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Contents

Foreword

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

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  - 1 presented to TSG for information;
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  - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
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In the present document, modal verbs have the following meanings:

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shall not indicates an interdiction (prohibition) to do something

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

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

should indicates a recommendation to do something

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may indicates permission to do something

need not indicates permission not to do something

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

can indicates that something is possible

cannot indicates that something is impossible

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

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

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

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

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

In addition:

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

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

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

1 Scope

The present document specifies the stage 3 protocol and high level data model for the Nudr Service Based Interface. It provides stage 3 protocol definitions and message flows, and specifies the API for each service offered by the Unified Data Repository (UDR). The data model and usage of the subscription data is specified in 3GPP TS 29.505 [2], and the data model and usage of the policy data, structured data for exposure and application data are specified in 3GPP TS 29.519 [3].

The 5G System architecture is specified in 3GPP TS 23.501 [4]. The stage 2 definition and related procedures for Nudr SBI service are specified in 3GPP TS 23.502 [5] and 3GPP TS 23.503 [6].

The Technical Realization of the Service Based Architecture is specified in 3GPP TS 29.500 [7] and the Principles and Guidelines for Services Definition is specified in 3GPP TS 29.501 [8].

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 29.505: "5G System; Usage of the Unified Data Repository Services for Subscription Data; Stage 3".

[3] 3GPP TS 29.519: "5G System; Usage of the Unified Data Repository Service for Policy Data, Structured Data for Exposure and Application Data; Stage 3".

[4] 3GPP TS 23.501: "System Architecture for the 5G System; Stage 2".

[5] 3GPP TS 23.502: "Procedures for the 5G System; Stage 2".

[6] 3GPP TS 23.503: "Policy and Charging Control Framework for the 5G System; Stage 2".

[7] 3GPP TS 29.500: "5G System; Technical Realization of Service Based Architecture; Stage 3".

[8] 3GPP TS 29.501: "5G System; Principles and Guidelines for Services Definition; Stage 3".

[9] IETF RFC 6901(April 2013): "JavaScript Object Notation (JSON) Pointer".

[10] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces Stage 3".

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

[12] 3GPP TS 33.501: "Security architecture and procedures for 5G system".

[13] IETF RFC 6749: "The OAuth 2.0 Authorization Framework".

[14] 3GPP TS 29.510: "Network Function Repository Services; Stage 3".

[15] IETF RFC 9110: "HTTP Semantics ".

[16] IETF RFC 9111: "HTTP Caching".

[17] IETF RFC 9457: "Problem Details for HTTP APIs".

[18] IETF RFC 7396: "JSON Merge Patch".

[19] IETF RFC 6902: "JavaScript Object Notation (JSON) Patch".

[20] 3GPP TR 21.900: "Technical Specification Group working methods".

[21] OpenAPI Initiative, "OpenAPI Specification Version 3.0.0", https://spec.openapis.org/oas/v3.0.0

[22] IETF RFC 9113: "HTTP/2".

[23] IETF RFC 3986: "Uniform Resource Identifier (URI): Generic Syntax".

3 Definitions 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 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].

GPSI	Generic Public Subscription Identifier
NEF	Network Exposure Function
PCF	Policy Control Function
SUPI	Subscription Permanent Identifier
UDM	Unified Data Management
UDR	Unified Data Repository

4 Overview

The Unified Data Repository (UDR) is the network entity in the 5G Core Network (5GC) supporting the following functionalities:

- Storage and retrieval of subscription data as specified in 3GPP TS 29.505 [2];
- Storage and retrieval of policy data as specified in 3GPP TS 29.519 [3];
- Storage and retrieval of structured data for exposure as specified in 3GPP TS 29.519 [3];
- Storage and retrieval of application data (including Packet Flow Descriptions (PFDs) for application detection, application request information for multiple UEs) as specified in 3GPP TS 29.519 [3];
- Subscription to notification and the notification of subscribed data changes.
- Storage and retrieval of NF-Group Id mapping data.

Figures 4-1 shows the data storage architecture for the 5GC:

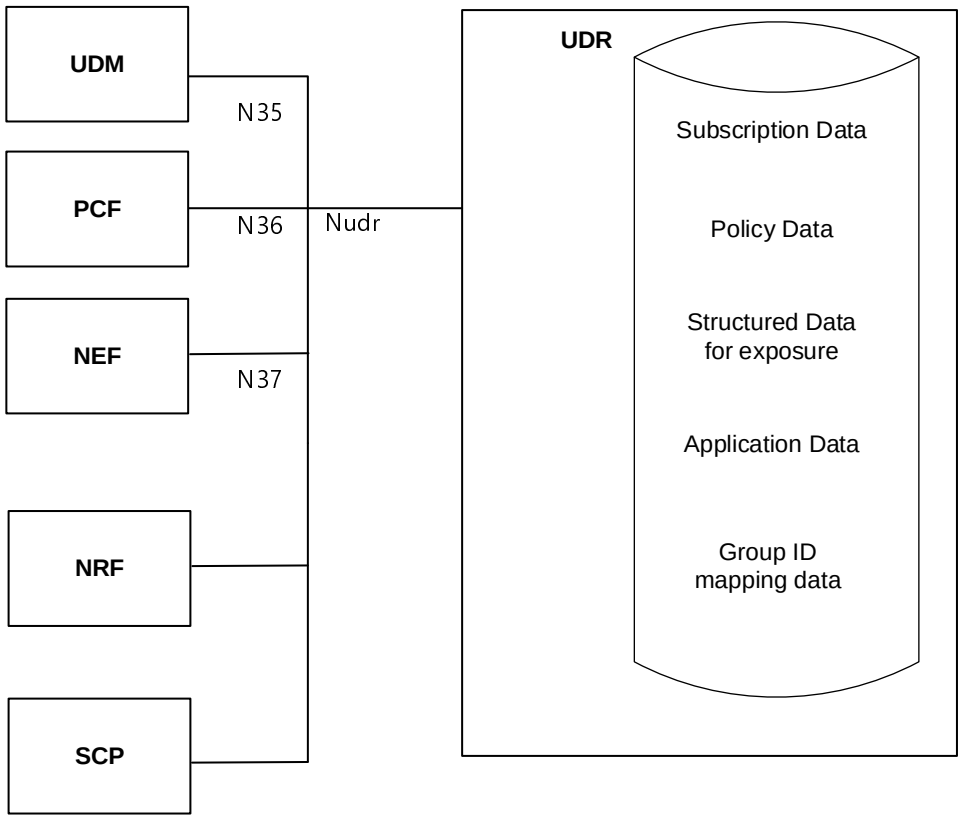

Figure 4-1: Data storage architecture

The Nudr interface is used by the network functions (i.e. UDM, PCF, NEF and NRF) to access a particular set of the data stored in the UDR.

NOTE: Services offered by the UDR via the Nudr service-based interface can also be consumed by the HSS as specified in 3GPP TS 23.632 clause 5.2.4.

5 Services offered by the UDR

5.1 Introduction

The UDR offers the following services via the Nudr interface:

- Nudr_DataRepository Service

NOTE: This service corresponds to the Nudr_DataManagement service in 3GPP TS 23.501 [4], 3GPP TS 23.502 [5] and 3GPP TS 23.503 [6].

- Nudr_GroupIDmap Service

Table 5.1-1 summarizes the corresponding APIs defined for this specification.

Table 5.1-1: API Descriptions

Service Name	Clause	Description	OpenAPI Specification File	apiName	Annex
Nudr_DataRepository	6.1	Unified Data Repository Service	TS29504_Nudr_DR.yaml	nudr-dr	A.2
Nudr_GroupIDmap	6.2	Unified Data Repository Service for NF-Group ID retrieval	TS29504_Nudr_GroupIDmap.yaml	nudr-group-id-map	A.3

5.2 Nudr_DataRepository Service

5.2.1 Service Description

5.2.1.1 Service and operation description

The UDR is acting as NF Service Producer. It provides Unified Data Repository service to the NF service consumer. The known NF Service Consumers are the UDM, PCF and NEF.

For the Nudr_DataRepository service, the following service operations are defined:

- Query
- Create
- Delete
- Update
- Subscribe
- Unsubscribe
- Notify
- DataRestorationNotification

This service allows NF service consumers to retrieve, create, update, modify and delete data stored in the UDR.

This service allows the NF service consumers to subscribe/unsubscribe the data change notification and to be notified of the data change.

This service allows the NF service consumers to be notified upon the UDR restoration.

5.2.1.2 Service operation and data access authorization

UDR provides one Nudr_DataRepository service to all of the NF consumers, while different types of data may have different data access authorizations, the UDR shall be able to have the authorization management mechanism to guarantee the safety of data access.

And the information in the Nudr_DataRepository service operation should be able to identify the NF type of the consumer and the service operation type or name, and to indicate the requested data information including the data set and data subset, and the resource/data identifier. All HTTP methods for the service operation shall include the information in the appropriate place of the HTTP message.

If there is an illegal service operation or data access request initiated by a NF consumer, the service failure response should be returned through the Nudr interface with an explicit cause value.

NOTE: For allowed service operations or data access requests initiated by an NF consumer it is not expected (unless explicitly specified otherwise) that the UDR performs any consumer-specific application logic to check whether a requested service operation should be rejected.

5.2.2 Service Operations

5.2.2.1 Introduction

This clause specifies the generic Nudr_DataRepository service operations towards the different data sets as shown in Figure 4-1.

The HTTP request of the service operations contains a resource URI where the {apiSpecificResourceUriPart} (see clause 4.4.2 in 3GPP TS 29.501 [8]) consists of a top-level segment and sub-level segment(s), followed by query parameters (optional or required).

If multiple query parameters are defined for a method on the resource, the default logical relationship between the different query parameters shall be the logical "AND", unless explicitly indicated on each specific resource and operation on the Nudr_DataRepository API.

NOTE: Not all query parameters imply necessarily a logical relationship with other parameters (e.g. "supported-features"); whether or not such logical relationship exists, is determined by the semantics of the different query parameters in each resource and operation.

For Create, Query, Update and Delete operations, the top-level segment indicates one top level resource representing one of the data sets, which are defined as "/subscription-data", "/policy-data", "/exposure-data" and "/application-data" in Figure 6.1.3.1-1. And a certain child resource is indicated by of the end URI of the sub-level segments, which are defined in 3GPP TS 29.505 [2] for use when the top-level segment is "/subscription-data" and in 3GPP TS 29.519 [3] for use when the top-level segment is "/policy-data", "/exposure-data" or "/application-data".

For Subscribe/Unsubscribe to data change notification operations, the resource of the subscription to the notification should be as the child resource of each of the data sets (i.e. "/subscription-data", "/policy-data", "/exposure-data" and "/application-data"), which are indicated by the top-level segment in the URI. And the resource representation of the subscription to the notification should be indicated by the sub-level segment of each data set.

The following procedures for each operation should be taken as the common procedures and applicable to corresponding detail procedures with the same service operation in 3GPP TS 29.505 [2] and 3GPP TS 29.519 [3].

5.2.2.2 Query

5.2.2.2.1 General

The Query service operation is used to retrieve the data stored in the UDR. HTTP GET method shall be used for the service operation to request the certain data record(s). One piece of data records should be a data set, a data subset, a group of data in one data subset, or a specific data. If the data record(s) are the attribute(s), query parameter or the combination of query parameters should be used as the filters to control the content of result.

5.2.2.2.2 Data retrieval

Figure 5.2.2.2.2-1 shows a scenario where the NF service consumer (e.g. UDM, PCF or NEF) sends a request to the UDR to retrieve data.

Query parameters may be used for data retrieval:

i) Clause 5.2.2.2.3 specifies the query parameter used for retrieving subset of a resource;

ii) Other query parameters are defined in 3GPP TS 29.505 [2] and 3GPP TS 29.519 [3].

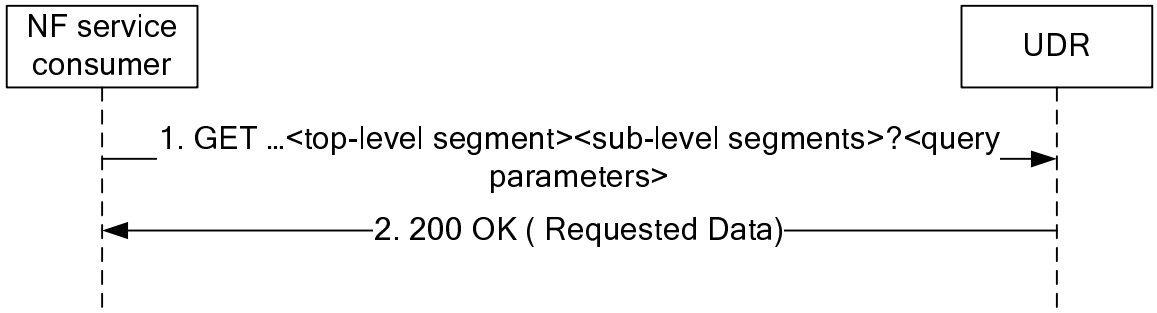

Figure 5.2.2.2.2-1: Retrieving Data

1. The NF service consumer shall send a GET request to the resource representing the data. Query parameters may be used to restrict the response to the requested data record(s) of the resource's representation. Query parameters may also indicate the features that the NF service consumer supports as described in clause 6.6.2 of 3GPP TS 29.500 [7].

2. On success, the UDR shall respond with "200 OK" with the message body containing the requested data record(s) restricted to the query parameters. (and thus also to the indicated features supported by the NF service consumer).

   On failure, the UDR shall return an appropriated error code with the error cause information.

The error codes of corresponding service operations in 3GPP TS 29.505 [2] and 3GPP TS 29.519 [3] shall align and comply with the failure response mechanism which is defined in 3GPP TS 29.500 [7].

5.2.2.2.3 Retrieval of subset of a resource

When a resource has multiple attributes, it is allowed for the NFs to retrieve a subset of the attributes. When the attribute is of type map, it is allowed for the NFs to retrieve individual member(s) of that map. For retrieval of subset of a resource, a new query parameter "fields" is defined to carry the identities of the attributes to be retrieved. The definition of "fields" query parameter is:

1) "fields" query parameter is of type array; and

2) each element of the array is of type string encoded as a JSON pointer as defined IETF RFC 6901 [9].

NOTE: identifying an individual element in the array is supported by JSON pointer, however it is not recommended to use this feature if the client is not exactly aware of the order of the members in the array.

If retrieval of subset of a particular resource is supported, then all the attributes of the corresponding data type of that resource shall be optional or conditional.

EXAMPLE 1:

Given the following representation of ExResource:

```
{
  "lv1Attr1": "value1"
  "lv1Attr2": "value2"
  "lv1Attr3": {
    "lv2Attr1": "value3"
    "lv2Attr2": "value4"
  }
}
```

To retrieve "lv1Attr1" and "lv2Attr2", the NF sends the following request:

GET /ExResource?fields=/lv1Attr1, /lv1Attr3/lv2Attr2

Upon success, the UDR then returns the following representation:

```
{
  "lv1Attr1": "value1"
  "lv1Attr3": {
    "lv2Attr2": "value4"
  }
}
```

EXAMPLE 2:

Given the following representation of ExResource:

```
{
  "Attr1": "value1"
  "Attr2": "value2"
  "AttrMap": {
    "Key1": {ExObject1}
    "Key2": {ExObject2}
  }
}
```

To retrieve "Attr1" and the second member of "AttrMap ", the NF sends the following request:

GET /ExResource?fields=/Attr1, /AttrMap/Key2

Upon success, the UDR then returns the following representation:

```
{
  "Attr1": "value1"
  "AttrMap": {
    "Key2": {ExObject2}
  }
}
```

5.2.2.3 Create

5.2.2.3.1 General

The Create service operation is used by the NF service consumer (e.g. NEF) to create the data into the UDR.

The following procedures using the Create service operation are supported:

- Data creation using PUT
- Data creation using POST

5.2.2.3.2 Data Creation using PUT

Figure 5.2.2.3.2-1 shows a scenario where the NF service consumer (e.g. NEF) sends a request to the UDR to create data. The parent resource of the resource identified by the resource URI shall be of archetype Store (see clause C.3 in 3GPP TS 29.501 [8]).

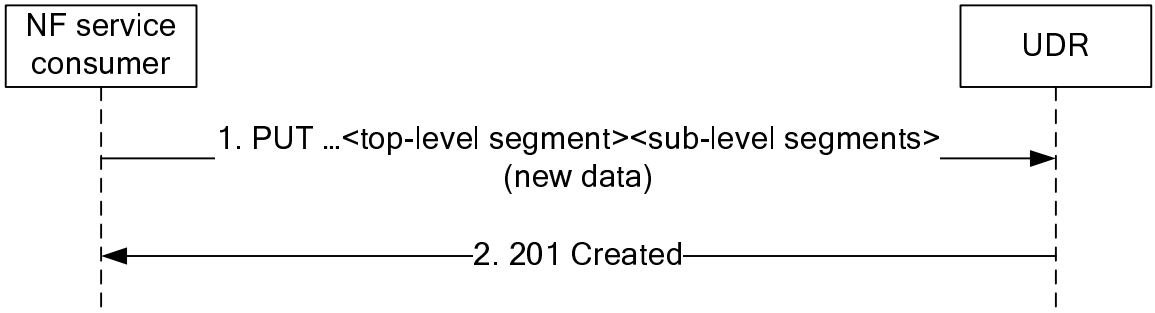

Figure 5.2.2.3.2-1: Creating Data using PUT

1. The NF service consumer shall send a PUT request to the resource representing the data. The content of the PUT request shall contain the representation of the new data.
2. On success, the UDR shall respond with "201 Created" with the content containing the representation of the created data, and the "Location" header shall be present and contains the URI of the created data.

   On failure, the UDR shall return an appropriated error code with the error cause information.

5.2.2.3.3 Data Creation using POST

Figure 5.2.2.3.3-1 shows a scenario where the NF service consumer (e.g. NEF) sends a request to the UDR to create data. The resource identified by the resource URI shall be of archetype Collection (see clause C.2 in 3GPP TS 29.501 [8]).

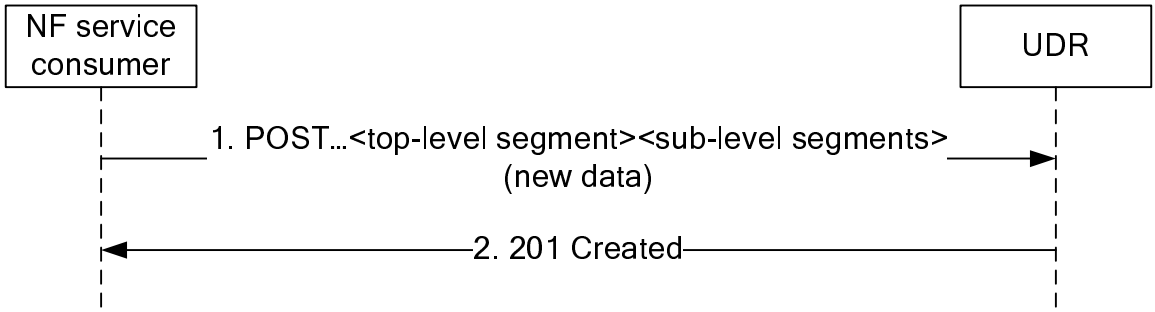

Figure 5.2.2.3.3-1: Creating Data using POST

1. The NF service consumer shall send a POST request to create the new data record as the child resource of the parent resource in the UDR. The content of the POST request shall contain the representation of the new data.
2. The UDR generates the data identifier and constructs the URI for the created data record by appending the data identifier to the parent resource URI received as request URI of the POST request.

   On success, the UDR shall respond with "201 Created" with the content containing the representation of the created data, and the "Location" header shall be present and contains the URI of the created data.

   On failure, the UDR shall return an appropriated error code with the error cause information.

5.2.2.4 Delete

5.2.2.4.1 General

The Delete service operation is used by the NF service consumer (e.g. NEF) to remove the data from the UDR.

The following procedures using the Delete service operation are supported:

- Data Deletion

HTTP DELETE method shall be used.

5.2.2.4.2 Deleting Data

Figure 5.2.2.4.2-1 shows a scenario where the NF service consumer (e.g. NEF) sends a request to the UDR to delete a data record.

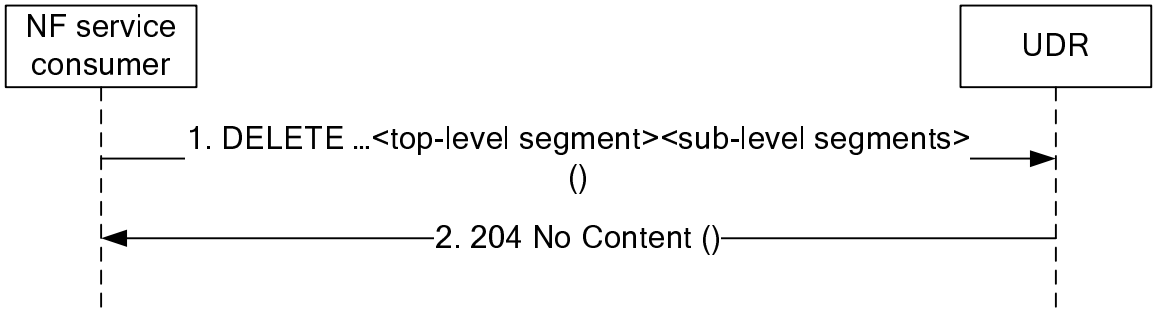

Figure 5.2.2.4.2-1: Deleting Data

1. The NF service consumer shall send a DELETE request to the resource representing the data. The content of the request shall be empty.
2. On success, the UDR shall respond with "204 No Content", the content of the DELETE response shall be empty.

   On failure, the UDR shall return an appropriated error code with the error cause information.

