service based interface.

Table 5.1.6.1-2: Ndccf_DataManagement re-used Data Types

Data type	Reference	Comments	Applicability
AfEventExposureNotif	3GPP TS 29.517 [21]	Represents notifications on AF event(s) that occurred for an Individual AF Event Subscription resource.	
AfEventExposureSubsc	3GPP TS 29.517 [21]	Represents AF event subscription	
AmfEventNotification	3GPP TS 29.518 [19]	Represents notifications on AMF event(s) that occurred for an Individual AMF Event Subscription resource.	
AmfEventSubscription	3GPP TS 29.518 [19]	Represents AMF event subscription.	
DurationSec	3GPP TS 29.571 [17]	Time in seconds.	
EeSubscription	3GPP TS 29.503 [20]	Represents UDM event subscription.	
MonitoringReport	3GPP TS 29.503 [20]	UDM Monitoring Report	
NefEventExposureNotif	3GPP TS 29.591 [22]	Represents notifications on network exposure event(s) that occurred for an Individual Network Exposure Event Subscription resource.	
NefEventExposureSubsc	3GPP TS 29.591 [22]	Represents NEF event subscription	
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 an NWDAF analytics subscription.	
NnwdafEventsSubscriptionNotification	3GPP TS 29.520 [15]	Represents an NWDAF analytics subscription notification.	
NsmfEventExposure	3GPP TS 29.508 [18]	Represents SMF event subscription.	
NsmfEventExposureNotification	3GPP TS 29.508 [18]	Represents SMF event notification.	
NumberAverage	3GPP TS 29.520 [15]	Represents average and variance of a parameter value.	
SupportedFeatures	3GPP TS 29.571 [8]	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 NdccfAnalyticsSubscription

Table 5.1.6.2.2-1: Definition of type NdccfAnalyticsSubscription

Attribute name	Data type	P	Cardinality	Description	Applicability
anaSub	NnwdafEventsSubscription	M	1	Subscribed analytics events. (NOTE)	
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.	
targetNfSetId	NfSetId	O	0..1	NF set identifier to which the DCCF shall create the requested subscription.	
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.	
NOTE: The "notificationURI" attribute of NnwdafEventsSubscription data type shall be ignored by the DCCF. The DCCF will provide the notification target address of the DCCF itself in the NnwdafEventsSubscription data type during the event subscription request to the NWDAF.					

Editor's Note: It's FFS that more attributes of the reused data types will be analysed and described later.

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
amfDataSub	AmfEventSubscription	C	0..1	Represents requested AMF Events subscription. (NOTE 1, NOTE 2)	
smfDataSub	NsmfEventExposure	C	0..1	Represents requested SMF Events subscription. (NOTE 1, NOTE 2)	
udmDataSub	EeSubscription	C	0..1	Represents requested UDM Events subscription. (NOTE 1, NOTE 2)	
nefDataSub	NefEventExposureSubsc	C	0..1	Represents requested NEF Events subscription. (NOTE 1, NOTE 2)	
afDataSub	AfEventExposureSubsc	C	0..1	Represents requested AF Events subscription. (NOTE 1, NOTE 2)	
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.	
procInstructs	array(ProcessinInstruction)	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.	
targetNfSetId	NfSetId	O	0..1	Data Producer NF set identifier to which the DCCF shall create the requested subscription.	
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.	

NOTE 1: Exactly one of these attributes shall be provided.
NOTE 2: The notification target address contained in the subscription attribute that is provided (i.e. "notifUri" of "pcfDataSub", "eventNotifyUri" of "amfDataSub", "notifUri" of "smfDataSub", "callbackReference" of "udmDataSub", "notifUri" of "nefDataSub", or "notifUri" of "afDataSub") shall be ignored by the DCCF. The DCCF will provide the notification target address of the DCCF itself in the data type during the event subscription request to each NF.

Editor's Note: It is FFS to check if further data sources are applicable for DCCF data collection subscriptions.

Editor's Note: It's FFS that more attributes of the reused data types will be analysed and described later.

