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TECHNICAL SPECIFICATION

**5G;
5G System;
5G Direct Discovery Name Management Services;
Stage 3
(3GPP TS 29.555 version 17.2.0 Release 17)**

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Contents

Foreword

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

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

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where:

x   the first digit:

   1   presented to TSG for information;

   2   presented to TSG for approval;

   3   or greater indicates TSG approved document under change control.

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

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

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

shall   indicates a mandatory requirement to do something

shall not   indicates an interdiction (prohibition) to do something

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

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

should   indicates a recommendation to do something

should not   indicates a recommendation not to do something

may   indicates permission to do something

need not   indicates permission not to do something

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

can   indicates that something is possible

cannot   indicates that something is impossible

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

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

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

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

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

In addition:

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

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

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

1   Scope

The present document specifies the stage 3 protocol and data model for the N5g-ddnmf Service Based Interface. It provides stage 3 protocol definitions and message flows, and specifies the API for each service offered by the 5G DDNMF as specified in 3GPP TS 23.304 [4].

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

The Technical Realization of the Service Based Architecture and the Principles and Guidelines for Services Definition are specified in 3GPP TS 29.500 [5] and 3GPP TS 29.501 [6].

2   References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1]   3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

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

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

[4]   3GPP TS 23.304: "Proximity based Services (ProSe) in the 5G System (5GS)".

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

[6]   3GPP TS 29.501: "5G System; Principles and Guidelines for Services Definition; Stage 3".

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

[8]   IETF RFC 7540: "Hypertext Transfer Protocol Version 2 (HTTP/2)".

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

[10]   IETF RFC 7807: "Problem Details for HTTP APIs".

[11]   3GPP TS 33.501: "Security architecture and procedures for 5G system".

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

[13]   3GPP TS 29.510: "Network Function Repository Services; Stage 3".

[14]   3GPP TR 21.900: "Technical Specification Group working methods".

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

[16]   3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces Stage 3".

[17]   3GPP TS 23.003: "Numbering, addressing and identification".

3 Definitions, symbols and abbreviations

3.1 Definitions

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

5G DDNMF: The 5G DDNMF is the logical function handling network related actions required for dynamic ProSe Direct Discovery. The 5G DDNMF in the HPLMN may interact with the 5G DDNMF in a VPLMN or Local PLMN in order to manage the ProSe Direct Discovery service.

ProSe Direct Discovery: A procedure employed by a ProSe-enabled UE to discover other ProSe-enabled UEs in its vicinity based on direct radio transmissions between the two UEs with NR technology.

3.2 Symbols

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

<symbol>   <Explanation>

3.3 Abbreviations

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

5G DDNMF	5G Direct Discovery Name Management Function
5G ProSe	5G Proximity-based Services
RPAUID	Restricted ProSe Application User ID
PDUID	ProSe Discovery UE ID

4 Overview

The 5G Direct Discovery Name Management Function (5G DDNMF) is the network entity in the 5G Core Network (5GC) supporting Direct Discovery Services. Within the 5GC, the 5G DDNMF in HPLMN invokes services provided by the 5G DDNMF in Local PLMN and/or in VPLMN via the N5g-ddnmf service based interface (see 3GPP TS 23.304 [4]).

Figure 4-1 provides the reference model (in service based interface representation and in reference point representation), with focus on the 5G DDNMF:
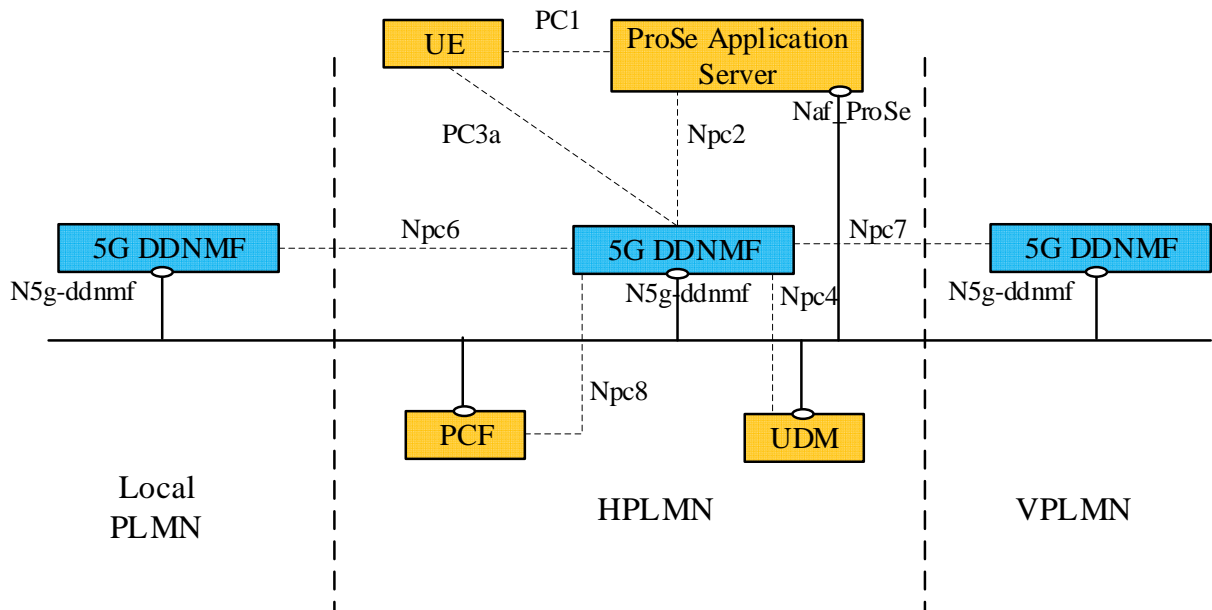
Figure 4-1: Reference model – 5G DDNMF

The functionalities supported by the 5G DDNMF are listed in clause 4.3.2 of 3GPP TS 23.304 [4].

NOTE: Only service based interfaces between 5G DDNMFs will be covered in this TS, other interfaces won't be covered for the time being.

5   Services offered by the 5G DDNMF

5.1   Introduction

The table 5.1-1 shows the 5G DDNMF Services and 5G DDNMF Service Operations:

Table 5.1-1: List of 5G DDNMF Services

Service Name	Service Operations	Operation Semantics	Example Consumer(s)
N5g-ddnmf_Discovery	AnnounceAuthorize	Request/Response	5G DDNMF
	AnnounceUpdate	Request/Response	5G DDNMF
	MonitorAuthorize	Request/Response	5G DDNMF
	MonitorUpdate	Request/Response	5G DDNMF
	MonitorUpdateResult	Notify	5G DDNMF
	DiscoveryAuthorize	Request/Response	5G DDNMF
	MatchReport	Request/Response	5G DDNMF
	MatchInformation	Notify	5G DDNMF

Table 5.1-2 summarizes the corresponding APIs defined for this specification.

Table 5.1-2: API Descriptions

Service Name	Clause	Description	OpenAPI Specification File	apiName	Annex
N5g-ddnmf_Discovery	6.1	N5g-ddnmf Discovery Service	TS29555_ N5g-ddnmf_Discovery.yaml	n5gddnmf-disc	A.2

5.2 N5g-ddnmf_Discovery Service

5.2.1 Service Description

The N5g-ddnmf_Discovery service enables an NF or SCP to manage inter-PLMN ProSe Direct Discovery operations for a target UE. The following are the key functionalities of this NF service.

- Allow the consumer NF to obtain the authorization from the 5G DDNMF for announcing in the PLMN.

- Allow the consumer NF to update or revoke the authorization from the 5G DDNMF for announcing in the PLMN.

- Allow the consumer NF to obtain the authorization from the 5G DDNMF for monitoring in the PLMN.

- Allow the consumer NF to update or revoke the authorization for the indicated UE to monitor in the PLMN.

- Allow the consumer NF to inform the 5G DDNMF of the monitoring revocation results.

- Allow the consumer NF to obtain the authorization from the 5G DDNMF for a discoverer UE in the PLMN to operate Model B restricted discovery.

- Allow the consumer NF to obtain the information about the indicated discovery code from the 5G DDNMF.

- Allow the consumer NF to receive from the 5G DDNMF of a matching result, and the information can be used for charging purpose.

5.2.2 Service Operations

5.2.2.1 Introduction

This clause introduces the service operations defined for the N5g-ddnmf_Discovery services as follows:

- AnnounceAuthorize

- AnnounceUpdate

- MonitorAuthorize

- MonitorUpdate

- MonitorUpdateResult

- DiscoveryAuthorize

- MatchReport

- MatchInformation

5.2.2.2 AnnounceAuthorize

5.2.2.2.1 General

The AnnounceAuthorize service operation shall be used by the NF Service consumer to obtain the authorization to announce for a UE from the 5G DDNMF in the PLMN. The following procedures are supported using the AnnounceAuthorize service operation:

- Discovery Request procedures (see 3GPP 3GPP TS 23.304 [4], clause 6.3.1.4)

- Announcing Alert Procedures for restricted discovery (see 3GPP 3GPP TS 23.304 [4], clause 6.3.1.6)

- Direct Discovery Update Procedures (see 3GPP 3GPP TS 23.304 [4], clause 6.3.1.7)