5.2.2.5 Update

5.2.2.5.1 General

The Update service operation is used by the NF service consumer (e.g. UDM, PCF or NEF) to update the data stored in the UDR.

The following procedures using the Update service operation are supported:

- Data Update using PATCH
- Data Update using PUT

HTTP PATCH method shall be used to add/create, delete or modify part of the value(s) in the data record (e.g. a specific data or a group of data in one data subset). HTTP PUT method shall be used to replace a complete data record.

5.2.2.5.2 Data Update using PATCH

Figure 5.2.2.5.2-1 shows a scenario where the NF service consumer (e.g. UDM, PCF or NEF) sends a request to the UDR to update some parts of the data record.

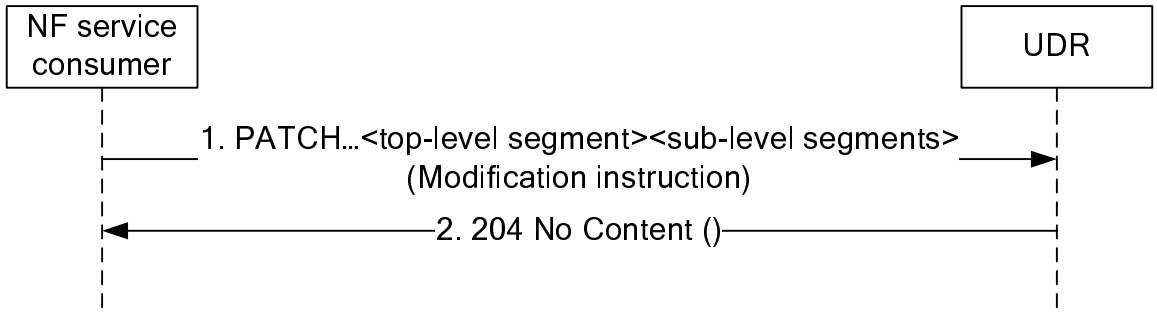

Figure 5.2.2.5.2-1: Data Updating using PATCH

1. The NF service consumer shall send a PATCH request to the resource representing the data record. The content contains the modification instruction towards the data record.
2. On success, the UDR shall respond with "204 No Content".

   On failure, the UDR shall return an appropriated error code with the error cause information.

5.2.2.5.3 Data Update using PUT

Figure 5.2.2.5.3-1 shows a scenario where the NF service consumer (e.g. UDM, PCF or NEF) sends a request to the UDR to update the whole data record.

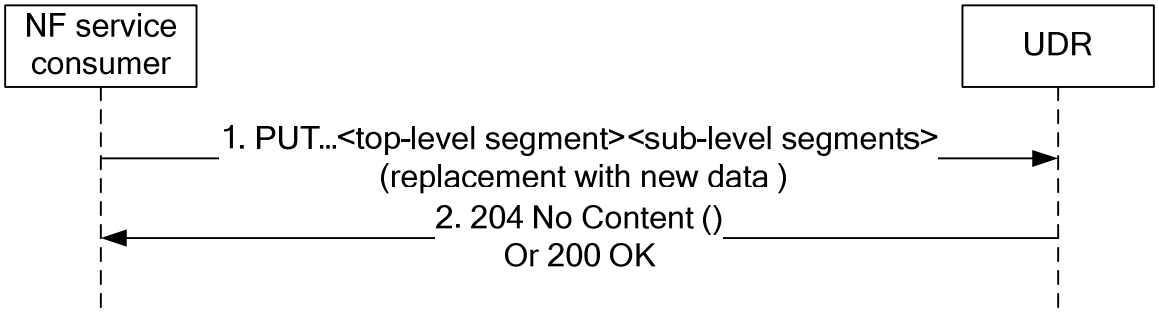

Figure 5.2.2.5.3-1: Data Updating using PUT

1. The NF service consumer shall send a PUT request to the resource representing the data record. The content contains the new data for the resource.
2. On success, the UDR shall respond with "204 No Content" or "200 OK".

   On failure, the UDR shall return an appropriated error code with the error cause information.

5.2.2.6 Subscribe

5.2.2.6.1 General

The Subscribe service operation is used for the NF service consumer to explicitly subscribe to the data change notification from the UDR.

Permanent Subscription Data i.e. sub-resources of the ProvisionedData resource (see 3GPP TS 29.505 [2]) can be modified only by means of provisioning at the UDR and may be (as a deployment option) implicitly subscribed by the UDM as described in 3GPP TS 29.501 [8] clause 4.6.2.2.1. If so and when a data modification of permanent subscription data occurs by means of provisioning and there is the need to notify at least one serving node (e.g. AMF, SMF, SMSF), the UDR shall select one of the suitable and available UDMs (as discovered via the NRF) and send a notification using the callback URI provided by the NRF during UDM discovery.

5.2.2.6.2 NF service consumer subscribes to notifications to UDR

Figure 5.2.2.6.2-1 shows a scenario where the NF service consumer (e.g. UDM, PCF or NEF) sends a request to the UDR to subscribe to data change notifications.

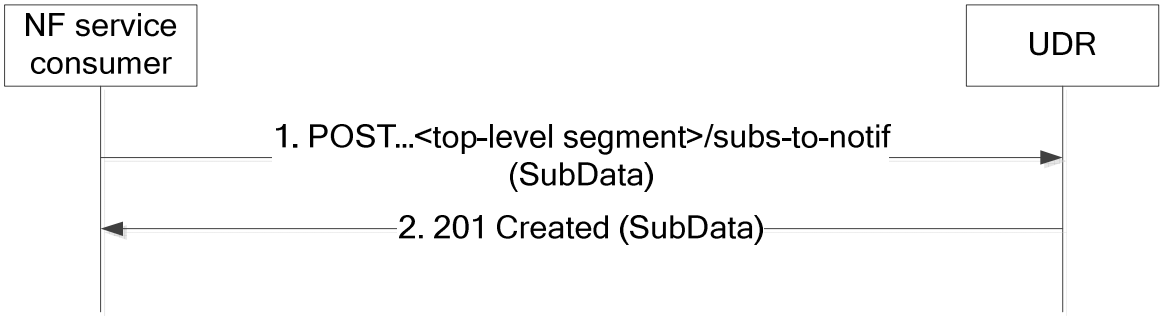

Figure 5.2.2.6.2-1: subscribing to data change notifications

1. The NF service consumer sends a POST request to the parent resource (...<top-level segment>/subs-to-notif). The NF service consumer describes the notifications it wants to receive, and it also indicates the features it supports (see clause 6.6.2 of 3GPP TS 29.500 [7]). The request may contain an expiry time, suggested by the NF Service Consumer as a hint, representing the time upto which the subscription is desired to be kept active.

2. On success, the UDR responds with "201 Created" with the message body containing a representation of the created subscription and indicating the supported features (see clause 6.6.2 of 3GPP TS 29.500 [7]). The Location HTTP header shall contain the URI of the created subscription. In subsequent notifications according to clause 5.2.2.8.2, the UDR only uses the indicated supported features.

   The response based on operator policies and taking into account the expiry time included in the request, may contain an expiry time (i.e a future timestamp), as determined by the UDR, after which the subscription becomes invalid. If an expiry time was included in the request, then the expiry time returned in the response should be less than or equal to that value. Once the subscription expires, if the NF Service Consumer wants to keep receiving notifications, it shall create a new subscription in the UDR. The UDR shall not provide the same expiry time (i.e a future timestamp) for many subscriptions in order to avoid all of them expiring and recreating the subscription at the same time. If the expiry time is not included in the response, the NF Service Consumer shall consider the subscription to be valid without an expiry time.

   On failure, the UDR returns an appropriated error code with the error cause information.

Once the subscription has been created, an NF Service Consumer may request the update of the subscription in UDR (e.g., to request an extension of the subscription lifetime before the subscription expires) by issuing a PUT or PATCH request, as described in 3GPP TS 29.501 [8], clause 4.6.2.2.3.

5.2.2.6.3 Stateless UDM subscribes to notifications to UDR

Figure 5.2.2.6.3-1 shows a scenario where the stateless UDM subscribes to notification to the UDR.

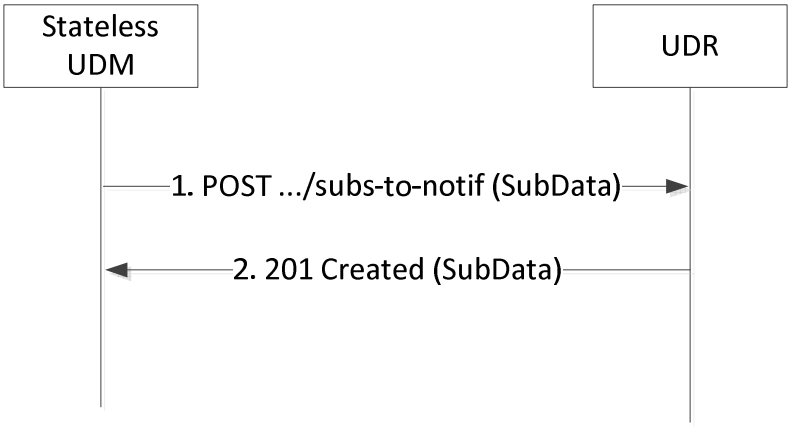

Figure 5.2.2.6.3-1: subscribing to data change notifications via stateless UDM

1. The stateless UDM sends a POST request to the UDR to subscribe to the notifications.

   The SubData in the POST request body shall indicate the same data for which a change will trigger a notification.

   The SubData in the POST request body shall contain a callbackReference URI to which the notifications will be sent to. The host part of the callbackReference URI shall be set to the FQDN of the UDM set to which the stateless UDM belongs.

   The SubData in the POST request body shall contain an original callbackReference URI of the NF which initially triggers the subscription.

   The request may contain an expiry time, suggested by the NF Service Consumer as a hint, representing the time upto which the subscription is desired to be kept active.

2. On success, the UDR responds with "201 Created" with the message body containing a representation of the created subscription. The Location HTTP header shall contain the URI of the created subscription and that URI shall contain the subscription ID allocated by the UDR.

   The response based on operator policies and taking into account the expiry time included in the request, may contain an expiry time (i.e a future timestamp), as determined by the UDR, after which the subscription becomes invalid. If an expiry time was included in the request, then the expiry time returned in the response should be less than or equal to that value. Once the subscription expires, if the NF Service Consumer wants to keep receiving notifications, it shall create a new subscription in the UDR. The UDR shall not provide the same expiry time (i.e a future timestamp) for many subscriptions in order to avoid all of them expiring and recreating the subscription at the same time. If the expiry time is not included in the response, the NF Service Consumer shall consider the subscription to be valid without an expiry time.

   On failure, the UDR returns an appropriated error code with the error cause information.

Once the subscription has been created, the stateless UDM may request the update of the subscription in UDR (e.g., to request an extension of the subscription lifetime before the subscription expires) by issuing a PUT or PATCH request, as described in 3GPP TS 29.501 [8], clause 4.6.2.2.3.

5.2.2.7 Unsubscribe

5.2.2.7.1 General

The Unsubscribe service operation is used for the NF service consumer to unsubscribe to the data change notification from the UDR.

5.2.2.7.2 Unsubscribe service operation

Figure 5.2.2.7.2-1 shows a scenario where the NF service consumer (e.g. UDM, PCF or NEF) sends a request to the UDR to unsubscribe to data change notifications.

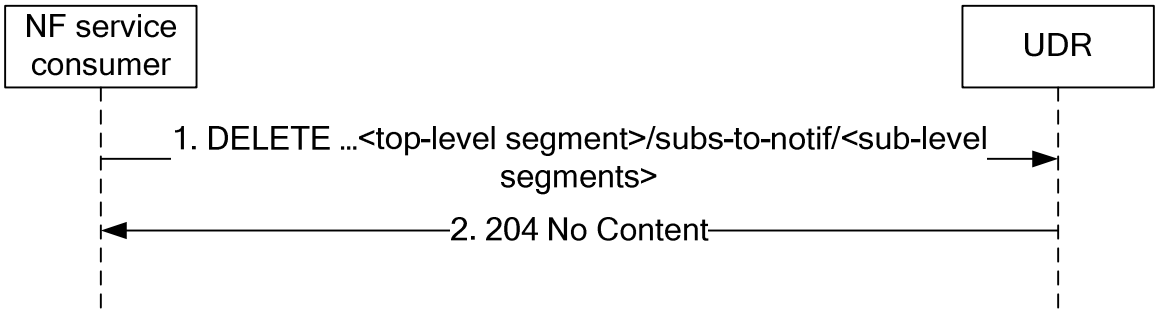

Figure 5.2.2.7.2-1: Unsubscribing to the data change notifications

1. The NF service consumer sends a DELETE request to the resource identified by the URI previously received during subscription creation, i.e. in the Location header field of the HTTP 201 Created response.
2. On success, the UDR responds with "204 No Content".

   On failure, the UDR returns an appropriated error code with the error cause information.

5.2.2.8 Notify

5.2.2.8.1 General

The Notify service operation is used for the UDR to notify the data change notification to the previous subscribe operation requestor.

5.2.2.8.2 Notification to NF service consumer on data change

Figure 5.2.2.8.2-1 shows a scenario where the UDR notifies the NF service consumer about the subscribed data change. The request contains the CallbackReference URI as previously received in the subscribe operation (see clause 5.2.2.6).

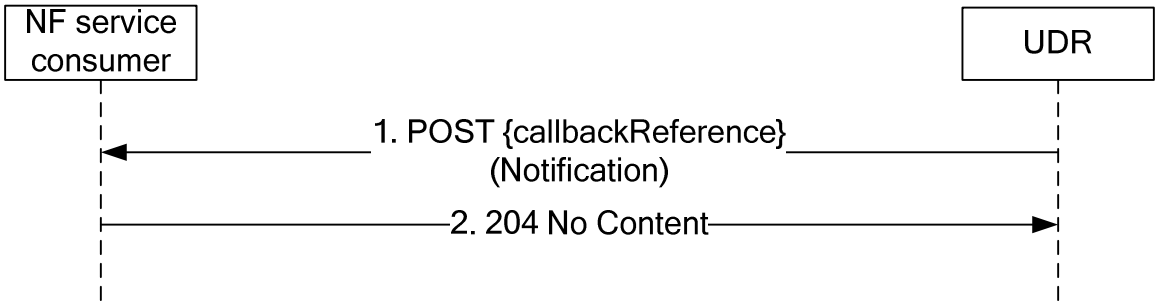

Figure 5.2.2.8.2-1: Data Change Notification

1. The UDR sends a POST request to the callbackReference URI as provided by the NF service consumer in the subscribe operation.
2. On success, the NF service consumer responds with "204 No Content".

   On failure, the NF service consumer responds an appropriated error code with the error cause information.

5.2.2.8.3 Notification to stateless UDM on data change

Figure 5.2.2.8.3-1 shows a scenario where the UDR notifies the NF service consumer about the subscribed data change.

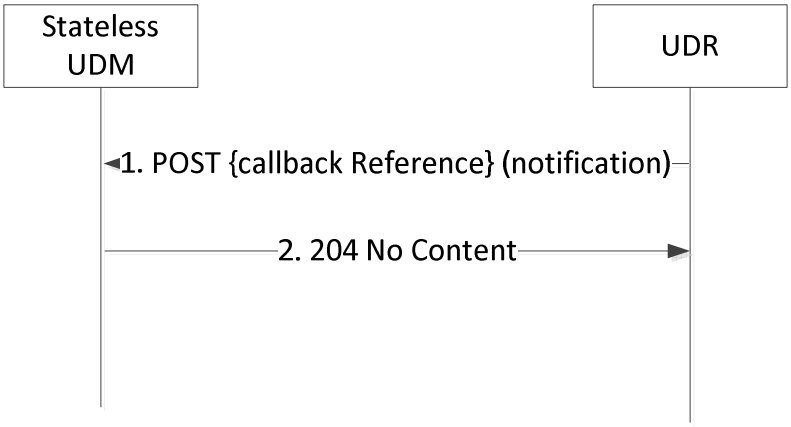

Figure 5.2.2.8.3-1: Data Change Notification to stateless UDM

1. The UDR sends a POST request to the callbackReference URI as provided by the stateless UDM in the subscribe operation.

   The notification in the POST request body shall contain the original callbackReference URI which is received in step 1 of Figure 5.2.2.6.3-1.

   When the notification in the POST request body includes one or more arrays, the UDR shall use the complete replacement representation of the arrays, see 3GPP TS29.501 [4], Annex E.

   When the notification in the POST request body includes one or more arrays where all the array elements have been removed, the UDR shall include the original array representation, i.e. in the origValue attribute of the ChangeItem.

2. On success, the stateless UDM responds with "204 No Content".

On failure, the stateless UDM responds an appropriated error code with the error cause information.

5.2.2.9 DataRestorationNotification

5.2.2.9.1 General

The DataRestorationNotification service operation is used for the UDR to send notfications on UDR restoration event to one or a set of NFs which are subject to the data restoration procedure.

5.2.2.9.2 Notification on Data Restoration

The notification on data restoration may be based on implicit subscription to data restoration event. When the NF service consumer (e.g. UDM) access UDR (i.e. to access the data stored in the UDR) for the first time, the UDR shall identify the identity of the NF service consumer via the NF instance ID contained in the 3gpp-Sbi-NF-Peer-Info header field of the request, then the UDR may create a default subscription on data restoration for that NF service consumer accordingly.

Figure 5.2.2.9.2-1 shows a scenario where the UDR notifies the NF service consumer about the need to restore data due to a potential data-loss event occurred at the UDR. The dataRestorationCallbackUri contained in the request is the default callback URI as discovered from NRF.

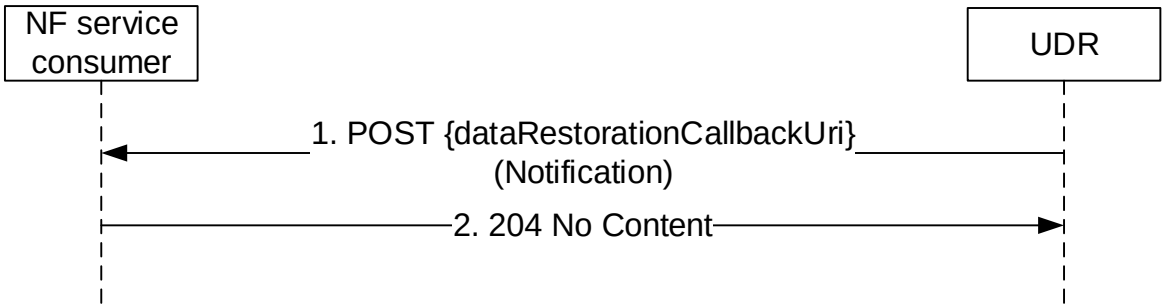

Figure 5.2.2.9.2-1: Data Restoration Notification

1. The UDR sends a POST request to the dataRestorationCallbackUri as discovered from NRF.
2. On success, the NF service consumer responds with "204 No Content".

   On failure, the NF service consumer responds an appropriated error code with the error cause information.

5.3 Nudr_GroupIDmap Service

5.3.1 Service Description

5.3.1.1 Service and operation description

The Nudr_GroupIDmap service may be used by NF service consumers (e.g. NRF or SCP) to retrieve the NF Group ID for a given NF type and subscriber identifier (or information related to a set of subscribers served by a same NF Group ID, such as the Routing Indicator); see 3GPP TS 23.501 [4] and 3GPP TS 23.502 [5].

It may also be used to retrieve the list of Routing Indicators served by a given NF Group.

For the Nudr_GroupIDmap service, the following service operations are defined:

- Query
- Subscribe
- Unsubscribe
- Notify

This service allows NF service consumers to retrieve, NF GroupID data stored in the UDR.

This service allows the NF service consumers to subscribe/unsubscribe to changes on user ID to NF Group ID mapping, and to be notified on changes of such mapping.

- QueryRID

This service allows NF service consumers to retrieve Routing Indicator data stored in the UDR.

5.3.2 Service Operations

5.3.2.1 Introduction

The service operations defined for the Nudr_GroupIDmap service are as follows:

- Query: It allows an NF consumer (e.g. NRF) to retrieve the NF Group ID for a given NF type and subscriber-related information.

5.3.2.2 Query

5.3.2.2.1 General

The following procedure using the Query service operation is supported:

- NF-Group ID Retrieval

5.3.2.2.2 NF Group ID retrieval

Figure 5.3.2.2.2-1 shows a scenario where the NF service consumer (e.g. NRF) sends a request to the UDR to retrieve the NF Group ID.

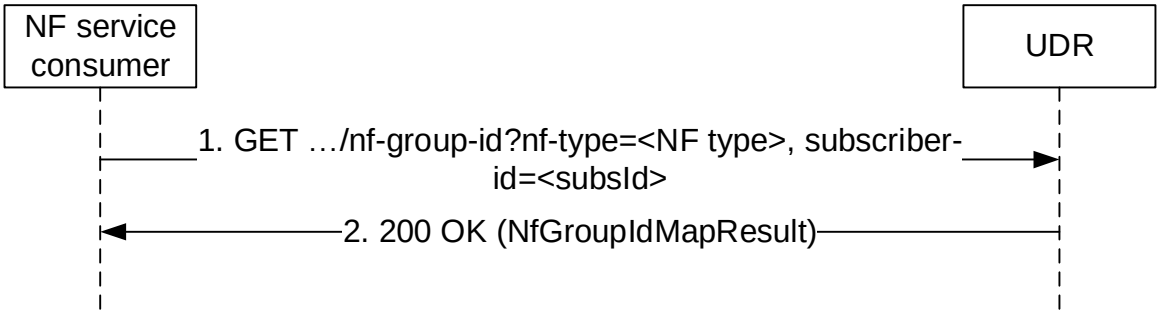

Figure 5.3.2.2.2-1: Retrieving NF Group ID

1. The NF service consumer shall send a GET request to the resource representing the data. Query parameters shall be used to identify the NF type (e.g. UDM) of the requested NF Group ID (e.g. UDM Group ID) and the subscriber-id, or information related to a set of subscribers.
2. On success, the UDR shall respond with "200 OK" with the message body containing the requested data

   On failure, the UDR shall return an appropriated error code with the error cause information.