5.1.6.2.4 Type NdccfAnalyticsSubscriptionNotification

Table 5.1.6.2.4-1: Definition of type NdccfAnalyticsSubscriptionNotification

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

5.1.6.2.5 Type NdccfDataSubscriptionNotification

Table 5.1.6.2.5-1: Definition of type NdccfDataSubscriptionNotification

Attribute name	Data type	P	Cardinality	Description	Applicability
nefEventNotifs	array(NefEventExposureNotif)	C	1..N	List of notifications on network exposure event(s). (NOTE 1)	
afEventNotifs	array(AfEventExposureNotif)	C	1..N	List of notifications on AF event(s). (NOTE 1)	
amfEventNotifs	array(AmfEventNotification)	C	1..N	List of notifications on AMF event(s). (NOTE 1)	
smfEventNotifs	array(NsmfEventExposureNotification)	C	1..N	List of notifications on SMF event(s). (NOTE 1)	
udmEventNotifs	array(MonitoringReport)	C	1..N	List of monitoring reports containing information about UDM event(s). (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)	
dattaNotifCorrId	string	M	1	Notification correlation identifier.	
NOTE 1: Exactly one of these attributes shall be provided. NOTE 2: The "fetchInstruct" attribute shall not be included in the response body.					

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 Ndccf_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	string	M	1	Identifies the (event exposure or analytics) event that the processing instructions apply to.	
procInterval	DurationSec	M	1	Indicates the interval (in seconds) over which the processing of data for inclusion in each notification sent to consumers shall occur.	
paramProcInstructs	array(ParameterProcessingInstruction)	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.	

Editor's Note: It is FFS to determine how the DCCF interprets the eventId attribute, e.g. whether it needs to be defined as a new data type that is a union of all applicable enumerations (i.e. containing either an "NwdafEvent" from 29.520 for analytics events or an "SmfEvent" from 29.508 for SMF Event Exposure event or …).

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, or MonitoringReport 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.	

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	string	M	1	Identifies the (event exposure or analytics) event that this report applies to.	
procInterval	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(string)	M	1..N	The list of values of the reported parameter.	
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 "paramProcInstructs" 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 "paramProcInstructs" 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 "paramProcInstructs" 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 "paramProcInstructs" 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 "paramProcInstructs" 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 "paramProcInstructs" 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)	
NOTE: Exactly one of these attributes shall be provided.					

5.1.6.2.12 Type FetchInstruction

Table 5.1.6.2.12-1: Definition of type FetchInstruction

Attribute name	Data type	P	Cardinality	Description	Applicability
fetchAddress	Uri	M	1	Address from which the data can be fetched.	

Editor's Note: Whether the fetchAdress is necessary and the exact data type for modelling it are FFS.

Editor's Note: Whether the Fetch Correlation ID needs to be provided is FFS.

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.	
MIN_MAX	Maximum and minimum parameter values.	

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 Ndccf_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 Ndccf_DataManagement API.

5.1.7.2 Protocol Errors

No specific procedures for the Ndccf_DataManagement service are specified.

Or add specific information for the API if applicable.

5.1.7.3 Application Errors

The application errors defined for the Ndccf_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 Ndccf_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 Ndccf_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 Ndccf_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 Ndccf_DataManagement service.

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

5.2 Ndccf_ContextManagement Service API

5.2.1 Introduction

The Ndccf_ContextManagement shall use the Ndccf_ContextManagement API.

The API URI of the Ndccf_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.

Add specific information for the API if applicable.

5.2.3 Resources

5.2.3.1 Overview

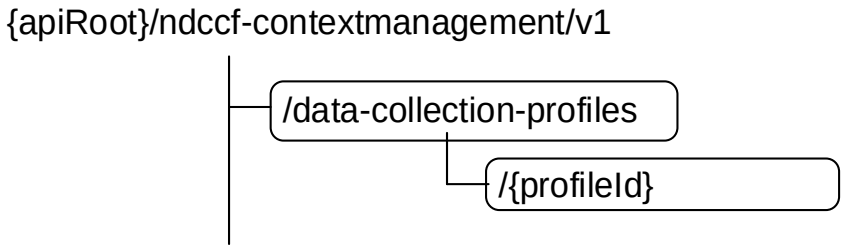

Figure 5.2.3.1-1: Resource URI structure of the Ndccf_ContextManagement API

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/v1/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 manadatory 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/v1/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/v1/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 manadatory 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 manadatory 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

5.2.4.1 Overview

This clause will specify custom operations without any associated resource (i.e. RPC) supported by this API.

Table 5.2.4.1-1: Custom operations without associated resources

Custom operation URI	Mapped HTTP method	Description
<custom operation URI>	e.g.POST	<Operation executed by Custom operation>

5.2.4.2 Operation: <operation 1>

Where <operation 1> is to be replaced by the name of the custom operation, e.g. Authentication_Information_Request.