5.2.2.2.2   Obtain the authorization to announce for a UE

The AnnounceAuthorize service operation is invoked by a NF Service Consumer, e.g. HPLMN 5G DDNMF, towards the 5G DDNMF (e.g. VPLMN 5G DDNMF or Local PLMN 5G DDNMF) to request to obtain the authorization from the 5G DDNMF for announcing for a target UE. See Figure 5.2.2.2.2-1. The request contains the UE's identity (/{ueId}) which shall be a SUPI or GPSI and the discovery Entry ID (/{discEntryId}) which is used to identify the discovery entry related to this request.
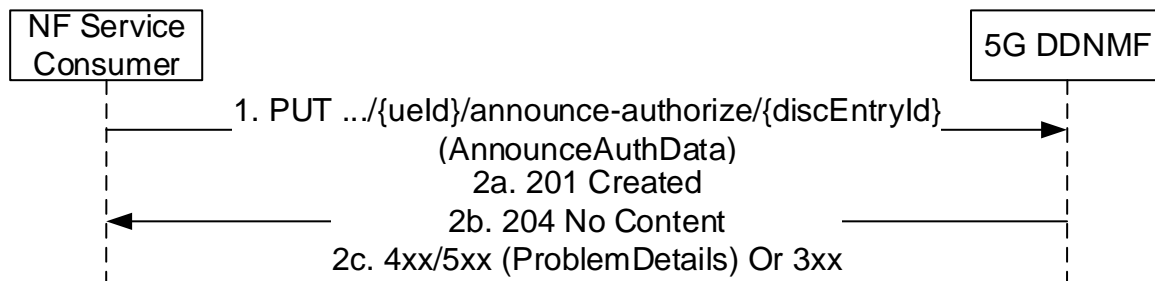
Figure 5.2.2.2.2-1: Obtain the authorization to announce for a UE

1.   The NF Service Consumer shall send an HTTP PUT request to the resource representing the authorization to announce for a UE to obtain the authorization to announce for this UE. The request shall include the Discovery Type, if the Discovery Type is OPEN the Announce Authorisation Data for open discovery shall be included, and if the Discovery Type is RESTRICTED the Announce Authorisation Data for restricted discovery shall be included in the HTTP PUT request body.

2a. If the context indicated by the discEntryId doesn't exist, the 5G DDNMF shall create the new resource, and upon success of creation of the resource, "201 created" shall be returned.

2b. If the context indicated by the discEntryId already exists, the 5G DDNMF shall replace the stored data using the received data, and upon success of the update of the resource, "204 No Content" shall be returned.

2c. On failure or redirection, one of the HTTP status code listed in Table 6.1.3.2.3.1-3 may be returned. For a 4xx/5xx response, the message body may contain a ProblemDetails structure with the "cause" attribute set to one of the application error listed in Table 6.1.3.2.3.1-3.

5.2.2.3   AnnounceUpdate

5.2.2.3.1   General

The AnnounceUpdate service operation shall be used by the NF Service consumer to update or revoke the authorization from the 5G DDNMF for announcing in the PLMN. The following procedures are supported using the AnnounceUpdate service operation:

-   Direct Discovery Update Procedures (see 3GPP 3GPP TS 23.304 [4], clause 6.3.1.7)

5.2.2.3.2   Update the authorization for announcing for a UE

The AnnounceUpdate service operation is invoked by a NF Service Consumer, e.g. HPLMN 5G DDNMF, towards the 5G DDNMF (e.g. VPLMN 5G DDNMF or Local PLMN 5G DDNMF) to request to update the authorization for announcing in the PLMN from the 5G DDNMF for a target UE. See Figure 5.2.2.3.2-1. The request contains the UE's identity (/{ueId}) which shall be a SUPI or GPSI and the discovery Entry ID (/{discEntryId}) which is used to identify the discovery entry related to this request.
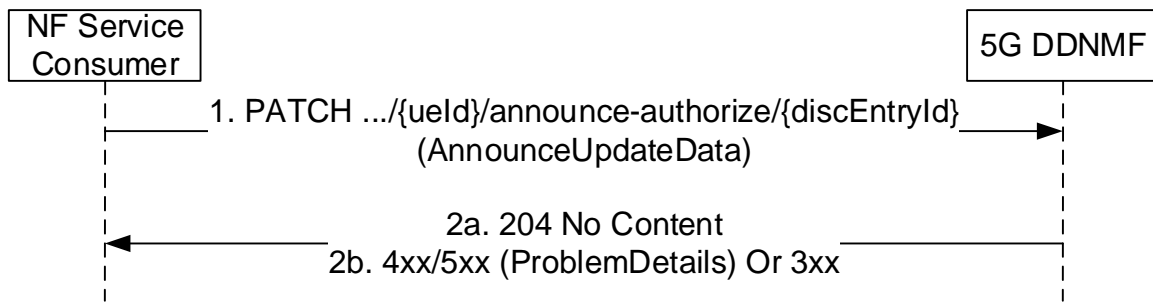
Figure 5.2.2.3.2-1: Update the authorization for announcing for a UE

1. The NF Service Consumer shall send an HTTP PATCH request to the resource representing the authorization to announce for a UE to update or revoke the authorization from the 5G DDNMF for announcing in the PLMN. The request shall include Discovery Type, the Validity Timer, and the ProSe Application Code if the ProSe Application Code is changed in the HTTP PATCH request body. If the Validity Timer sets to a full zero, it indicates to revoke the authorization for the announcing in the PLMN.

2a. On success, "204 No Content" shall be returned.

2b. On failure or redirection, one of the HTTP status code listed in Table 6.1.3.2.3.2-3 may be returned. For a 4xx/5xx response, the message body may contain a ProblemDetails structure with the "cause" attribute set to one of the application error listed in Table 6.1.3.2.3.2-3.

5.2.2.4 MonitorAuthorize

5.2.2.4.1 General

The MonitorAuthorize service operation shall be used by the NF Service consumer to obtain the authorization from the 5G DDNMF for monitoring for an UE in the PLMN. The following procedures are supported using the MonitorAuthorize service operation:

- Discovery Request procedures (see 3GPP 3GPP TS 23.304 [4], clause 6.3.1.4).

5.2.2.4.2 Obtain the authorization to monitor for a UE

The MonitorAuthorize service operation is invoked by a NF Service Consumer, e.g. HPLMN 5G DDNMF, towards the 5G DDNMF (e.g. VPLMN 5G DDNMF or Local PLMN 5G DDNMF) to request to obtain the authorization from the 5G DDNMF for monitoring for a target UE. See Figure 5.2.2.4.2-1. The request contains the UE's identity (/{ueId}) which shall be a SUPI or GPSI and the discovery Entry ID (/{discEntryId}) which is used to identify the discovery entry related to this request.
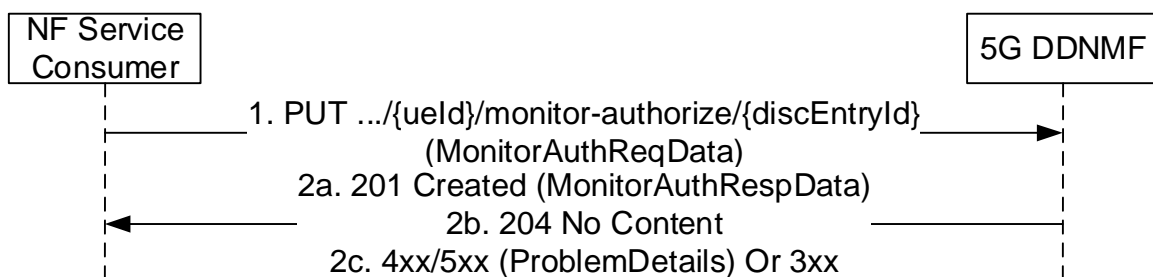
Figure 5.2.2.4.2-1: Obtain the authorization to monitor for a UE

1. The NF Service Consumer shall send an HTTP PUT request to the resource representing the authorization to monitor for a UE to obtain the authorization to monitor for this UE. The request shall include the Discovery Type, if the Discovery Type is OPEN the Monitor Authorisation Data for open discovery shall be included, and if the Discovery Type is RESTRICTED the Monitor Authorisation Data for restricted discovery shall be included in the HTTP PUT request body.

2a. If the context indicated by the discEntryId doesn't exist, the 5G DDNMF shall create the new resource, and upon success of creation of the resource, "201 created" shall be returned. The response body shall contain the parameters related to the determined authorization data to monitor for the UE.

2b. If the context indicated by the discEntryId already exists, the 5G DDNMF shall replace the stored data using the received data, and upon success of the update of the resource, "204 No Content" shall be returned.

2c. On failure or redirection, one of the HTTP status code listed in Table 6.1.3.3.3.1-3 may be returned. For a 4xx/5xx response, the message body may contain a ProblemDetails structure with the "cause" attribute set to one of the application error listed in Table 6.1.3.3.3.1-3.

5.2.2.5 MonitorUpdate

5.2.2.5.1 General

The MonitorUpdate service operation shall be used by the NF Service consumer to update or revoke the authorization for the indicated UE to monitor in the PLMN. The following procedures are supported using the MonitorUpdate service operation:

- Direct Discovery Update Procedures (see 3GPP 3GPP TS 23.304 [4], clause 6.3.1.7).

