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Contents

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

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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

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may indicates permission to do something

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

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

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

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

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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

1 Scope

The present document specifies the stage 3 protocol and data model for the MFAF Service Based Interface. It provides stage 3 protocol definitions and message flows, and specifies the API for each service offered by the MFAF.

The 5G System stage 2 architecture and procedures are specified in 3GPP TS 23.501 [2] and 3GPP TS 23.502 [3]. The stage 2 definition and procedures of Messaging Framework Adaptation are contained in 3GPP TS 23.288 [14] and 3GPP TS 23.502 [3].

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 3.0.0 Specification", https://github.com/OAI/OpenAPI-Specification/blob/master/versions/3.0.0.md.

[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 9113: "HTTP/2".

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

[13] IETF RFC 9457: "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 29.574: "5G System; Data Collection Coordination Services; Stage 3".

[16] Void.

[17] Void.

[18] Void.

[19] Void.

[20] 3GPP TS 29.520: "5G System; Network Data Analytics Services; Stage 3".

[21] Void.

[22] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces; Stage 3".

[23] 3GPP TS 29.575: "5G System; 5G System; Analytics Data Repository Services; Stage 3".

3 Definitions, symbols and abbreviations

3.1 Definitions

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

3.2 Symbols

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

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
LMF	Location Management Function
MFAF	Messaging Framework Adaptor Function
NEF	Network Exposure Function
NF	Network Function
NRF	Network Repository Function
NSSF	Network Slice Selection Function
NWDAF	Network Data Analytics Function
PCF	Policy Control Function
SCP	Service Communication Proxy
SMF	Session Management Function
UDM	Unified Data Management

4 Services offered by the MFAF

4.1 Introduction

The Messaging Framework Adaptor Services are used for the Messaging Framework Adaptor Function (MFAF) to enable the 5GS to interact with the messaging framework using Nmfaf services. The MFAF offers other NFs the following services:

- Nmfaf_3daDataManagement;
- Nmfaf_3caDataManagement; and

- Nmfaf_ContextManagement.

Table 4.1-1: Service provided by MFAF

Service Name	Description	Service Operations	Operation Semantics	Example Consumer(s)
Nmfaf_3daDataManagement	The 3GPP DCCF Adaptor (3DA) Data Management Service enables the NF service consumer to convey to the messaging framework information related to the data or analytics that the messaging framework will receive and deliver.	Configure	Request / Response	DCCF, NWDAF
		Deconfigure	Request / Response	DCCF, NWDAF
Nmfaf_3caDataManagement	The 3GPP Consumer Adaptor (3CA) Data Management Service is used to deliver data or analytics.	Notify	Subscribe / Notify	NWDAF, PCF, NSSF, AMF, SMF, NEF, AF, ADRF, LMF, SCP, NRF, UDM
		Fetch	Request / Response	NWDAF, PCF, NSSF, AMF, SMF, NEF, AF, ADRF, LMF, SCP, NRF, UDM
Nmfaf_ContextManagement	The MFAF Context Management service enables the transfer of configurations between MFAFs.	Transfer	Request / Response	MFAF

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
Nmfaf_3daDataManagement	5.1	API for Nmfaf_3daDataManagement	TS29576_Nmfaf_3daDataManagement.yaml	nmfaf-3dadatamanagement	A.2
Nmfaf_3caDataManagement	5.2	API for Nmfaf_3caDataManagement	TS29576_Nmfaf_3caDataManagement.yaml	nmfaf-3cadatamanagement	A.3
Nmfaf_ContextManagement	5.3	API for Nmfaf_ContextManagement	TS29576_Nmfaf_ContextManagement.yaml	nmfaf-contextmanagement	A.4

4.2 Nmfaf_3daDataManagement Service

4.2.1 Service Description

4.2.1.1 Overview

The Nmfaf_3daDataManagement service as defined in 3GPP TS 23.288 [14], is provided by the Messaging Framework Adaptor Function (MFAF).

This service:

- allows NF consumers to configure or reconfigure the MFAF; and

- allows NF consumers to remove configurations from the MFAF.

4.2.1.2 Service Architecture

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

The Nmfaf_3daDataManagement service is part of the Nmfaf service-based interface exhibited by the Messaging Framework Adaptor Function (MFAF).

Known consumer of the Nmfaf_3daDataManagement service is:

- Data Collection Coordination Function (DCCF)

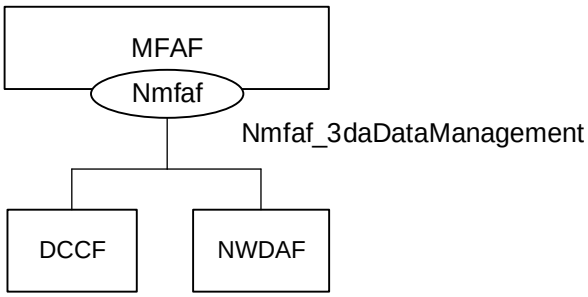

Figure 4.2.1.2-1: Reference Architecture for the Nmfaf_3daDataManagement Service; SBI representation

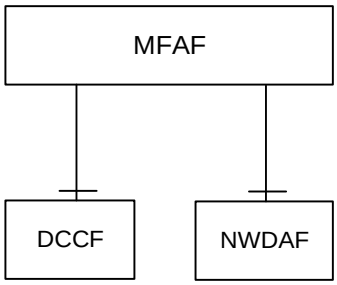

Figure 4.2.1.2-2: Reference Architecture for the Nmfaf_3daDataManagement Service; reference point representation

4.2.1.3 Network Functions

4.2.1.3.1 Messaging Framework Adaptor Function (MFAF)

The Messaging Framework Adaptor Function (MFAF) provides the functionality to allow NF consumers to configure the behaviour of the MFAF.

4.2.1.3.2 NF Service Consumers

The Data Collection Coordination Function (DCCF) and the NWDAF support:

- configuring the MFAF; and
- deconfiguring the MFAF.

4.2.2 Service Operations

4.2.2.1 Introduction

Table 4.2.2.1-1: Operations of the Nmfaf_3daDataManagement Service

Service operation name	Description	Initiated by
Nmfaf_3daDataManagement_Configure	This service operation is used by an NF to configure or reconfigure the MFAF.	NF service consumer (DCCF, NWDAF)
Nmfaf_3daDataManagement_Deconfigure	This service operation is used by an NF to remove configuration(s) from the MFAF.	NF service consumer (DCCF, NWDAF)

4.2.2.2 Nmfaf_3daDataManagement_Configure service operation

4.2.2.2.1 General

The Nmfaf_3daDataManagement_Configure service operation is used by an NF service consumer to configure or update the configuration of the MFAF.

4.2.2.2.2 Initial configuration of the MFAF

Figure 4.2.2.2.2-1 shows a scenario where the NF service consumer (e.g. DCCF) sends a request to the MFAF to request an MFAF configuration.

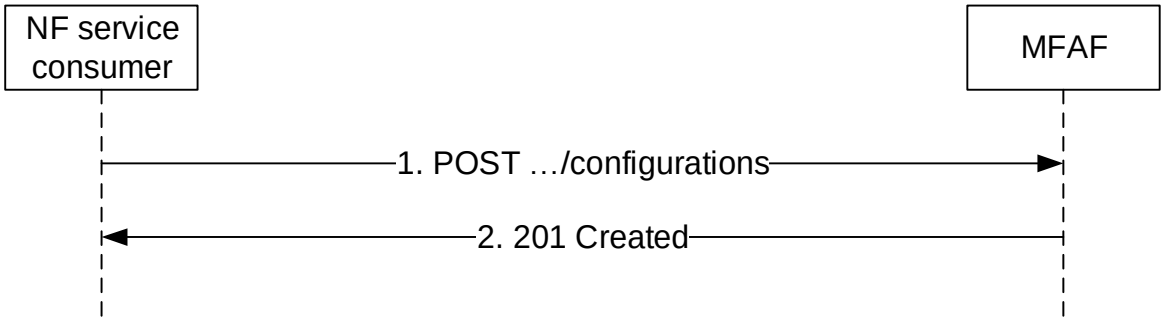

Figure 4.2.2.2.2-1: NF service consumer create the configuration

The NF service consumer shall invoke the Nmfaf_3daDataManagement_Configure service operation to create the configuration(s). The NF service consumer shall send an HTTP POST request with "{apiRoot}/nmfaf-3dadatamanagement/<apiVersion>/configurations" as Resource URI representing the "MFAF Configurations", as shown in figure 4.2.2.2.2-1, step 1, to create a configuration for an "Individual MFAF Configuration" according to the information in message body. The MfafConfiguration data structure provided in the request body

shall include one of the following:

- MFAF transfer information within the "mfafTransferInfo" attribute, if the MfafTransfer feature is supported.
- a description of the configurations as "messageConfigurations" attribute that, for each configuration, the MessageConfiguration data type shall include

  1) a notification URI of Data Consumer or Analytics Consumer or other endpoint where to receive the requested mapping data or analytics as "notificationURI" attribute; and

  2)- if the configuration is used for mapping analytics or data collection, a Notification Correlation ID for the Data or Analytics Consumer (or other endpoint) as "correId" attribute;

  and may include:

  1) the formatting instructions as "formatInstruct" attribute;

2) the processing instructions as "procInstruct" attribute or "multiProcInstructs" attribute if the "MultiProcessingInstruction" feature is supported;

3) the MFAF notification information to identify the Event Notifications received from the NWDAF or Data Source NF (e.g. AMF, SMF), which can be sent to the consumer or other notification endpoints, as "mfafNotiInfo" attribute;

4) NF instance identifier of the ADRF as "adrfId" attribute; and

5) the notification endpoints within the "notifEndpoints" attribute, if the "DataAnaCollect" feature is supported.

Upon the reception of an HTTP POST request with: "{apiRoot}/nmfaf-3dadatamanagement/<apiVersion>/configurations" as Resource URI and MfafConfiguration data structure as request body, the MFAF shall:

- create a new configuration;
- assign a transaction reference id;
- if the request was for providing message configurations and no MFAF notification information has been provided in the request, determine the MFAF notification information and add it to the configuration that is created and will be returned to the NF service consumer;
- if the request was for triggering MFAF configuration transfer, the MFAF shall execute the transfer invoking the Nmfaf_ContextManagement_Transfer service operation as defined in clause 4.4.2.2;
- store the configuration.

If the MFAF created an "Individual MFAF Configuration" resource, the MFAF shall respond with "201 Created" with the message body containing a representation of the created configuration, as shown in figure 4.2.2.2.2-1, step 2.