5.3.2.3 QueryRID

5.3.2.3.1 General

The following procedure using the QueryRID service operation is supported:

- Routing IDs Retrieval

5.3.2.3.2 Routing IDs retrieval

Figure 5.3.2.x.2-1 shows a scenario where the NF service consumer (e.g. NRF) sends a request to the UDR to retrieve the Routing Indicators served by a given NF Group (identified by its NF type and its NF Group ID).

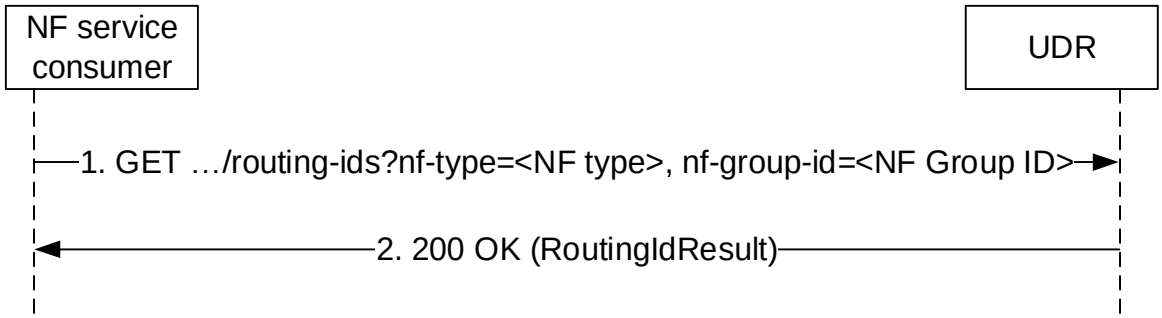

Figure 5.3.2.3.2-1: Retrieving Routing Ids

1. The NF service consumer shall send a GET request to the resource representing the data. Query parameters shall be used to identify the NF type (e.g. UDM) and the NF Group ID (e.g. UDM Group ID).
2. On success, the UDR shall respond with "200 OK" with the message body containing the requested data.

   On failure, the UDR shall return an appropriated error code with the error cause information.

5.3.2.4 Subscribe

5.3.2.4.1 General

The Subscribe service operation is used for the NF service consumer to subscribe to notifications from the UDR when there is a change in the mapping between a subscriber ID and an NF Group ID.

5.3.2.4.2 NF service consumer subscribes to notifications to UDR

Figure 5.3.2.4.2-1 shows a scenario where the NF service consumer (e.g. NRF or SCP) sends a request to the UDR to subscribe to NF Group ID mapping changes.

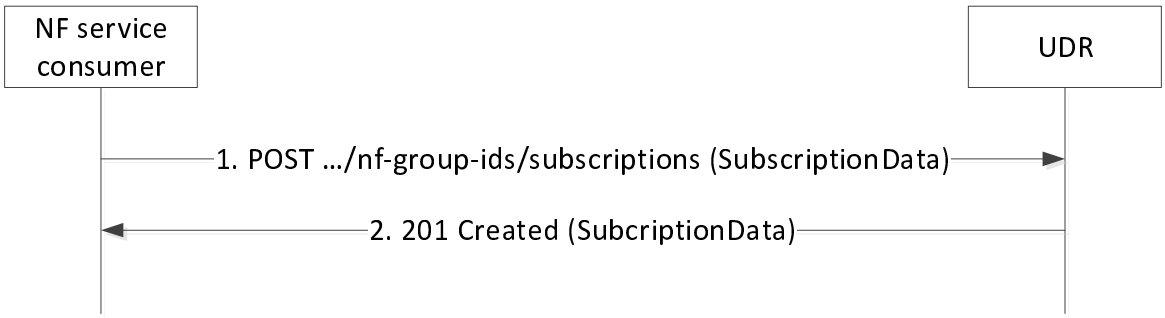

Figure 5.3.2.4.2-1: Subscribing to NF Group ID mapping changes

1. The NF service consumer sends a POST request to the resource (…/nf-group-ids/subscriptions). The NF service consumer describes the notifications it wants to receive (i.e., the NF type and NF Group ID to be monitored for changes on mapping to subscriber IDs) and provides a notification URI. The request may contain an expiry time, suggested by the NF Service Consumer as a hint, representing the time upto which the subscription is desired to be kept active.
2. On success, the UDR responds with "201 Created" with the message body containing a representation of the created subscription. The Location HTTP header shall contain the URI of the created subscription.

   The response based on operator policies and taking into account the expiry time included in the request, may contain an expiry time (i.e a future timestamp), as determined by the UDR, after which the subscription becomes invalid. If an expiry time was included in the request, then the expiry time returned in the response should be less than or equal to that value. Once the subscription expires, if the NF Service Consumer wants to keep receiving notifications, it shall create a new subscription in the UDR. The UDR shall not provide the same expiry time (i.e

a future timestamp) for many subscriptions in order to avoid all of them expiring and recreating the subscription at the same time. If the expiry time is not included in the response, the NF Service Consumer shall consider the subscription to be valid without an expiry time.

On failure, the UDR returns an appropriated error code with the error cause information.

Once the subscription has been created, an NF Service Consumer may request the update of the subscription in UDR (e.g., to request an extension of the subscription lifetime before the subscription expires) by issuing a PATCH request.

5.3.2.5 Unsubscribe

5.3.2.5.1 General

The Unsubscribe service operation is used for the NF service consumer to unsubscribe to NF Group ID mapping changes from the UDR.

5.3.2.5.2 Unsubscribe service operation

Figure 5.3.2.5.2-1 shows a scenario where the NF service consumer (e.g. NRF or SCP) sends a request to the UDR to unsubscribe to NF Group ID mapping changes.

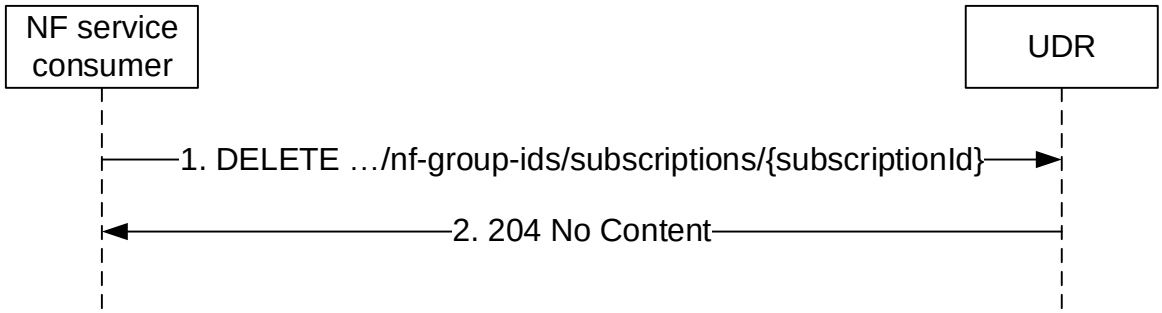

Figure 5.3.2.5.2-1: Unsubscribing to NF Group ID mapping changes

1. The NF service consumer sends a DELETE request to the resource identified by the URI previously received during subscription creation in the Location header field of the HTTP 201 Created response.
2. On success, the UDR responds with "204 No Content".

   On failure, the UDR returns an appropriated error code with the error cause information.

5.3.2.6 Notify

5.3.2.6.1 General

The Notify service operation is used for the UDR to notify the NF Group ID mapping change to the previous subscribe operation requestor.

5.3.2.6.2 Notification to NF service consumer on data change

Figure 5.3.2.6.2-1 shows a scenario where the UDR notifies the NF service consumer about the NF Group ID mapping change. The request is sent to the notificationURI as previously received in the subscribe operation (see clause 5.3.2.4.2).

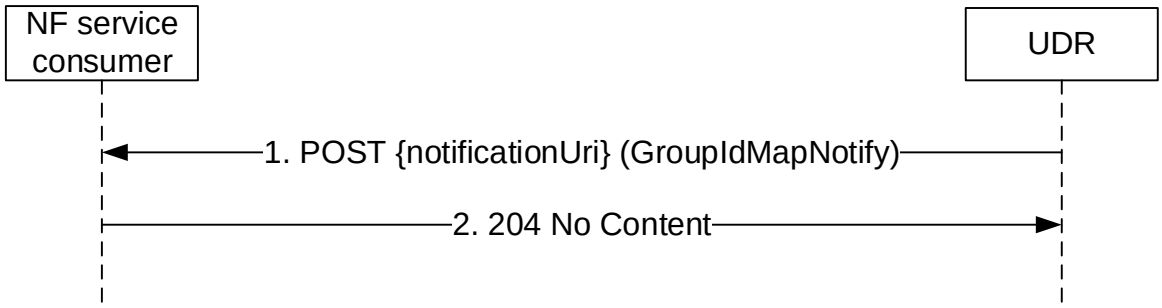

Figure 5.3.2.6.2-1: NF Group ID mapping change notification

1. The UDR sends a POST request to the notificationUri as provided by the NF service consumer in the subscribe operation. The content of the notification includes the identities whose mapping to a given NF Group ID has changed.

NOTE: For a subscriber identity that currently does not have any NF Group ID assigned, the notification is not needed, and the UDR can decide, based on implementation choice, to only send notifications when the mapping has changed from a given NF Group ID to a different one. Nonetheless, it can be reasonable to send such notifications, for example, when they are related to a large range of subscriber identities, no matter if the individual subscriber identities had, or not, a previous NF Group ID assigned.

2. On success, the NF service consumer responds with "204 No Content".

   On failure, the NF service consumer responds an appropriated error code with the error cause information.

6 API Definitions

6.1 Nudr_DataRepository Service API

6.1.1 API URI

The Nudr-dr shall use the Nudr-dr API.

The request URI used in HTTP request from the NF service consumer towards the NF service producer shall have the structure defined in clause 4.4.1 of 3GPP TS 29.501 [8], i.e.:

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

with the following components:

- The {apiRoot} shall be set as described in 3GPP TS 29.501 [8].
- The <apiName> shall be "nudr-dr".
- The <apiVersion> shall be "v2".
- The <apiSpecificResourceUriPart> shall be set as described in clause 6.1.3.

6.1.2 Usage of HTTP

6.1.2.1 General

Nudr service shall comply with the usage of HTTP/2.0 protocol over Service Based Interfaces. (See Clause 5, 3GPP TS 29.500[7]).

6.1.2.2 HTTP standard headers

6.1.2.2.1 General

The usage of HTTP standard headers shall be supported on Nudr interface as defined in clause 5.2.2 of 3GPP TS 29.500 [7].

6.1.2.2.2 Content type

The following content types shall be supported:

- JSON, as defined in IETF RFC 8259 [11], shall be used as content type of the HTTP bodies specified in the present specification as indicated in clause 5.4 of 3GPP TS 29.500 [7].
- The Problem Details JSON Object (IETF RFC 9457 [17]). The use of the Problem Details JSON object in a HTTP response body shall be signalled by the content type "application/problem+json".
- JSON Merge Patch (IETF RFC 7396 [18]. The use of the JSON Merge Patch format in a HTTP request body shall be signalled by the content type "application/merge-patch+json".
- JSON Patch (IETF RFC 6902 [19]). The use of the JSON Patch format in a HTTP request body shall be signalled by the content type "application/json-patch+json".

6.1.2.2.3 Cache-Control

As described in IETF RFC 9111 [16] clause 5.2, a "Cache-Control" header should be included in HTTP responses carrying a representation of cacheable resources (e.g. SessionManagementSubscriptionData). If it is included, it shall contain a "max-age" value, indicating the amount of time in seconds after which the received response is considered stale.

The "max-age" value shall be configurable by operator policy.

6.1.2.2.4 ETag

As described in IETF RFC 9110 [15] clause 8.8.3, an "ETag" (entity-tag) header should be included in HTTP responses carrying a representation of cacheable resources (e.g. AccessAndMobilitySubscriptionData) or modifyable resources (e.g. Amf3GppAccessRegistration) to allow an NF Service Consumer performing a conditional GET request with "If-None-Match" header or a conditional POST / PUT / PATCH / DELETE request with "If-Match" header. If it is included, it shall contain a server-generated strong validator, that allows further matching of this value (included in subsequent client requests) with a given resource representation stored in the server or in a cache.

6.1.2.2.5 If-None-Match

As described in IETF RFC 9110 [15] clause 13.1.2, an NF Service Consumer may issue conditional GET request towards UDR by including an "If-None-Match" header in HTTP requests containing one or several entity tags received in previous responses for the same resource.

6.1.2.2.5a If-Match

As described in IETF RFC 9110 [15] clause 13.1.1, an NF Service Consumer may issue conditional POST / PUT / PATCH / DELETE request towards UDR by including an "If-Match" header in HTTP requests containing an entity tag received in previous responses for the same resource.

6.1.2.2.6 Last-Modified

As described in IETF RFC 9110 [15] clause13.1.3, a "Last-Modified" header should be included in HTTP responses carrying a representation of cacheable resources (e.g. SmfSelectionSubscriptionData) to allow an NF Service Consumer performing a conditional request with "If-Modified-Since" header.

6.1.2.2.7 If-Modified-Since

As described in IETF RFC 7232 [15] clause 3.3, an NF Service Consumer may issue conditional GET request towards UDR, by including an "If-Modified-Since" header in HTTP requests.

6.1.2.2.8 When to Use Entity-Tags and Last-Modified Dates

Both "ETag" and "Last-Modified" headers should be sent in the same HTTP response as stated in IETF RFC 9110 [15] clause 15.3.1.

NOTE: "ETag" is a stronger validator than "Last-Modified" and is preferred.

If the UDR included an "ETag" header with the resource then a conditional GET request for this resource shall be performed with the "If-None-Match" header, and a POST / PUT / PATCH / DELETE request for this resource shall be performed with the "If-Match" header.

6.1.2.3 HTTP custom headers

6.1.2.3.1 General

The custom HTTP headers applicable to Nudr service are specified in the following clauses.

6.1.2.3.2 3gpp-Sbi-Message-Priority

Nudr interface shall support 3gpp-Sbi-Message-Priority custom header. The header contains the HTTP/2 message priority value. See details in Clause 5.2.3.2.2 of 3GPP TS 29.500 [7].

6.1.2.3.3 3gpp-Sbi-Notification-Correlation

The 3gpp-Sbi-Notification-Correlation header field is used by a NF in a UDR resource create/update/delete request to indicate the subscription context(s) whose notification needs to be disabled when triggered as consequence of a request including this header. Subsequent create/update/delete requests that do not include the 3gpp-Sbi-Notification-Correlation header trigger the corresponding notifications as per currently defined procedures.

This header contains subscription identifier(s), as provided by the UDR during the subscribe operation.

The encoding of the header follows the ABNF as defined in IETF RFC 9110 [15].

```
Sbi-Notification-Correlation-Header = "3gpp-Sbi-Notification-Correlation:" OWS subscriptionId *(OWS
"," OWS subscriptionId ) OWS

subscriptionId = token
```

See clause 5.6.2 of IETF RFC 9110 [15] for the "token" definition.

EXAMPLE: 3gpp-Sbi-Notification-Correlation: subsid123, subsid345.

6.1.2.3.4 3gpp-Sbi-Etags

The 3gpp-Sbi-Etags header field is used by the UDR in 200 OK responses to GET requests for multiple data set retrieval, allowing to convey one Etag per retrieved data set. The consumer may make use of a received Etag for a given data set in If-Match/If-None-Match headers of subsequent requests individually accessing the given data set.

The encoding of the header follows the ABNF as defined in IETF RFC 9110 [15].

```
Sbi-Etags-Header = "3gpp-Sbi-Etags:" OWS datasetEtag *(OWS "," OWS datasetEtag) OWS

datasetEtag = dataSetName "=" entity-tag

dataSetName = UeSubscribedDataSetName

UeSubscribedDataSetName = 1*( ALPHA / DIGIT / "_" )
```

See clause 5.4.3.11 of 3GPP TS 29.505 [2] for the "UeSubscribedDataSetName" definition.

See IETF RFC 9110 [15] section 8.8.3 for the "entity-tag" definition.

EXAMPLE: 3gpp-Sbi-Etags: AM="xxx", SM="yyy"

6.1.3 Resources

6.1.3.1 Overview

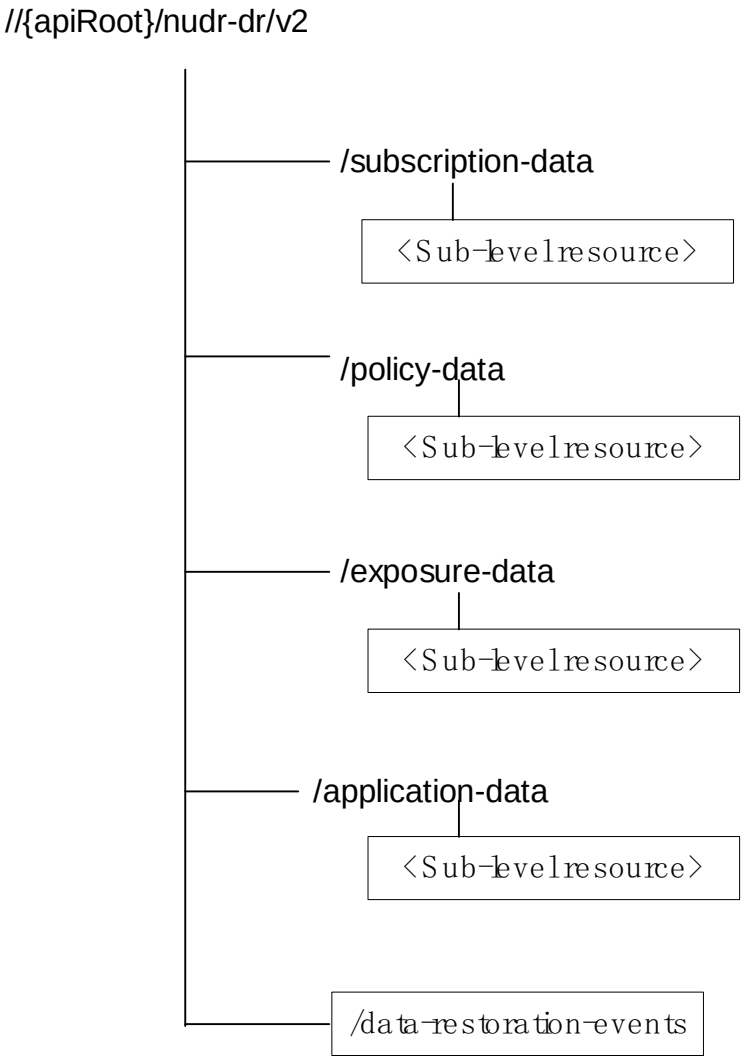

Figure 6.1.3.1-1: Resource URI structure of the Nudr_DataRepository API

Table 6.1.3.1-1 provides an overview of the resources and applicable HTTP methods.

Table 6.1.3.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method or custom operation	Description
SubscriptionData	/subscription-data	none	For sub-level resource names, resource URIs and HTTP methods see 3GPP TS 29.505 [2]
PolicyData	/policy-data	none	For sub-level resource names, resource URIs and HTTP methods see 3GPP TS 29.519 [3]
StructuredDataForExposure	/exposure-data	none	For sub-level resource names, resource URIs and HTTP methods see 3GPP TS 29.519 [3]
ApplicationData	/application-data	none	For sub-level resource names, resource URIs and HTTP methods see 3GPP TS 29.519 [3]
DataRestorationEvents	/data-restoration-events	POST	This is a pseudo operation.

6.1.3.2 SubscriptionData

See 3GPP TS 29.505 [2].

6.1.3.3 PolicyData

See 3GPP TS 29.519 [3].

6.1.3.4 StructuredDataForExposure

See 3GPP TS 29.519 [3].

6.1.3.5 ApplicationData

See 3GPP TS 29.519 [3].

6.1.3.6 Resource: DataRestorationEvents

6.1.3.6.1 Description

6.1.3.6.2 Resource Definition

Resource URI: **{apiRoot}/nudr-dr/<apiVersion>/data-restoration-events**

This resource shall support the resource URI variables defined in table 6.1.3.6.2-1.

Table 6.1.3.6.2-1: Resource URI variables for this resource

Name	Data type	Definition
apiRoot	string	See clause 6.1.1
apiVersion	string	See clause 6.1.1

6.1.3.6.3 Resource Standard Methods

6.1.3.6.3.1 POST

This method will not be actually invoked.

This method shall support the URI query parameters specified in table 6.1.3.6.3.1-1.

Table 6.1.3.6.3.1-1: 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 6.1.3.6.3.1-2 and the response data structures and response codes specified in table 6.1.3.6.3.1-3.

Table 6.1.3.6.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
Any			

Table 6.1.3.6.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a				

6.1.4 Custom Operations without associated resources

In this release of this specification, no custom operations without associated resources are defined for the Nudr_DataRepository Service.

6.1.5 Notifications

6.1.5.1 General

This clause specifies the general mechanism of notifications in the following scenarios:

- notification of changed data which are stored in the UDR;
- notification of data restoration.

The mechanism shall be applicable to the data specified in 3GPP TS 29.505[2] and 3GPP TS 29.519[3].

6.1.5.2 Data Change Notification

The POST method shall be used for Data Change Notifications and the URI shall be as provided during the subscription procedure.

Resource URI: {callbackReference}

Support of POST request data structures should contain the object of changed data and conditionally the URI of original Callback reference, which is received from the original subscribed NF.