5.2.2.5.2 Update the authorization for monitoring for a UE

The MonitorUpdate service operation is invoked by a NF Service Consumer, e.g. HPLMN 5G DDNMF, towards the 5G DDNMF (e.g. VPLMN 5G DDNMF or Local PLMN 5G DDNMF) to request to update the authorization for monitoring in the PLMN from the 5G DDNMF for a target UE. See Figure 5.2.2.5.2-1. The request contains the UE's identity (/{ueId}) which shall be a SUPI or GPSI and the discovery Entry ID (/{discEntryId}) which is used to identify the discovery entry related to this request.
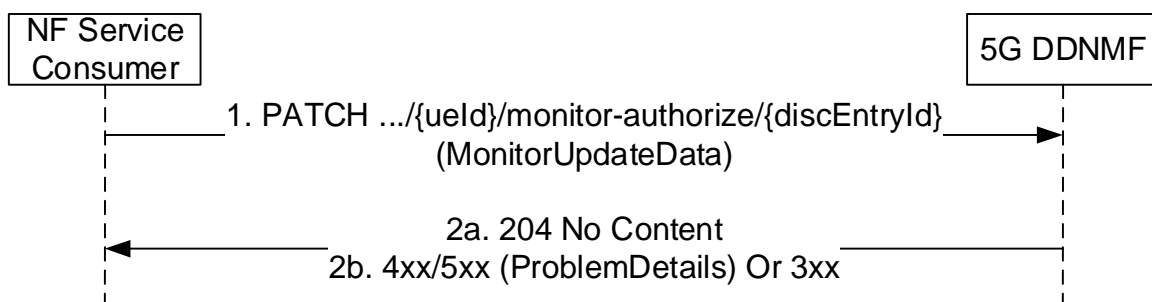
Figure 5.2.2.5.2-1: Update the authorization for monitoring for a UE

1. The NF Service Consumer shall send an HTTP PATCH request to the resource representing the authorization to monitor for a UE to update or revoke the authorization for the indicated UE to monitor in the PLMN. The request shall include Discovery Type, if the Discovery Type indicates "RESTRICTED", the ProSe Application ID Name, and the TTL shall be included in the HTTP PATCH request body. And if the value of TTL in the request sets to zero, it indicates to revoke the previously authorized monitoring to the given Discovery Entry ID, if the Discovery Type indicates "OPEN", ProSe Restricted Code, Application ID, Banned RPAUID, and Banned PDUID shall be included in the HTTP PATCH request body, and monitorUpdateResultCallbackRef may be included in the request body if the NF Service Consumer expects to receive the monitoring revocation results

2a. On success, "204 No Content" shall be returned.

2b. On failure or redirection, one of the HTTP status code listed in Table 6.1.3.3.3.2-3 may be returned. For a 4xx/5xx response, the message body may contain a ProblemDetails structure with the "cause" attribute set to one of the application error listed in Table 6.1.3.3.3.2-3.

5.2.2.6 MonitorUpdateResult

5.2.2.6.1 General

The MonitorUpdateResult service operation shall be used by the 5G DDNMF to notify the NF Service consumer of the 5G DDNMF of the monitoring revocation results. The following procedures are supported using the MonitorUpdateResult service operation:

- Direct Discovery Update Procedures (see 3GPP 3GPP TS 23.304 [4], clause 6.3.1.7).

5.2.2.6.2 Monitor Update Result Notification

The MonitorUpdateResult service operation notifies the NF service consumer (e.g. HPLMN 5G DDNMF) serving the user about the monitoring revocation results for the user. The request contains the monitorUpdateResultCallbackRef URI. See Figure 5.2.2.6.2-1.
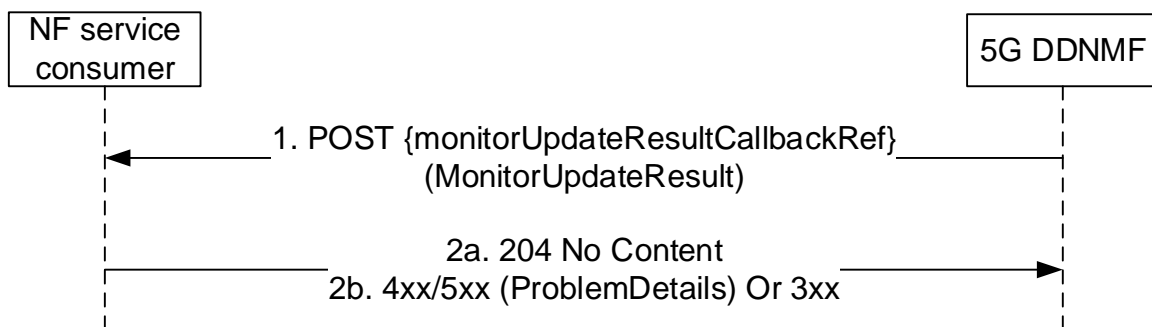
Figure 5.2.2.6.2-1: Monitor Update Result Notification

1. The 5G DDNMF sends a POST request to the monitorUpdateResultCallbackRef to notify the NF service consumer about the monitoring revocation results for the user. The request shall the Discovery Type, the ProSe Restricted Code, the Application ID, the Banned RPAUID, the Banned PDUID, and the monitoring revocation results.

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

2b. On failure or redirection, one of the HTTP status code listed in Table 6.1.5.2.3.1-3 may be returned. For a 4xx/5xx response, the message body may contain a ProblemDetails structure with the "cause" attribute set to one of the application error listed in Table 6.1.5.2.3.1-3.

5.2.2.7 DiscoveryAuthorize

5.2.2.7.1 General

The DiscoveryAuthorize service operation shall be used by the NF Service consumer to obtain the authorization from the 5G DDNMF for a discoverer UE in the PLMN to operate Model B restricted discovery. The following procedures are supported using the DiscoveryAuthorize service operation:

- Discovery Request procedures (see 3GPP 3GPP TS 23.304 [4], clause 6.3.1.4).

5.2.2.7.2 Obtain the authorization for a discoverer UE to operate Model B restricted discovery

The DiscoveryAuthorize service operation is invoked by a NF Service Consumer, e.g. HPLMN 5G DDNMF, towards the 5G DDNMF (e.g. VPLMN 5G DDNMF or Local PLMN 5G DDNMF) to request to obtain the authorization from the 5G DDNMF for a discoverer UE in the PLMN to operate Model B restricted discovery. See Figure 5.2.2.7.2-1. The request contains the UE's identity (/{ueId}) which shall be a SUPI or GPSI and the discovery Entry ID (/{discEntryId}) which is used to identify the discovery entry related to this request.
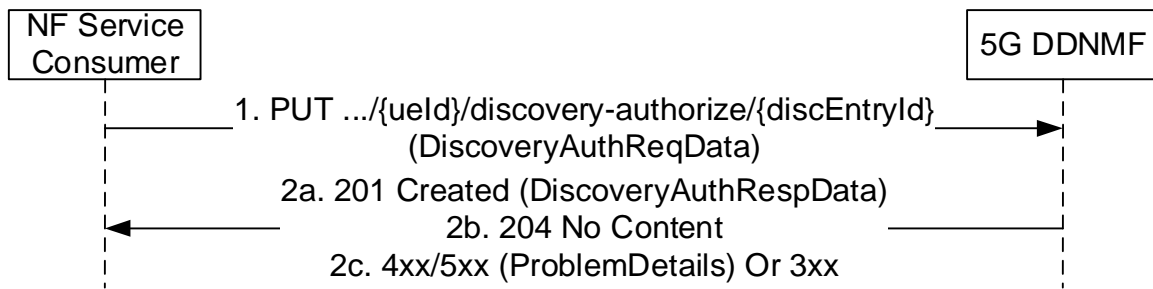
Figure 5.2.2.7.2-1: Obtain the authorization for a discoverer UE to operate Model B restricted discovery

1. The NF Service Consumer shall send an HTTP PUT request to the resource representing the authorization for a discoverer UE to obtain the authorization for a discoverer UE to operate Model B restricted discovery. The request shall include the Discovery Type, authorisation data for restricted discovery in the HTTP PUT request body.

2a. If the context indicated by the discEntryId doesn't exist, the 5G DDNMF shall create the new resource, and upon success of creation of the resource, "201 created" shall be returned. The response body shall contain the parameters related to the determined authorization data for the discoverer UE to operate Model B restricted discovery.

2b. If the context indicated by the discEntryId already exists, the 5G DDNMF shall replace the stored data using the received data, and upon success of the update of the resource, "204 No Content" shall be returned.

2c. On failure or redirection, one of the HTTP status code listed in Table 6.1.3.4.3.1-3 may be returned. For a 4xx/5xx response, the message body may contain a ProblemDetails structure with the "cause" attribute set to one of the application error listed in Table 6.1.3.4.3.1-3.

5.2.2.8 MatchReport

5.2.2.8.1 General

The MatchReport service operation shall be used by the NF Service consumer to obtain the information about the indicated discovery code from the 5G DDNMF. The following procedures are supported using the MatchReport service operation:

- Discovery Reporting procedures (see 3GPP 3GPP TS 23.304 [4], clause 6.3.1.5).

5.2.2.8.2 Obtain the information about the indicated discovery code

The MatchReport service operation is invoked by a NF Service Consumer, e.g. HPLMN 5G DDNMF, towards the 5G DDNMF (e.g. VPLMN 5G DDNMF or Local PLMN 5G DDNMF) to request to obtain the information about the indicated discovery code from the 5G DDNMF. See Figure 5.2.2.8.2-1. The request contains the UE's identity (/{ueId}) which shall be a SUPI or GPSI, the type of request (/match-report).
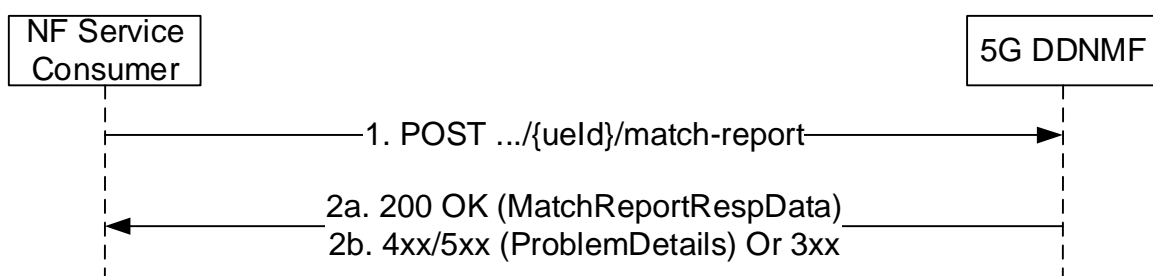
Figure 5.2.2.8.2-1: Obtain the information about the indicated discovery code

1. The NF Service Consumer shall send an HTTP POST request to the resource representing the information about the indicated discovery code to obtain the information about the indicated discovery code. The request shall

include the Discovery Type, the ProSe Application Codes if the discovery type is OPEN in the HTTP POST request body, and optionally includes Monitored PLMN ID in the HTTP POST request body.