It will describe, for each custom operation, the use and the URI of the operation, the HTTP method on which it is mapped, request and response data structures and response codes, and if applicable, HTTP headers specific to the operation.

5.2.4.2.1 Description

This sublause will describe the custom operation and what it is used for, and the custom operation's URI.

5.2.4.2.2 Operation Definition

This clause will specify the custom operation and the HTTP method on which it is mapped.

This operation shall support the response data structures and response codes specified in tables 5.2.4.2.2-1 and 5.2.4.2.2-2.

Table 5.2.4.2.2-1: Data structures supported by the <e.g. POST> Request Body on this resource

Data type	P	Cardinality	Description
"*<type>*" or "array(*<type>*)" or "map(*<type>*)"	"M", "C" or "O"	"0..1", "1", or "M..N", or <leave empty>	<only if applicable>

Table 5.2.4.2.2-2: Data structures supported by the <e.g. POST> Response Body on this resource

Data type	P	Cardinality	Response codes	Description
"*<type>*" or "array(*<type>*)" or "map(*<type>*)"	"M", "C" or "O"	"0..1", "1" or "M..N", or <leave empty>	<list applicable codes with name from the applicable RFCs>	<Meaning of the success case> or <Meaning of the error case with additional statement regarding error handling>
NOTE: The manadatory HTTP error status code for the <e.g. POST> method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply.				

5.2.4.3 Operation: < operation 2>

And so on if there are more than one custom operations supported by the service. Same structure as in clause 5.2.4.2.

5.2.5 Notifications

5.2.5.1 General

This clause will specify the use of notifications and corresponding protocol details if required for the specific service. When notifications are supported by the API, it will include a reference to the general description of notifications support over the 5G SBIs specified in TS 29.500 / TS 29.501.

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 5.2.5.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
<notification 1> e.g. Status Change Notification	< Callback URI > e.g. {StatusCallbackUri}	e.g POST	e.g. Notify Event

5.2.5.2 <notification 1>

5.2.5.2.1 Description

The Event Notification is used by the NF service producer to report one or several observed Events to a NF service consumer that has subscribed to such Notifications.

5.2.5.2.2 Target URI

The Callback URI **"{notifUri}"** shall be used with the callback URI variables defined in table 5.2.5.2.2-1.

Table 5.2.5.2.2-1: Callback URI variables

Name	Definition
notifUri	String formatted as URI with the Callback Uri

5.2.5.2.3 Standard Methods

5.2.5.2.3.1 POST

This method shall support the request data structures specified in table 5.2.5.2.3.1-1 and the response data structures and response codes specified in table 5.2.5.2.3.1-1.

Table 5.2.5.2.3.1-1: Data structures supported by the POST Request Body

Data type	P	Cardinality	Description
"<*type*>" or "array(<*type*>)" or "map(<*type*>)"	"M", "C" or "O"	"0..1", "1", or "M..N", or <leave empty>	<only if applicable>

Table 5.2.5.2.3.1-2: Data structures supported by the POST Response Body

Data type	P	Cardinality	Response codes	Description
"<*type*>" or "array(<*type*>)" or "map(<*type*>)"	"M", "C" or "O"	"0..1", "1" or "M..N", or <leave empty>	<list applicable codes with name from the applicable RFCs>	<Meaning of the success case> or <Meaning of the error case with additional statement regarding error handling>
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.				

5.2.5.3 <notification 2>

And so on if there are more than one notifications supported by the service. Same structure as in clause 5.2.5.2.

5.2.6 Data Model

5.2.6.1 General

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

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

Table 5.2.6.1-1: Ndccf_ContextManagement specific Data Types

Data type	Clause defined	Description	Applicability
NdccfDataCollectionProfile	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 Ndccf_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 Ndccf_ContextManagement service based interface.