6.1.5.3 Data Restoration Notification

The POST method shall be used to inform the NF Service Consumer about a potential data-loss event occurred at the UDR, and the callback URI shall be dynamically discovered by UDR by querying NRF for a default notification URI.

Resource URI: {dataRestorationCallbackUri}

Support of URI query parameters is specified in table 6.1.5.3-1.

Table 6.1.5.3-1: URI query parameters supported by the POST method

Name	Data type	P	Cardinality	Description
n/a				

Support of request data structures is specified in table 6.1.5.3-2 and of response data structures and response codes is specified in table 6.1.5.3-3.

Table 6.1.5.3-2: Data structures supported by the POST Request Body

Data type	P	Cardinality	Description
DataRestorationNotification	M	1	Contains identifiers representing those UEs potentially affected by a data-loss event at the UDR.

Table 6.1.5.3-3: Data structures supported by the POST Response Body

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Upon success, an empty response body shall be returned.
RedirectResponse	O	0..1	307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing a different URI. The URI shall be an alternative URI of the resource located on an alternative service instance within the same NF or NF (service) set. If an SCP redirects the message to another SCP then the location header field shall contain the same URI or a different URI pointing to the endpoint of the NF service consumer to which the notification should be sent.
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing a different URI. The URI shall be an alternative URI of the resource located on an alternative service instance within the same NF or NF (service) set. If an SCP redirects the message to another SCP then the location header field shall contain the same URI or a different URI pointing to the endpoint of the NF service consumer to which the notification should be sent.
ProblemDetails	O	0..1	404 Not Found	The "cause" attribute may be used to indicate one of the following application errors: - CONTEXT_NOT_FOUND
NOTE: In addition, common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [7] are supported.				

Table 6.1.5.3-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains the Callback URI of the target NF Service Consumer (e.g. UDM) to which the request is redirected
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target NF (service) instance ID towards which the request is redirected

Table 6.1.5.3-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains the Callback URI of the target NF Service Consumer (e.g. AMF) to which the request is redirected
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target NF (service) instance ID towards which the request is redirected

6.1.5a Data Model

6.1.5a.1 General

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

Table 6.1.5a.1-1 specifies the data types defined for the Nudr_DataRepository API.

Table 6.1.5a.1-1: Nudr_DataRepository specific Data Types

Data type	Clause defined	Description
DataRestorationNotification	6.2.5a.2.2	Contains identities representing those UEs potentially affected by a data-loss event at the UDR

Table 6.1.5a.1-2 specifies data types re-used by the Nudr_DataRepository 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 Nudr_DataRepository service-based interface.

Table 6.1.5a.1-2: Nudr_DataRepository re-used Data Types

Data type	Reference	Comments
Dnn	3GPP TS 29.571 [10]	Data Network Name with Network Identifier only.
Snssai	3GPP TS 29.571 [10]	Single NSSAI
NfGroupId	3GPP TS 29.571 [10]	NF Group ID
IdentityRange	3GPP TS 29.510 [14]	Identity Range
SupiRange	3GPP TS 29.510 [14]	SUPI Range

6.1.5a.2 Structured data types

6.1.5a.2.1 Introduction

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

6.1.5a.2.2 Type: DataRestorationNotification

Table 6.2.5a.2.2-1: Definition of type DataRestorationNotification

Attribute name	Data type	P	Cardinality	Description
supiRanges	array(SupiRange)	O	1..N	If present, it contains the list of SUPIs potentially subject to a data-loss event at the UDR.
gpsiRanges	array(IdentityRange)	O	1..N	If present, it contains the list of GPSIs potentially subject to a data-loss event at the UDR.
resetIds	array(string)	O	1..N	If present, it contains the list of Reset-IDs of those UEs potentially subject to a data-loss event at the UDR.
sNssaiList	array(Snssai)	O	1..N	If present, it contains the list of slices (S-NSSAIs) potentially subject to a data-loss event at the UDR.
dnnList	array(Dnn)	O	1..N	If present, it contains the list of DNNs potentially subject to a data-loss event at the UDR.
lastReplicationTime	DateTime	O	0..1	If present, it contains the timestamp of the most recent instant when the data was assumed to be consistent at UDR (i.e. the potential data loss event at UDR did not occur before this instant).
recoveryTime	DateTime	O	0..1	If present, it contains the timestamp of the instant when the potential data loss event was recovered at UDR (i.e. all data records stored by UDR after this time are assumed to be consistent).
udrGroupId	NfGroupId	O	0..1	If present, it contains the ID of the UDR Group whose UEs have been potentially subject to a data loss event at the UDR.

6.1.6 Error Handling

Table 6.1.6-1 lists common response body data structures used within the nudr-dr (Nudr_DataRepository) API

Table 6.1.6-1: Common Response Body Data Structures

Data type	P	Cardinality	Response codes	Description
ProblemDetails	O	0..1	4xx, 5xx responses	For error status codes, the UDR may provide detailed information.
NOTE: In addition common data structures as defined in 3GPP TS 29.500 [7] are supported.				

The "ProblemDetails" data structure may contain a "cause" attribute to indicate the application error, see 3GPP TS 29.571 [10]. The values for "cause" attribute are defined in table 6.1.6-2.

Table 6.1.6-2: Application Errors

Application Error	HTTP status code	Description
NF_TYPE_NOT_ALLOWED	403 Forbidden	The target data set is not permitted to access for the NF type of the NF consumer.
UNSUPPORTED_MONITORED_URI	501 Not Implemented	The subscribe service operation is not able to be implemented due to invalid resource URI to be monitored).
USER_NOT_FOUND	404 Not Found	The user indicated in the HTTP/2 request does not exist in the UDR.
DATA_NOT_FOUND	404 Not Found	The data indicated in the HTTP/2 request is unavailable in the UDR.
INCORRECT_CONDITIONAL_REQUEST	412 Precondition Failed	One or more conditions given in the request header fields evaluated to false when tested in the UDR.
UNPROCESSABLE_REQUEST	422 Unprocessable Entity	The request cannot be procesed due to semantic errors when trying to process a patch method.
DATABASE INCONSISTENCY	500 Internal Server Error	Requested data cannot be returned due to database inconsistency
RESOURCE_TEMP_MOVED	307 Temporary Redirect	The resource is unavailable in the current target URI but can be temporarily found in an alternative URI.
RESOURCE_MOVED	308 Permanent Redirect	The resource is unavailable in the current target URI but can be permanently found in an alternative URI.
GROUP_IDENTIFIER_NOT_FOUND	404 Not Found	The group identifier does not exist.
MODIFICATION_NOT_ALLOWED	403 Forbidden	Modification of the target resource representation is not permitted.
PLMN_NOT_FOUND	404 Not Found	The 'servingPlmnId' indicated in the HTTP/2 query is unavailable in the UDR. This status code is also used when 'servingPlmnId' path variable contains SNPN ID, see Table 5.2.3.2-1 in 3GPP TS 29.505 [2].
INTERNAL_GROUP_ID_NOT_UNIQUE	403 Forbidden	The internal group ID allocated by the UDM for a newly created 5G VN Group already exists in the UDR.
NOTE: The error codes shall apply to both 3GPP TS 29.505 [2] and 3GPP TS 29.519 [3]. In addition error codes shall comply with the definition in clause 5.2.7.2 of 3GPP TS 29.500 [7].		

6.1.7 Security

As indicated in 3GPP TS 33.501 [12], the access to the Nudr_DataRepository API may be authorized by means of the OAuth2 protocol (see IETF RFC 6749 [13]), using the "Client Credentials" authorization grant, where the NRF (see 3GPP TS 29.510 [14]) plays the role of the authorization server.

If Oauth2 authorization is used, an NF Service Consumer, prior to consuming services offered by the Nudr_DataRepository API, shall obtain a "token" from the authorization server, by invoking the Access Token Request service, as described in 3GPP TS 29.510 [14], 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 Nudr_DataRepository service.

The Nudr_DataRepository API defines the following scopes for OAuth2 authorization:

Table 6.1.7-1: Oauth2 scopes defined in Nudr_DataRepository API

Scope	Description
"nudr-dr"	Access to the Nudr DataRepository API
"nudr-dr:subscription-data"	Access to the SubscriptionData data set.
"nudr-dr:subscription-data:authentication-subscription:read"	Access to read the AuthenticationSubscription resource of the SubscriptionData data set.
"nudr-dr:subscription-data:authentication-subscription:modify"	Access to update the AuthenticationSubscription resource of the SubscriptionData data set.
"nudr-dr:subscription-data:registrations:write"	Write access to NF registration resources of the SubscriptionData data set.
"nudr-dr:policy-data"	Access to the PolicyData data set.
"nudr-dr:policy-data:ues:read"	Access to read the UEs resource.
"nudr-dr:policy-data:ues:am-data:read"	Access to read the UEs Access and Mobility Policy data.
"nudr-dr:policy-data:ues:ue-policy-set:read"	Access to read the UEs Policy Set data.
"nudr-dr:policy-data:ues:ue-policy-set:create"	Access to create the UEs Policy Set data.
"nudr-dr:policy-data:ues:ue-policy-set:modify"	Access to update the UEs Policy Set data.
"nudr-dr:policy-data:ues:sm-data:read"	Access to read the UEs Session Management policy data.
"nudr-dr:policy-data:ues:sm-data:modify"	Access to update the UEs Session Management policy data.
"nudr-dr:policy-data:ues:sm-data:create"	Access to create the UEs Session Management policy data.
"nudr-dr:policy-data:sponsor-connectivity-data:read"	Access to read the sponsored connectivity data.
"nudr-dr:policy-data:bdt-data:read"	Access to read the BDT data resource.
"nudr-dr:policy-data:bdt-data:create"	Access to create the BDT data resource.
"nudr-dr:policy-data:bdt-data:modify"	Access to update the BDT data resource.
"nudr-dr:policy-data:subs-to-notify:create"	Access to create Subscriptions resources.
"nudr-dr:policy-data:subs-to-notify:modify"	Access to update Subscriptions resources.
"nudr-dr:policy-data:ues:operator-specific-data:read"	Access to read the UEs operator specific policy data.
"nudr-dr:policy-data:ues:operator-specific-data:modify"	Access to update the UEs operator specific policy data.
"nudr-dr:policy-data:ues:operator-specific-data:create"	Access to create the UEs operator specific policy data.
"nudr-dr:policy-data:slice-control-data:read"	Access to read Slice specific Policy Control Data.
"nudr-dr:policy-data:slice-control-data:modify"	Access to update Slice specific Policy Control Data.
"nudr-dr:policy-data:group-control-data:read"	Access to read Group Control Data.
"nudr-dr:policy-data:group-control-data:modify"	Access to update Group Control Data.
"nudr-dr:exposure-data"	Access to the ExposureData data set.
"nudr-dr:exposure-data:access-and-mobility-data:create"	Access to create Access and Mobility data.
"nudr-dr:exposure-data:access-and-mobility-data:read"	Access to read Access and Mobility data.
"nudr-dr:exposure-data:access-and-mobility-data:modify"	Access to update Access and Mobility data.
"nudr-dr:exposure-data:session-management-data:create"	Access to create Session Management data.
"nudr-dr:exposure-data:session-management-data:read"	Access to read Session Management data.
"nudr-dr:exposure-data:session-management-data:modify"	Access to update Session Management data.
"nudr-dr:exposure-data:subs-to-notify:create"	Access to create Subscriptions resources.
"nudr-dr:exposure-data:subs-to-notify:modify"	Access to update Subscriptions resources.
"nudr-dr:application-data"	Access to the ApplicationData data set.
"nudr-dr:application-data:pfds:read"	Access to read PFDData.

"nudr-dr:application-data:pfds:modify"	Access to update PFDData.
"nudr-dr:application-data:pfds:create"	Access to create PFDData.
"nudr-dr:application-data:influence-data:read"	Access to read Traffic Influence Data.
"nudr-dr:application-data:influence-data:create"	Access to create Traffic Influence Data.
"nudr-dr:application-data:influence-data:modify"	Access to update Traffic Influence Data.
"nudr-dr:application-data:influence-data:subscriptions:create"	Access to create Traffic Influence Data Subscriptions.
"nudr-dr:application-data:influence-data:subscriptions:read"	Access to read Traffic Influence Data Subscriptions.
"nudr-dr:application-data:influence-data:subscriptions:modify"	Access to update Traffic Influence Data Subscriptions.
"nudr-dr:application-data:bdt-policy-data:read"	Access to read BDT Policy Data.
"nudr-dr:application-data:bdt-policy-data:create"	Access to create BDT Policy Data.
"nudr-dr:application-data:bdt-policy-data:modify"	Access to update BDT Policy Data.
"nudr-dr:application-data:iptv-config-data:read"	Access to read IPTV Configuration Data.
"nudr-dr:application-data:iptv-config-data:create"	Access to create IPTV Configuration Data.
"nudr-dr:application-data:iptv-config-data:modify"	Access to update IPTV Configuration Data.
"nudr-dr:application-data:service-param-data:read"	Access to read Service Parameter Data.
"nudr-dr:application-data:service-param-data:create"	Access to create Service Parameter Data.
"nudr-dr:application-data:service-param-data:modify"	Access to update Service Parameter Data.
"nudr-dr:application-data:am-influence-data:read"	Access to read AM Influence Data.
"nudr-dr:application-data:am-influence-data:create"	Access to create AM Influence Data.
"nudr-dr:application-data:am-influence-data:modify"	Access to update AM Influence Data.
"nudr-dr:application-data:subs-to-notify:create"	Access to create Subscriptions resources.
"nudr-dr:application-data:subs-to-notify:read"	Access to read Subscriptions resources.
"nudr-dr:application-data:subs-to-notify:modify"	Access to update Subscriptions resources.
"nudr-dr:application-data:eas-deploy-data:read"	Access to read EAS Deployment Information Data.
"nudr-dr:application-data:eas-deploy-data:create"	Access to create EAS Deployment Information Data.
"nudr-dr:application-data:eas-deploy-data:modify"	Access to update EAS Deployment Information Data.
"nudr-dr:application-data:ecs-address-roaming:read"	Access to read ECS Address Roaming Data resources
"nudr-dr:application-data:ecs-address-roaming:create"	Access to create ECS Address Roaming Data resources
"nudr-dr:application-data:ecs-address-roaming:modify"	Access to update ECS Address Roaming Data resources
"nudr-dr:application-data:dnai-eas:read"	Access to read DNAI-EAS mapping resources.
"nudr-dr:application-data:af-qos-data-sets:read	Access to read AF QoS Data Sets
"nudr-dr:application-data:af-qos-data-sets:create	Access to create AF QoS Data Sets
"nudr-dr:application-data:af-qos-data-sets:modify	Access to update AF QoS Data Sets

6.1.8 Feature negotiation

The optional features in table 6.1.8-1 are defined for the Nudr_DataRepository API. They shall be negotiated using the extensibility mechanism defined in clause 6.6 of 3GPP TS 29.500 [7].

Table 6.1.8-1: Supported Features

Feature number	Feature Name	Description
1	ResourceRemovalNotificationPolicyData	This feature indicates the support of the complete removal of a Policy Data resource.
2	ResourceNotificationExposureDataFix	This feature indicates the support of corrections to Notifications of data changes in the Exposure Data resource.
3	DomainNameProtocol	This feature supports the additional protocol matching condition for the domain name in PFD data.
4	EnhancedBackgroundDataTransfer	This feature indicates the support of applying the Background Data Transfer Policy to a future PDU session requested by the AF for Policy Data resource and Application Data resource as defined in 3GPP TS 29.519 [3]. This feature requires the support of SessionManagementPolicyDataPatch feature to update Background Data Transfer data within the Session Management Policy Data.
5	MacAddressRange	This feature indicates the support of a set of MAC addresses with a specific range for the traffic filter in the application data resource as specified in 3GPP TS 29.519 [3].
6	MultiTemporalCondition	This feature indicates the support of multiple temporal validity conditions in the Traffic Influence Data resource as specified in 3GPP TS 29.519 [3].
7	PatchReport	If some of the modifications included in the PATCH request are not successfully implemented, the UDM reports the result of PATCH request execution to the consumer. See clause 5.2.7.2 of 3GPP TS 29.500 [7].
8	URLLC	This feature indicates support of Ultra Reliable Low Latency Communication (URLLC) requirements, i.e. AF application relocation and UE address(es) preservation in the Application Data resource as specified in 3GPP TS 29.519 [3].
9	SessionManagementPolicyDataPatch	This feature indicates the support of the HTTP PATCH method to update the session management policy data defined in a Policy Data resource as specified in 3GPP TS 29.519 [3].
10	ConditionalSubscriptionwithPartialNotification	This feature indicates the support of subscription to notification of resource data changes conditioned to the change occurs in a fragment of the resource. It applies for Policy Data resources as specified in 3GPP TS 29.519 [3].
11	EnhancedInfluDataNotification	This feature indicates the support of enhancement of data change Notifications in the Influence Data resource as specified in 3GPP TS 29.519 [3].
12	PerUePerSnAuthStatus	This feature indicates the support of the Individual authentication status per UE per serving network as specified in 3GPP TS 29.505 [2].
13	OpSpecDataMapNotification	This feature indicates the support of the notification of data changes in the OperatorSpecificData resource by including the complete map of Operator Specific Data Containers. It applies to Policy Data resources as specified in 3GPP TS 29.519 [3].
14		Reserved
15	OSDResource_Create_Delete	This feature indicates the support of the creation and the removal of the OperatorSpecificData resource by a Policy Data NF service consumer. It applies to Policy Data resources as specified in 3GPP TS 29.519 [3].
16	AF_latency	This feature indicates the support for Edge relocation considering user plane latency. It applies for Influence Data resource as specified in 3GPP TS 29.519 [3].
17	CHFsetSupport	This feature indicates the support of CHF redundancy and failover mechanisms based on CHF instance availability within a CHF Set, (i.e. secondary CHF address may be omitted). It applies to Policy Data resources as specified in 3GPP TS 29.519 [3].
18	ConditionalSubscriptionWithExcludeNotification	This feature indicates the support in the subscription to notification of data changes of the indication of the properties whose changes do not trigger a notification. It applies to Policy Data resources as specified in 3GPP TS 29.519 [3]. It requires the support of OpSpecDataMapNotification feature
19	ProSe	This feature indicates the support of UE 5G ProSe policies and subscription information. It applies for Policy Data resources as specified in 3GPP TS 29.519 [3].

20	NSAC	This feature indicates the support of NSAC (Network Slice Admission Control) related policy subscription information. It applies to Policy Data resources as specified in 3GPP TS 29.519 [3].
21	UESubDataSetRetrieve	This feature indicates the support of the UE Subscription Data Sets Retrieve as specified in clause 5.2.47 of 3GPP TS 29.505 [2].
22	SharedSmSubsData	This feature indicates the support of shared Session Management Subscription Data. If the NF consumer (UDM) does not support this feature, the UDR shall not take the alternative to include extendedSmSubsData in SmSubsData. It applies to Subscription Data resources as specified in 3GPP TS 29.505 [2]
23	DeliveryOutcome	This feature indicates the support of functionality to allow PCF notifications about the outcome of the UE Policy delivery related to the invocation of AF provisioned service parameters as specified in 3GPP TS 29.519 [3].
24	AfGuideURSP	This feature indicates the support of Application guidance for URSP determination related application data as specified in 3GPP TS 29.519 [3].
25	EasDeployment	This feature indicates the support of EAS Deployment Information Data and Subscription related application data as specified in 3GPP TS 29.519 [3].
26	DCAMP	This feature indicates the support of DCAMP related application data. It applies to Application Data resources as specified in 3GPP TS 29.519 [3].
27	FilterAnyUE	This feature indicates the support of queries and subscriptions to service parameter data resource filtered by the any UE indication as specified in 3GPP TS 29.519 [3].
28	SimultConnectivity	This feature indicates the support of temporary simultaneously connectivity at edge relocation. It applies for Influence Data resource as specified in 3GPP TS 29.519 [3].
29	EeSubscriptionExt	This feature indicates the support of handling EE subscription data along with associated subscription resources as specified in 3GPP TS 29.505 [2].
30	PeiResource	This feature indicates the support of storing PEI in the PeiInfo resource as specified in 3GPP TS 29.505 [2].
31	ImmediateReportPcc	This feature indicates support of ImmediateReport within a PolicyDataSubscription in 3GPP TS 29.519 [3]. When a UDR consumer detects that the UDR supports the ImmediateReportPcc feature, it can indicate an immediateReport flag when invoking the Subscribe service operation. If the UDR receives the ImmediateReport flag in the received Subscribe service operation request, it shall return the resource's representation(s) of the monitored resource(s) in the service operation response body.
32	ImmediateReport	This feature indicates support of ImmediateReport within an SubscriptionDataSubscription in 3GPP TS 29.505 [2]. When a UDR consumer detects that the UDR supports the ImmediateReport feature, it can indicate an immediateReport flag when invoking the Subscribe service operation. If the UDR receives the ImmediateReport flag in the received Subscribe service operation request, it shall return the resource's representation(s) of the monitored resource(s) in the service operation response body.
33	UESubDataSetRetrieveExt	This feature indicates the support of the Extended UE Subscription Data Sets Retrieve as specified in clause 5.2.47 of 3GPP TS 29.505 [2].
34	SFC	This feature indicates support of Service Function Chaining functionality. It applies for Influence Data resource as specified in 3GPP TS 29.519 [3].
35	SubscribedV2XPolicy	This feature indicates the support of subscribed V2X policy data as specified in 3GPP TS 29.519 [3].
36	CommonEASDNAI	This feature indicates the support of the common EAS/DNAI selection as specified in 3GPP TS 29.519 [3].
37	PolSubscRetrieval	This feature indicates the support of the indication, within the PolicyDataSubscription data type, of the variable part of the Individual Policy Data subscription. It applies to Policy Data subscription resources as specified in 3GPP TS 29.519 [3].