2a. On success, "200 OK" shall be returned. The response body shall contain the parameters related to the information about the indicated discovery code.

2b On failure or redirection, one of the HTTP status code listed in Table 6.1.3.5.3.1-3 may be returned. For a 4xx/5xx response, the message body may contain a ProblemDetails structure with the "cause" attribute set to one of the application error listed in Table 6.1.3.5.3.1-3.

5.2.2.9 MatchInformation

5.2.2.9.1 General

The MatchInformation service operation shall be used by the 5G DDNMF to notify the NF Service consumer of a matching result, and the information that can be used for charging purpose. The following procedures are supported using the MatchInformation service operation:

- Discovery Reporting procedures (see 3GPP 3GPP TS 23.304 [4], clause 6.3.1.5)

5.2.2.9.2 Match Information Notification

The MatchInformation service operation notifies the NF service consumer (e.g. VPLMN 5G DDNMF or Local PLMN 5G DDNMF) about match information including a matching result, and the information can be used for charging purpose. The request contains the matchInfoCallbackRef URI. See Figure 5.2.2.9.2-1.
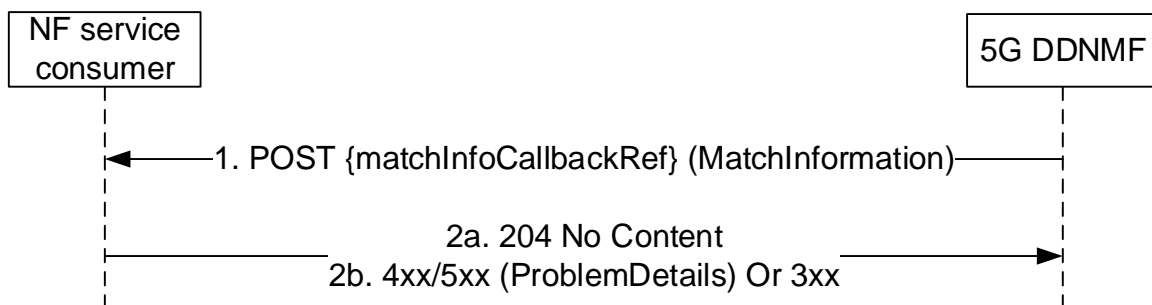
Figure 5.2.2.9.2-1: Match Information Notification

1. The 5G DDNMF sends a POST request to the matchInfoCallbackRef URI to notify the NF service consumer about match information including a matching result, and the information can be used for charging purpose. The request shall include the Discovery Type, match report information for open discovery type if match report information for open discovery type is OPEN, and match report information for restricted discovery type if match report information for open discovery type is RESTRICTED

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

2b. On failure or redirection, one of the HTTP status code listed in Table 6.1.5.3.3.1-3 may be returned. For a 4xx/5xx response, the message body may contain a ProblemDetails structure with the "cause" attribute set to one of the application error listed in Table 6.1.5.3.3.1-3.

6 API Definitions

6.1 N5g-ddnmf_Discovery Service API

6.1.1 Introduction

The N5g-ddnmf_Discovery shall use the N5g-ddnmf_Discovery API.

The API URI of the N5g-ddnmf_Discovery API shall be:

{apiRoot}/<apiName>/<apiVersion>

The request URIs used in HTTP requests from the NF service consumer towards the NF service producer shall have the Resource URI structure defined in clause 4.4.1 of 3GPP TS 29.501 [6], i.e.:

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

with the following components:

- The {apiRoot} shall be set as described in 3GPP TS 29.501 [6].

- The <apiName> shall be "n5g-ddnmf-disc".

- The <apiVersion> shall be "v1".

- The <apiSpecificResourceUriPart> shall be set as described in clause 6.1.3.

6.1.2   Usage of HTTP

6.1.2.1   General

HTTP/2, IETF RFC 7540 [8], shall be used as specified in clause 5 of 3GPP TS 29.500 [5].

HTTP/2 shall be transported as specified in clause 5.3 of 3GPP TS 29.500 [5].

The OpenAPI [7] specification of HTTP messages and content bodies for the n5g-ddnmf-disc API is contained in Annex A.2.

6.1.2.2   HTTP standard headers

6.1.2.2.1   General

See clause 5.2.2 of 3GPP TS 29.500 [5] for the usage of HTTP standard headers.

6.1.2.2.2   Content type

JSON, IETF RFC 8259 [9], shall be used as content type of the HTTP bodies specified in the present specification as specified in clause 5.4 of 3GPP TS 29.500 [5]. The use of the JSON format shall be signalled by the content type "application/json".

"Problem Details" JSON object shall be used to indicate additional details of the error in a HTTP response body and shall be signalled by the content type "application/problem+json", as defined in IETF RFC 7807 [10].

JSON Merge Patch, as defined in IETF RFC 7396 [15], signalled by the content type "application/merge-patch+json".

6.1.2.3   HTTP custom headers

The mandatory HTTP custom header fields specified in clause 5.2.3.2 of 3GPP TS 29.500 [5] shall be supported, and the optional HTTP custom header fields specified in clause 5.2.3.3 of 3GPP TS 29.500 [4] may be supported.

6.1.3   Resources

6.1.3.1   Overview

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

Figure 6.1.3.1-1 depicts the resource URIs structure for the N5g-ddnmf_Discovery API.
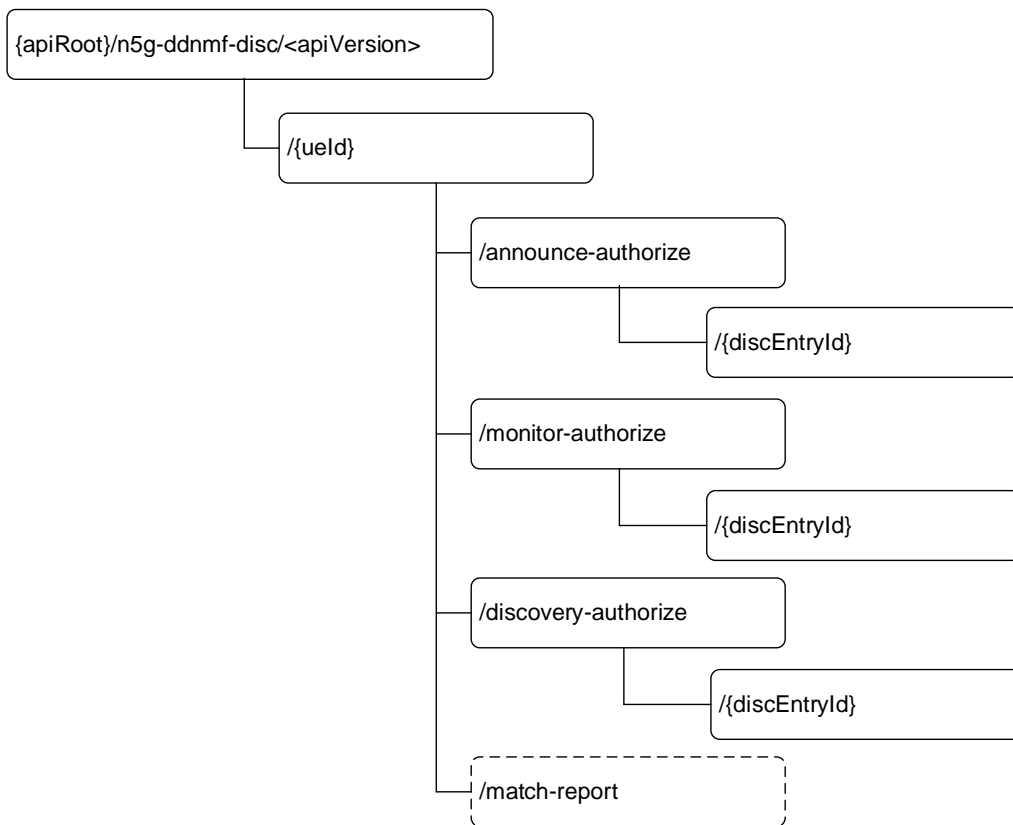
Figure 6.1.3.1-1: Resource URI structure of the N5g-ddnmf_Discovery API

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
AnnounceData	/{ueId}/announce-authorize/{discEntryId}	PUT	Obtain the authorization to announce for a UE from the 5G DDNMF in the PLMN.
		PATCH	Update or revoke the authorization from the 5G DDNMF for announcing in the PLMN.
MonitorData	/{ueId}/monitor-authorize/{discEntryId}	PUT	Obtain the authorization from the 5G DDNMF for monitoring for an UE in the PLMN.
		PATCH	Update or revoke the authorization for the indicated UE to monitor in the PLMN.
DiscoveryData	/{ueId}/discovery-authorize/{discEntryId}	PUT	Obtain the authorization from the 5G DDNMF for a discoverer UE in the PLMN to operate Model B restricted discovery.
UeData	/{ueId}/match-report	match-report (POST)	Obtain the information about the indicated discovery code from the 5G DDNMF.

6.1.3.2 Resource: AnnounceData

6.1.3.2.1 Description

6.1.3.2.2 Resource Definition

Resource URI: **{apiRoot}/n5g-ddnmf-disc/<apiVersion>/{ueId}/announce-authorize/{discEntryId}**

This resource shall support the resource URI variables defined in table 6.1.3.2.2-1.