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

4.2.2.2.3 Update the configuration of the MFAF

Figure 4.2.2.2.3-1 shows a scenario where the NF service consumer sends a request to the MFAF to update a configuration (as shown in 3GPP TS 23.288 [14])

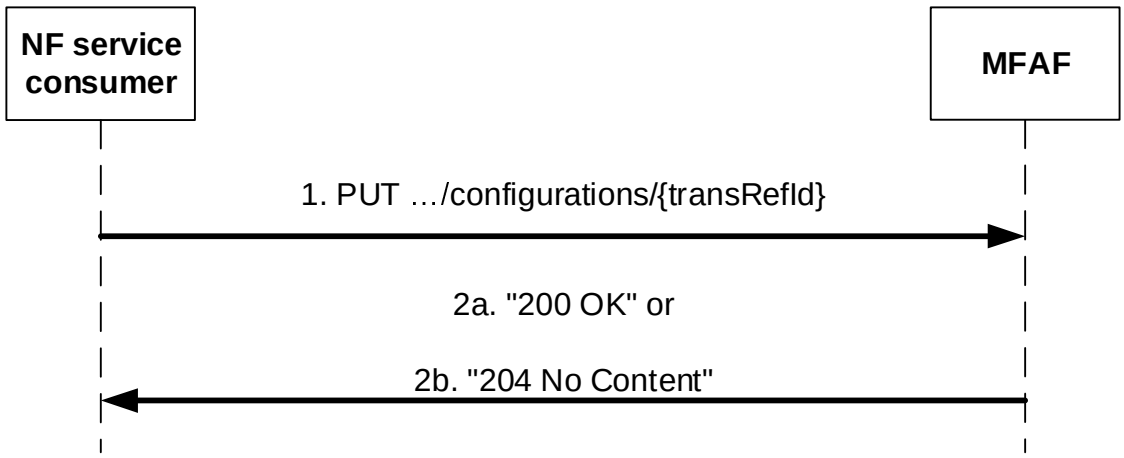

Figure 4.2.2.2.3-1: NF service consumer updates configuration

The NF service consumer shall invoke the Nmfaf_3daDataManagement_Configure service operation to update the configuration(s). The NF service consumer shall send an HTTP PUT request with "{apiRoot}/nmfaf-3dadatamanagement/<apiVersion>/configurations/{transRefId}" as Resource URI representing the "Individual MFAF Configuration", as shown in figure 4.2.2.2.3-1, step 1, to update an "Individual MFAF Configuration" resource identified by the {transRefId}. This service operation shall not be performed on an "Individual MFAF Configuration" that contains the "mfafTransferInfo" attribute. The MfafConfiguration data structure provided in the request body shall

include the same contents as described in 4.2.2.2.2 with the restrictionthat the "mfafTransferInfo" attribute is not applicable here.

Upon the reception of an HTTP PUT request with: "{apiRoot}/nmfaf-3dadatamanagement/<apiVersion>/configurations/{transRefId}" as Resource URI and MfafConfiguration data structure as request body, the MFAF shall:

- update the configuration of corresponding transaction reference Id; and
- store the configuration.

If the MFAF successfully processed and accepted the received HTTP PUT request, the MFAF shall update an "Individual MFAF Configuration" resource, and shall respond with:

a) HTTP "200 OK" status code with the message body containing a representation of the updated configuration, as shown in figure 4.2.2.2.3-1, step 2a. 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 MFAF shall send an HTTP error response as specified in clause 5.1.7.

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

4.2.2.3 Nmfaf_3daDataManagement_Deconfigure service operation

4.2.2.3.1 General

The Nmfaf_3daDataManagement_Deconfigure service operation is used by an NF service consumer to remove an MFAF configuration.

4.2.2.3.2 Remove MFAF configuration

Figure 4.2.2.3.2-1 shows a scenario where the NF service consumer sends a request to the MFAF to remove an MFAF configuration.

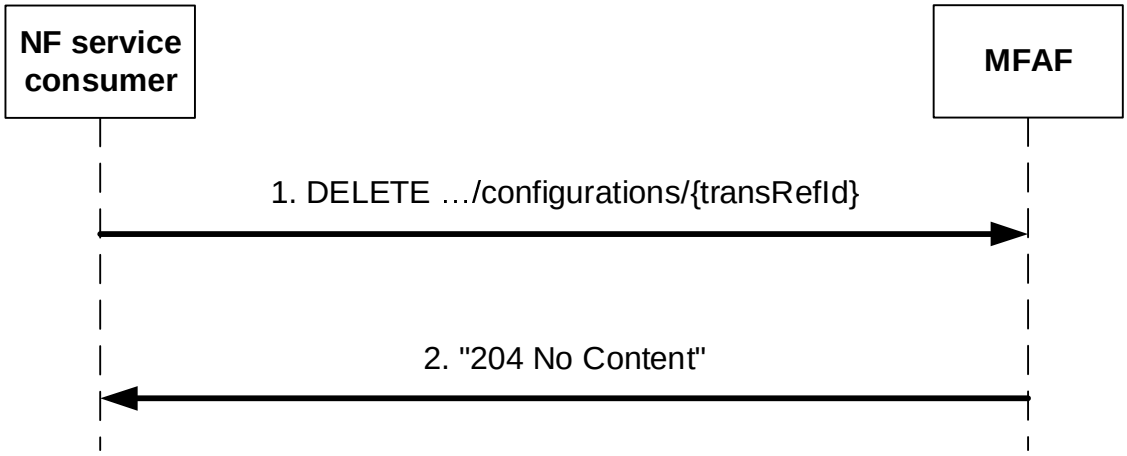

Figure 4.2.2.3.2-1: NF service consumer stops mapping data or analytics

The NF service consumer shall invoke the Nmfaf_3daDataManagement_Deconfigure service operation to remove an MFAF configuration. The NF service consumer shall send an HTTP DELETE request with "{apiRoot}/nmfaf-3dadatamanagement/<apiVersion>/configurations/{transRefId}" as Resource URI, where {transRefId} represents the "Individual MFAF Configuration" to be deleted, as shown in figure 4.2.2.3.2-1, step 1.

Upon the reception of an HTTP DELETE request and if the MFAF successfully processed and accepted the received HTTP DELETE request from the NF service consumer, the MFAF shall acknowledge the request by sending a "204 No

Content" response to the NF service consumer, as shown in figure 4.2.2.3.2-1, step 2. Further, the MFAF shall remove the individual resource linked to the delete request.

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

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

4.3 Nmfaf_3caDataManagement Service

4.3.1 Service Description

4.3.1.1 Overview

The Nmfaf_3caDataManagement service as defined in 3GPP TS 23.288 [14], is provided by the Messaging Framework Adaptor Function (MFAF).

This service:

- allows NF consumers to collect the data or analytics from the MFAF.

4.3.1.2 Service Architecture

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

The Nmfaf_3caDataManagement service is part of the Nmfaf service-based interface exhibited by the Messaging Framework Adaptor Function (MFAF).

Known consumers of the Nmfaf_3caDataManagement service are:

- Network Data Analytics Function (NWDAF)
- Policy Control Function (PCF)
- Network Slice Selection Function (NSSF)
- Access and Mobility Management Function (AMF)
- Session Management Function (SMF)
- Network Exposure Function (NEF)
- Application Function (AF)
- Analytics Data Repository Function (ADRF)
- Location Management Function (LMF)
- Service Communication Proxy (SCP)
- Unified Data Management (UDM)
- Network Repository Function (NRF)

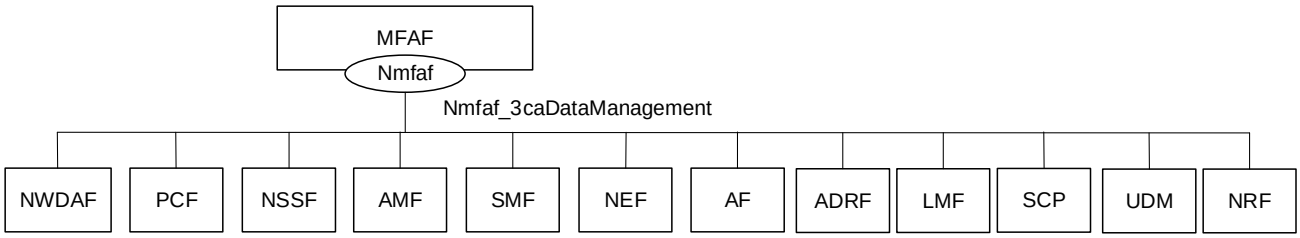

Figure 4.3.1.2-1: Reference Architecture for the Nmfaf_3caDataManagement Service; SBI representation

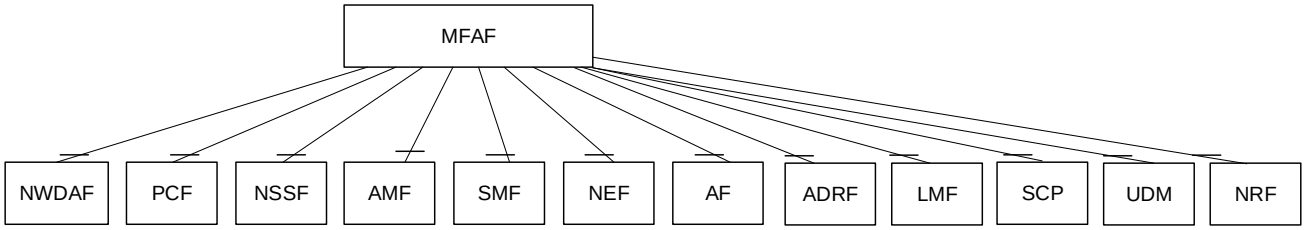

Figure 4.3.1.2-2: Reference Architecture for the Nmfaf_3caDataManagement Service; reference point

4.3.1.3 Network Functions

4.3.1.3.1 Messaging Framework Adaptor Function (MFAF)

The Messaging Framework Adaptor Function (MFAF) provides the functionality to supply data or analytics, or an indication of availability of data or analytics to notification endpoints configured in Nmfaf_3caDataManagement service as described in clause 4.2.1.

4.3.1.3.2 NF Service Consumers

The NWDAF, PCF, NSSF, AMF, SMF, LMF, NEF, ADRF, SCP, NRF, UDM, and AF:

- supports retrieving data or analytics from the MFAF.

4.3.2 Service Operations

4.3.2.1 Introduction

Table 4.3.2.1-1: Operations of the Nmfaf_3caDataManagement Service

Service operation name	Description	Initiated by
Nmfaf_3caDataManagement_Fetch	This service operation is used by an NF to retrieve stored data or analytics from the MFAF.	NF service consumer (NWDAF, PCF, NSSF, AMF, SMF, LMF, ADRF, NEF, AF, SCP, NRF, UDM)
Nmfaf_3caDataManagement_Subscribe	This is a pseudo operation, the actual subscription is created via Nmfaf_3daDataManagement Service. (NOTE)	
Nmfaf_3caDataManagement_Notify	This service operation is used by an NF with either data or analytics to provide data or analytics or notification of availability of data or analytics to notification endpoints.	MFAF
NOTE: In the current release OpenAPI 3.0.0 is adopted, with OpenAPI 3.0.0 it is not possible to document a stand-alone callback operation, thus the Notify operation has to be defined in combination with a Subscribe operation.		