38	A2X	This feature indicates the support of A2X communication as specified in 3GPP TS 29.519 [3].
39	EpsUrsp	This feature indicates support of epsUrspInd within UePolicySet and UePolicySetPatch in 3GPP TS 29.519 [3].
40	DCAMP_Roaming_LBO	This feature indicates support for dynamically changing AM policy for inbound roaming UE using LBO as specified in 3GPP TS 29.519 [3].
41	GMEC	This feature indicates support of Generic Group Management, Exposure and Communication functionality. It applies to Policy Data resource and Application Data resource as specified in 3GPP TS 29.519 [3].
42	PatchCorrection	This feature introduces the correction to the PATCH method to support the service parameter urspGuidance to guide the URSP as specified in 3GPP TS 29.519 [3].
43	EnhancedUePolicy	This feature indicates the support of enhancement of the UE policy (e.g. Tracing Requirements). It applies to Policy Data resource as specified in 3GPP TS 29.519 [3].
44	ProSe_Ph2	This feature indicates the support of UE 5G ProSe policies and subscription information for UE-to-UE relay service. It applies for Policy Data resources as specified in 3GPP TS 29.519 [3].
45	OpSpecAmPolicyData	This feature indicates the support of the operator specific data changes in the AccessAndMobilityPolicyData resource. It applies to AM Policy Data resource as specified in 3GPP TS 29.519 [3].
46	CHFInformation	This feature indicates the support of provisioning of CHF information. It applies to Policy Data resource as specified in 3GPP TS 29.519 [3].
47	SLAMUP	This feature indicates support of Spending Limits for AM and UE Policies in the 5GC. It applies to Policy Data resource as specified in 3GPP TS 29.519 [3]. This feature requires the support of the CHFInformation feature.
48	AfGuideTNAPs	This feature is used in 3GPP TS 29.519 [3] and indicates the support of AF-provided guidance to the HPLMN of the UE of the list of TNAP(s) collocated with a 5G-RG.
49	URSPEnforcement	This feature indicates support of urspEnfInd within UePolicySet and UePolicySetPatch in 3GPP TS 29.519 [3].
50	VPLMNSpecificURSP	This feature indicates support of vpsUrspInd within UePolicySet and UePolicySetPatch in 3GPP TS 29.519 [3].
51	DnaiEasMappings	This feature indicates support of OAM-configured DNAI-EAS mapping information as specified in 3GPP TS 29.519 [3].
52	HR-SBO	This feature indicates support of provisioning ECS Address Configuration Information for Roaming UEs to the V-NEF for the support of Home-Routed deployments with Session Breakout in 3GPP TS 29.519 [3]. This feature requires the support of the “TrafficInfluSubExt” feature.
53	FinerGranUEs	This feature indicates support of finer granular UE sets as specified in 3GPP TS 29.519 [3].
54	CachingTimer	This feature indicates the support of storing caching timer with unit of duration second as specified in 3GPP TS 29.519 [3].
55	AccessAndMobilityPolicyDataModify	This feature indicates the support of the HTTP PATCH method to update the access and mobility policy data defined in a Policy Data resource as specified in 3GPP TS 29.519 [3].
56	Ranging_SL	This feature indicates the support of the ranging and sidelink positioning functionality. It applies to Application Data resources as specified in 3GPP TS 29.519 [3].
57	PDTQ	This feature indicates the support of Planned Data Transfer with QoS requirements Data. It applies to Policy Data resources as specified in 3GPP TS 29.519 [3].
58	PfdDetermination	This feature inidicates the support of including the source NF type of the PFD in PFD Data as specified in 3GPP TS 29.519 [3].
59	URI-reference	This feature indicates the support of the encoding of the URI either as an absolute URI or as an absolute-path relative reference as specified in IETF RFC 3986 [23]. It applies to Policy Data and Exposure Data as specified in 3GPP TS 29.519 [3].

60	TrafficInfluSubExt	This feature indicates support of subscriptions to Traffic Influence Data using various combinations of query parameters as specified in 3GPP TS 29.519 [3].

6.2 Nudr_GroupIDmap Service API

6.2.1 API URI

URIs of this API shall have the following root:

{apiRoot}/<apiName>/<apiVersion>

where "apiRoot" is defined in clause 4.4.1 of 3GPP TS 29.501 [8], the "apiName" shall be set to "nudr-group-id-map" and the "apiVersion" shall be set to "v1" for the current version of this specification.

6.2.2 Usage of HTTP

6.2.2.1 General

HTTP/2, as defined in IETF RFC 9113 [22], shall be used as specified in clause 5 of 3GPP TS 29.500 [7].

HTTP/2 shall be transported as specified in clause 5.3 of 3GPP TS 29.500 [7].

HTTP messages and bodies for the Nudr_GroupIDmap service shall comply with the OpenAPI [21] specification contained in Annex A3.

6.2.2.2 HTTP standard headers

6.2.2.2.1 General

The usage of HTTP standard headers shall be supported on Nudr interface as defined in clause 5.2.2 of 3GPP TS 29.500 [7].

6.2.2.2.2 Content type

The following content types shall be supported:

- JSON, as defined in IETF RFC 8259 [11], shall be used as content type of the HTTP bodies specified in the present specification as indicated in clause 5.4 of 3GPP TS 29.500 [7].
- The Problem Details JSON Object (IETF RFC 9457 [17]). The use of the Problem Details JSON object in a HTTP response body shall be signalled by the content type "application/problem+json".
- JSON Patch (IETF RFC 6902 [19]). The use of the JSON Patch format in a HTTP request body shall be signalled by the content type "application/json-patch+json".

6.2.2.2.3 Cache-Control

As described in IETF RFC 9111 [16] clause 5.2, a "Cache-Control" header should be included in HTTP responses carrying a representation of cacheable resources. If it is included, it shall contain a "max-age" value, indicating the amount of time in seconds after which the received response is considered stale.

The "max-age" value shall be configurable by operator policy.

6.2.2.2.4 ETag

As described in IETF RFC 9110 [15] clause 8.8.3, an "ETag" (entity-tag) header should be included in HTTP responses carrying a representation of cacheable resources to allow an NF Service Consumer performing a conditional GET request with "If-None-Match" header. If it is included, it shall contain a server-generated strong validator, that allows

further matching of this value (included in subsequent client requests) with a given resource representation stored in the server or in a cache.

6.2.2.2.5 If-None-Match

As described in IETF RFC 9110 [15] clause 13.1.2, an NF Service Consumer may issue conditional GET request towards UDR by including an "If-None-Match" header in HTTP requests containing one or several entity tags received in previous responses for the same resource.

6.2.2.2.6 Last-Modified

As described in IETF RFC 9110 [15] clause 8.8.2, a "Last-Modified" header should be included in HTTP responses carrying a representation of cacheable resources (e.g. SmfSelectionSubscriptionData) to allow an NF Service Consumer performing a conditional request with "If-Modified-Since" header.

6.2.2.2.7 If-Modified-Since

As described in IETF RFC 9110 [15] clause 13.1.3, an NF Service Consumer may issue conditional GET request towards UDR, by including an "If-Modified-Since" header in HTTP requests.

6.2.2.2.8 When to Use Entity-Tags and Last-Modified Dates

Both "ETag" and "Last-Modified" headers should be sent in the same HTTP response as stated in IETF RFC 9110 [15] clause 15.3.1.

NOTE: "ETag" is a stronger validator than "Last-Modified" and is preferred.

If the UDR included an "ETag" header with the resource then a conditional GET request for this resource shall be performed with the "If-None-Match" header.

6.2.2.3 HTTP custom headers

6.2.2.3.1 General

In this release of this specification, no custom headers specific to the Nudr_GroupIDmap service are defined. For 3GPP specific HTTP custom headers used across all service-based interfaces, see clause 5.2.3 of 3GPP TS 29.500 [7].

6.2.3 Resources

6.2.3.1 Overview

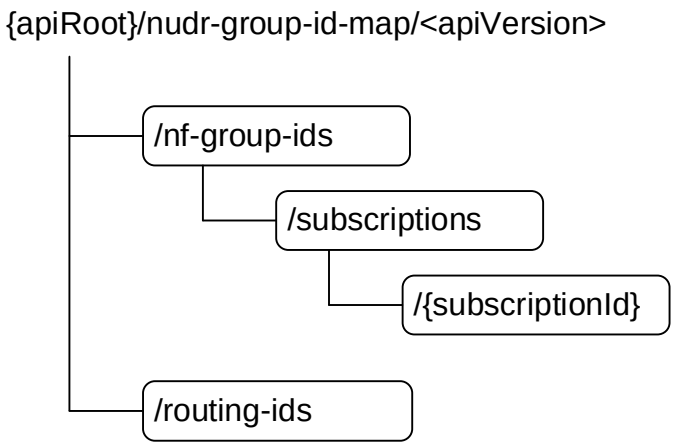

Figure 6.2.3.1-1: Resource URI structure of the nudr-group-id-map API

Table 6.2.3.1-1 provides an overview of the resources and applicable HTTP methods.

Table 6.2.3.1-1: Resources and methods overview

Resource name	Resource URI	HTTP method	Description
NfGroupIds	/nf-group-ids	GET	Obtain the NF Group ID for a given subscriber ID
Subscriptions	/nf-group-ids/subscriptions	POST	Create a subscription
IndividualSubscription	/nf-group-ids/subscriptions/{subscriptionId}	GET	Retrieve an individual subscription
		PATCH	Modify an individual subscription
		DELETE	Delete an individual subscription
RoutingIds	/routing-ids	GET	Obtain the list of Routing IDs served by a given NF Group

6.2.3.2 Resource NfGroupIds

6.2.3.2.1 Description

This resource represents the NF Group IDs for the provided subscriber information (e.g. the subscriber identifier, or information related to a set of subscribers, such as the Routing Indicator).

6.2.3.2.2 Resource Definition

Resource URI: {apiRoot}/nudr-group-id-map/<apiVersion>/nf-group-ids

This resource shall support the resource URI variables defined in table 6.2.3.2.2-1.

Table 6.2.3.2.2-1: Resource URI variables for this resource

Name	Definition
apiRoot	See clause 6.2.1

6.2.3.2.3 Resource Standard Methods

6.2.3.2.3.1 GET

This method shall support the URI query parameters specified in table 6.2.3.2.3.1-1.

Table 6.2.3.2.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description
nf-type	array(NFType)	M	1..N	see 3GPP TS 29.510 [14]
subscriberId	SubscriberId	M	1	Represents the Subscription Identifier SUPI or GPSI or IMPI or IMPU (see 3GPP TS 23.501 [4] clause 5.9.2 and clause 5.9.8) or Routing Indicator pattern: ^(imsi-[0-9]{5,15}|nai-.+|msisdn-[0-9]{5,15}|extid-[^@]+@[^@]+|impi-.+|impu-.+|rid-[0-9]{1,4}|.+)$

NOTE 1: The format of the query parameter subscriberId is in line with the yaml and thus does not follow the lower-with-hyphen format specified in 3GPP TS 29.501 [8].

NOTE 2: If the UDR does not support a certain alternative in the regular expression pattern of the subscriberId query parameter (e.g. "rid-xxxx"), it returns an HTTP 404 error response.

This method shall support the request data structures specified in table 6.2.3.2.3.1-2 and the response data structures and response codes specified in table 6.2.3.2.3.1-3.

Table 6.2.3.2.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 6.2.3.2.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
NfGroupIdMapResult	M	1	200 OK	Upon success, a response body containing the NF Group IDs for the requested NF types shall be returned.
ProblemDetails	O	0..1	404 Not Found	The "cause" attribute may be set to one of the following application errors: - USER_NOT_FOUND
NOTE: In addition, common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 are supported.				

6.2.3.3 Resource RoutingIds

6.2.3.3.1 Description

This resource represents the Routing Indicators served by an NF Group.

6.2.3.3.2 Resource Definition

Resource URI: {apiRoot}/nudr-group-id-map/<apiVersion>/routing-ids

This resource shall support the resource URI variables defined in table 6.2.3.3.2-1.

Table 6.2.3.3.2-1: Resource URI variables for this resource

Name	Definition
apiRoot	See clause 6.2.1

6.2.3.3.3 Resource Standard Methods

6.2.3.3.3.1 GET

This method shall support the URI query parameters specified in table 6.2.3.3.3.1-1.

Table 6.2.3.3.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description
nf-type	NFType	M	1	see 3GPP TS 29.510 [14]
nf-group-id	NfGroupId	M	1	Contains the identity of the NF Group

This method shall support the request data structures specified in table 6.2.3.3.3.1-2 and the response data structures and response codes specified in table 6.2.3.3.3.1-3.

Table 6.2.3.3.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 6.2.3.3.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
RoutingIdResult	M	1	200 OK	Upon success, a response body containing the Routing IDs for the requested NF type and NF Group ID shall be returned.
NOTE: In addition, common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 are supported.				

6.2.3.4 Resource Subscriptions

6.2.3.4.1 Description

This resource represents the subscriptions to changes on the mapping between user ID and NF Group ID.

6.2.3.4.2 Resource Definition

Resource URI: {apiRoot}/nudr-group-id-map/<apiVersion>/nf-group-ids/subscriptions

This resource shall support the resource URI variables defined in table 6.2.3.4.2-1.

Table 6.2.3.4.2-1: Resource URI variables for this resource

Name	Definition
apiRoot	See clause 6.2.1

6.2.3.4.3 Resource Standard Methods

6.2.3.4.3.1 POST

This method shall support the URI query parameters specified in table 6.2.3.4.3.1-1.

Table 6.2.3.4.3.1-1: URI query parameters supported by the POST method on this resource

Name	Data type	P	Cardinality	Description
supported-features	SupportedFeatures	O	0..1	see 3GPP TS 29.500 [7] clause 6.6

This method shall support the request data structures specified in table 6.2.3.4.3.1-2 and the response data structures and response codes specified in table 6.2.3.4.3.1-3.

Table 6.2.3.4.3.1-2: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
SubscriptionData	M	1	Identifies the input data to create a subscription.

Table 6.2.3.4.3.1-3: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
SubscriptionData	M	1	200 OK	Upon success, a response body containing the Routing IDs for the requested NF type and NF Group ID shall be returned.
NOTE: In addition, common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [7] are supported.				

6.2.3.5 Resource IndividualSubscription

6.2.3.5.1 Description

This resource represents an individual subscription to changes on the mapping between user ID and NF Group ID.

6.2.3.5.2 Resource Definition

Resource URI: {apiRoot}/nudr-group-id-map/<apiVersion>/nf-group-ids/subscriptions/{subscriptionId}

This resource shall support the resource URI variables defined in table 6.2.3.5.2-1.

Table 6.2.3.5.2-1: Resource URI variables for this resource

Name	Definition
apiRoot	See clause 6.2.1
subscriptionId	It identifies an individual subscription to notifications. The value is allocated by the UDR during creation of the IndividualSubscription resource.

6.2.3.5.3 Resource Standard Methods

6.2.3.5.3.1 GET

This method shall support the URI query parameters specified in table 6.2.3.5.3.1-1.

Table 6.2.3.5.3.1-1: URI query parameters supported by the GET method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 6.2.3.5.3.1-2 and the response data structures and response codes specified in table 6.2.3.5.3.1-3.

Table 6.2.3.5.3.1-2: Data structures supported by the GET Request Body on this resource

Data type	P	Cardinality	Description
n/a			

Table 6.2.3.5.3.1-3: Data structures supported by the GET Response Body on this resource

Data type	P	Cardinality	Response codes	Description
SubscriptionData	M	1	200 OK	Upon success, a response body containing the data that represents an individual subscription shall be returned.
NOTE: In addition, common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [7] are supported.				

6.2.3.5.3.2 PATCH

This method shall support the URI query parameters specified in table 6.2.3.5.3.2-1.

Table 6.2.3.5.3.2-1: URI query parameters supported by the PATCH method on this resource

Name	Data type	P	Cardinality	Description
supported-features	SupportedFeatures	O	0..1	see 3GPP TS 29.500 [7] clause 6.6

This method shall support the request data structures specified in table 6.2.3.5.3.2-2 and the response data structures and response codes specified in table 6.2.3.5.3.2-3.

Table 6.2.3.5.3.2-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
array(PatchItem)	M	1..N	Contains the delta data to the Individual Subscription.

Table 6.2.3.5.3.2-3: Data structures supported by the PATCH Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Upon successful modification, when all the modification instructions in the PATCH request have been implemented, there is no body in the response message.
SubscriptionData	C	1	200 OK	Upon partial success, if any of the requested modifications have not been accepted, but the server has set different values than those requested by the client, in any of the attributes of the resource, the modified individual SubscriptionData is returned with the accepted/confirmed values, e.g. the confirmed expiry time.
NOTE: In addition, common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [7] are supported.				

6.2.3.5.3.3 DELETE

This method shall support the URI query parameters specified in table 6.2.3.5.3.3-1.

Table 6.2.3.5.3.3-1: URI query parameters supported by the DELETE method on this resource

Name	Data type	P	Cardinality	Description
n/a				

This method shall support the request data structures specified in table 6.2.3.5.3.3-2 and the response data structures and response codes specified in table 6.2.3.5.3.3-3.

Table 6.2.3.5.3.3-2: Data structures supported by the DELETE Request Body on this resource

Data type	P	Cardinality	Description
n/a			The request body shall be empty.

Table 6.2.3.5.3.3-3: Data structures supported by the DELETE Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Upon success, an empty response body shall be returned.
NOTE: In addition, common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [7] are supported.				

6.2.4 Custom Operations without associated resources

In this release of this specification, no custom operations without associated resources are defined for the Nudr_GroupIDmap Service.

6.2.5 Notifications

6.2.5.1 General

This clause specifies the general mechanism of notifications in the following scenarios:

- notification of changed data of mapping between a subscriber ID and an NF Group ID

6.2.5.2 Data Change Notification

The POST method shall be used to inform the NF Service Consumer about a change on the mapping between a subscriber ID and an NF Group ID.

Resource URI: {notificationUri}

Support of URI query parameters is specified in table 6.2.5.2-1.

Table 6.2.5.2-1: URI query parameters supported by the POST method

Name	Data type	P	Cardinality	Description
n/a				

Support of request data structures is specified in table 6.2.5.2-2 and of response data structures and response codes is specified in table 6.2.5.2-3.

Table 6.2.5.2-2: Data structures supported by the POST Request Body

Data type	P	Cardinality	Description
GroupIdMapNotify	M	1	Contains the subscriber ID(s) whose mapping has changed, and the new NF Group ID (and NF type).

Table 6.2.5.2-3: Data structures supported by the POST Response Body

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Upon success, an empty response body shall be returned.
NOTE: In addition, common data structures as listed in table 5.2.7.1-1 of 3GPP TS 29.500 [7] are supported.				

6.2.6 Data Model

6.2.6.1 General

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

Table 6.2.6.1-1 specifies the structured data types defined for the Nudr_GroupIDmap service API. For simple data types defined for the Nudr_GroupIDmap service API see table 6.2.6.3.2-1.

Table 6.2.6.1-1: Nudr_GroupIDmap specific Data Types

Data type	Clause defined	Description
NfGroupIdMapResult	6.2.6.2.2	NF-Group IDs for the requested NF types
RoutingIdResult	6.2.6.2.3	Routing Indicators for the requested NF type and NF Group ID
SubscriptionData	6.2.6.2.4	Information of a subscription to notifications to UDR GroupIDmap service, included in subscription requests and responses
GroupIdMapNotify	6.2.6.2.5	Data sent in notifications from UDR to entities subscribed to UDR GroupIDmap service
SubscriberId	6.2.6.3.2	Represents the Subscription Identifier SUPI or GPSI or IMPI or IMPU or Routing Indicator

Table 6.2.6.1-2 specifies data types re-used by the Nudr_GroupIDmap service API from other specifications, including a reference to their respective specifications and when needed, a short description of their use within the Nudr_GroupIDmap service API.

Table 6.2.6.1-2: Nudr_GroupIDmap re-used Data Types

Data type	Reference	Comments
ProblemDetails	3GPP TS 29.571 [10]	Common data type used in response bodies
SupportedFeatures	3GPP TS 29.571 [10]	
NFType	3GPP TS 29.510 [14]	
NfGroupId	3GPP TS 29.571 [10]	
IdentityRanges	3GPP TS 29.571 [10]	

6.2.6.2 Structured data types

6.2.6.2.1 Introduction

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

6.2.6.2.2 Type: NfGroupIdMapResult

Table 6.2.6.2.2-1: Definition of type NfGroupIdMapResult

Attribute name	Data type	P	Cardinality	Description
nfGroupIDs	map(NfGroupId)	M	1..N	A map (list of key-value pairs where NFType serves as key) of NFGroupIds

6.2.6.2.3 Type: RoutingIdResult

Table 6.2.6.2.3-1: Definition of type NfGroupIdMapResult

Attribute name	Data type	P	Cardinality	Description
routingIndicators	array(string)	M	1..N	An array of Routing Indicators. pattern (of each item): '^[0-9]{1,4}$'

6.2.6.2.4 Type: SubscriptionData

Table 6.2.6.2.4-1: Definition of type SubscriptionData

Attribute name	Data type	P	Cardinality	Description
notificationUri	Uri	M	1	Identifies the URI of the NF Service Consumer where the notification shall be sent by UDR.
nfType	NFType	M	1	NF type of the NF Group ID that shall be monitored for changes on the mapping with subscriber IDs.
nfGroupId	NfGroupId	M	1	NF Group ID that shall be monitored for changes on the mapping with subscriber IDs.
subscriptionId	string	C	0..1	Identity of the individual subscripton, as allocated by the UDR, and sent to the NF Service Consumer in the response message. It shall be absent in request messages and shall be present in response messages. readOnly: true
expiry	DateTime	O	0..1	This IE shall be included in a subscription response if, based on operator policy and taking into account the expiry time included in the request, the UDR needs to include an expiry time. This IE may be included in a subscription request. When present, this IE shall represent the time after which the subscription becomes invalid. The absence of this attribute in the subscription response means the subscription to be valid without an expiry time.