Table 6.1.3.2.2-1: Resource URI variables for this resource

Name	Data type	Definition
apiRoot	string	See clause 6.1.1
ueId	VarUeId	Represents the Subscription Identifier SUPI or GPSI (see 3GPP TS 23.501 [2] clause 5.9.2) pattern: See pattern of type VarUeId in 3GPP TS 29.571 [16]
discEntryId	DiscoveryEntryId	Represents Discovery Entry Id.

6.1.3.2.3 Resource Standard Methods

6.1.3.2.3.1 PUT

This method shall support the URI query parameters specified in table 6.1.3.2.3.1-1.

Table 6.1.3.2.3.1-1: URI query parameters supported by the PUT method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.1.3.2.3.1-2 and the response data structures and response codes specified in table 6.1.3.2.3.1-3.

Table 6.1.3.2.3.1-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
AnnounceAuthData	M	1	Contains the Announce Authorization Data for the indicated UE and indicated discovery entry.

Table 6.1.3.2.3.1-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
AnnounceAuthData			201 Created	Upon success of creation of the resource, a response body shall be returned. The HTTP response shall include a "Location" HTTP header that contains the resource URI of the created resource.
n/a			204 No Content	Upon success of the update of the resource, 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, or the same URI if this is a redirection triggered by an SCP to the same target resource via another SCP. In the former case, the URI shall be an alternative URI of the resource located on an alternative service instance within the same 5G DDNMF or 5G DDNMF (service) set. (NOTE 2)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing a different URI, or the same URI if this is a redirection triggered by an SCP to the same target resource via another SCP. In the former case, the URI shall be an alternative URI of the resource located on an alternative service instance within the same 5G DDNMF or 5G DDNMF (service) set. (NOTE 2)
ProblemDetails	O	0..1	403 Forbidden	The "cause" attribute may be used to indicate one of the following application errors: - PROSE_SERVICE_UNAUTHORIZED See table 6.1.7.3-1 for the description of these errors.
NOTE 1: The manadatory HTTP error status code for the PUT method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [5] also apply.				
NOTE 2: RedirectResponse may be inserted by an SCP, see clause 6.10.9.1 of 3GPP TS 29.500 [5].				

Table 6.1.3.2.3.1-4: Headers supported by the 201 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains the URI of the newly created resource, according to the structure: {apiRoot}/n5g-ddnmf-disc>/<apiVersion>/{ueId}/announce-authorize/{discEntryId}

Table 6.1.3.2.3.1-5: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative service instance within the same 5G DDNMF or 5G DDNMF (service) set. Or the same URI, if a request is redirected to the same target resource via a different SCP.
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target NF (service) instance ID towards which the request is redirected

Table 6.1.3.2.3.1-6: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative service instance within the same 5G DDNMF or 5G DDNMF (service) set. Or the same URI, if a request is redirected to the same target resource via a different SCP.
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target NF (service) instance ID towards which the request is redirected

6.1.3.2.3.2   PATCH

This method shall support the URI query parameters specified in table 6.1.3.2.3.2-1.

Table 6.1.3.2.3.2-1: URI query parameters supported by the PATCH method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.1.3.2.3.2-2 and the response data structures and response codes specified in table 6.1.3.2.3.2-3.

Table 6.1.3.2.3.2-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
AnnounceUpdate Data	M	1	Contains the Announce Authorization Data to update for the indicated UE and indicated discovery entry.

Table 6.1.3.2.3.2-3: Data structures supported by the PATCH Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Upon success, an empty response body shall be returned.
PatchResult	M	1	200 OK	Upon success, the execution report is returned. (NOTE 3)
RedirectResponse	O	0..1	307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing a different URI, or the same URI if this is a redirection triggered by an SCP to the same target resource via another SCP. In the former case, the URI shall be an alternative URI of the resource located on an alternative service instance within the same 5G DDNMF or 5G DDNMF (service) set. (NOTE 2)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing a different URI, or the same URI if this is a redirection triggered by an SCP to the same target resource via another SCP. In the former case, the URI shall be an alternative URI of the resource located on an alternative service instance within the same 5G DDNMF or 5G DDNMF (service) set. (NOTE 2)
ProblemDetails	O	0..1	404 Not Found	The "cause" attribute may be used to indicate one of the following application errors: - CONTEXT_NOT_FOUND See table 6.1.7.3-1 for the description of these errors.
ProblemDetails	O	0..1	422 Unprocessable Entity	The "cause" attribute may be used to indicate one of the following application errors: - UNPROCESSABLE_REQUEST
NOTE 1: The manadatory HTTP error status code for the PATCH method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [5] also apply.				
NOTE 2: RedirectResponse may be inserted by an SCP, see clause 6.10.9.1 of 3GPP TS 29.500 [5].				
NOTE 3: If all the modification instructions in the PATCH request have been implemented, the 5G DDNMF shall respond with 204 No Content response; if some of the modification instructions in the PATCH request have been discarded, and the NF service consumer has included in the supported-feature query parameter the "PatchReport" feature number, the 5G DDNMF shall respond with PatchResult.				

Table 6.1.3.2.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative service instance within the same 5G DDNMF or 5G DDNMF (service) set. Or the same URI, if a request is redirected to the same target resource via a different SCP.
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target NF (service) instance ID towards which the request is redirected

Table 6.1.3.2.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative service instance within the same 5G DDNMF or 5G DDNMF (service) set. Or the same URI, if a request is redirected to the same target resource via a different SCP.
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target NF (service) instance ID towards which the request is redirected

6.1.3.3 Resource: MonitorData

6.1.3.3.1 Description

This resource represents the Monitor data.

6.1.3.3.2 Resource Definition

Resource URI: **{apiRoot}/n5g-ddnmf-disc/<apiVersion>/{ueId}/monitor-authorize/{discEntryId}**

This resource shall support the resource URI variables defined in table 6.1.3.3.2-1.

Table 6.1.3.3.2-1: Resource URI variables for this resource

Name	Data type	Definition
apiRoot	string	See clause 6.1.1
ueId	VarUeId	Represents the Subscription Identifier SUPI or GPSI (see 3GPP TS 23.501 [2] clause 5.9.2) pattern: See pattern of type VarUeId in 3GPP TS 29.571 [16]
discEntryId	DiscoveryEntryId	Represents Discovery Entry Id.

6.1.3.3.3 Resource Standard Methods

6.1.3.3.3.1 PUT

This method shall support the URI query parameters specified in table 6.1.3.3.3.1-1.

Table 6.1.3.3.3.1-1: URI query parameters supported by the PUT method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.1.3.3.3.1-2 and the response data structures and response codes specified in table 6.1.3.3.3.1-3.

Table 6.1.3.3.3.1-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
MonitorAuthReqData	M	1	Contains the Monitor Authorization Data for the indicated UE and indicated discovery entry.

Table 6.1.3.3.3.1-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
MonitorAuthResp Data	M	1	201 Created	Upon success of creation of the resource, a response body containing a representation of the authorized data to monitor for the UE shall be returned. The HTTP response shall include a "Location" HTTP header that contains the resource URI of the created resource.
n/a			204 No Content	Upon success of the update of the resource, an empty response body shall be returned.
RedirectRespons e	O	0..1	307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing a different URI, or the same URI if this is a redirection triggered by an SCP to the same target resource via another SCP. In the former case, the URI shall be an alternative URI of the resource located on an alternative service instance within the same 5G DDNMF or 5G DDNMF (service) set. (NOTE 2)
RedirectRespons e	O	0..1	308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing a different URI, or the same URI if this is a redirection triggered by an SCP to the same target resource via another SCP. In the former case, the URI shall be an alternative URI of the resource located on an alternative service instance within the same 5G DDNMF or 5G DDNMF (service) set. (NOTE 2)
ProblemDetails	O	0..1	403 Forbidden	The "cause" attribute may be used to indicate one of the following application errors: - PROSE_SERVICE_UNAUTHORIZED See table 6.1.7.3-1 for the description of these errors.
ProblemDetails	O	0..1	404 Not Found	The "cause" attribute may be used to indicate one of the following application errors: - APPLICATION_NOT_FOUND See table 6.1.7.3-1 for the description of these errors.
NOTE 1: The manadatory HTTP error status code for the PUT method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [5] also apply.				
NOTE 2: RedirectResponse may be inserted by an SCP, see clause 6.10.9.1 of 3GPP TS 29.500 [5].				

Table 6.1.3.3.3.1-4: Headers supported by the 201 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains the URI of the newly created resource, according to the structure: {apiRoot}/n5g-ddnmf-disc>/<apiVersion>/{ueId}/monitor-authorize/{discEntryId}

Table 6.1.3.3.3.1-5: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative service instance within the same 5G DDNMF or 5G DDNMF (service) set. Or the same URI, if a request is redirected to the same target resource via a different SCP.
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target NF (service) instance ID towards which the request is redirected

Table 6.1.3.3.3.1-6: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative service instance within the same 5G DDNMF or 5G DDNMF (service) set. Or the same URI, if a request is redirected to the same target resource via a different SCP.
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target NF (service) instance ID towards which the request is redirected

6.1.3.3.3.2   PATCH

This method shall support the URI query parameters specified in table 6.1.3.3.3.2-1.

Table 6.1.3.3.3.2-1: URI query parameters supported by the PATCH method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.1.3.3.3.2-2 and the response data structures and response codes specified in table 6.1.3.3.3.2-3.

Table 6.1.3.3.3.2-2: Data structures supported by the PATCH Request Body on this resource

Data type	P	Cardinality	Description
MonitorUpdateData	M	1	Contains the Monitor Authorization Data to update for the indicated UE and indicated discovery entry.