Table 5.2.6.1-2: Ndccf_ContextManagement re-used Data Types

Data type	Reference	Comments	Applicability
AfEventExposureSubsc	3GPP TS 29.517 [21]	Represents an AF event subscription	
AmfEventSubscription	3GPP TS 29.518 [19]	Represents an AMF event subscription.	
EeSubscription	3GPP TS 29.503 [20]	Represents a UDM event subscription.	
NefEventExposureSubsc	3GPP TS 29.591 [22]	Represents an NEF event subscription.	
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 an NWDAF analytics subscription.	
NsmfEventExposure	3GPP TS 29.508 [18]	Represents an SMF event 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: NdccfDataCollectionProfile

Table 5.2.6.2.2-1: Definition of type NdccfDataCollectionProfile

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)	
amfDataSub	AmfEventSubscription	C	0..1	Representation of the AMF Events subscription that is used to collect data. (NOTE 1)	
smfDataSub	NsmfEventExposure	C	0..1	Representation of the SMF Events subscription that is used to collect data. (NOTE 1)	
udmDataSub	EeSubscription	C	0..1	Representation of the UDM Events subscription that is used to collect data. (NOTE 1)	
nefDataSub	NefEventExposureSubsc	C	0..1	Representation of the NEF Events subscription that is used to collect data. (NOTE 1)	
afDataSub	AfEventExposureSubsc	C	0..1	Representation of the AF Events 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.					

Editor's Note: It is FFS to check whether further types of data sources/subscriptions are applicable.

5.2.6.3 Simple data types and enumerations

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

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
	<one simple data type, i.e. boolean, integer, number, or string>		

5.2.6.3.3 Enumeration: <EnumType1>

The enumeration <EnumType1> represents <something>. It shall comply with the provisions defined in table 5.2.6.3.3-1.

Table 5.2.6.3.3-1: Enumeration < EnumType1>

Enumeration value	Description	Applicability

5.2.6.3.4 Enumeration: <EnumType2>

And so on if there are more enumerations to define.

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 Ndccf_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 Ndccf_ContextManagement API.

5.2.7.2 Protocol Errors

No specific procedures for the Ndccf_ContextManagement service are specified.

Or add specific information for the API if applicable.

5.2.7.3 Application Errors

The application errors defined for the Ndccf_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 Ndccf_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 Ndccf_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 Ndccf_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 Ndccf_ContextManagement service.

The Ndccf_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: 1.0.0-alpha.3
  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 V17.0.0; 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 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/v1/analytics-subscriptions/{subscriptionId}
              required: true
              schema:
```

```
            type: string
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/NdccfAnalyticsSubscription'
      '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/NdccfAnalyticsSubscriptionNotification'
            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'
  /analytics-subscriptions/{subscriptionId}:
    delete:
      summary: Delete an existing Individual DCCF Data Subscription
      operationId: DeleteDCCFAnalyticsSubscription
      tags:
        - Individual DCCF Analytics Subscription (Document)
      parameters:
        - name: subscriptionId
          in: path
          description: >
            String identifying a 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'
      '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'
  put:
    summary: Update an existing Individual DCCF Analytics Subscription
    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 a 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: Create 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/v1/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'
  /data-subscriptions/{subscriptionId}:
    delete:
      summary: Delete an existing Individual DCCF Data Subscription
      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'
        '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'
    put:
      summary: Update an existing Individual DCCF Data Subscription
      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'
#
    NdccfDataSubscription:
      description: Represents an Individual DCCF Data Subscription.
      type: object
      required:
        - dataNotifUri
        - dataNotifCorrId
      oneOf:
        - required: [amfDataSub]
        - required: [smfDataSub]
        - required: [udmDataSub]
        - required: [nefDataSub]
        - required: [afDataSub]
      properties:
        amfDataSub:
          $ref: 'TS29518_Namf_EventExposure.yaml#/components/schemas/AmfEventSubscription'
        smfDataSub:
          $ref: 'TS29508_Nsmf_EventExposure.yaml#/components/schemas/NsmfEventExposure'
        udmDataSub:
          $ref: 'TS29503_Nudm_EE.yaml#/components/schemas/EeSubscription'
        afDataSub:
          $ref: 'TS29517_Naf_EventExposure.yaml#/components/schemas/AfEventExposureSubsc'
        nefDataSub:
          $ref: 'TS29591_Nnef_EventExposure.yaml#/components/schemas/NefEventExposureSubsc'
        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'
#
    NdccfAnalyticsSubscriptionNotification:
      description: Represents a notification for a DCCF analytics subscription.
      type: object
      required:
        - anaNotifCorrId
      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: '#/components/schemas/FetchInstruction'
#
    NdccfDataSubscriptionNotification:
      description: Represents a notification for a DCCF data subscription.
      type: object
      required:
        - dataNotifCorrId
      oneOf:
        - required: [amfEventNotifs]
        - required: [smfEventNotifs]
        - required: [udmEventNotifs]
        - required: [nefEventNotifs]
        - required: [afEventNotifs]
        - required: [dataReports]
        - required: [fetchInstruct]
      properties:
        dataNotifCorrId:
          type: string
          description: Notification correlation identifier.
        amfEventNotifs:
          type: array
          items:
            $ref: 'TS29518_Namf_EventExposure.yaml#/components/schemas/AmfEventNotification'
          minItems: 1
          description: List of notifications on AMF events.
        smfEventNotifs:
          type: array
          items:
            $ref:
'TS29508_Nsmf_EventExposure.yaml#/components/schemas/NsmfEventExposureNotification'
          minItems: 1
          description: List of notifications on SMF events.
        udmEventNotifs:
          type: array
          items:
            $ref: 'TS29503_Nudm_EE.yaml#/components/schemas/MonitoringReport'
          minItems: 1
          description: List of notifications on UDM events.
        nefEventNotifs:
          type: array
          items:
            $ref: 'TS29591_Nnef_EventExposure.yaml#/components/schemas/NefEventExposureNotif'
          minItems: 1
          description: List of notifications on NEF events.
        afEventNotifs:
          type: array
          items:
            $ref: 'TS29517_Naf_EventExposure.yaml#/components/schemas/AfEventExposureNotif'
          minItems: 1
          description: List of notifications on AF events.
        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: '#/components/schemas/FetchInstruction'
#
    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.
#
    ProcessingInstruction:
      description: Contains instructions related to the processing of notifications.
      type: object
      required:
       - eventId
       - procInterval
      properties:
        eventId:
          type: string
          description: >
            Identifies the (event exposure or analytics) event that the processing instructions
shall
            apply to.
        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.
#
    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.
#
    NotifSummaryReport:
      description: Represents summarized notifications based on processing instructions.
      type: object
      required:
       - eventId
       - procInterval
       - eventReports
      properties:
        eventId:
```