NOTE: Nmfaf_3caDataManagement_Subscribe service operation is not used by any NF service consumers in this release.

4.3.2.2 Nmfaf_3caDataManagement_Fetch service operation

4.3.2.2.1 General

The Nmfaf_3caDataManagement_Fetch service operation allows consumer to retrieves data or analytics from the MFAF as indicated by Nmfaf_3caDataManagement_Notify Fetch Instruction.

4.3.2.2.2 Retrieve data or analytics from the MFAF

Figure 4.3.2.2.2-1 shows a scenario where the NF service consumer (e.g. NWDAF) sends a request to the MFAF to retrieve the data or analytics as indicated by Nmfaf_3caDataManagement_Notify Fetch Instruction.

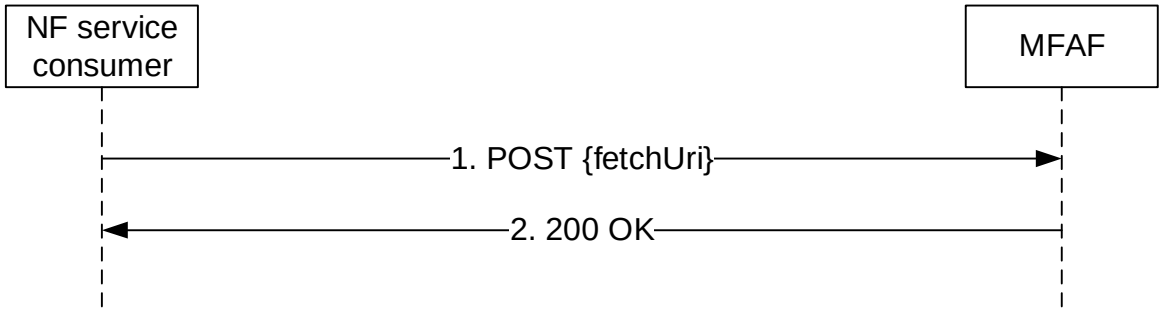

Figure 4.3.2.2.2-1: NF service consumer retrieve data or analytics from the MFAF

The NF service consumer shall invoke the Nmfaf_3caDataManagement_Fetch service operation to retrieve stored data or analytics. The NF service consumer shall send an HTTP POST request to the URI "{fetchUri}" which was previously provided by the MFAF within a FetchInstruction data structure in an MFAF notification, as shown in figure 4.3.2.2.2-1, step 1, to fetch data or analytics from the MFAF.

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

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

- find the data or analytics according to the requested parameters.

If the requested data is found, the MFAF shall respond with "200 OK" status code with the message body containing the NmfafDataAnaNotification data structure. The NmfafDataAnaNotification data structure in the response body shall include one of the following:

- information about network data analytics function events that occurred in the "anaNotifications" attribute;
- data collected from data sources (e.g. SMF, NEF) in the "dataNotif" attribute;
- if the "DataProcess" feature is supported, the summarized data or analytics derived from events notifications which received from the data producer or NWDAF based on the processing and formatting instructions in the "dataReports" attribute.

If errors occur when processing the HTTP POST request, the NF service consumer shall send an HTTP error response as specified in clause 5.2.7.

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

4.3.2.2A Nmfaf_3caDataManagement_Subscribe service operation

This is a pseudo operation, the MFAF does not actually provide Subscribe service operation through Nmfaf_3caDataManagement service. The actual subscription is created via Nmfaf_3daDataManagement Service.

4.3.2.3 Nmfaf_3caDataManagement_Notify service operation

4.3.2.3.1 General

The Nmfaf_3caDataManagement_Notify service operation provides data or analytics or notification of availability of data or analytics to notification endpoints.

4.3.2.3.2 Notification about the subscribed data or analytics

Figure 4.3.2.3.2-1 shows a scenario where the MFAF sends a request to the NF service consumer to notify it about data or analytics or fetch instructions.

The subscription corresponding to the notification is created by the service consumer via Nmfaf_3daDataManagement Service Operation.

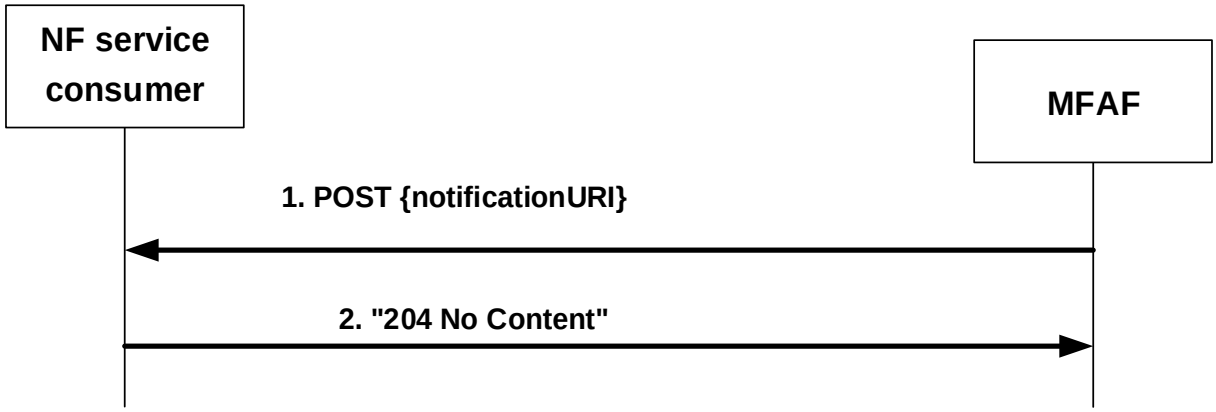

Figure 4.3.2.3.2-1: MFAF notifies the NF service consumer about subscribed data or analytics or fetch instructions

The MFAF shall invoke the Nmfaf_3caDataManagement_Notify service operation to notify about subscribed data or analytics, or notification about the availability of data or analytics. The MFAF shall send an HTTP POST request to the "{notificationURI}" received in the subscription (see clause 5.2.5 for the definition of this notificationURI), as shown in figure 4.3.2.3.2-1, step 1. The NmfafDataRetrievalNotification data structure provided in the request body shall include:

- notification correlation Id within the "correId" attribute;

and shall include one of the following:

- fetch instructions indicate whether the data or analytics are to be fetched by the Consumer in the "fetchInstruction" attribute;
- information about the MFAF data or analytics in the "dataAnaNotif" attribute, which contains one of the following:
  - information about network data analytics function events that occurred in the "anaNotifications" attribute;
  - data collected from data sources (e.g. SMF, NEF) in the "dataNotif" attribute;
  - if the "DataProcess" feature is supported, the summarized data or analytics derived from events notifications which received from the data producer or NWDAF based on the processing and formatting instructions in the "dataReports" attribute.

Upon the reception of an HTTP POST request with "{notificationURI}" as Resource URI and NmfafDataRetrievalNotification 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 clause 5.2.7.

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

After the successful processing of the HTTP POST request, if the MFAF requests the NF service consumer to retrieve the data or analytics with the "fetchInstruct" attribute, the NF service consumer may invoke the Nmfaf_3caDataManagement_Fetch service operation to retrieve the notified data or analytics as defined in clause 4.3.2.2.

4.4 Nmfaf_ContextManagement Service

4.4.1 Service Description

4.4.1.1 Overview

The Nmfaf_ContextManagement service is provided by the Messaging Framework Adaptor Function (MFAF).

This service allows NF consumers to transfer configurations between MFAFs.

4.4.1.2 Service Architecture

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

The Nmfaf_ContextManagement service is part of the Nmfaf service-based interface exhibited by the Messaging Framework Adaptor Function (MFAF).

Known consumer of the Nmfaf_ContextManagement service is:

- Messaging Framework Adaptor Function (MFAF)

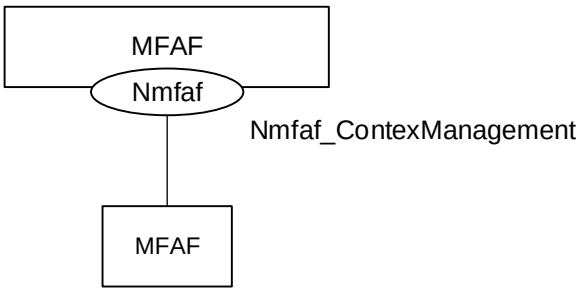

Figure 4.4.1.2-1: Reference Architecture for the Nmfaf_ContextManagement Service; SBI representation

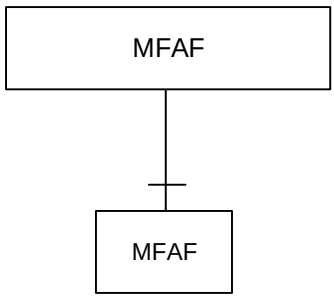

Figure 4.4.1.2-2: Reference Architecture for the Nmfaf_ContextManagement Service; reference point representation

4.4.1.3 Network Functions

4.4.1.3.1 Messaging Framework Adaptor Function (MFAF)

The Messaging Framework Adaptor Function (MFAF) provides the functionality to allow NF service consumers to transfer configurations between MFAFs.

4.4.1.3.2 NF Service Consumers

The Messaging Framework Adaptor Function (MFAF) supports transferring configurations from the NF service producer to the NF service consumer.

4.4.2 Service Operations

4.4.2.1 Introduction

Table 4.4.2.1-1: Operations of the Nmfaf_ContextManagement Service

Service operation name	Description	Initiated by
Nmfaf_ContextManagement_Transfer	This service operation is used by an NF service consumer to transfer configurations from the NF service producer to the NF service consumer.	NF service consumer (MFAF)

4.4.2.2 Nmfaf_ContextManagement_Transfer service operation

4.4.2.2.1 General

The Nmfaf_ContextManagement_Transfer service operation is used by an NF service consumer to transfer configurations from the NF service producer to the NF service consumer.

NOTE: When the UE data or analytics is being collected via the MFAF, the DCCF can independently configure the MFAF for each UE to enable the relocation of this UE's MFAF context to a new MFAF if the UE moves outside of the serving area of the current MFAF.

4.4.2.2.2 Transferring MFAF configurations

Figure 4.4.2.2.2-1 shows a scenario where the NF service consumer (e.g. MFAF) sends a request to the MFAF to transfer configuration(s) of mapping data or analytics.