Table 6.1.3.3.3.2-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Upon success, an empty response body shall be returned.
PatchResult	M	1	200 OK	Upon success, the execution report is returned. (NOTE 3)
RedirectResponse	O	0..1	307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing a different URI, or the same URI if this is a redirection triggered by an SCP to the same target resource via another SCP. In the former case, the URI shall be an alternative URI of the resource located on an alternative service instance within the same 5G DDNMF or 5G DDNMF (service) set. (NOTE 2)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing a different URI, or the same URI if this is a redirection triggered by an SCP to the same target resource via another SCP. In the former case, the URI shall be an alternative URI of the resource located on an alternative service instance within the same 5G DDNMF or 5G DDNMF (service) set. (NOTE 2)
ProblemDetails	O	0..1	404 Not Found	The "cause" attribute may be used to indicate one of the following application errors: - CONTEXT_NOT_FOUND See table 6.1.7.3-1 for the description of these errors.
ProblemDetails	O	0..1	422 Unprocessable Entity	The "cause" attribute may be used to indicate one of the following application errors: - UNPROCESSABLE_REQUEST
NOTE 1: The manadatory HTTP error status code for the PATCH method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [5] also apply.				
NOTE 2: RedirectResponse may be inserted by an SCP, see clause 6.10.9.1 of 3GPP TS 29.500 [5].				
NOTE 3: If all the modification instructions in the PATCH request have been implemented, the 5G DDNMF shall respond with 204 No Content response; if some of the modification instructions in the PATCH request have been discarded, and the NF service consumer has included in the supported-feature query parameter the "PatchReport" feature number, the 5G DDNMF shall respond with PatchResult.				

Table 6.1.3.3.3.2-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative service instance within the same 5G DDNMF or 5G DDNMF (service) set. Or the same URI, if a request is redirected to the same target resource via a different SCP.
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target NF (service) instance ID towards which the request is redirected

Table 6.1.3.3.3.2-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative service instance within the same 5G DDNMF or 5G DDNMF (service) set. Or the same URI, if a request is redirected to the same target resource via a different SCP.
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target NF (service) instance ID towards which the request is redirected

6.1.3.4 Resource: DiscoveryData

6.1.3.4.1 Description

This resource represents the Discovery Data.

6.1.3.4.2 Resource Definition

Resource URI: **{apiRoot}/n5g-ddnmf-disc/<apiVersion>/{ueId}/discovery-authorize/{discEntryId}**

This resource shall support the resource URI variables defined in table 6.1.3.4.2-1.

Table 6.1.3.4.2-1: Resource URI variables for this resource

Name	Data type	Definition
apiRoot	string	See clause 6.1.1
ueId	VarUeId	Represents the Subscription Identifier SUPI or GPSI (see 3GPP TS 23.501 [2] clause 5.9.2) pattern: See pattern of type VarUeId in 3GPP TS 29.571 [16]
discEntryId	DiscoveryEntryId	Represents Discovery Entry Id.

6.1.3.4.3 Resource Standard Methods

6.1.3.4.3.1 PUT

This method shall support the URI query parameters specified in table 6.1.3.4.3.1-1.

Table 6.1.3.4.3.1-1: URI query parameters supported by the PUT method on this resource

Name	Data type	P	Cardinality	Description	Applicability
n/a					

This method shall support the request data structures specified in table 6.1.3.4.3.1-2 and the response data structures and response codes specified in table 6.1.3.4.3.1-3.

Table 6.1.3.4.3.1-2: Data structures supported by the PUT Request Body on this resource

Data type	P	Cardinality	Description
DiscoveryAuthReqData	M	1	Contains the Discovery Authorization Data for the indicated discoverer UE and indicated discovery entry.

Table 6.1.3.4.3.1-3: Data structures supported by the PUT Response Body on this resource

Data type	P	Cardinality	Response codes	Description
DiscoveryAuthRespData	M	1	201 Created	Upon success of creation of the resource, a response body containing a representation of the authorized data for the discoverer UE in the PLMN to operate Model B restricted discovery shall be returned. The HTTP response shall include a "Location" HTTP header that contains the resource URI of the created resource.
n/a			204 No Content	Upon success of the update of the resource, 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, or the same URI if this is a redirection triggered by an SCP to the same target resource via another SCP. In the former case, the URI shall be an alternative URI of the resource located on an alternative service instance within the same 5G DDNMF or 5G DDNMF (service) set. (NOTE 2)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing a different URI, or the same URI if this is a redirection triggered by an SCP to the same target resource via another SCP. In the former case, the URI shall be an alternative URI of the resource located on an alternative service instance within the same 5G DDNMF or 5G DDNMF (service) set. (NOTE 2)

ProblemDetails	O	0..1	403 Forbidden	The "cause" attribute may be used to indicate one of the following application errors:
				  - PROSE_SERVICE_UNAUTHORIZED
				  - ANNOUNCING_UNAUTHORIZED_IN_PLMN
				
				See table 6.1.7.3-1 for the description of these errors.

ProblemDetails	O	0..1	404 Not Found	The "cause" attribute may be used to indicate one of the following application errors: - APPLICATION_NOT_FOUND See table 6.1.7.3-1 for the description of these errors.
NOTE 1: The manadatory HTTP error status code for the PUT method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [5] also apply.				
NOTE 2: RedirectResponse may be inserted by an SCP, see clause 6.10.9.1 of 3GPP TS 29.500 [5].				

Table 6.1.3.4.3.1-4: Headers supported by the 201 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	Contains the URI of the newly created resource, according to the structure: {apiRoot}/n5g-ddnmf-disc>/<apiVersion>/{ueId}/discovery -authorize/{discEntryId}

Table 6.1.3.4.3.1-5: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative service instance within the same 5G DDNMF or 5G DDNMF (service) set. Or the same URI, if a request is redirected to the same target resource via a different SCP.
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target NF (service) instance ID towards which the request is redirected

Table 6.1.3.4.3.1-6: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative service instance within the same 5G DDNMF or 5G DDNMF (service) set. Or the same URI, if a request is redirected to the same target resource via a different SCP.
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target NF (service) instance ID towards which the request is redirected

6.1.3.5 Resource: UeData (Custom operation)

6.1.3.5.1 Description

This resource represents the UE Data.

6.1.3.5.2 Resource Definition

Resource URI: **{apiRoot}/n5g-ddnmf-disc/<apiVersion>/{ueId}**

This resource shall support the resource URI variables defined in table 6.1.3.5.2-1.

Table 6.1.3.5.2-1: Resource URI variables for this resource

Name	Data type	Definition
apiRoot	string	See clause 6.1.1
ueId	VarUeId	Represents the Subscription Identifier SUPI or GPSI (see 3GPP TS 23.501 [2] clause 5.9.2) pattern: See pattern of type VarUeId in 3GPP TS 29.571 [16]

6.1.3.5.3 Resource Standard Methods

6.1.3.5.4 Resource Custom Operations

No Standard Methods are supported for this resource.

6.1.3.5.4.1   Overview

Table 6.1.3.5.4.1-1: Custom operations

Operation name	Custom operation URI	Mapped HTTP method	Description
match-report	/{ueId}/match-report	POST	Obtain the information about the indicated discovery code from the 5G DDNMF.

6.1.3.5.4.2   Operation: match-report

6.1.3.5.4.2.1   Description

This operation is used to request the 5G DDNMF to resolve a matched ProSe Discovery Code(s) (ProSe Application Code for open discovery) and obtain the corresponding ProSe Application ID Name(s) and additional information, e.g. metadata.

6.1.3.5.4.2.2   Operation Definition

This operation shall support the request data structures specified in table 6.1.3.5.4.2.2-1 and the response data structure and response codes specified in table 6.1.3.5.4.2.2-2.

Table 6.1.3.5.4.2.2-1: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
MatchReportReq Data	M	1	Contains the Match Report information.

Table 6.1.3.5.4.2.2-2: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
MatchReportResp Data	M	1	200 OK	Upon success, a response body containing a representation of the Match Report Acknowledgement shall be returned.
RedirectResponse	O	0..1	307 Temporary Redirect	Temporary redirection. The response shall include a Location header field containing a different URI, or the same URI if this is a redirection triggered by an SCP to the same target resource via another SCP. In the former case, the URI shall be an alternative URI of the resource located on an alternative service instance within the same 5G DDNMF or 5G DDNMF (service) set. (NOTE 2)
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection. The response shall include a Location header field containing a different URI, or the same URI if this is a redirection triggered by an SCP to the same target resource via another SCP. In the former case, the URI shall be an alternative URI of the resource located on an alternative service instance within the same 5G DDNMF or 5G DDNMF (service) set. (NOTE 2)

ProblemDetails	O	0..1	403 Forbidden	The "cause" attribute may be used to indicate one of the following application errors:
				    - PROSE_SERVICE_UNAUTHORIZED
				    - ANNOUNCING_UNAUTHORIZED_IN_PLMN
				    - INVALID_APPLICATION_CODE
				
				See table 6.1.7.3-1 for the description of these errors.

NOTE 1: The manadatory HTTP error status code for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [5] also apply.				
NOTE 2: RedirectResponse may be inserted by an SCP, see clause 6.10.9.1 of 3GPP TS 29.500 [5].				