6.2.6.2.5 Type: GroupIdMapNotify

Table 6.2.6.2.5-1: Definition of type GroupIdMapNotify

Attribute name	Data type	P	Cardinality	Description
subscriberId	SubscriberId	M	1	Identity of the subscriber whose mapping to an NF Group ID has changed. If multiple subscriber identities are reported (by including the "identityRanges" attribute), the "subscriberId" attribute shall contain any of the identities included in those ranges.
nfType	NFType	M	1	NF type of the NF Group that starts handling the subscribers identified by this notification.
nfGroupId	NfGroupId	M	1	NF Group ID that starts handling the subscribers identified by this notification.
identityRanges	array(IdentityRanges)	O	1..N	Ranges of identities whose mapping to an NF Group ID has changed. Absence of this attribute indicates that only the user identified by the "subscriberId" attribute is affected by the NF Group ID mapping change. See NOTE.
NOTE: The type of identity shall be the same for all elements of the IdentityRanges array, and it shall be the same as the type of identity indicated by the "subscriberId" attribute.				

EXAMPLE:

- If the following SUPI ranges: [imsi-12345600000 to imsi-12345600099] (100 subscribers) and [imsi-12345699990 to imsi-12345699999] (10 subscribers) have been migrated from UDM Group ID "UDM_GROUP_1" to "UDM_GROUP_2", the notification shall contain the following data:

```
{
  "subscriberId": "imsi-12345600000",
  "nfType": "UDM",
  "nfGroupId": "UDM_GROUP_2",
  "identityRanges": [
    { "start": "12345600000", "end": "12345600099" },
    { "start": "12345699990", "end": "12345699999" }
  ]
}
```

6.2.6.3 Simple data types and enumerations

6.2.6.3.1 Introduction

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

6.2.6.3.2 Simple data types

The simple data types defined in table 6.2.6.3.2-1 shall be supported.

Table 6.2.6.3.2-1: Simple data types

Type Name	Type Definition	Description
SubscriberId	string	Pattern: ^(imsi-[0-9]{5,15}|nai-.+|msisdn-[0-9]{5,15}|extid-[^@]+@[^@]+|impi-.+|impu-.+|rid-[0-9]{1,4}|.+)$

6.2.7 Error Handling

6.2.7.1 General

HTTP error handling shall be supported as specified in clause 5.2.4 of 3GPP TS 29.500 [7].

6.2.7.2 Protocol Errors

Protocol errors handling shall be supported as specified in clause 5.2.7 of 3GPP TS 29.500 [7].

6.2.7.3 Application Errors

The common application errors defined in the Table 5.2.7.2-1 in 3GPP TS 29.500 [7] may also be used for the Nudr_GroupIDmap service. The following application errors listed in Table 6.2.7.3-1 are specific for the Nudr_GroupIDmap service.

Table 6.2.7.3-1: Application errors

Application Error	HTTP status code	Description
USER_NOT_FOUND	404 Not Found	The user does not exist in the HPLMN

6.2.8 Security

As indicated in 3GPP TS 33.501 [12], the access to the Nudr_GroupIDmap API may be authorized by means of the OAuth2 protocol (see IETF RFC 6749 [13]), using the "Client Credentials" authorization grant, where the NRF (see 3GPP TS 29.510 [14]) plays the role of the authorization server.

If Oauth2 authorization is used, an NF Service Consumer, prior to consuming services offered by the Nudr_GroupIDmap API, shall obtain a "token" from the authorization server, by invoking the Access Token Request service, as described in 3GPP TS 29.510 [14], 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 Nudr_GroupIDmap service.

The Nudr_GroupIDmap API defines scopes for OAuth2 authorization as specified in 3GPP TS 33.501 [12]; it defines a single scope consisting on the name of the service (i.e., "nudr-group-id-map"), and it does not define any additional scopes at resource or operation level.

6.2.9 Feature Negotiation

The optional features in table 6.2.9-1 are defined for the Nudr_GroupIDmap API. They shall be negotiated using the extensibility mechanism defined in clause 6.6 of 3GPP TS 29.500 [7].

Table 6.2.9-1: Supported Features

Feature number	Feature Name	Description

Annex A (normative): OpenAPI specification

A.1 General

This document specifies the common service operations and the top level data model for Nudr_DataRepository Service Based Interface. There are no specific HTTP methods or custom operations on the four top level resources in Table 6.1.3.1-1. Hence, the top level OpenAPI specification is not needed.

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

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

Informative copies of the OpenAPI specification files contained in this 3GPP Technical Specification are available on a Git-based repository, that uses the GitLab software version control system (see 3GPP TS 29.501 [8] clause 5.3.1 and 3GPP TR 21.900 [20] clause 5B).

A.2 Nudr_DataRepository API

This Annex specifies the formal definition of the Nudr_DataRepository service. It consists of OpenAPI 3.0.0 specifications, in YAML format.

The OpenAPI 3.0.0 definition related to SubscriptionData shall comply with the definition in 3GPP TS 29.505 [2].

The OpenAPI 3.0.0 definition related to PolicyData, StructuredDataForExposure and ApplicationData shall comply with the definition in 3GPP TS 29.519 [3].

The OpenAPI file for the Nudr_DataRepository API is defined as follows:

```
openapi: 3.0.0

info:
  version: 2.3.0
  title: 'Nudr_DataRepository API OpenAPI file'
  description: |
    Unified Data Repository Service.
    © 2024, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: 3GPP TS 29.504 V18.6.0; 5G System; Unified Data Repository Services; Stage 3
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.504/'

servers:
  - description: API root
    url: '{apiRoot}/nudr-dr/v2'
    variables:
      apiRoot:
        default: https://example.com

security:
  - {}
  - oAuth2ClientCredentials:
      - nudr-dr

paths:
  /subscription-data/{ueId}/authentication-data/authentication-subscription:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1authentication-
data~1authentication-subscription'
  /subscription-data/{ueId}/authentication-data/authentication-status:
```

```
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1authentication-
data~1authentication-status'
  /subscription-data/{ueId}/authentication-data/authentication-status/{servingNetworkName}:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1authentication-
data~1authentication-status~1%7BservingNetworkName%7D'
  /subscription-data/{ueId}/ue-update-confirmation-data/sor-data:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1ue-update-
confirmation-data~1sor-data'
  /subscription-data/{ueId}/ue-update-confirmation-data/upu-data:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1ue-update-
confirmation-data~1upu-data'
  /subscription-data/{ueId}/ue-update-confirmation-data/subscribed-cag:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1ue-update-
confirmation-data~1subscribed-cag'
  /subscription-data/{ueId}/ue-update-confirmation-data/subscribed-snssais:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1ue-update-
confirmation-data~1subscribed-snssais'
  /subscription-data/{ueId}/{servingPlmnId}/provisioned-data:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-
data~1%7BueId%7D~1%7BservingPlmnId%7D~1provisioned-data'
  /subscription-data/{ueId}/{servingPlmnId}/provisioned-data/am-data:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-
data~1%7BueId%7D~1%7BservingPlmnId%7D~1provisioned-data~1am-data'
  /subscription-data/{ueId}/{servingPlmnId}/provisioned-data/smf-selection-subscription-data:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-
data~1%7BueId%7D~1%7BservingPlmnId%7D~1provisioned-data~1smf-selection-subscription-data'
  /subscription-data/{ueId}/{servingPlmnId}/provisioned-data/sm-data:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-
data~1%7BueId%7D~1%7BservingPlmnId%7D~1provisioned-data~1sm-data'
  /subscription-data/{ueId}/{servingPlmnId}/provisioned-data/lcs-bca-data:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-
data~1%7BueId%7D~1%7BservingPlmnId%7D~1provisioned-data~1lcs-bca-data'
  /subscription-data/{ueId}/context-data:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1context-data'
  /subscription-data/{ueId}/context-data/amf-3gpp-access:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1context-data~1amf-
3gpp-access'
  /subscription-data/{ueId}/context-data/amf-non-3gpp-access:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1context-data~1amf-
non-3gpp-access'
  /subscription-data/{ueId}/context-data/smf-registrations:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1context-data~1smf-
registrations'
  /subscription-data/{ueId}/context-data/smf-registrations/{pduSessionId}:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1context-data~1smf-
registrations~1%7BpduSessionId%7D'
  /subscription-data/{ueId}/operator-specific-data:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1operator-specific-
data'
  /subscription-data/{ueId}/context-data/smsf-3gpp-access:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1context-
data~1smsf-3gpp-access'
  /subscription-data/{ueId}/context-data/smsf-non-3gpp-access:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1context-
data~1smsf-non-3gpp-access'
  /subscription-data/{ueId}/context-data/location:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1context-
data~1location'
  /subscription-data/{ueId}/context-data/ip-sm-gw:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1context-data~1ip-
sm-gw'
  /subscription-data/{ueId}/context-data/mwd:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1context-data~1mwd'
  /subscription-data/{ueId}/context-data/roaming-information:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1context-
data~1roaming-information'
  /subscription-data/{ueId}/context-data/pei-info:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1context-data~1pei-
info'
  /subscription-data/{ueId}/{servingPlmnId}/provisioned-data/sms-mng-data:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-
data~1%7BueId%7D~1%7BservingPlmnId%7D~1provisioned-data~1sms-mng-data'
  /subscription-data/{ueId}/{servingPlmnId}/provisioned-data/sms-data:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-
data~1%7BueId%7D~1%7BservingPlmnId%7D~1provisioned-data~1sms-data'
  /subscription-data/{ueId}/lcs-privacy-data:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1lcs-privacy-data'
  /subscription-data/{ueId}/lcs-mo-data:
```

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    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1lcs-mo-data'
  /subscription-data/{ueId}/lcs-subscription-data:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1lcs-subscription-
data'
  /subscription-data/{ueId}/pp-data:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1pp-data'
  /subscription-data/{ueId}/context-data/ee-subscriptions:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1context-data~1ee-
subscriptions'
  /subscription-data/{ueId}/context-data/ee-subscriptions/{subsId}:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1context-data~1ee-
subscriptions~1%7BsubsId%7D'
  /subscription-data/{ueId}/context-data/ee-subscriptions/{subsId}/amf-subscriptions:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1context-data~1ee-
subscriptions~1%7BsubsId%7D~1amf-subscriptions'
  /subscription-data/{ueId}/context-data/ee-subscriptions/{subsId}/smf-subscriptions:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1context-data~1ee-
subscriptions~1%7BsubsId%7D~1smf-subscriptions'
  /subscription-data/{ueId}/context-data/ee-subscriptions/{subsId}/hss-subscriptions:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1context-data~1ee-
subscriptions~1%7BsubsId%7D~1hss-subscriptions'
  /subscription-data/group-data/{ueGroupId}/ee-subscriptions:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1group-
data~1%7BueGroupId%7D~1ee-subscriptions'
  /subscription-data/group-data/{ueGroupId}/ee-subscriptions/{subsId}:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1group-
data~1%7BueGroupId%7D~1ee-subscriptions~1%7BsubsId%7D'
  /subscription-data/group-data/{ueGroupId}/ee-subscriptions/{subsId}/amf-subscriptions:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1group-
data~1%7BueGroupId%7D~1ee-subscriptions~1%7BsubsId%7D~1amf-subscriptions'
  /subscription-data/group-data/{ueGroupId}/ee-subscriptions/{subsId}/smf-subscriptions:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1group-
data~1%7BueGroupId%7D~1ee-subscriptions~1%7BsubsId%7D~1smf-subscriptions'
  /subscription-data/group-data/{ueGroupId}/ee-subscriptions/{subsId}/hss-subscriptions:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1group-
data~1%7BueGroupId%7D~1ee-subscriptions~1%7BsubsId%7D~1hss-subscriptions'
  /subscription-data/group-data/{ueGroupId}/ee-profile-data:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1group-
data~1%7BueGroupId%7D~1ee-profile-data'
  /subscription-data/group-data/5g-vn-groups:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1group-data~15g-vn-groups'
  /subscription-data/group-data/5g-vn-groups/{externalGroupId}:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1group-data~15g-vn-
groups~1%7BexternalGroupId%7D'
  /subscription-data/group-data/5g-vn-groups/internal:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1group-data~15g-vn-
groups~1internal'
  /subscription-data/group-data/5g-vn-groups/pp-profile-data:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1group-data~15g-vn-groups~1pp-
profile-data'
  /subscription-data/group-data/mbs-group-membership:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1group-data~1mbs-group-
membership'
  /subscription-data/group-data/mbs-group-membership/{externalGroupId}:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1group-data~1mbs-group-
membership~1%7BexternalGroupId%7D'
  /subscription-data/group-data/mbs-group-membership/internal:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1group-data~1mbs-group-
membership~1internal'
  /subscription-data/group-data/mbs-group-membership/pp-profile-data:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1group-data~1mbs-group-
membership~1pp-profile-data'
  /subscription-data/{ueId}/ee-profile-data:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1ee-profile-data'
  /subscription-data/{ueId}/context-data/sdm-subscriptions:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1context-data~1sdm-
subscriptions'
  /subscription-data/{ueId}/context-data/sdm-subscriptions/{subsId}:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1context-data~1sdm-
subscriptions~1%7BsubsId%7D'
  /subscription-data/{ueId}/context-data/nidd-authorizations:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1context-
data~1nidd-authorizations'
  /subscription-data/{ueId}/context-data/sdm-subscriptions/{subsId}/hss-sdm-subscriptions:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1context-data~1sdm-
subscriptions~1%7BsubsId%7D~1hss-sdm-subscriptions'
  /subscription-data/shared-data:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1shared-data'
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  /subscription-data/shared-data/{sharedDataId}:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1shared-
data~1%7BsharedDataId%7D'
  /subscription-data/subs-to-notify:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1subs-to-notify'
  /subscription-data/subs-to-notify/{subsId}:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1subs-to-notify~1%7BsubsId%7D'
  /subscription-data/{ueId}/{servingPlmnId}/provisioned-data/trace-data:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-
data~1%7BueId%7D~1%7BservingPlmnId%7D~1provisioned-data~1trace-data'
  /subscription-data/{ueId}/identity-data:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1identity-data'
  /subscription-data/{ueId}/operator-determined-barring-data:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1operator-
determined-barring-data'
  /subscription-data/{ueId}/nidd-authorization-data:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1nidd-
authorization-data'
  /subscription-data/{ueId}/service-specific-authorization-data/{serviceType}:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1service-specific-
authorization-data~1%7BserviceType%7D'
  /subscription-data/{ueId}/v2x-data:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1v2x-data'
  /subscription-data/{ueId}/pp-profile-data:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1pp-profile-data'
  /subscription-data/{ueId}/coverage-restriction-data:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1coverage-
restriction-data'
  /subscription-data/group-data/group-identifiers:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1group-data~1group-identifiers'
  /subscription-data/{ueId}/prose-data:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1prose-data'
  /subscription-data/{ueId}/pp-data-store:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1pp-data-store'
  /subscription-data/{ueId}/context-data/service-specific-authorizations/{serviceType}:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1context-
data~1service-specific-authorizations~1%7BserviceType%7D'
  /subscription-data/{ueId}/5mbs-data:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~15mbs-data'
  /subscription-data/{ueId}/uc-data:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1uc-data'
  /subscription-data/{ueId}/time-sync-data:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1time-sync-data'
  /subscription-data/{ueId}/ranging-slpos-data:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1ranging-slpos-
data'
  /subscription-data/{ueId}/a2x-data:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1a2x-data'
  /subscription-data/{ueId}/rangingsl-privacy-data:
    $ref: 'TS29505_Subscription_Data.yaml#/paths/~1subscription-data~1%7BueId%7D~1rangingsl-privacy-
data'
  /policy-data/ues/{ueId}:
    $ref: 'TS29519_Policy_Data.yaml#/paths/~1policy-data~1ues~1%7BueId%7D'
  /policy-data/ues/{ueId}/am-data:
    $ref: 'TS29519_Policy_Data.yaml#/paths/~1policy-data~1ues~1%7BueId%7D~1am-data'
  /policy-data/ues/{ueId}/ue-policy-set:
    $ref: 'TS29519_Policy_Data.yaml#/paths/~1policy-data~1ues~1%7BueId%7D~1ue-policy-set'
  /policy-data/ues/{ueId}/sm-data:
    $ref: 'TS29519_Policy_Data.yaml#/paths/~1policy-data~1ues~1%7BueId%7D~1sm-data'
  /policy-data/ues/{ueId}/sm-data/{usageMonId}:
    $ref: 'TS29519_Policy_Data.yaml#/paths/~1policy-data~1ues~1%7BueId%7D~1sm-
data~1%7BusageMonId%7D'
  /policy-data/sponsor-connectivity-data/{sponsorId}:
    $ref: 'TS29519_Policy_Data.yaml#/paths/~1policy-data~1sponsor-connectivity-
data~1%7BsponsorId%7D'
  /policy-data/bdt-data:
    $ref: 'TS29519_Policy_Data.yaml#/paths/~1policy-data~1bdt-data'
  /policy-data/bdt-data/{bdtReferenceId}:
    $ref: 'TS29519_Policy_Data.yaml#/paths/~1policy-data~1bdt-data~1%7BbdtReferenceId%7D'
  /policy-data/subs-to-notify:
    $ref: 'TS29519_Policy_Data.yaml#/paths/~1policy-data~1subs-to-notify'
  /policy-data/subs-to-notify/{subsId}:
    $ref: 'TS29519_Policy_Data.yaml#/paths/~1policy-data~1subs-to-notify~1%7BsubsId%7D'
  /policy-data/ues/{ueId}/operator-specific-data:
    $ref: 'TS29519_Policy_Data.yaml#/paths/~1policy-data~1ues~1%7BueId%7D~1operator-specific-data'
  /application-data/pfds:
    $ref: 'TS29519_Application_Data.yaml#/paths/~1application-data~1pfds'
  /application-data/pfds/{appId}:
```

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    $ref: 'TS29519_Application_Data.yaml#/paths/~1application-data~1pfds~1%7BappId%7D'
  /application-data/influenceData:
    $ref: 'TS29519_Application_Data.yaml#/paths/~1application-data~1influenceData'
# The path segment is left not following the naming convention as defined in 3GPP TS 29.501 due to
backward compatibility consideration.
  /application-data/influenceData/{influenceId}:
    $ref: 'TS29519_Application_Data.yaml#/paths/~1application-
data~1influenceData~1%7BinfluenceId%7D'
# The path segment is left not following the naming convention as defined in 3GPP TS 29.501 due to
backward compatibility consideration.
  /policy-data/plmns/{plmnId}/ue-policy-set:
    $ref: 'TS29519_Policy_Data.yaml#/paths/~1policy-data~1plmns~1%7BplmnId%7D~1ue-policy-set'
  /application-data/bdtPolicyData:
    $ref: 'TS29519_Application_Data.yaml#/paths/~1application-data~1bdtPolicyData'
# The path segment is left not following the naming convention as defined in 3GPP TS 29.501 due to
backward compatibility consideration.
  /application-data/bdtPolicyData/{bdtPolicyId}:
    $ref: 'TS29519_Application_Data.yaml#/paths/~1application-
data~1bdtPolicyData~1%7BbdtPolicyId%7D'
# The path segment is left not following the naming convention as defined in 3GPP TS 29.501 due to
backward compatibility consideration.
  /application-data/iptvConfigData:
    $ref: 'TS29519_Application_Data.yaml#/paths/~1application-data~1iptvConfigData'
# The path segment is left not following the naming convention as defined in 3GPP TS 29.501 due to
backward compatibility consideration.
  /application-data/iptvConfigData/{configurationId}:
    $ref: 'TS29519_Application_Data.yaml#/paths/~1application-
data~1iptvConfigData~1%7BconfigurationId%7D'
# The path segment is left not following the naming convention as defined in 3GPP TS 29.501 due to
backward compatibility consideration.
  /application-data/serviceParamData:
    $ref: 'TS29519_Application_Data.yaml#/paths/~1application-data~1serviceParamData'
# The path segment is left not following the naming convention as defined in 3GPP TS 29.501 due to
backward compatibility consideration.
  /application-data/serviceParamData/{serviceParamId}:
    $ref: 'TS29519_Application_Data.yaml#/paths/~1application-
data~1serviceParamData~1%7BserviceParamId%7D'
# The path segment is left not following the naming convention as defined in 3GPP TS 29.501 due to
backward compatibility consideration.
  /application-data/influenceData/subs-to-notify:
    $ref: 'TS29519_Application_Data.yaml#/paths/~1application-data~1influenceData~1subs-to-notify'
# The path segment is left not following the naming convention as defined in 3GPP TS 29.501 due to
backward compatibility consideration.
  /application-data/influenceData/subs-to-notify/{subscriptionId}:
    $ref: 'TS29519_Application_Data.yaml#/paths/~1application-data~1influenceData~1subs-to-
notify~1%7BsubscriptionId%7D'
# The path segment is left not following the naming convention as defined in 3GPP TS 29.501 due to
backward compatibility consideration.
  /application-data/subs-to-notify:
    $ref: 'TS29519_Application_Data.yaml#/paths/~1application-data~1subs-to-notify'
  /application-data/subs-to-notify/{subsId}:
    $ref: 'TS29519_Application_Data.yaml#/paths/~1application-data~1subs-to-notify~1%7BsubsId%7D'
  /exposure-data/{ueId}/access-and-mobility-data:
    $ref: 'TS29519_Exposure_Data.yaml#/paths/~1exposure-data~1%7BueId%7D~1access-and-mobility-data'
  /exposure-data/{ueId}/session-management-data/{pduSessionId}:
    $ref: 'TS29519_Exposure_Data.yaml#/paths/~1exposure-data~1%7BueId%7D~1session-management-
data~1%7BpduSessionId%7D'
  /exposure-data/subs-to-notify:
    $ref: 'TS29519_Exposure_Data.yaml#/paths/~1exposure-data~1subs-to-notify'
  /exposure-data/subs-to-notify/{subId}:
    $ref: 'TS29519_Exposure_Data.yaml#/paths/~1exposure-data~1subs-to-notify~1%7BsubId%7D'
  /data-restoration-events:
    post:
    # This is a pseudo operation, clients shall NOT invoke this method!
      summary: subscribe to data restoration notifications
      operationId: CreateIndividualSubcription
      tags:
        - Subscriptions (Collection)
      requestBody:
        required: true
        content:
          application/json:
            schema: {}
      responses:
        default:
          $ref: 'TS29571_CommonData.yaml#/components/responses/default'
      callbacks:
        restorationNotification:
```