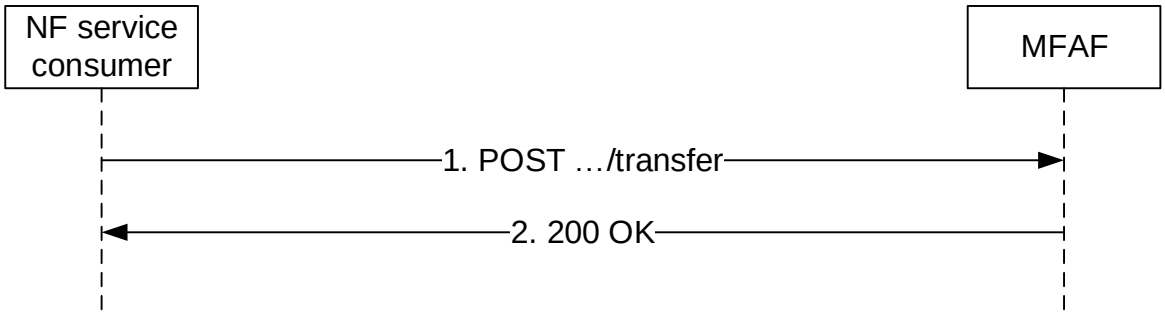

Figure 4.4.2.2.2-1: NF service consumer performing MFAF configuration transfer

The NF service consumer shall invoke the Nmfaf_ContexManagement_Transfer service operation to transfer configuration(s) by sending an HTTP POST request with "{apiRoot}/nmfaf-contextmanagement/<apiVersion>/transfer" as URI, as shown in figure 4.4.2.2.2-1, step 1. The ContextTransferReq data structure provided in the request body shall include:

- the resource URI(s) of the configuration(s) that are requested to be transferred within the "refIds" attribute.

Upon the reception of an HTTP POST request with: "{apiRoot}/nmfaf-contextmanagement/<apiVersion>/transfer" as URI and ContextTransferReq data structure as request body, the MFAF shall perform the transfer of the indicated configurations, i.e. respond with "200 OK" with the message body containing the ContextTransferResp data structure (see clause 5.3.6.2.3), as shown in figure 4.4.2.2.2-1, step 2, and locally remove the respective Individual MFAF Configuration resources. Upon receiving the response, the NF service consumer shall create an Individual MFAF Configuration resource for each successfully transferred configuration and assign a new transaction reference id (i.e. also a new resource URI) to it.

If an error occurs when processing the HTTP POST request, the MFAF shall send an HTTP error response as specified in clause 5.3.7.

5 API Definitions

5.1 Nmfaf_3daDataManagement Service API

5.1.1 Introduction

The Nmfaf_3daDataManagement Service shall use the Nmfaf_3daDataManagement API.

The API URI of the Nmfaf_3daDataManagement 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 "nmfaf-3dadatamanagement".
- 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 9113 [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 Nmfaf_3daDataManagement API is contained in Annex A.

5.1.2.2 HTTP standard headers

5.1.2.2.1 General

See clause 5.1.2 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 9457 [13].

5.1.2.3 HTTP custom headers

The mandatory HTTP custom header fields specified in clause 5.1.3.2 of 3GPP TS 29.500 [4] shall be applicable.

5.1.3 Resources

5.1.3.1 Overview

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

Figure 5.1.3.1-1 depicts the resource URIs structure for the Nmfaf_3daDataManagement API.

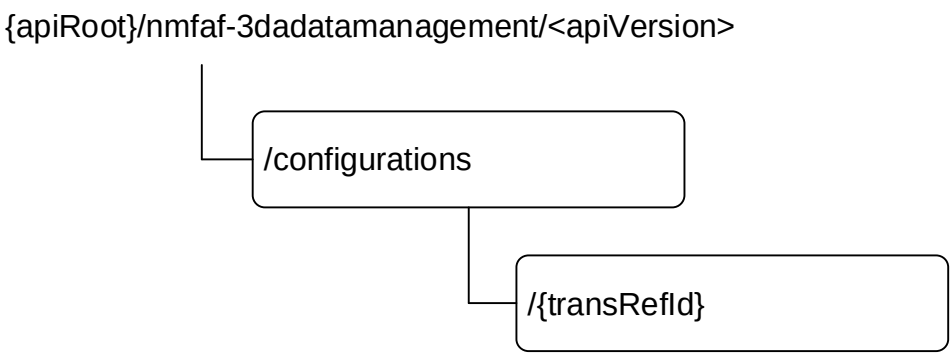

Figure 5.1.3.1-1: Resource URI structure of the Nmfaf_3daDataManagement API

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
MFAF Configurations	/configurations	POST	Creates a new individual MFAF Configuration resource.
Individual MFAF Configuration	/configurations/{transRefId}	PUT	Modifies an existing Individual MFAF Configuration subresource.
		DELETE	Deletes an Individual MFAF Configuration identified by subresource {transRefId}.

5.1.3.2 Resource: MFAF Configurations

5.1.3.2.1 Description

The MFAF Configurations resource represents all configuration to the Nmfaf_3daDataManagement Service at a given MFAF. The resource allows an NF service consumer to create a new Individual MFAF Configuration resource.

5.1.3.2.2 Resource Definition

Resource URI: **{apiRoot}/nmfaf-3dadatamanagement/<apiVersion>/configurations**

The <apiVersion> shall be set as described in clause 5.1.1.

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
MfafConfiguration	M	1	Create a new Individual MFAF Configuration resource.

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
MfafConfiguration	M	1	201 Created	The creation of an Individual MFAF Configuration 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 5.1.3.2.3.1-4: 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}/nmfaf-3dadatamanagement/<apiVersion>/configurations/{transRefId}

5.1.3.2.4 Resource Custom Operations

None in this release of the specification.

5.1.3.3 Resource: Individual MFAF Configuration

5.1.3.3.1 Description

The Individual MFAF Configuration resource represents an individual configuration created in the MFAF and associated with transaction reference Id.

5.1.3.3.2 Resource Definition

Resource URI: **{apiRoot}/nmfaf-3dadatamanagement/<apiVersion>/configurations/{transRefId}**

The <apiVersion> shall be set as described in clause 5.1.1.

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
transRefId	string	Unique identifier of the Individual MFAF Configuration resource.

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
MfafConfiguration	M	1	The updated MFAF Configuration.

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
MfafConfiguration	M	1	200 OK	The update of an Individual MFAF Configuration resource is confirmed and a representation of that resource is returned.
n/a			204 No Content	Successful case: The Individual MFAF Configuration resource was modified.
RedirectResponse	O	0..1	307 Temporary Redirect	Temporary redirection, during resource modification. (NOTE 2)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection, during resource modification. (NOTE 2)
NOTE 1: 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. NOTE 2: The RedirectResponse data structure may be provided by an SCP (cf. clause 6.10.9.1 of 3GPP TS 29.500 [4]).				

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	Contains an alternative URI of the resource located in an alternative NF (service) instance towards which the request is redirected. For the case where the request is redirected to the same target via a different SCP, refer to clause 6.10.9.1 of 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target MFAF (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	Contains an alternative URI of the resource located in an alternative NF (service) instance towards which the request is redirected. For the case where the request is redirected to the same target via a different SCP, refer to clause 6.10.9.1 of 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target MFAF (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	Successful case: The Individual MFAF Configuration resource matching the transRefId was deleted.
RedirectResponse	O	0..1	307 Temporary Redirect	Temporary redirection, during resource deletion (NOTE 2)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection, during resource deletion (NOTE 2)
NOTE 1: 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. NOTE 2: The RedirectResponse data structure may be provided by an SCP (cf. clause 6.10.9.1 of 3GPP TS 29.500 [4]).				

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	Contains an alternative URI of the resource located in an alternative NF (service) instance towards which the request is redirected. For the case where the request is redirected to the same target via a different SCP, refer to clause 6.10.9.1 of 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target MFAF (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	Contains an alternative URI of the resource located in an alternative NF (service) instance towards which the request is redirected. For the case where the request is redirected to the same target via a different SCP, refer to clause 6.10.9.1 of 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target MFAF (service) instance towards which the request is redirected.

5.1.4 Custom Operations without associated resources

None in this release of the specification.

5.1.5 Notifications

None in this release of the specification.

5.1.6 Data Model

5.1.6.1 General

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

Table 5.1.6.1-1 specifies the data types defined for the Nmfaf_3daDataManagement service based interface protocol.

Table 5.1.6.1-1: Nmfaf_3daDataManagement specific Data Types

Data type	Clause defined	Description	Applicability
TargetMfafNotiInfo	5.1.6.2.6	The target MFAF notification information.	MfafTransfer
MfafConfiguration	5.1.6.2.2	The description of MFAF configuration	
MessageConfiguration	5.1.6.2.3	The description of the configurations.	
MfafNotiInfo	5.1.6.2.4	The MFAF notification information.	
MfafTransferInfo	5.1.6.2.5	The MFAF transfer information.	MfafTransfer

Table 5.1.6.1-2 specifies data types re-used by the Nmfaf_3daDataManagement 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 Nmfaf_3daDataManagement service based interface.

Table 5.1.6.1-2: Nmfaf_3daDataManagement re-used Data Types

Data type	Reference	Comments	Applicability
FormattingInstruction	3GPP TS 29.574 [15]	Contains data or analytics formatting Instructions.	
NfInstanceId	3GPP TS 29.571 [22]	Contains an NF instance identifier.	MfafTransfer
NfSetId	3GPP TS 29.571 [22]	Contains an NF set identifier.	MfafTransfer
NotifyEndpoint	3GPP TS 29.574 [15]	The information of notification endpoint.	DataAnaCollect
ProcessingInstruction	3GPP TS 29.574 [15]	Contains instructions related to the processing	
SupportedFeatures	3GPP TS 29.571 [22]	Used to negotiate the applicability of the optional features defined in table 5.1.8-1.	
Uri	3GPP TS 29.571 [22]	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: MfafConfiguration

Table 5.1.6.2.2-1: Definition of type MfafConfiguration

Attribute name	Data type	P	Cardinality	Description	Applicability
messageConfigurations	array(MessageConfiguration)	C	1..N	The configuration of the MFAF for mapping data or analytics. (NOTE)	
mfafTransferInfo	MfafTransferInfo	C	0..1	Contains MFAF transfer information. (NOTE)	MfafTransfer
NOTE: One of these attributes shall be provided.					

5.1.6.2.3 Type: MessageConfiguration

Table 5.1.6.2.3-1: Definition of type MessageConfiguration

Attribute name	Data type	P	Cardinality	Description	Applicability
correId	string	M	1	If the configuration is used for mapping analytics or data collection, representing the Analytics Consumer Notification Correlation ID or Data Consumer Notification Correlation ID.	
formatInstruct	FormattingInstruction	O	0..1	Formatting instructions to be used for sending event notifications.	
mfafNotiInfo	MfafNotiInfo	C	0..1	The MFAF notification information. It shall be provided in a response message if it had not been provided in the respective request message.	
notificationURI	Uri	M	1	The notification URI of Data Consumer or Analytics Consumer or other endpoint where to receive the requested mapping data or analytics	
notifEndpoints	array(NotifyEndpoint)	O	1..N	The notification target address(es) and correlation identifier(s) of additional endpoints that need to be notified, if any.	DataAnaCollect
procInstruct	ProcessingInstruction	O	0..1	Processing instructions to be used for sending event notifications. (NOTE 1)	
multiProcInstructs	array(ProcessingInstruction)	O	1..N	Processing instructions to be used for sending event notifications. (NOTE 1)	MultiProcessingInstruction
adrfId	NfInstanceId	O	0..1	NF instance identifier of the ADRF in which data and analytics can be stored.	
suppFeat	SupportedFeatures	C	0..1	This IE represents a list of Supported features as described in clause 5.1.8. (NOTE 2)	
NOTE 1: The "multiProcInstructs" attribute shall be used instead of the "procInstruct" attribute when the "MultiProcessingInstruction" feature is supported. NOTE 2 It shall be present if feature negotiation needs to take place.					