Table 6.1.3.5.4.2.2-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative service instance within the same 5G DDNMF or 5G DDNMF (service) set. Or the same URI, if a request is redirected to the same target resource via a different SCP.
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target NF (service) instance ID towards which the request is redirected

Table 6.1.3.5.4.2.2-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	An alternative URI of the resource located on an alternative service instance within the same 5G DDNMF or 5G DDNMF (service) set. Or the same URI, if a request is redirected to the same target resource via a different SCP.
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target NF (service) instance ID towards which the request is redirected

6.1.4   Custom Operations without associated resources

In this release of this specification, no custom operations without associated resources are defined for the N5g-ddnmf_Discovery Service.

6.1.5   Notifications

6.1.5.1   General

Notifications shall comply to clause 6.2 of 3GPP TS 29.500 [5] and clause 4.6.2.3 of 3GPP TS 29.501 [6].

Table 6.1.5.1-1: Notifications overview

Notification	Callback URI	HTTP method or custom operation	Description (service operation)
MonitorUpdateResult	{monitorUpdateResultCallbackRef}	POST	Report the monitoring revocation results.
MatchInformation	{matchInfoCallbackRef}	POST	Report an observed matching result to a NF service consumer

6.1.5.2   MonitorUpdateResult

6.1.5.2.1   Description

The MonitorUpdateResult is used by the 5G DDNMF to report the monitoring revocation results (e.g. 5G DDNMF)

6.1.5.2.2 Target URI

The Callback URI **"{monitorUpdateResultCallbackRef}"** shall be used with the callback URI variables defined in table 6.1.5.2.2-1.

Table 6.1.5.2.2-1: Callback URI variables

Name	Definition
monitorUpdateResult CallbackRef	String formatted as URI with the Callback Uri

6.1.5.2.3 Standard Methods

6.1.5.2.3.1 POST

This method shall support the request data structures specified in table 6.1.5.2.3.1-1 and the response data structures and response codes specified in table 6.1.5.2.3.1-1.

Table 6.1.5.2.3.1-2: Data structures supported by the POST Request Body

Data type	P	Cardinality	Description
MonitorUpdateResult	M	1	The MonitorUpdateResult shall contain the monitoring revocation results.

Table 6.1.5.2.3.1-3: 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 NF service consumer shall generate a Location header field containing a URI pointing to the endpoint of another NF service consumer to which the notification should be sent, or the same URI if this is a redirection triggered by an SCP to the same target resource via another SCP.
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection. The NF service consumer shall generate a Location header field containing a URI pointing to the endpoint of another NF service consumer to which the notification should be sent, or the same URI if this is a redirection triggered by an SCP to the same target resource via another SCP.
ProblemDetails	O	0..1	404 Not Found	The "cause" attribute may be used to indicate one of the following application errors: - CONTEXT_NOT_FOUND See table 6.1.7.3-1 for the description of these errors.
NOTE 1: The mandatory HTTP error status codes for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [5] also apply.				
NOTE 2: RedirectResponse may be inserted by an SCP, see clause 6.10.9.1 of 3GPP TS 29.500 [5].				

Table 6.1.5.2.3.1-4: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	A URI pointing to the endpoint of another NF service consumer to which the notification should be sent. Or the same URI, if a request is redirected to the same target resource via a different SCP.
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target NF (service) instance ID towards which the request is redirected

Table 6.1.5.2.3.1-5: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	A URI pointing to the endpoint of another NF service consumer to which the notification should be sent. Or the same URI, if a request is redirected to the same target resource via a different SCP.
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target NF (service) instance ID towards which the request is redirected

6.1.5.3 MatchInformation

6.1.5.3.1 Description

The POST method is used by the 5G DDNMF to report an observed matching result to a NF service consumer (e.g. 5G DDNMF).

6.1.5.3.2 Target URI

The Callback URI **"{matchInfoCallbackRef}"** shall be used with the callback URI variables defined in table 6.1.5.3.2-1.

Table 6.1.5.3.2-1: Callback URI variables

Name	Definition
matchInfoCallbackRef	String formatted as URI with the Callback Uri

6.1.5.3.3 Standard Methods

6.1.5.3.3.1 POST

This method shall support the request data structures specified in table 6.1.5.3.3.1-1 and the response data structures and response codes specified in table 6.1.5.3.3.1-1.

Table 6.1.5.3.3.1-1: Data structures supported by the POST Request Body

Data type	P	Cardinality	Description
MatchInformation	M	1	The MatchInformation shall contain a matching result of the corresponding operation.

Table 6.1.5.3.3.1-2: Data structures supported by the POST Response Body

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	Upon success, an empty response body shall be returned.
ProblemDetails	O	0..1	404 Not Found	The "cause" attribute may be used to indicate one of the following application errors: - CONTEXT_NOT_FOUND See table 6.1.7.3-1 for the description of these errors.
RedirectResponse	O	0..1	307 Temporary Redirect	Temporary redirection. The NF service consumer shall generate a Location header field containing a URI pointing to the endpoint of another NF service consumer to which the notification should be sent, or the same URI if this is a redirection triggered by an SCP to the same target resource via another SCP.
RedirectResponse	O	0..1	308 Permanent Redirect	Permanent redirection. The NF service consumer shall generate a Location header field containing a URI pointing to the endpoint of another NF service consumer to which the notification should be sent, or the same URI if this is a redirection triggered by an SCP to the same target resource via another SCP.
NOTE 1: The mandatory HTTP error status codes for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [5] also apply.				
NOTE 2: RedirectResponse may be inserted by an SCP, see clause 6.10.9.1 of 3GPP TS 29.500 [5].				

Table 6.1.5.3.3.1-3: Headers supported by the 307 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	A URI pointing to the endpoint of another NF service consumer to which the notification should be sent. Or the same URI, if a request is redirected to the same target resource via a different SCP.
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target NF (service) instance ID towards which the request is redirected

Table 6.1.5.3.3.1-4: Headers supported by the 308 Response Code on this resource

Name	Data type	P	Cardinality	Description
Location	string	M	1	A URI pointing to the endpoint of another NF service consumer to which the notification should be sent. Or the same URI, if a request is redirected to the same target resource via a different SCP.
3gpp-Sbi-Target-Nf-Id	string	O	0..1	Identifier of the target NF (service) instance ID towards which the request is redirected

6.1.6   Data Model

6.1.6.1   General

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

Table 6.1.6.1-1 specifies the data types defined for the N5g-ddnmf service based interface protocol.

Table 6.1.6.1-1: N5g-ddnmf specific Data Types

Data type	Clause defined	Description	Applicability
AnnounceAuthData	6.1.6.2.2	Represents Data used to request the authorization to announce for a UE	
AnnounceDiscDataForOpen	6.1.6.2.4	Represents Data for open discovery used to request the authorization to announce for a UE	
AnnounceDiscDataForRestricted	6.1.6.2.5	Represents Data for restricted discovery used to request the authorization to announce for a UE	
AnnounceUpdateData	6.1.6.2.6	Represents Announce Authorize Data to update.	
MonitorAuthReqData	6.1.6.2.7	Represents Data used to request the authorization to monitor for a UE	
MonitorAuthRespData	6.1.6.2.8	Represents the obtained Monitor Authorize Data for a UE	
MonitorDiscDataForOpen	6.1.6.2.9	Represents Data for open discovery used to request the authorization to monitor for a UE	
MonitorDiscDataForRestricted	6.1.6.2.10	Represents Data for restricted discovery used to request the authorization to monitor for a UE	
MonitorAuthDataForOpen	6.1.6.2.11	Represents the obtained Announce Authorize Data for open discovery for a UE	
MonitorAuthDataForRestricted	6.1.6.2.12	Represents the obtained Announce Authorize Data for restricted discovery for a UE	
MonitorUpdateData	6.1.6.2.13	Represents Monitor Authorize Data to update.	
DiscoveryAuthReqData	6.1.6.2.14	Represents Data used to request the authorization for a discoverer UE	
DiscoveryAuthRespData	6.1.6.2.15	Represents the obtained authorization Data for a discoverer UE.	
DiscDataForRestricted	6.1.6.2.16	Represents Data for restricted discovery used to request the authorization for a discoverer UE	
AuthDataForRestricted	6.1.6.2.17	Represents obtained authorization Data for restricted discovery for a discoverer UE	
MatchReportReqData	6.1.6.2.18	Represents the Match Report information	
MatchReportRespData	6.1.6.2.19	Represents Match Report Acknowledgement	
MonitorUpdateResult	6.1.6.2.20	Represents the monitoring revocation results.	
MatchInformation	6.1.6.2.21	Represents a report including a matching result, and the information that can be used for charging purpose	
MatchInfoForOpen	6.1.6.2.22	Represents a report including a matching result, and the information that can be used for charging purpose for the open discovery type.	
MatchInfoForRestricted	6.1.6.2.23	Represents a report including a matching result, and the information that can be used for charging purpose for the restricted discovery type.	
RestrictedCodeSuffixPool	6.1.6.2.24	Contains the Restricted Code Suffix Pool.	
RestrictedCodeSuffixRange	6.1.6.2.25	Contains a range of the Restricted Code Suffixes which are consecutive.	
ProseApplicationCodeSuffixPool	6.1.6.2.26	Contains the Prose Application Code Suffix Pool.	
ProseAppCodeSuffixRange	6.1.6.2.27	Contains a range of the Prose Application Code Suffixes which are consecutive.	

MonitorUpdateDataForOpen	6.1.6.2.28	Represents Monitor Update Data for the Discovery Type "OPEN"	
MonitorUpdateDataForRestricted	6.1.6.2.29	Represents Monitor Update Data for the Discovery Type "RESTRICTED".	
DiscoveryType	6.1.6.3.3	Represents Discovery Type for ProSe Service	
AuthorizationResult	6.1.6.3.4	Represents Authorization Result Type for ProSe Service	
RevocationResult	6.1.6.3.5	Represents the monitoring Revocation Result for ProSe Service	

Table 6.1.6.1-2 specifies data types re-used by the N5g-ddnmf 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 N$_{<NF>}$ service based interface.