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          '{dataRestorationCallbackUri}':
          # The URI in {dataRestorationCallbackUri} is the default endpoint discovered from NRF.
            post:
              requestBody:
                required: true
                content:
                  application/json:
                    schema:
                      $ref: '#/components/schemas/DataRestorationNotification'
              responses:
                '204':
                  description: No Content, Notification was succesfull
                '307':
                  description: Temporary Redirect
                  content:
                    application/json:
                      schema:
                        $ref: 'TS29571_CommonData.yaml#/components/schemas/RedirectResponse'
                  headers:
                    Location:
                      description: 'The URI pointing to the resource located on the redirect target
NF service consumer'
                      required: true
                      schema:
                        type: string
                '308':
                  description: Permanent Redirect
                  content:
                    application/json:
                      schema:
                        $ref: 'TS29571_CommonData.yaml#/components/schemas/RedirectResponse'
                  headers:
                    Location:
                      description: 'The URI pointing to the resource located on the redirect target
NF service consumer'
                      required: true
                      schema:
                        type: string
                '404':
                  $ref: 'TS29571_CommonData.yaml#/components/responses/404'
                default:
                  $ref: 'TS29571_CommonData.yaml#/components/responses/default'

components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{nrfApiRoot}/oauth2/token'
          scopes:
            nudr-dr: Access to the Nudr_DataRepository API
            nudr-dr:subscription-data: Access to the SubscriptionData data set
            nudr-dr:subscription-data:authentication-subscription:read: Access to read the
AuthenticationSubscription resource of the SubscriptionData data set
            nudr-dr:subscription-data:authentication-subscription:modify: Access to update the
AuthenticationSubscription resource of the SubscriptionData data set
            nudr-dr:subscription-data:registrations:write: Write access to NF registration resources
of the SubscriptionData data set
            nudr-dr:policy-data: Access to the PolicyData data set
            nudr-dr:policy-data:ues:read: Access to read the UEs resource
            nudr-dr:policy-data:ues:am-data:read: Access to read the UEs Access and Mobility policy
data
            nudr-dr:policy-data:ues:ue-policy-set:read: Access to read the UEs Policy Set data
            nudr-dr:policy-data:ues:ue-policy-set:create: Access to create the UEs Policy Set data
            nudr-dr:policy-data:ues:ue-policy-set:modify: Access to update the UEs Policy Set data
            nudr-dr:policy-data:ues:sm-data:read: Access to read the UEs Session Management Policy
data
            nudr-dr:policy-data:ues:sm-data:modify: Access to update the UEs Session Management
Policy data
            nudr-dr:policy-data:ues:sm-data:create: Access to create the UEs Session Management
Policy data
            nudr-dr:policy-data:sponsor-connectivity-data:read: Access to read the sponsored
Connectivity Data
            nudr-dr:policy-data:bdt-data:read: Access to read the BDT data resource
            nudr-dr:policy-data:bdt-data:create: Access to create the BDT data resource
            nudr-dr:policy-data:bdt-data:modify: Access to update the BDT data resource
            nudr-dr:policy-data:subs-to-notify:create: Access to create Subscriptions resources
```

```
            nudr-dr:policy-data:subs-to-notify:modify: Access to update Subscriptions resources
            nudr-dr:policy-data:ues:operator-specific-data:read: Access to read the UEs operator
specific policy data
            nudr-dr:policy-data:ues:operator-specific-data:modify: Access to update the UEs operator
specific policy data
            nudr-dr:policy-data:ues:operator-specific-data:create: Access to create the UEs operator
specific policy data
            nudr-dr:policy-data:slice-control-data:read: Access to read Slice specific Policy
Control Data
            nudr-dr:policy-data:slice-control-data:modify: Access to update Slice specific Policy
Control Data
            nudr-dr:policy-data:group-control-data:read: Access to read Group Control Data
            nudr-dr:policy-data:group-control-data:modify: Access to update Group Control Data
            nudr-dr:exposure-data: Access to the ExposureData data set
            nudr-dr:exposure-data:access-and-mobility-data:create: Access to create ExposureData
            nudr-dr:exposure-data:access-and-mobility-data:read: Access to read ExposureData
            nudr-dr:exposure-data:access-and-mobility-data:modify: Access to update ExposureData
            nudr-dr:exposure-data:session-management-data:create: Access to create ExposureData
            nudr-dr:exposure-data:session-management-data:read: Access to read ExposureData
            nudr-dr:exposure-data:session-management-data:modify: Access to update ExposureData
            nudr-dr:exposure-data:subs-to-notify:create: Access to create Subscriptions resources
            nudr-dr:exposure-data:subs-to-notify:modify: Access to update Subscriptions resources
            nudr-dr:application-data: Access to the ApplicationData data set
            nudr-dr:application-data:pfds:read: Access to read PFDData
            nudr-dr:application-data:pfds:modify: Access to update PFDData
            nudr-dr:application-data:pfds:create: Access to create PFDData
            nudr-dr:application-data:influence-data:read: Access to read Traffic Influence Data
            nudr-dr:application-data:influence-data:create: Access to create Traffic Influence Data.
            nudr-dr:application-data:influence-data:modify: Access to update Traffic Influence Data
            nudr-dr:application-data:influence-data:subscriptions:read: Access to read Traffic
Influence Data Subscriptions
            nudr-dr:application-data:influence-data:subscriptions:create: Access to create Traffic
Influence Data Subscriptions
            nudr-dr:application-data:influence-data:subscriptions:modify: Access to update Traffic
Influence Data Subscriptions
            nudr-dr:application-data:bdt-policy-data:read: Access to read BDT Policy Data
            nudr-dr:application-data:bdt-policy-data:create: Access to create BDT Policy Data
            nudr-dr:application-data:bdt-policy-data:modify: Access to update BDT Policy Data
            nudr-dr:application-data:iptv-config-data:read: Access to read IPTV Configuration Data
            nudr-dr:application-data:iptv-config-data:create: Access to create IPTV Configuration
Data
            nudr-dr:application-data:iptv-config-data:modify: Access to update IPTV Configuration
Data
            nudr-dr:application-data:service-param-data:read: Access to read Service Parameter Data
            nudr-dr:application-data:service-param-data:create: Access to create Service Parameter
Data
            nudr-dr:application-data:service-param-data:modify: Access to update Service Parameter
Data
            nudr-dr:application-data:am-influence-data:read: Access to read AM Influence Data
            nudr-dr:application-data:am-influence-data:create: Access to create AM Influence Data
            nudr-dr:application-data:am-influence-data:modify: Access to update AM Influence Data
            nudr-dr:application-data:subs-to-notify:create: Access to create Subscriptions resources
            nudr-dr:application-data:subs-to-notify:read: Access to read Subscriptions resources
            nudr-dr:application-data:subs-to-notify:modify: Access to update Subscriptions resources
            nudr-dr:application-data:eas-deploy-data:read: Access to read EAS Deployment Information
Data
            nudr-dr:application-data:eas-deploy-data:create: Access to create EAS Deployment
Information Data
            nudr-dr:application-data:eas-deploy-data:modify: Access to update EAS Deployment
Information Data
            nudr-dr:application-data:ecs-address-roaming:read: Access to read ECS Address Roaming
Data
            nudr-dr:application-data:ecs-address-roaming:create: Access to create ECS Address
Roaming Data
            nudr-dr:application-data:ecs-address-roaming:modify: Access to update ECS Address
Roaming Data
            nudr-dr:application-data:dnai-eas:read: Access to read DNAI-EAS Mapping Data
            nudr-dr:application-data:af-qos-data-sets:read: Access to read AF Qos Data Sets
            nudr-dr:application-data:af-qos-data-sets:create: Access to create AF Qos Data Sets
            nudr-dr:application-data:af-qos-data-sets:modify: Access to update AF Qos Data Sets

  schemas:
    DataRestorationNotification:
      description: Contains identities representing those UEs potentially affected by a data-loss
event at the UDR
      type: object
      properties:
        supiRanges:
```

```
          type: array
          items:
            $ref: 'TS29510_Nnrf_NFManagement.yaml#/components/schemas/SupiRange'
          minItems: 1
        gpsiRanges:
          type: array
          items:
            $ref: 'TS29510_Nnrf_NFManagement.yaml#/components/schemas/IdentityRange'
          minItems: 1
        resetIds:
          type: array
          items:
            type: string
          minItems: 1
        sNssaiList:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/Snssai'
          minItems: 1
        dnnList:
          type: array
          items:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/Dnn'
          minItems: 1
        udrGroupId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/NfGroupId'
```

A.3 Nudr_GroupIDmap API

```
openapi: 3.0.0

info:
  version: 1.2.0
  title: 'Nudr_GroupIDmap'
  description: |
    Unified Data Repository Service for NF-Group ID retrieval.
    © 2024, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: 3GPP TS 29.504 V18.6.0; 5G System; Unified Data Repository Services; Stage 3
  url: 'https://www.3gpp.org/ftp/Specs/archive/29_series/29.504/'

servers:
  - description: API root
    url: '{apiRoot}/nudr-group-id-map/v1'
    variables:
      apiRoot:
        default: https://example.com

security:
  - {}
  - oAuth2ClientCredentials:
      - nudr-group-id-map

paths:
  /nf-group-ids:
    get:
      summary: Retrieves NF-Group IDs for provided Subscriber and NF types
      operationId: GetNfGroupIDs
      tags:
        - NF Group IDs (Document)
      parameters:
        - name: nf-type
          in: query
          description: Type of NF
          required: true
          style: form
          explode: false
          schema:
            type: array
            items:
              $ref: 'TS29510_Nnrf_NFManagement.yaml#/components/schemas/NFType'
            minItems: 1
```

```
        - name: subscriberId
# The name of this query parameter is left not following the naming convention as defined in 3GPP TS
29.501 due to backward compatibility consideration.
          in: query
          description: Identifier of the subscriber
          required: true
          schema:
            $ref: '#/components/schemas/SubscriberId'
      responses:
        '200':
          description: Expected response to a valid request
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/NfGroupIdMapResult'
        '400':
          $ref: 'TS29571_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29571_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29571_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29571_CommonData.yaml#/components/responses/404'
        '406':
          $ref: 'TS29571_CommonData.yaml#/components/responses/406'
        '429':
          $ref: 'TS29571_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29571_CommonData.yaml#/components/responses/500'
        '502':
          $ref: 'TS29571_CommonData.yaml#/components/responses/502'
        '503':
          $ref: 'TS29571_CommonData.yaml#/components/responses/503'
        default:
          description: Unexpected error

  /nf-group-ids/subscriptions:
    post:
      summary: Create subscription to NF Group ID mapping
      operationId: CreateGroupIdSubscription
      tags:
        - NF Group ID Subscriptions (Collection)
      parameters:
        - name: supported-features
          in: query
          description: Features required to be supported by the target NF
          schema:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
      requestBody:
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/SubscriptionData'
        required: true
      responses:
        '201':
          description: Expected response to a valid request
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/SubscriptionData'
          headers:
            Location:
              description: >
                Contains the URI of the newly created resource, according to the structure:
                {apiRoot}/nudr-grup-id-map/<apiVersion>/nf-group-ids/subscriptions/{subscriptionId}
              required: true
              schema:
                type: string
        '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:
        $ref: 'TS29571_CommonData.yaml#/components/responses/default'
    callbacks:
      onGroupIdMapChange:
        '{$request.body#/notificationUri}':
          post:
            requestBody:
              required: true
              content:
                application/json:
                  schema:
                    $ref: '#/components/schemas/GroupIdMapNotify'
            responses:
              '204':
                description: Expected response to a valid request
              '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'

  /nf-group-ids/subscriptions/{subscriptionId}:
    get:
      summary: Retrieves a individual subscription to NF Group ID mapping
      operationId: QueryGroupIdSubscription
      tags:
        - NF Group ID Subscription (Document)
      parameters:
        - name: subscriptionId
          in: path
          required: true
          description: Unique ID of the subscription to retrieve
          schema:
            type: string
      responses:
        '200':
          description: Expected response to a valid request
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/SubscriptionData'
        '400':
          $ref: 'TS29571_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29571_CommonData.yaml#/components/responses/401'
        '403':
```

```
        $ref: 'TS29571_CommonData.yaml#/components/responses/403'
      '404':
        $ref: 'TS29571_CommonData.yaml#/components/responses/404'
      '406':
        $ref: 'TS29571_CommonData.yaml#/components/responses/406'
      '429':
        $ref: 'TS29571_CommonData.yaml#/components/responses/429'
      '500':
        $ref: 'TS29571_CommonData.yaml#/components/responses/500'
      '502':
        $ref: 'TS29571_CommonData.yaml#/components/responses/502'
      '503':
        $ref: 'TS29571_CommonData.yaml#/components/responses/503'
      default:
        $ref: 'TS29571_CommonData.yaml#/components/responses/default'

  patch:
    summary: Modify an individual subscription to NF Group ID mapping
    operationId: ModifyGroupIdSubscription
    tags:
      - NF Group ID Subscription (Document)
    parameters:
      - name: subscriptionId
        in: path
        required: true
        schema:
          type: string
      - name: supported-features
        in: query
        description: Features required to be supported by the target NF
        schema:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/SupportedFeatures'
    requestBody:
      content:
        application/json-patch+json:
          schema:
            type: array
            items:
              $ref: 'TS29571_CommonData.yaml#/components/schemas/PatchItem'
            minItems: 1
      required: true
    responses:
      '204':
        description: Successful response
      '200':
        description: Expected response to a valid request
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/SubscriptionData'
      '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'

  delete:
    summary: Deletes a subscription to NF Group ID mapping
    operationId: RemoveGroupIdSubscription
```

```
    tags:
      - NF Group ID Subscription (Document)
    parameters:
      - name: subscriptionId
        in: path
        required: true
        description: Unique ID of the subscription to remove
        schema:
          type: string
    responses:
      '204':
        description: Expected response to a successful subscription removal
      '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'

  /routing-ids:
    get:
      summary: Retrieves Routing Indicators for the provided NF type and NF Group ID
      operationId: GetRoutingIDs
      tags:
        - Routing IDs (Document)
      parameters:
        - name: nf-type
          in: query
          description: Type of NF
          required: true
          schema:
            $ref: 'TS29510_Nnrf_NFManagement.yaml#/components/schemas/NFType'
        - name: nf-group-id
          in: query
          description: Identifier of the NF Group
          required: true
          schema:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/NfGroupId'
      responses:
        '200':
          description: Expected response to a valid request
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/RoutingIdResult'
        '400':
          $ref: 'TS29571_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29571_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29571_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29571_CommonData.yaml#/components/responses/404'
        '406':
          $ref: 'TS29571_CommonData.yaml#/components/responses/406'
        '429':
          $ref: 'TS29571_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29571_CommonData.yaml#/components/responses/500'
        '502':
          $ref: 'TS29571_CommonData.yaml#/components/responses/502'
        '503':
          $ref: 'TS29571_CommonData.yaml#/components/responses/503'
        default:
          description: Unexpected error
```

```
components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{nrfApiRoot}/oauth2/token'
          scopes:
            nudr-group-id-map: Access to the Nudr_GroupIDmap API



  schemas:

# STRUCTURED TYPES:

    NfGroupIdMapResult:
      description: >
        Contains the NFGroupIds for the requested NF types. The NFType is the key of the map.
      type: object
      additionalProperties:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/NfGroupId'
      minProperties: 1

    RoutingIdResult:
      description: >
        Contains the Routing Indicators for the requested NF type and NF Group ID.
      type: object
      properties:
        routingIndicators:
          type: array
          items:
            type: string
            pattern: '^[0-9]{1,4}$'
          minItems: 1

    SubscriptionData:
      description: >
        Information of a subscription to notifications to UDR GroupIDmap service,
        included in subscription requests and responses
      type: object
      required:
        - notificationUri
        - nfType
        - nfGroupId
      properties:
        notificationUri:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'
        nfType:
          $ref: 'TS29510_Nnrf_NFManagement.yaml#/components/schemas/NFType'
        nfGroupId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/NfGroupId'
        subscriptionId:
          type: string
          readOnly: true
        expiry:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'

    GroupIdMapNotify:
      description: >
        Data sent in notifications from UDR to entities subscribed
        to UDR GroupIDmap service
      type: object
      required:
        - subscriberId
        - nfType
        - nfGroupId
      properties:
        subscriberId:
          $ref: '#/components/schemas/SubscriberId'
        nfType:
          $ref: 'TS29510_Nnrf_NFManagement.yaml#/components/schemas/NFType'
        nfGroupId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/NfGroupId'
        identityRanges:
          type: array
          items:
            $ref: 'TS29510_Nnrf_NFManagement.yaml#/components/schemas/IdentityRange'
```

```
          minItems: 1

# SIMPLE TYPES:

    SubscriberId:
      description: >
        Represents the Subscription Identifier SUPI or GPSI or IMPI or IMPU, or Routing Indicator.
      type: string
      pattern: '^(imsi-[0-9]{5,15}|nai-.+|msisdn-[0-9]{5,15}|extid-[^@]+@[^@]+|impi-.+|impu-.+|rid-
[0-9]{1,4}|.+)$'

# ENUMS:
```

Annex B (Normative): ABNF grammar for 3GPP SBI HTTP custom headers

B.1 General

This Annex contains a self-contained set of ABNF rules, comprising the re-used rules from IETF RFCs, and the rules defined by the 3GPP custom headers defined in this specification (see clause 6.1.2.3).

This grammar may be used as input to existing tools to help implementations to parse 3GPP custom headers.

B.2 ABNF definitions (Filename: "TS29504_CustomHeaders.abnf")

```
; ----------------------------------------
;   RFC 5234
; ----------------------------------------

HTAB   = %x09 ; horizontal tab

LF     = %x0A ; linefeed

CR     = %x0D ; carriage return

SP     = %x20

DQUOTE = %x22 ; " (Double Quote)

DIGIT  = %x30-39 ; 0-9

ALPHA  = %x41-5A / %x61-7A ; A-Z / a-z

VCHAR  = %x21-7E ; visible (printing) characters

WSP    = SP / HTAB ; white space

CRLF   = CR LF ; Internet standard newline


; ----------------------------------------
;   RFC 5322
; ----------------------------------------

obs-FWS       = 1*WSP *( CRLF 1*WSP )

FWS           = ( [ *WSP CRLF ] 1*WSP ) / obs-FWS

obs-NO-WS-CTL = %d1-8 / %d11 / %d12 / %d14-31 / %d127

obs-ctext     = obs-NO-WS-CTL

ctext         = %d33-39 / %d42-91 / %d93-126 / obs-ctext

obs-qp        = "\" ( obs-NO-WS-CTL / LF / CR )

quoted-pair   = ( "\" ( VCHAR / WSP ) ) / obs-qp

ccontent      = ctext / quoted-pair / comment

comment       = "(" *( [ FWS ] ccontent ) [ FWS ] ")"


; ----------------------------------------
;   RFC 9110
; ----------------------------------------

OWS        = *( SP / HTAB )
```

```
tchar      = "!" / "#" / "$" / "%" / "&" / "'" / "*" / "+" / "-"
           / "." / "^" / "_" / "`" / "|" / "~" / DIGIT / ALPHA

token      = 1*tchar

obs-text   = %x80-FF



entity-tag = [ weak ] opaque-tag

weak       = %x57.2F ; "W/", case-sensitive

opaque-tag = DQUOTE *etagc DQUOTE

etagc      = %x21 / %x23-7E / obs-text ; VCHAR except double quotes, plus obs-text


; ----------------------------------------
;   3GPP TS 29.504
;
;   Version: 18.5.0 (March 2024)
;
;   (c) 2024, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
; ----------------------------------------

;
; Header: 3gpp-Sbi-Notification-Correlation
;

Sbi-Notification-Correlation-Header = "3gpp-Sbi-Notification-Correlation:" OWS subscriptionId
                                     *( OWS "," OWS subscriptionId ) OWS

subscriptionId                     = token



;
; Header: 3gpp-Sbi-Etags
;