5.1.6.2.4 Type: MfafNotiInfo

Table 5.1.6.2.4-1: Definition of type MfafNotiInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
mfafNotifUri	Uri	M	1	The notification URI of MFAF Notification Target Address.	
mfafCorreId	string	M	1	The MFAF Notification Correlation ID	

5.1.6.2.5 Type: MfafTransferInfo

Table 5.1.6.2.5-1: Definition of type MfafTransferInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
mfafId	NfInstanceId	C	0..1	Identifier of the MFAF currently holding the configuration(s). (NOTE)	
mfafSetId	NfSetId	C	0..1	Identifier of the MFAF Set currently holding the configuration(s). (NOTE)	
refIds	array(Uri)	M	1..N	List of resource URIs of the configurations that are requested to be transferred (i.e. the URIs including the transaction reference identifiers, which had been returned during the creation of the configuration as described in clause 4.2.2.2.2).	
tgtMfafNotiInfos	map(TargetMfafNotiInfo)	C	1..N	The target MFAF notification information. It shall be provided in a response message if it had not been provided in the respective request message. In the request, the key used in this map for each entry is one of the values of the "refIds" attribute. In the response, the key used in this map for each entry is one of the values of the "newRefIds" attribute.	
newRefIds	map(Uri)	C	1..N	A map of the pre-transfer resource URIs to the post-transfer resource URIs of the configurations that were requested to be transferred. The key used in this map for each entry is one of the values of the "refIds" attribute provided in the request and the value is the resource URI of the configuration after the transfer. It may not be present in the request and it shall be included in the response provided by the NF service producer.	
suppFeat	SupportedFeatures	C	0..1	This IE represents a list of Supported features as described in clause 5.1.8. It shall be present when feature negotiation needs to take place.	
NOTE: One of these attributes shall be provided.					

5.1.6.2.6 Type: TargetMfafNotiInfo

Table 5.1.6.2.6-1: Definition of type TargetMfafNotiInfo

Attribute name	Data type	P	Cardinality	Description	Applicability
mfafNotiInfos	map(MfafNotiInfo)	M	1..N	A list of MFAF notification information. The key used in this map for each entry is the value of the "correId" attribute within MessageConfiguration data type.	

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

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

None in current specification.

5.1.6.5 Binary data

None in current specification.

5.1.7 Error Handling

5.1.7.1 General

For the Nmfaf_3daDataManagement 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 Nmfaf_3daDataManagement API.

5.1.7.2 Protocol Errors

No specific procedures for the Nmfaf_3daDataManagement service are specified.

5.1.7.3 Application Errors

The application errors defined for the Nmfaf_3daDataManagement service are listed in Table 5.1.7.3-1.

Table 5.1.7.3-1: Application errors

Application Error	HTTP status code	Description

5.1.8 Feature negotiation

The optional features in table 5.1.8-1 are defined for the Nmfaf_3daDataManagement 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
1	MultiProcessingInstruction	Indicates the support of multiple processing instructions.
2	DataAnaCollect	This feature indicates support for the enhancement of data and analytics process.
3	MfafTransfer	This feature indicates support of transferring MFAF configurations.

5.1.9 Security

As indicated in 3GPP TS 33.501 [8] and 3GPP TS 29.500 [4], the access to the Nmfaf_3daDataManagement 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 Nmfaf_3daDataManagement 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 Nmfaf_3daDataManagement service.

The Nmfaf_3daDataManagement API defines a single scope "nmfaf-3dadatamanagement" for the entire service, and it does not define any additional scopes at resource or operation level.

5.2 Nmfaf_3caDataManagement Service API

5.2.1 Introduction

The Nmfaf_3caDataManagement Service shall use the Nmfaf_3caDataManagement API.

The API URI of the Nmfaf_3caDataManagement 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 "nmfaf-3cadatamanagement".
- 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 9113 [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 Nmfaf_3caDataManagement 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 9457 [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 applicable.

5.2.3 Resources

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

5.2.4 Custom Operations without associated resources

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

5.2.5 Notifications

5.2.5.1 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 5.2.5.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
MFAF Notification	{notificationURI} (NOTE)	POST	Report one or several observed data or analytics.
Fetch Notification	{fetchUri}	POST	Fetch one or several notified data or analytics.
NOTE: The notificationURI is not provided by NF service consumer via Nmfaf_3caDataManagement API, it is provided via Nmfaf_3daDataManagement API during the configuration for mapping data or analytics.			

5.2.5.2 MFAF Notification

5.2.5.2.1 Description

The MFAF Notification is used by the MFAF to provide data or analytics or notification of availability of data or analytics to notification endpoints.

5.2.5.2.2 Target URI

The Callback URI **"{**notificationURI**}"** 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
notificationURI	The notification URI of Data Consumer or Analytics Consumer or other endpoint where to receive the requested data or analytics. The notificationURI is not provided by NF service consumer via Nmfaf_3caDataManagement API, it is provided via Nmfaf_3daDataManagement API during the configuration for mapping data or analytics.

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 5.2.5.2.3.1-2.

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

Data type	P	Cardinality	Description
NmfafDataRetrievalNotification	M	1	The data or analytics or notification of availability of data or analytics to notification endpoints.

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

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	The MFAF notification is treated successfully.
RedirectResponse	O	0..1	307 Temporary Redirect	Temporary redirection, during the retrieval notification. (NOTE 2)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection, during the retrieval notification. (NOTE 2)
NOTE 1: 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. NOTE 2: The RedirectResponse data structure may be provided by an SCP (cf. clause 6.10.9.1 of 3GPP TS 29.500 [4]).				

Table 5.2.5.2.3.1-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative NF consumer (service) instance towards which the notification is redirected. For the case where the notification is redirected to the same target via a different SCP, refer to clause 6.10.9.1 of 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target NF service consumer (service) instance towards which the notification request is redirected.

Table 5.2.5.2.3.1-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative NF consumer (service) instance towards which the notification is redirected. For the case where the notification is redirected to the same target via a different SCP, refer to clause 6.10.9.1 of 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target NF service consumer (service) instance towards which the notification request is redirected.

5.2.5.3 Fetch Notification

5.2.5.3.1 Description

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

5.2.5.3.2 Target URI

The Callback URI **"{fetchUri}"** shall be used with the callback URI variables defined in table 5.2.5.3.2-1.

Table 5.2.5.3.2-1: Callback URI variables

Name	Data type	Definition
fetchUri	Uri	Fetch Uri as assigned during the procedure of notification about the subscribed data or analytics within the FetchInstruction data type (see table 5.2.6.2.3-1).

5.2.5.3.3 Standard Methods

5.2.5.3.3.1 POST

This method shall support the URI query parameters specified in table 5.2.5.3.3.1-1.

Table 5.2.5.3.3.1-1: 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 5.2.5.3.3.1-2 and the response data structures and response codes specified in table 5.2.5.3.3.1-3.

Table 5.2.5.3.3.1-2: Data structures supported by the POST Request Body on this resource

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

Table 5.2.5.3.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
NmfafDataAnaNotification	M	1	200 OK	The stored data or analytics related to the fetch correlation identifier(s).
RedirectResponse	O	0..1	307 Temporary Redirect	Temporary redirection, during the retrieval notification. (NOTE 2)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection, during the retrieval notification. (NOTE 2)
NOTE 1: 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. NOTE 2: The RedirectResponse data structure may be provided by an SCP (cf. clause 6.10.9.1 of 3GPP TS 29.500 [4]).				

Table 5.2.5.3.3.1-4: Headers supported by the by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative NF consumer (service) instance towards which the notification should be redirected. For the case where the notification is redirected to the same target via a different SCP, refer to clause 6.10.9.1 of 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target NF service consumer (service) instance towards which the notification request is redirected.

Table 5.2.5.3.3.1-5: Headers supported by the 308 response code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative NF consumer (service) instance towards which the notification should be redirected. For the case where the notification is redirected to the same target via a different SCP, refer to clause 6.10.9.1 of 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target NF service consumer (service) instance towards which the notification request is redirected.

5.2.6 Data Model

5.2.6.1 General

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

Table 5.2.6.1-1 specifies the data types defined for the Nmfaf_3caDataManagement service based interface protocol.

Table 5.2.6.1-1: Nmfaf_3caDataManagement specific Data Types

Data type	Clause defined	Description	Applicability
FetchInstruction	5.2.6.2.3	The fetch instruction indicates whether the data or analytics are to be fetched by the Consumer.	
NmfafDataAnaNotification	5.2.6.2.4	MFAF data or analytics.	
NmfafDataRetrievalNotification	5.2.6.2.2	The data or analytics or notification of availability of data or analytics to notification endpoints.	

Table 5.2.6.1-2 specifies data types re-used by the Nmfaf_3caDataManagement 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 Nmfaf_3caDataManagement service based interface.

Table 5.2.6.1-2: Nmfaf_3caDataManagement re-used Data Types

Data type	Reference	Comments	Applicability
DataNotification	3GPP TS 29.575 [23]	Represents a data subscription notification of one of various possible data sources	
DateTime	3GPP TS 29.571 [22]	Identifies a specific time.	
NnwdafEventsSubscriptionNotification	3GPP TS 29.520 [20]	Represents an NWDAF analytics subscription notification.	
NotifSummaryReport	3GPP TS 29.574 [15]	Contains a summary report of processed notifications.	DataProcess
Uri	3GPP TS 29.571 [22]	URI.	

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: NmfafDataRetrievalNotification

Table 5.2.6.2.2-1: Definition of type NmfafDataRetrievalNotification

Attribute name	Data type	P	Cardinality	Description	Applicability
correId	string	M	1	Represents the Analytics Consumer Notification Correlation ID or Data Consumer Notification Correlation ID. It shall be set to the same value as the "correId" attribute of MessageConfiguration data type.	
dataAnaNotif	NmfafDataAna Notification	C	0..1	Represents notifications of analytics and data. (NOTE)	
fetchInstruction	FetchInstruction	C	0..1	The fetch instruction indicate whether the data or analytics are to be fetched by the Consumer. (NOTE)	
NOTE: Exactly one of the "dataAnaNotif" and "fetchInstruction" shall be included.					