```
          type: string
          description: >
            Identifies the (event exposure or analytics) event that this report applies to.
        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:
            type: string
          minItems: 1
          description: The list of values of the reported parameter.
        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'
        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.
#
    FetchInstruction:
      description: Contains instructions for fetching notifications.
      type: object
      required:
        - fetchAddress
      properties:
        fetchAddress:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
          description: Address from which the data can be fetched.
#
    SummarizationAttribute:
      anyOf:
      - type: string
        enum:
          - SPACING
          - DURATION
          - OCCURRENCES
          - AVG_VAR
          - MIN_MAX
      - type: string
      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.
        - MIN_MAX: Maximum and minimum parameter values.
#
```

A.3 Ndccf_ContextManagement API

```
openapi: 3.0.0
info:
```

```
  version: 1.0.0-alpha.3
  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 V17.0.0; 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 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: Create a new Individual DCCF Data Collection Profile resource.
          headers:
            Location:
              description: >
                Contains the URI of the newly created resource, according to the structure
                {apiRoot}/ndccf-contextmanagement/v1/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: Delete an existing Individual DCCF Data Subscription
      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'
      '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'
  put:
    summary: Update an existing Individual DCCF Data Collection Profile
    operationId: UpdateDCCFDataCollectionProfile
    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: [amfDataSub]
          - required: [smfDataSub]
          - required: [udmDataSub]
          - required: [nefDataSub]
          - required: [afDataSub]
        - oneOf:
          - required: [nwdafId]
          - required: [adrfId]
          - required: [nwdafSetId]
          - required: [adrfSetId]
      properties:
        anaSub:
          $ref:
'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/NnwdafEventsSubscription'
        amfDataSub:
          $ref: 'TS29518_Namf_EventExposure.yaml#/components/schemas/AmfEventSubscription'
        smfDataSub:
          $ref: 'TS29508_Nsmf_EventExposure.yaml#/components/schemas/NsmfEventExposure'
        udmDataSub:
          $ref: 'TS29503_Nudm_EE.yaml#/components/schemas/EeSubscription'
        afDataSub:
          $ref: 'TS29517_Naf_EventExposure.yaml#/components/schemas/AfEventExposureSubsc'
        nefDataSub:
          $ref: 'TS29591_Nnef_EventExposure.yaml#/components/schemas/NefEventExposureSubsc'
        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

History

Document history		
V17.0.0	May 2022	Publication