Sbi-Etags-Header        = "3gpp-Sbi-Etags:" OWS datasetEtag *( OWS "," OWS datasetEtag ) OWS

datasetEtag             = dataSetName "=" entity-tag

dataSetName             = UeSubscribedDataSetName

UeSubscribedDataSetName = 1*( ALPHA / DIGIT / "_" )
```

Annex C (informative): Change history

Change history							
Date	Meeting	TDoc	CR	Rev	Cat	Subject/Comment	New version
2018-01	CT4#82	C4-181365				TS skeleton	0.0.0
2018-01	CT4#82	C4-181396				Inclusion of pCRs agreed at CT4#82, including C4-181366, C4-181367, C4-181323 and C4-181385.	0.1.0
2018-03	CT4#83	C4-182441				Inclusion of pCRs agreed at CT4#83, including C4-182337, C4-182429.	0.2.0
2018-04	CT4#84	C4-183522				Inclusion of pCRs agreed at CT4#84, including C4-183497, C4-183295, C4-183296, C4-183297, C4-183102, C4-183420, C4-183498.	0.3.0
2018-05	CT4#85	C4-184636				Inclusion of pCRs agreed at CT4#85, including C4-184482, C4-184484, C4-184167, C4-184168, C4-184489, C4-184564, C4-184637.	0.4.0
2018-06	CT#80	CP-181102				Presented for information and approval	1.0.0
2018-06	CT#80					Approved in CT#80.	15.0.0
2018-09	CT#81	CP-182057	0002	1	F	Service Name	15.1.0
2018-09	CT#81	CP-182057	0006	2	F	Supported Features Negotiation	15.1.0
2018-09	CT#81	CP-182057	0004	2	F	Error handling in UDR	15.1.0
2018-09	CT#81	CP-182211	0003	4		OpenAPI file for Nudr_DataRepository API	15.1.0
2018-10	CT#82	CP-183015	0008	-	F	Update the Reference point name	15.2.0
2018-10	CT#82	CP-183015	0009	-	F	Introduction of Barring of Roaming in 5GC	15.2.0
2018-10	CT#82	CP-183015	0010	1	F	Shared Data	15.2.0
2018-10	CT#82	CP-183015	0011	-		Get multiple datasets for ProvsionedData	15.2.0
2018-10	CT#82	CP-183015	0012	1	F	Definition of Authentication Data	15.2.0
2018-12	CT#82	CP-183015	0013	1	F	Adding headers for cache control and conditional request to the Nudr Services API	15.2.0
2018-12	CT#82	CP-183015	0014	-		APIRoot Clarification	15.2.0
2018-12	CT#82	CP-183015	0015	2	F	lifetime of subscription	15.2.0
2018-12	CT#82	CP-183015	0016	1	F	Authorized Event Types	15.2.0
2018-12	CT#82	CP-183015	0017	-		Group Subscription Path	15.2.0
2018-12	CT#82	CP-183177	0018	2	F	PLMN ID as key for UE data sets	15.2.0
2018-12	CT#82	CP-183241	0020	1	F	Correction to Nudr_DataRepository service OpenAPI	15.2.0
2019-03	CT#83	CP-190020	0021	1		CR 0018r2 was not implemented	15.3.0
2019-03	CT#83	CP-190020	0022	2		Corrections on openAPI	15.3.0
2019-03	CT#83	CP-190020	0023			UDR Application Errors	15.3.0
2019-03	CT#83	CP-190020	0025	1		Missing URLs in UDR API	15.3.0
2019-03	CT#83	CP-190172	0026	1		3GPP TS 29.504 API version update	15.3.0
2019-06	CT#84	CP-191031	0027	-	F	Content Type	15.4.0
2019-06	CT#84	CP-191031	0028	-	F	UE Parameter Update (UPU)	15.4.0
2019-06	CT#84	CP-191031	0030	1	F	Group Identifier Translation	15.4.0
2019-06	CT#84	CP-191031	0032	2	F	Storage of OpenAPI specification files	15.4.0
2019-06	CT#84	CP-191031	0034	1	F	Missing Context Path	15.4.0
2019-06	CT#84	CP-191031	0035	-	F	Copyright Note in YAML file	15.4.0
2019-06	CT#84	CP-191031	0038	-	F	3GPP TS 29.504 API version update	15.4.0
2019-06	CT#84	CP-191031	0036	1	F	Resource notification featurres for Policy and Exposure Data	15.4.0
2019-06	CT#84	CP-191048	0037	-	F	3GPP TS 29.504 API version update	16.0.0
2019-06	CT#84	CP-191051	0029	1	B	PFD extension for domain name	16.0.0
2019-09	CT#85	CP-192133	0040	-	B	Closed Access Group	16.1.0
2019-09	CT#85	CP-192133	0041	-	B	VN-Group parameter provisioning	16.1.0
2019-09	CT#85	CP-192123	0042	-	B	Conditional POST / PUT / PATCH / DELETE requests	16.1.0
2019-09	CT#85	CP-192190	0048	1	B	New supported features for xBDT	16.1.0
2019-09	CT#85	CP-192123	0049	1	B	Support a set of MAC addresses in traffic filter	16.1.0
2019-09	CT#85	CP-192123	0050	1	B	Multiple temporal validity conditions for AF traffic influence	16.1.0
2019-09	CT#85	CP-192123	0039	1	B	Network Slicing Subscription Change	16.1.0
2019-09	CT#85	CP-192123	0044	1	F	UDR Application Errors	16.1.0
2019-09	CT#85	CP-192104	0054	1	A	Correction on Feature numbers	16.1.0
2019-09	CT#85	CP-192120	0056	-	F	3GPP TS 29.504 API version update	16.1.0
2019-10	-	-	-	-	-	TS outlook fixed	16.1.1
2019-12	CT#86	CP-193028	0066		A	Wrong YAML Structure of OpenAPI 'info' Clause	16.2.0
2019-12	CT#86	CP-193028	0068		A	CR 0026r1 was not correctly implemented	16.2.0
2019-12	CT#86	CP-193039	0070	1	B	Update Application Data Resources	16.2.0
2019-12	CT#86	CP-193044	0073		F	3GPP TS 29.504 API version update	16.2.0
2019-12	CT#86	CP-193049	0069	1	B	NIDD Authorization Data	16.2.0
2019-12	CT#86	CP-193055	0060	1	B	LCS Private	16.2.0
2019-12	CT#86	CP-193055	0061	1	B	Mobile Originated Data	16.2.0
2019-12	CT#86	CP-193060	0058	1	B	Missed URLLC feature from Application Data	16.2.0
2019-12	CT#86	CP-193063	0059		B	Patch Report Feature	16.2.0
2019-12	CT#86	CP-193063	0057	2	F	Clarification on Implicit Subscriptions to Notifications	16.2.0
2019-12	CT#86	CP-193130	0064	2	B	Nudr_GroupIDmap Service	16.2.0
2019-12	CT#86	CP-193064	0063	1	B	Definition of SessionManagementPolicyDataPatch feature	16.2.0
2020-03	CT#87	CP-200020	0079		B	Mute Notifications	16.3.0

2020-03	CT#87	CP-200039	0074	2	F	Add Corresponding API descriptions in clause 5.1	16.3.0
2020-03	CT#87	CP-200020	0080	1	B	Definition of ConditionalSubscription and NotificationResourceFragment features	16.3.0
2020-03	CT#87	CP-200052	0082		F	3GPP TS 29.504 Rel16 API version and External doc update	16.3.0
2020-03	CT#87	CP-200098	0083		B	Definition of EnhancedInfluDataNotification feature	16.3.0
2020-06	CT#88-e	CP-201046	0084		B	Coverage restriction data resource	16.4.0
2020-06	CT#88-e	CP-201032	0086		B	Location information retrieval for GMLC	16.4.0
2020-06	CT#88-e	CP-201032	0087		B	Resource LcsPrivacySubscriptionData	16.4.0
2020-06	CT#88-e	CP-201071	0088		F	Storage of YAML files in ETSI Forge	16.4.0
2020-06	CT#88-e	CP-201020	0090		A	Definition of OpSpecDataMapNotification feature	16.4.0
2020-06	CT#88-e	CP-201049	0091		B	Correction on V2X Subscription data	16.4.0
2020-06	CT#88-e	CP-201034	0093		F	Cardinality of ProblemDetails	16.4.0
2020-06	CT#88-e	CP-201034	0094		B	Resource Level Authorization	16.4.0
2020-06	CT#88-e	CP-201033	0095		B	Support of SMSoIP	16.4.0
2020-06	CT#88-e	CP-201032	0096		F	Mobile Originated Data retrieval	16.4.0
2020-06	CT#88-e	CP-201034	0097		F	New feature of per UE per serving network authEvent	16.4.0
2020-06	CT#88-e	CP-201073	0098		F	29.504 Rel16 API version and External doc update	16.4.0
2020-09	CT#89-e	CP-202110	100		F	Scopes for Resource Level Authorization	16.5.0
2020-09	CT#89-e	CP-202112	104		F	Store Broadcast Location Assistance Data	16.5.0
2020-09	CT#89-e	CP-202110	105	1	F	Corrections with regard to references	16.5.0
2020-09	CT#89-e	CP-202096	107		F	API version and External doc update	16.5.0
2020-09	CT#89-e	CP-202123	101		B	Resource Level Authorization for Data Sets	17.0.0
2020-09	CT#89-e	CP-202123	102		B	Resource Level Authorization for registrations	17.0.0
2020-09	CT#89-e	CP-202120	106		B	API version and External doc update	17.0.0
2020-12	CT#90-e	CP-203049	0111	1	A	HSS can consume UDR services	17.1.0
2020-12	CT#90-e	CP-203042	0113		A	5G VN Groups	17.1.0
2020-12	CT#90-e	CP-203035	0115		A	Storage of YAML files in 3GPP Forge	17.1.0
2020-12	CT#90-e	CP-203061	0117		B	Data retrieval of multiple policy data sets	17.1.0
2020-12	CT#90-e	CP-203055	0119		F	Rel17 API version and External doc update	17.1.0
2021-03	CT#91-e	CP-210021	0120		F	SCP may consume Nudr service	17.2.0
2021-03	CT#91-e	CP-210043	0122	1	A	Incorrect NfGroupIds definition and missing UDR access paths	17.2.0
2021-03	CT#91-e	CP-210021	0123	1	B	Add Feature for Session Management Policy Data per PLMN	17.2.0
2021-03	CT#91-e	CP-210034	0124	1	F	OpenAPI Reference and description field for map data types	17.2.0
2021-03	CT#91-e	CP-210048	0126		A	SMF Events Storage Resource Path	17.2.0
2021-03	CT#91-e	CP-210029	0127		F	29.504 Rel-17 API version and External doc update	17.2.0
2021-06	CT#92-e	CP-211028	0130	1	F	Change Notification of Array to Stateless UDM	17.3.0
2021-06	CT#92-e	CP-211028	0142		F	Data Types Descriptions	17.3.0
2021-06	CT#92-e	CP-211031	0131	1	B	Support of User Plane Latency requirements	17.3.0
2021-06	CT#92-e	CP-211039	0132		B	Store ProSe Subscription Data	17.3.0
2021-06	CT#92-e	CP-211039	0144		B	Add new ProSe feature	17.3.0
2021-06	CT#92-e	CP-211045	0141		B	Correction to OSD Handling	17.3.0
2021-06	CT#92-e	CP-211045	0143		B	New feature ConditionalSubscriptionWithExcludeNotification	17.3.0
2021-06	CT#92-e	CP-211050	0145		F	29.504 Rel-17 API version and External doc update	17.3.0
2021-06	CT#92-e	CP-211059	0140	1	F	Correction to Charging Information	17.3.0
2021-06	CT#92-e	CP-211079	0134		A	Subscribed EE profile data for a group	17.3.0
2021-06	CT#92-e	CP-211079	0136		A	Subscribed PP profile data for 5g-VN-group	17.3.0
2021-06	CT#92-e	CP-211079	0138		A	Subscribed PP profile data	17.3.0
2021-09	CT#93-e	CP-212030	0148	1	B	New feature for NSAC	17.4.0
2021-09	CT#93-e	CP-212049	0150	1	B	Get the PP data of mutiple Afs	17.4.0
2021-09	CT#93-e	CP-212059	0151		F	29.504 Rel-17 API version and External doc update	17.4.0
2021-09	CT#93-e	CP-212064	0154		A	SharedDataId Resource	17.4.0
2021-12	CT#94-e	CP-213085	0156		B	UE Subscription Data Sets Retrieve	17.5.0
2021-12	CT#94-e	CP-213085	0157		F	Corrections to the API URI	17.5.0
2021-12	CT#94-e	CP-213085	0159		B	Share Session Management Subscription Data	17.5.0
2021-12	CT#94-e	CP-213086	0163		F	NIDD Authorization data storage	17.5.0
2021-12	CT#94-e	CP-213086	0167		F	Subscription update	17.5.0
2021-12	CT#94-e	CP-213087	0168		B	Update Roaming Status in EPC	17.5.0
2021-12	CT#94-e	CP-213087	0162	1	F	Consumer service logic	17.5.0
2021-12	CT#94-e	CP-213088	0166	1	A	Naming Convention	17.5.0
2021-12	CT#94-e	CP-213093	0155	1	B	Support for Service Specific Authorization	17.5.0
2021-12	CT#94-e	CP-213093	0164		B	Supported Features needed for the Enhanced Edge Computing functionality	17.5.0
2021-12	CT#94-e	CP-213097	0158		B	Store 5MBS Subscription Data	17.5.0
2021-12	CT#94-e	CP-213121	0169		F	29.504 Rel-17 API version and External doc update	17.5.0
2021-12	CT#94-e	CP-213136	0161		A	Path definitions	17.5.0
2022-03	CT#95-e	CP-220023	0176		F	Resource paths in Group Subscription Storage	17.6.0
2022-03	CT#95-e	CP-220031	0179	1	B	Handling of supported features for Edge Computing	17.6.0
2022-03	CT#95-e	CP-220036	0174	1	B	UDR restoration notification	17.6.0
2022-03	CT#95-e	CP-220041	0173		B	SOR-AF as NF consumer of UDR	17.6.0
2022-03	CT#95-e	CP-220042	0178	1	B	UDR features for TSC and DCAMP	17.6.0
2022-03	CT#95-e	CP-220047	0172	1	B	New value for 404 status code	17.6.0

2022-03	CT#95-e	CP-220049	0175	1	B	User Consent subscription	17.6.0
2022-03	CT#95-e	CP-220066	0181		F	29.504 Rel-17 API version and External doc update	17.6.0
2022-03	CT#95-e	CP-220090	0180		F	Update incorrect NOTE format	17.6.0
2022-06	CT#96-e	CP-221025	0191	1	F	UDR Restoration	17.7.0
2022-06	CT#96-e	CP-221028	0185	1	F	Logical Relationship of Query Parameters	17.7.0
2022-06	CT#96-e	CP-221028	0186	1	F	OAuth2 scopes for policy data	17.7.0
2022-06	CT#96-e	CP-221028	0189		F	OAuth2 scopes for exposure data	17.7.0
2022-06	CT#96-e	CP-221029	0188	1	F	OAuth2 scopes for application data	17.7.0
2022-06	CT#96-e	CP-221029	0190	1	F	UDM to support Optimized EventExposure Subscriptions Data access over Nudr	17.7.0
2022-06	CT#96-e	CP-221034	0184	1	F	Missing supported features in Nudr service	17.7.0
2022-06	CT#96-e	CP-221051	0193		F	29.504 Rel-17 API version and External doc update	17.7.0
2022-06	CT#96-e	CP-221052	0192		F	Update of description of feature ConditionalSubscriptionWithExcludeNotification	17.7.0
2022-06	CT#96-e	CP-221057	0183		F	FilterAnyUE feature	17.7.0
2022-09	CT#97-e	CP-222057	0194		F	PEI Information	17.8.0
2022-09	CT#97-e	CP-222058	0195		F	29.504 Rel-17 API version and External doc update	17.8.0
2022-12	CT#98-e	CP-223027	0198		B	Immediate reporting for policy data	18.0.0
2022-12	CT#98-e	CP-223027	0197	1	F	Missing Mandatory Status Codes in OpenAPI	18.0.0
2022-12	CT#98-e	CP-223029	0196	1	B	Immediate Report in subscribe response	18.0.0
2022-12	CT#98-e	CP-223033	0199		F	29.504 Rel-18 API version and External doc update	18.0.0
2023-03	CT#99	CP-230029	0204		B	Retrieval of Provisioned data and Context data with a single GET request	18.1.0
2023-03	CT#99	CP-230029	0205	1	B	SuppFeatExt feature	18.1.0
2023-03	CT#99	CP-230029	0206	2	B	Granular UE Sets	18.1.0
2023-03	CT#99	CP-230042	0201		B	Time Sync Subscription Data	18.1.0
2023-03	CT#99	CP-230044	0208		B	Service Function Chaining support in Nudr interface	18.1.0
2023-03	CT#99	CP-230071	0209		F	29.504 Rel-18 API version and External doc update	18.1.0
2023-03	CT#99	CP-230072	0203	1	A	Removing of unnecessary feature	18.1.0
2023-06	CT#100	CP-231025	0213		F	InternalGroupIdentifier in 5GVnGroupConfiguration	18.2.0
2023-06	CT#100	CP-231026	0216		B	Definition of PolSubsRetrieval feature for Policy Data	18.2.0
2023-06	CT#100	CP-231029	0222	2	B	Multiple Data Set retrieval with Etags	18.2.0
2023-06	CT#100	CP-231031	0212	1	B	Storage and Retrieval of LCS Subscription Data	18.2.0
2023-06	CT#100	CP-231033	0215		B	Add CommonEASDNAI feature	18.2.0
2023-06	CT#100	CP-231049	0223	1	B	Support of new feature “GMEC” in UDR	18.2.0
2023-06	CT#100	CP-231051	0210	1	B	Support for A2X service parameters provisioning	18.2.0
2023-06	CT#100	CP-231052	0224		B	Ranging Sidelink Positioning Subscription data	18.2.0
2023-06	CT#100	CP-231054	0214	2	B	New feature URSP provisioning in EPS	18.2.0
2023-06	CT#100	CP-231060	0211		B	Support for subscribed V2X policy data	18.2.0
2023-06	CT#100	CP-231068	0221		B	DCAMP Roaming LBO feature	18.2.0
2023-06	CT#100	CP-231070	0225		F	29.504 Rel-18 API version and External doc update	18.2.0
2023-06	CT#100	CP-231076	0220	1	A	Update on Multicast MBS group membership management parameters	18.2.0
2023-09	CT#101	CP-232033	0227	1	F	Custom Header ABNF	18.3.0
2023-09	CT#101	CP-232052	0236	1	B	New feature for URSP enforcement and VPLMN specific URSP	18.3.0
2023-09	CT#101	CP-232056	0228	1	B	TNAP IDs support	18.3.0
2023-09	CT#101	CP-232057	0233	1	B	Add new feature for 5G ProSe_Ph2	18.3.0
2023-09	CT#101	CP-232058	0234		B	New feature EnhancedUePolicy for Policy Data	18.3.0
2023-09	CT#101	CP-232058	0237	1	B	Feature support for Operator Specific Data in AccessandMobilityPolicyData	18.3.0
2023-09	CT#101	CP-232058	0235	1	B	New feature SLAMUP for Policy Data	18.3.0
2023-09	CT#101	CP-232060	0238		F	29.504 Rel-18 API version and External doc update	18.3.0
2023-09	CT#101	CP-232067	0232	1	A	Correction to ServiceParameterDataPatch data type	18.3.0
2023-12	CT#102	CP-233029	0248		F	3gpp-Sbi-Etags header clarification	18.4.0
2023-12	CT#102	CP-233030	0252		F	ProblemDetails RFC 7807 obsoleted by 9457	18.4.0
2023-12	CT#102	CP-233030	0245	2	F	HTTP RFCs obsoleted by IETF RFC 9110, 9111 and 9113	18.4.0
2023-12	CT#102	CP-233031	0255		F	Granular UE Sets	18.4.0
2023-12	CT#102	CP-233038	0241	1	B	DNAI-EAS Mappings data subset in the UDR	18.4.0
2023-12	CT#102	CP-233038	0251		B	ECSAddressRoaming data subset	18.4.0
2023-12	CT#102	CP-233047	0247	1	B	Support the change of the PDU Session Type for a 5G VN group	18.4.0
2023-12	CT#102	CP-233047	0249		B	Security Scopes for access to AF QoS Data	18.4.0
2023-12	CT#102	CP-233047	0250		F	Security Scopes for group policy control data	18.4.0
2023-12	CT#102	CP-233059	0244	1	B	Mapping between Routing Indicator and NF Group ID	18.4.0
2023-12	CT#102	CP-233059	0253	1	B	Mapping between NF Group ID and list of Routing Indicators	18.4.0
2023-12	CT#102	CP-233060	0256		F	29.504 Rel-18 API version and External doc update	18.4.0
2023-12	CT#102	CP-233068	0243		A	Removal of SOR-AF as UDR consumer	18.4.0
2024-03	CT#103	CP-240028	0261		F	ABNF Corrections	18.5.0
2024-03	CT#103	CP-240028	0264		B	GroupIdmap Subscriptions	18.5.0
2024-03	CT#103	CP-240028	0258	1	F	Application errors for 412 Precondition Failed	18.5.0
2024-03	CT#103	CP-240031	0260		F	Roaming ECS Address Provisioning feature	18.5.0
2024-03	CT#103	CP-240056	0265		F	29.504 Rel-18 API version and External doc update	18.5.0
2024-03	CT#103	CP-240071	0263		A	Missing Caching Timer feature in Nudr service	18.5.0
2024-06	CT#104	CP-241028	0271	1	F	Support of URI reference	18.6.0

2024-06	CT#104	CP-241031	0273		B	Feature support TrafficInfluSubExt	18.6.0
2024-06	CT#104	CP-241041	0269	1	F	Adding feature PfdDetermination	18.6.0
2024-06	CT#104	CP-241045	0270		F	Feature support	18.6.0
2024-06	CT#104	CP-241045	0272	2	F	UE RangingSL Positioning privacy profile	18.6.0
2024-06	CT#104	CP-241050	0268	1	F	New feature AccessAndMobilityPolicyDataModify for Policy Data	18.6.0
2024-06	CT#104	CP-241052	0274		F	29.504 Rel-18 API version and External doc update	18.6.0

History

Document history		
V18.5.0	May 2024	Publication
V18.6.0	July 2024	Publication