5.2.6.2.3 Type: FetchInstruction

Table 5.2.6.2.3-1: Definition of type FetchInstruction

Attribute name	Data type	P	Cardinality	Description	Applicability
fetchUri	Uri	M	1	The target address used by a data or analytics consumer to fetch the data or analytics.	
fetchCorrIds	array(string)	M	1..N	The fetch correlation identifier(s) of the MFAF Data or Analytics	
expiry	DateTime	O	0..1	Indicates an expiration time, i.e. a deadline to fetch the data.	

5.2.6.2.4 Type: NmfafDataAnaNotification

Table 5.2.6.2.4-1: Definition of type NmfafDataAnaNotification

Attribute name	Data type	P	Cardinality	Description	Applicability
anaNotifications	array(NnwdafEventsSubscriptionNotification)	C	1..N	List of analytics subscription notifications. (NOTE 1, NOTE 2)	
dataNotif	DataNotification	C	0..1	Data subscription notification. (NOTE 1, NOTE 2)	
dataReports	array(NotifSummaryReport)	C	1..N	List of reports with summarized data or analytics from multiple notifications received from data producer or NWDAF. (NOTE 1)	DataProcess
NOTE 1: Exactly one of these attributes shall be provided. NOTE 2: If the MFAF has received the notifications from another source without a time stamp, then the MFAF adds itself a time stamp based on the time it received the notification in "timeStampGen" attribute contained in the EventNotification data type in the NnwdafEventsSubscriptionNotification data type, or in "timeStamp" attribute contained in DataNotification data type.					

5.2.6.3 Simple data types and enumerations

5.2.6.3.1 Introduction

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

5.2.6.3.2 Simple data types

None in this release of the specification.

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 Nmfaf_3caDataManagement 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 Nmfaf_3caDataManagement API.

5.2.7.2 Protocol Errors

No specific procedures for the Nmfaf_3caDataManagement service are specified.

5.2.7.3 Application Errors

The application errors defined for the Nmfaf_3caDataManagement 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 Nmfaf_3caDataManagement 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
1	DataProcess	This feature indicates the support of the processing of the data or analytics, including: - providing summary reports of the event notifications received from the data producer or NWDAF based on the processing and formatting instructions.

5.2.9 Security

As indicated in 3GPP TS 33.501 [8] and 3GPP TS 29.500 [4], the access to the Nmfaf_3caDataManagement 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 Nmfaf_3caDataManagement 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 Nmfaf_3caDataManagement service.

The Nmfaf_3caDataManagement API defines a single scope "nmfaf-3cadatamanagement" for the entire service, and it does not define any additional scopes at resource or operation level.

5.3 Nmfaf_ContextManagement Service API

5.3.1 Introduction

The Nmfaf_ContextManagement Service shall use the Nmfaf_ContextManagement API.

The API URI of the Nmfaf_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 "nmfaf-contextmanagement".
- The <apiVersion> shall be "v1".
- The <apiSpecificResourceUriPart> shall be set as described in clause 5.3.3.

5.3.2 Usage of HTTP

5.3.2.1 General

HTTP/2, IETF RFC 9113 [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 Nmfaf_ContextManagement API is contained in Annex A.4.

5.3.2.2 HTTP standard headers

5.3.2.2.1 General

See clause 5.1.2 of 3GPP TS 29.500 [4] for the usage of HTTP standard headers.

5.3.2.2.2 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 9457 [13].

5.3.2.3 HTTP custom headers

The mandatory HTTP custom header fields specified in clause 5.1.3.2 of 3GPP TS 29.500 [4] shall be applicable.

5.3.3 Resources

5.3.3.1 Overview

None in this release of the specification.

5.3.4 Custom Operations without associated resources

The structure of the custom operation URIs of the Nmfaf_ContextManagement service is shown in Figure 5.3.4.1-1.

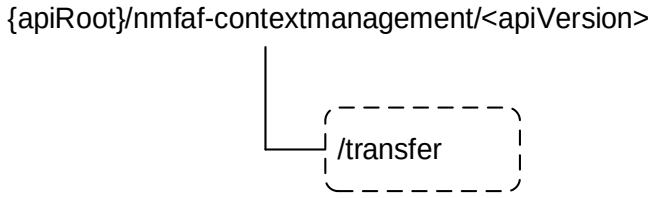

Figure 5.3.4.1-1: Custom operation URI structure of the Nmfaf_ContextManagement API

Table 5.3.4.1-1 provides an overview of the custom operations and applicable HTTP methods.

Table 5.3.4.1-1: Custom operations without associated resources

Custom operation URI	Mapped HTTP method	Description
{apiRoot}/nmfaf-contextmanagement/<apiVersion>/transfer	POST	Transfers configuration(s) from another MFAF.

5.3.4.2 Operation: transfer

5.3.4.2.1 Description

The operation is used by the NF service consumer to transfer MFAF configuration(s) from another MFAF.

5.3.4.2.2 Operation Definition

This operation shall support the request data structures shown in Table 5.3.4.2.2-1 and the response data structures and error codes specified in Tables 5.3.4.2.2-2.

Table 5.3.4.2.2-1: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
ContextTransferReq	M	1	Information about the MFAF configuration(s) to be transferred to this MFAF.

Table 5.3.4.2.2-2: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
ContextTransferResp	M	1	200 OK	Successful transfer of MFAF configuration(s) to this MFAF.
RedirectResponse	O	0..1	307 Temporary Redirect	Temporary redirection during the transfer request. (NOTE 2)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection, during the transfer request. (NOTE 2)
NOTE 1: The mandatory HTTP error status code for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply. NOTE 2: The RedirectResponse data structure may be provided by an SCP (cf. clause 6.10.9.1 of 3GPP TS 29.500 [4]).				

Table 5.3.4.2.2-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative MFAF (service) instance towards which the notification is redirected. For the case where the notification is redirected to the same target via a different SCP, refer to clause 6.10.9.1 of 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target MFAF (service) instance towards which the notification request is redirected.

Table 5.3.4.2.2-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains an alternative URI representing the end point of an alternative MFAF (service) instance towards which the notification is redirected. For the case where the notification is redirected to the same target via a different SCP, refer to clause 6.10.9.1 of 3GPP TS 29.500 [4].
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target MFAF (service) instance towards which the notification request is redirected.

5.3.5 Notifications

None in this release of the specification.

5.3.6 Data Model

5.3.6.1 General

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

Table 5.3.6.1-1 specifies the data types defined for the Nmfaf_ContextManagement service based interface protocol.

Table 5.3.6.1-1: Nmfaf_ContextManagement specific Data Types

Data type	Clause defined	Description	Applicability
ContextTransferReq	5.3.6.2.2	Represents the contents of an MFAF context transfer request.	
ContextTransferResp	5.3.6.2.3	Represents the contents of an MFAF context transfer response.	

Table 5.3.6.1-2 specifies data types re-used by the Nmfaf_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 Nmfaf_ContextManagement service based interface.

Table 5.3.6.1-2: Nmfaf_ContextManagement re-used Data Types

Data type	Reference	Comments	Applicability
MfafConfiguration	5.1.6.2.2	Contains the description of an MFAF configuration.	
NmfafDataAnaNotification	5.2.6.2.4	Contains a data or analytics notification.	
NnwdafEventsSubscriptionNotification	3GPP TS 29.520 [20]	Represents an NWDAF analytics subscription notification.	
SupportedFeatures	3GPP TS 29.571 [22]	Used to negotiate the applicability of the optional features defined in table 5.3.8-1.	
Uri	3GPP TS 29.571 [22]	Represents a URI.	

5.3.6.2 Structured data types

5.3.6.2.1 Introduction

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

5.3.6.2.2 Type: ContextTransferReq

Table 5.3.6.2.2-1: Definition of type ContextTransferReq

Attribute name	Data type	P	Cardinality	Description	Applicability
refIds	array(Uri)	M	1..N	List of resource URIs of the configurations to be transferred (i.e. the URIs including the transaction reference identifiers, which had been returned during the creation of the configuration as described in clause 4.2.2.2.2).	
suppFeat	SupportedFeatures	C	0..1	This attribute represents a list of supported features as described in clause 5.3.8. It shall be present if feature negotiation needs to take place.	

5.3.6.2.3 Type: ContextTransferResp

Table 5.3.6.2.3-1: Definition of type ContextTransferResp

Attribute name	Data type	P	Cardinality	Description	Applicability
configs	map(MfafConfiguration)	M	1..N	A map of the configurations that are transferred. The key used in this map for each entry is one of the values of the "refIds" attribute provided in the request and the value is the respective configuration. (NOTE)	
bufferedNotifs	map(NmfafDataAnaNotification)	O	1..N	A map of the buffered notifications that had not yet been delivered by the MFAF to the consumer. The key used in this map for each entry is one of the values of the "refIds" attribute provided in the request and the value is the respective buffered notifications.	
suppFeat	SupportedFeatures	C	0..1	This attribute represents a list of supported features as described in clause 5.3.8. It shall be present if feature negotiation needs to take place.	
NOTE: The "mfafNotiInfo" and "suppFeat" attributes within the MfafConfiguration data type are not applicable.					

5.3.6.3 Simple data types and enumerations

5.3.6.3.1 Introduction

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

5.3.6.3.2 Simple data types

The simple data types defined in table 5.3.6.3.2-1 shall be supported.

Table 5.3.6.3.2-1: Simple data types

Type Name	Type Definition	Description	Applicability

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

None in this release of the specification.

5.3.6.5 Binary data

None in this release of the specification.

5.3.7 Error Handling

5.3.7.1 General

For the Nmfaf_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 5.1.7.2-1 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 Nmfaf_ContextManagement API.

5.3.7.2 Protocol Errors

No specific procedures for the Nmfaf_ContextManagement service are specified.

5.3.7.3 Application Errors

The application errors defined for the Nmfaf_ContextManagement service are listed in Table 5.3.7.3-1.

Table 5.3.7.3-1: Application errors

Application Error	HTTP status code	Description

5.3.8 Feature negotiation

The optional features in table 5.3.8-1 are defined for the Nmfaf_ContextManagement API. They shall be negotiated using the extensibility mechanism defined in clause 6.6 of 3GPP TS 29.500 [4].

Table 5.3.8-1: Supported Features

Feature number	Feature Name	Description

5.3.9 Security

As indicated in 3GPP TS 33.501 [8] and 3GPP TS 29.500 [4], the access to the Nmfaf_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 Nmfaf_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 Nmfaf_ContextManagement service.

The Nmfaf_ContextManagement API defines a single scope "nmfaf-contextmanagement" 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 3.0.0 specifications in YAML format.

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

NOTE 1: The semantics and procedures, as well as conditions, e.g. for the applicability and allowed combinations of attributes or values, not expressed in the OpenAPI definitions but defined in other parts of the specification also apply.

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

A.2 Nmfaf_3daDataManagement API

```
openapi: 3.0.0

info:
  version: 1.2.0
  title: Nmfaf_3daDataManagement
  description: |
    MFAF 3GPP DCCF Adaptor (3DA) Data Management Service.
    © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: 3GPP TS 29.576 V19.5.0; 5G System; Messaging Framework Adaptor Services; Stage 3.
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.576/'

servers:
  - url: '{apiRoot}/nmfaf-3dadatamanagement/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 4.4 of 3GPP TS 29.501.

security:
  - oAuth2ClientCredentials:
    - nmfaf-3dadatamanagement
  - {}

paths:

  /configurations:
    post:
      summary: Creates a new Individual MFAF Configuration resource.
      operationId: CreateMFAFConfiguration
      tags:
        - MFAF Configuration(Collection)
      requestBody:
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/MfafConfiguration'
        required: true
        description: >
          Contains the information for the creation of a new Individual MFAF
          Configuration resource.
      responses:
        '201':
          description: Successful creation of new Individual MFAF Configuration resource.
```

```
        headers:
          Location:
            description: >
              Contains the URI of the newly created resource, according to the structure
              {apiRoot}/nmfaf-3dadatamanagement/<apiVersion>/configurations/{transRefId}
            required: true
            schema:
              type: string
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/MfafConfiguration'
      '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'
      '502':
        $ref: 'TS29571_CommonData.yaml#/components/responses/502'
      '503':
        $ref: 'TS29571_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29571_CommonData.yaml#/components/responses/default'

  /configurations/{transRefId}:
    put:
      summary: Updates an existing Individual MFAF Configuration resource.
      operationId: UpdateMFAFConfiguration
      tags:
        - Individual MFAF Configuration (Document)
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/MfafConfiguration'
      parameters:
        - name: transRefId
          in: path
          description: Unique identifier of the Individual MFAF Configuration resource.
          required: true
          schema:
            type: string
      responses:
        '200':
          description: The updated Individual MFAF Configuration resource is returned.
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/MfafConfiguration'
        '204':
          description: The Individual MFAF Configuration 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'
      '501':
        $ref: 'TS29571_CommonData.yaml#/components/responses/501'
      '502':
        $ref: 'TS29571_CommonData.yaml#/components/responses/502'
      '503':
        $ref: 'TS29571_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29571_CommonData.yaml#/components/responses/default'
  delete:
    summary: Deletes an existing Individual MFAF Configuration resource.
    operationId: DeleteMFAFConfiguration
    tags:
      - Individual MFAF Configuration (Document)
    parameters:
      - name: transRefId
        in: path
        description: Unique identifier of the Individual MFAF Configuration resource.
        required: true
        schema:
          type: string
    responses:
      '204':
        description: >
          No Content. The Individual MFAF Configuration resource matching
          the transRefId was deleted.
      '307':
        $ref: 'TS29571_CommonData.yaml#/components/responses/307'
      '308':
        $ref: 'TS29571_CommonData.yaml#/components/responses/308'
      '400':
        $ref: 'TS29571_CommonData.yaml#/components/responses/400'
      '401':
        $ref: 'TS29571_CommonData.yaml#/components/responses/401'
      '403':
        $ref: 'TS29571_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29571_CommonData.yaml#/components/responses/404'
      '429':
        $ref: 'TS29571_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29571_CommonData.yaml#/components/responses/500'
      '502':
        $ref: 'TS29571_CommonData.yaml#/components/responses/502'
      '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:
            nmfaf-3dadatamanagement: Access to the nmfaf-3dadatamanagement API

  schemas:

    MfafConfiguration:
      description: Represents an Individual MFAF Configuration.
      type: object
      oneOf:
        - required: [messageConfigurations]
        - required: [mfafTransferInfo]
      properties:
        messageConfigurations:
          type: array
          items:
```

```
          $ref: '#/components/schemas/MessageConfiguration'
        minItems: 1
        description: The configuration of the MFAF for mapping data or analytics.
      mfafTransferInfo:
        $ref: '#/components/schemas/MfafTransferInfo'

  MessageConfiguration:
    description: Represents the message configuration.
    type: object
    required:
      - notificationURI
      - correId
    properties:
      correId:
        type: string
        description: >
          If the configuration is used for mapping analytics or data collection,
          representing the Analytics Consumer Notification Correlation ID or
          Data Consumer Notification Correlation ID.
      formatInstruct:
        $ref: 'TS29574_Ndccf_DataManagement.yaml#/components/schemas/FormattingInstruction'
      mfafNotiInfo:
        $ref: '#/components/schemas/MfafNotiInfo'
      notificationURI:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
      notifEndpoints:
        type: array
        items:
          $ref: 'TS29574_Ndccf_DataManagement.yaml#/components/schemas/NotifyEndpoint'
        minItems: 1
        description: The information of notification endpoints.
      procInstruct:
        $ref: 'TS29574_Ndccf_DataManagement.yaml#/components/schemas/ProcessingInstruction'
      multiProcInstructs:
        type: array
        items:
          $ref: 'TS29574_Ndccf_DataManagement.yaml#/components/schemas/ProcessingInstruction'
        minItems: 1
        description: Processing instructions to be used for sending event notifications.
      adrfId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
      suppFeat:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'

  MfafNotiInfo:
    description: >
      The MFAF notification information. It shall be provided in a response message
      if it had not been provided in the respective request message.
    type: object
    required:
      - mfafNotifUri
      - mfafCorreId
    properties:
      mfafNotifUri:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
      mfafCorreId:
        type: string

  MfafTransferInfo:
    description: MFAF transfer information.
    type: object
    properties:
      mfafId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NfInstanceId'
      mfafSetId:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NfSetId'
      refIds:
        type: array
        items:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
        minItems: 1
        description: The resource URIs of the MFAF configurations to be transfered.
      newRefIds:
        type: object
        additionalProperties:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
        minProperties: 1
        description: >
```

```
            A map of the pre-transfer resource URIs to the post-transfer resource
            URIs of the configurations that were requested to be transferred.
        tgtMfafNotiInfos:
          type: object
          additionalProperties:
            $ref: '#/components/schemas/TargetMfafNotiInfo'
          minProperties: 1
          description: The target MFAF notification information.
        suppFeat:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
      required:
        - refIds
      oneOf:
        - required: [mfafId]
        - required: [mfafSetId]

    TargetMfafNotiInfo:
      description: A list of target MFAF notification information.
      type: object
      required:
        - mfafNotiInfos
      properties:
        mfafNotiInfos:
          type: object
          additionalProperties:
            $ref: '#/components/schemas/MfafNotiInfo'
          minProperties: 1
          description: The MFAF notification information.
```

A.3 Nmfaf_3caDataManagement API

```
openapi: 3.0.0

info:
  version: 1.2.0
  title: Nmfaf_3caDataManagement
  description: |
    MFAF 3GPP Consumer Adaptor (3CA) Data Management Service.
    © 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: 3GPP TS 29.576 V19.5.0; 5G System; Messaging Framework Adaptor Services; Stage 3.
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.576/'

servers:
  - url: '{apiRoot}/nmfaf-3cadatamanagement/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 4.4 of 3GPP TS 29.501.

security:
  - oAuth2ClientCredentials:
    - nmfaf-3cadatamanagement
  - {}

paths:
  /mfaf-data-analytics:
    post:
    # This is a pseudo operation, clients shall NOT invoke this method!
      requestBody:
        required: true
        content:
          application/json:
            # Unspecified schema for the JSON body, since this is used by neither the NF service
consumer nor the MFAF.
            schema: {}
      responses:
        default:
          $ref: 'TS29571_CommonData.yaml#/components/responses/default'
      callbacks:
        Notification:
          '{notificationURI}':
          # The URI in {notificationURI} is obtained out of band by the MFAF, i.e. it is provided
via the Nmfaf_3daDataManagement API during the configuration for mapping data or analytics.
```

```
    post:
      requestBody:
        required: true
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/NmfafDataRetrievalNotification'
      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'
        '502':
          $ref: 'TS29571_CommonData.yaml#/components/responses/502'
        '503':
          $ref: 'TS29571_CommonData.yaml#/components/responses/503'
        default:
          $ref: 'TS29571_CommonData.yaml#/components/responses/default'
      callbacks:
        Fetch:
          '{$request.body#/fetchInstruction/fetchUri}':
            post:
              requestBody:
                required: true
                content:
                  application/json:
                    schema:
                      type: array
                      items:
                        type: string
                      minItems: 1
                      description: Indicate the fetch correlation identifier.
              responses:
                '200':
                  description: Expected response to a valid request.
                  content:
                    application/json:
                      schema:
                        $ref: '#/components/schemas/NmfafDataAnaNotification'
                '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'
                        '502':
                          $ref: 'TS29571_CommonData.yaml#/components/responses/502'
                        '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:
            nmfaf-3cadatamanagement: Access to the nmfaf-3cadatamanagement API

  schemas:
    NmfafDataRetrievalNotification:
      description: >
        Represents the data or analytics or notification of availability of data or analytics
        to notification endpoints.
      type: object
      required:
        - correId
      oneOf:
        - required: [dataAnaNotif]
        - required: [fetchInstruction]
      properties:
        correId:
          type: string
          description: >
            Represents the Analytics Consumer Notification Correlation ID
            or Data Consumer Notification Correlation ID. It shall be set to the same
            value as the "correId" attribute of MessageConfiguration data type.
        dataAnaNotif:
          $ref: '#/components/schemas/NmfafDataAnaNotification'
        fetchInstruction:
          $ref: '#/components/schemas/FetchInstruction'

    FetchInstruction:
      description: >
        The fetch instructions indicate whether the data or analytics are to be fetched by the
        consumer.
      type: object
      required:
        - fetchUri
        - fetchCorrIds
      properties:
        fetchUri:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
        fetchCorrIds:
          type: array
          items:
            type: string
          minItems: 1
          description: The fetch correlation identifier(s) of the MFAF Data or Analytics.
        expiry:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'

    NmfafDataAnaNotification:
      description: MFAF data or analytics.
      type: object
      oneOf:
        - required: [anaNotifications]
        - required: [dataNotif]
        - required: [dataReports]
      properties:
        anaNotifications:
          type: array
          items:
            $ref:
'TS29520_Nnwdaf_EventsSubscription.yaml#/components/schemas/NnwdafEventsSubscriptionNotification'
          minItems: 1
```

```
    description: List of analytics subscription notifications.
  dataNotif:
    $ref: 'TS29575_Nadrf_DataManagement.yaml#/components/schemas/DataNotification'
  dataReports:
    type: array
    items:
      $ref: 'TS29574_Ndccf_DataManagement.yaml#/components/schemas/NotifSummaryReport'
    minItems: 1
    description: >
      List of reports with summarized data or analytics from multiple notifications.
```

A.4 Nmfaf_ContextManagement API

```
openapi: 3.0.0

info:
  version: 1.0.0
  title: Nmfaf_ContextManagement
  description: |
    MFAF Context Management Service.
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    All rights reserved.

externalDocs:
  description: 3GPP TS 29.576 V19.5.0; 5G System; Messaging Framework Adaptor Services; Stage 3.
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.576/'

servers:
  - url: '{apiRoot}/nmfaf-contextmanagement/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 4.4 of 3GPP TS 29.501.

security:
  - oAuth2ClientCredentials:
    - nmfaf-contextmanagement
  - {}

paths:

  /transfer:
    post:
      summary: Performs the transfer of MFAF configuration(s).
      operationId: MFAFTransfer
      tags:
        - MFAF Transfer
      requestBody:
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/ContextTransferReq'
        required: true
      responses:
        '200':
          description: >
            Successful MFAF configuration(s) transfer.
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/ContextTransferResp'
        '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'
        '502':
          $ref: 'TS29571_CommonData.yaml#/components/responses/502'
        '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:
            nmfaf-contextmanagement: Access to the nmfaf-contextmanagement API

  schemas:

    ContextTransferReq:
      description: The contents of an MFAF configuration transfer request.
      type: object
      properties:
        refIds:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
          minItems: 1
          description: The resource URIs of the MFAF configurations to be transfered.
        suppFeat:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
      required:
        - refIds

    ContextTransferResp:
      description: The contents of an MFAF configuration transfer response.
      type: object
      properties:
        configs:
          type: object
          additionalProperties:
            $ref: 'TS29576_Nmfaf_3daDataManagement.yaml#/components/schemas/MfafConfiguration'
          minProperties: 1
          description: >
            A map of the configurations that are transferred.
            The key used in this map for each entry is one of the values of the "refIds" attribute
            provided in the request and the value is the respective configuration.
        bufferedNotifs:
          type: object
          additionalProperties:
            $ref:
'TS29576_Nmfaf_3caDataManagement.yaml#/components/schemas/NmfafDataAnaNotification'
          minProperties: 1
          description: >
            A map of the buffered notifications that had not yet been delivered.
            The key used in this map for each entry is one of the values of the "refIds" attribute
            provided in the request and the value is the respective buffered notifications.
        suppFeat:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
      required:
        - configs
```

Annex B (informative): Change history

Change history							
Date	**Meeting**	**TDoc**	**CR**	**Rev**	**Cat**	**Subject/Comment**	**New version**
2021-06	CT3#116e					TS skeleton of Messaging Framework Adaptor Services specification	0.0.0
2021-06	CT3#116e	C3-213502				Inclusion of documents agreed in CT3#116e C3-213377.	0.1.0
2021-08	CT3#117e	C3-214580				Inclusion of documents agreed in CT3#117e C3-214479, C3-214358, C3-214359, C3-214360, C3-214361, C3-214362, C3-214363 and C3-214480.	0.2.0
2021-11	CT3#119e	C3-216522				Inclusion of documents agreed in CT3#119e C3-216422, C3-216423, C3-216441, C3-216465, C3-216467.	0.3.0
2022-01	CT3#119bis-e	C3-220455				Inclusion of documents agreed in CT3#119bis-e C3-220294, C3-220464, C3-220319, C3-220504, C3-220321, C3-220505.	0.4.0
2022-02	CT3#120e	C3-221516				Inclusion of documents agreed in CT3#120e C3-221289, C3-221299, C3-221424, C3-221602, C3-221603, C3-221604, C3-221605.	0.5.0
2022-03	CT#95e	CP-220161				Presentation to TSG CT for approval	1.0.0
2022-03	CT#95e	CP-220161				Approved by TSG CT	17.0.0
2022-06	CT#96	CP-221132	0001	1	F	Adding 3XX and error response handling support for MFAF services	17.1.0
2022-06	CT#96	CP-221132	0002	1	F	Corrections in the MFAF 3caDataManagement API	17.1.0
2022-06	CT#96	CP-221129	0003		F	Correct the Cardinality and Presence of some attributes	17.1.0
2022-06	CT#96	CP-221132	0004	1	B	Support carrying ADRF ID in Nmfaf_3daDataManagement_Configure service operation	17.1.0
2022-06	CT#96	CP-221129	0005		F	Nmfaf_3daDataManagement API corrections	17.1.0
2022-06	CT#96	CP-221131	0006	1	F	Nmfaf_3caDataManagement API corrections	17.1.0
2022-06	CT#96	CP-221130	0007		F	Handling of the redirection responses	17.1.0
2022-06	CT#96	CP-221134	0009	2	F	Correction on DataNotification type	17.1.0
2022-06	CT#96	CP-221133	0011		F	Removing UDM from the list of MFAF service consumers	17.1.0
2022-06	CT#96	CP-221135	0012	1	F	Update inputs of Nmfaf_3caDataManagement_Notify service	17.1.0
2022-06	CT#96	CP-221134	0014		F	Correction to MFAF notification information	17.1.0
2022-06	CT#96	CP-221134	0015		F	add CEF and OAM as consumers of Ndccf_DataManagement Service	17.1.0
2022-06	CT#96	CP-221134	0016		F	update of Abbreviations	17.1.0
2022-06	CT#96	CP-221155	0018	1	F	Update the apiVersion placeholder	17.1.0
2022-06	CT#96	CP-221152	0019		F	Update of info and externalDocs fields	17.1.0
2022-09	CT#97e	CP-222104	0021	2	F	Add expiry attribute to the fetch instructions	17.2.0
2022-09	CT#97e	CP-222104	0022	1	F	Corrections related to callback functions in MFAF	17.2.0
2022-09	CT#97e	CP-222104	0023	1	F	Add NWDAF hosting DCCF as consumer of the Nmfaf_3daDataManagement service	17.2.0
2022-09	CT#97e	CP-222101	0024		F	Clean up References	17.2.0
2022-09	CT#97e	CP-222101	0025		F	Corrections related to NmfafDataRetrievalNotification data type	17.2.0
2022-09	CT#97e	CP-222101	0026		F	Corrections to Fetch Notification	17.2.0
2022-09	CT#97e	CP-222102	0028	1	F	Miscellaneous corrections	17.2.0
2022-09	CT#97e	CP-222101	0029		F	Corrections to NF service consumer	17.2.0
2022-09	CT#97e	CP-222121	0030		F	Update of info and externalDocs fields	17.2.0
2022-12	CT#98e	CP-223172	0034		F	Correcting procedure description for dataNotif attribute	17.3.0
2022-12	CT#98e	CP-223172	0036		F	Corrections to data type in POST header	17.3.0
2022-12	CT#98e	CP-223237	0037	1	F	The time stamp of data and analytics notification	17.3.0
2022-12	CT#98e	CP-223188	0041		F	Update of info and externalDocs fields	17.3.0
2022-12	CT#98e	CP-223191	0031		F	Adding the mandatory error code 502 Bad Gateway	18.0.0
2022-12	CT#98e	CP-223176	0035	1	F	Correction of data type of procInstruct	18.0.0
2022-12	CT#98e	CP-223190	0040		F	Update of info and externalDocs fields	18.0.0
2023-03	CT#99	CP-230149	0042	1	F	Handling of fetch Instruction	18.1.0
2023-03	CT#99	CP-230148	0044		B	Support of multiple notification endpoints	18.1.0
2023-03	CT#99	CP-230162	0045		F	Update of info and externalDocs fields	18.1.0
2023-06	CT#100	CP-231131	0046	1	F	Corrections to the dummy POST based operation of the Nmfaf_3caDataManagement API	18.2.0
2023-06	CT#100	CP-231132	0047	1	F	Corrections to the redirection mechanism description	18.2.0
2023-06	CT#100	CP-231142	0048		F	Update of info and externalDocs fields	18.2.0
2023-12	CT#102	CP-233229	0049	1	F	IETF RFC 7540, RFC 7807 obsoleted by RFC 9113 and RFC 9457 respectively	18.3.0
2024-06	CT#104	CP-241101	0050		F	Callback correction	18.4.0
2024-06	CT#104	CP-241105	0052		A	Corrections on the attribute names in the service description	18.4.0
2024-06	CT#104	CP-241101	0053	1	F	MFAF service consumers	18.4.0
2024-06	CT#104	CP-241101	0054	1	F	MFAF API names corrections	18.4.0
2024-06	CT#104	CP-241101	0057		F	MFAF 3daDataManagement API corrections	18.4.0

2024-06	CT#104	CP-241101	0058		F	MFAF 3caDataManagement API corrections	18.4.0
2024-06	CT#104	CP-241105	0060	1	A	Corrections on attribute name	18.4.0
2024-06	CT#104	CP-241086	0061		F	Update of info and externalDocs fields	18.4.0
2024-09	CT#105	CP-242124	0063		F	Correction to API Descriptions table	19.0.0
2024-09	CT#105	CP-242128	0065	1	A	Adding ADRF as a consumer of Nmfaf_3caDataManagement_Fetch	18.5.0
2024-09	CT#105	CP-242124	0070		F	MFAF API corrections	19.0.0
2024-12	CT#106	CP-243088	0071	1	B	Support event notification processing based on the processing and formatting instructions	19.1.0
2024-12	CT#106	CP-243088	0072		B	Adding LMF as a consumer of Nmfaf_3caDataManagement Service	19.1.0
2024-12	CT#106	CP-243089	0073	1	B	MFAF ContextManagement API service descripiton	19.1.0
2024-12	CT#106	CP-243089	0074	1	B	MFAF ContextManagement API data model	19.1.0
2024-12	CT#106	CP-243278	0075	2	B	MFAF ContextManagement API OpenAPI	19.1.0
2024-12	CT#106	CP-243255	0076	2	B	MFAF 3daDataManagement updates to support MFAF transfer	19.1.0
2024-12	CT#106	CP-243147	0077		F	Update of info and externalDocs fields	19.1.0
2025-03	CT#107	CP-250084	0078	1	B	target MFAF Notification Information	19.2.0
2025-03	CT#107	CP-250086	0079	1	F	Incorrect resource name	19.2.0
2025-03	CT#107	CP-250084	0080	1	B	Clarification on the MFAF Configuration transfer	19.2.0
2025-03	CT#107	CP-250130	0082		F	Update of info and externalDocs fields	19.2.0
2025-06	CT#108	CP-251086	0083	1	B	Signalling Storm analytics consumers	19.3.0
2025-06	CT#108	CP-251088	0084		F	Using Maps for MFAF configurations transfer	19.3.0
2025-06	CT#108	CP-251232	0085		F	Update of info and externalDocs fields	19.3.0
2025-09	CT#109	CP-252114	0086		F	Update of info and externalDocs fields	19.4.0
2025-12	CT#110	CP-253022	0087		F	Signalling Storm analytics consumers	19.5.0
2025-12	CT#110	CP-253065	0088		F	Update of info and externalDocs fields	19.5.0

History

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