Table 6.1.6.1-2: N5g-ddnmf re-used Data Types

Data type	Reference	Comments	Applicability
VarUeId	3GPP TS 29.571 [16]	String represents the SUPI or GPSI.	
DateTime	3GPP TS 29.571 [16]	DataTime	
PlmnId	3GPP TS 29.571 [16]	Plmn ID	
Supi	3GPP TS 29.571 [16]	SUPI	
Uri	3GPP TS 29.571 [16]	URI	
ProblemDetails	3GPP TS 29.571 [16]		

6.1.6.2   Structured data types

6.1.6.2.1   Introduction

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

6.1.6.2.2   Type: AnnounceAuthData

Table 6.1.6.2.2-1: Definition of type AnnounceAuthData

Attribute name	Data type	P	Cardinality	Description	Applicability
discType	DiscoveryType	M	1	This IE shall contain the discovery type for ProSe Service.	
openDiscData	AnnounceDiscDataForOpen	C	0..1	This IE shall contain the input data of announce authorisation for open discovery when present. If the value of discType is "OPEN", this IE shall be present.	
restrictedDiscData	AnnounceDiscDataForRestricted	C	0..1	This IE shall contain the input data of announce authorisation for restricted discovery when present. If the value of discType is "RESTRICTED", this IE shall be present.	

6.1.6.2.3   Void

6.1.6.2.4   Type: AnnounceDiscDataForOpen

Table 6.1.6.2.4-1: Definition of type AnnounceDiscDataForOpen

Attribute name	Data type	P	Cardinality	Description	Applicability
proseAppId	ProseApplicationId	M	1	This IE shall contain the ProSe Application ID.	
validityTimer	DateTime	M	1	This IE shall contain validity timer up to which the ProSe Application Code is going to expire.	
proseAppCode	ProseApplicationCode	C	0..1	When present, this IE shall contain the ProSe Application Code. (NOTE)	
proseAppCodePrefix	ProseApplicationPrefix	C	0..1	When present, this IE shall contain the ProSe Application Code Prefix. (NOTE)	
proseAppCodeSuffixPool	ProseApplicationCodeSuffixPool	O	0..1	This IE shall contain the ProSe Application Code Suffix pool when present.	
metaData	MetaData	O	0..1	This IE shall contain the metadata when present.	
NOTE: Either attribute proseAppCode or attribute proseAppCodePrefix shall be present.					

6.1.6.2.5   Type: AnnounceDiscDataForRestricted

Table 6.1.6.2.5-1: Definition of type AnnounceDiscDataForRestricted

Attribute name	Data type	P	Cardinality	Description	Applicability
rpauid	Rpauid	M	1	This IE shall contain the RPAUID.	
appId	ApplicationId	M	1	This IE shall contain the Application ID	
validityTimer	DateTime	M	1	This IE shall contain validity timer up to which the ProSe Restricted Code is going to expire. If the value sets to a full zero (i.e., 0000-00-00T00:00:00), it indicates to removes the resources indicated by the Discovery Entry ID for the UE.	
proseRestrictedCode	ProseRestrictedCode	C	0..1	This IE shall contain the ProSe Restricted Code when present. (NOTE)	
proseRestrictedPrefix	ProseRestrictedPrefix	C	0..1	This IE shall contain the ProSe Restricted Code Prefix when present. (NOTE)	
codeSuffixPool	RestrictedCodeSuffixPool	O	0..1	This IE shall contain the Restricted Code Suffix pool when present.	
NOTE: Either attribute proseRestrictedCode or attribute proseRestrictedPrefix shall be present.					

6.1.6.2.6 Type: AnnounceUpdateData

Table 6.1.6.2.6-1: Definition of type AnnounceUpdateData

Attribute name	Data type	P	Cardinality	Description	Applicability
discType	DiscoveryType	M	1	This IE shall contain the discovery type for ProSe Service, only value "OPEN" is allowed.	
validityTime	DateTime	M	1	This IE shall contain validity timer up to which the ProSe Application Code is going to expire. If the value sets to a full zero (i.e., 0000-00-00T00:00:00), it indicates to revoke the authorization for the announcing in the PLMN.	
proseAppCode	ProseApplicationCode	C	0..1	This IE shall contain the ProSe Application Code when present. If the ProSe Application Code is changed, this IE shall be present. If the value of attribute is a full zero, this IE shall be absent.	

6.1.6.2.7 Type: MonitorAuthReqData

Table 6.1.6.2.7-1: Definition of type MonitorAuthReqData

Attribute name	Data type	P	Cardinality	Description	Applicability
discType	DiscoveryType	M	1	This IE shall contain the discovery type for ProSe Service.	
openDiscData	MonitorDiscDataForOpen	C	0..1	This IE shall contain the input data of monitor authorisation for open discovery when present. If the value of discType is "OPEN", this IE shall be present.	
restrictedDiscData	MonitorDiscDataForRestricted	C	0..1	This IE shall contain the input data of monitor authorisation for restricted discovery when present. If the value of discType is "RESTRICTED", this IE shall be present.	

6.1.6.2.8 Type: MonitorAuthRespData

Table 6.1.6.2.8-1: Definition of type MonitorAuthRespData

Attribute name	Data type	P	Cardinality	Description	Applicability
authDataOpen	MonitorAuthDataForOpen	C	0..1	This IE shall contain a list of the ProSe Application Codes when present. If the discovery type is "OPEN", this IE shall be present.	
authDataRestricted	MonitorAuthDataForRestricted	C	0..1	This IE shall contain the Prose Application Prefix when present. If the discovery type in request is "RESTRICTED", this IE shall be present.	

6.1.6.2.9 Type: MonitorDiscDataForOpen

Table 6.1.6.2.9-1: Definition of type MonitorDiscDataForOpen

Attribute name	Data type	P	Cardinality	Description	Applicability
proseAppIdNames	array(ProseApplicationIdName)	M	1..N	This IE shall contain a list of ProSe Application ID names.	

6.1.6.2.10 Type: MonitorDiscDataForRestricted

Table 6.1.6.2.10-1: Definition of type MonitorDiscDataForRestricted

Attribute name	Data type	P	Cardinality	Description	Applicability
rpauid	Rpauid	M	1	This IE shall contain the RPAUID.	
targetPduid	Pduid	M	1	This IE shall contain the Target PDUID.	
appId	ApplicationId	M	1	This IE shall contain the Application ID	
targetRpauid	Rpauid	M	1	This IE shall contain the Target RPAUID.	

6.1.6.2.11   Type: MonitorAuthDataForOpen

Table 6.1.6.2.11-1: Definition of type MonitorAuthDataForOpen

Attribute name	Data type	P	Cardinality	Description	Applicability
proseAppCodes	array(ProseApplicationCode)	C	1..N	This IE shall contain a list of the ProSe Application Codes. (NOTE)	
proseAppPrefix	ProseApplicationPrefix	C	0..1	This IE shall contain the Prose Application Prefix. (NOTE)	
proseAppMasks	array(ProseApplicationMask)	M	1..N	This IE shall contain a list of the ProSe Application Masks.	
ttl	integer	M	1	This IE shall contain the TTL. If the value sets to zero, it indicates to revoke the authorization for the monitoring in the PLMN.	
NOTE: Either attribute proseAppCodes or proseAppPrefix proseRestrictedPrefix shall be present if the discovery type is open.					

6.1.6.2.12   Type: MonitorAuthDataForRestricted

Table 6.1.6.2.12-1: Definition of type MonitorAuthDataForRestricted

Attribute name	Data type	P	Cardinality	Description	Applicability
proseRestrictedCode	ProseRestrictedCode	M	1	This IE shall contain the ProSe Restricted Code.	
validityTime	DateTime	M	1	This IE shall contain validity timer up to which the ProSe Application Code is going to expire.	

6.1.6.2.13   Type: MonitorUpdateData

Table 6.1.6.2.13-1: Definition of type MonitorUpdateData

Attribute name	Data type	P	Cardinality	Description	Applicability
discType	DiscoveryType	M	1	This IE shall contain the discovery type for ProSe Service.	
openUpdateData	MonitorUpdateDataForOpen	C	0..1	This IE shall contain the Monitor Update Data for open discovery when present. If the value of discType is "OPEN", this IE shall be present.	
restrictedUpdateData	MonitorUpdateDataForRestricted	C	0..1	This IE shall contain the Monitor Update Data for restricted discovery when present. If the value of discType is "RESTRICTED", this IE shall be present.	

6.1.6.2.14 Type: DiscoveryAuthReqData

Table 6.1.6.2.14-1: Definition of type DiscoveryAuthReqData

Attribute name	Data type	P	Cardinality	Description	Applicability
discType	DiscoveryType	M	1	This IE shall contain the discovery type for ProSe Service. Only value "RESTRICTED" is allowed.	
restrictedDiscData	DiscDataForRestricted	C	0..1	This IE shall contain the input data of authorisation for restricted discovery when present. If the value of discType is "RESTRICTED", this IE shall be present.	

6.1.6.2.15 Type: DiscoveryAuthRespData

Table 6.1.6.2.15-1: Definition of type DiscoveryAuthRespData

Attribute name	Data type	P	Cardinality	Description	Applicability
authDataRestricted	AuthDataForRestricted	C	0..1	This IE shall contain the authorized data for restricted discovery when present. If the discovery type in request is "RESTRICTED", this IE shall be present.	

6.1.6.2.16 Type: DiscDataForRestricted

Table 6.1.6.2.16-1: Definition of type DiscDataForRestricted

Attribute name	Data type	P	Cardinality	Description	Applicability
rpauid	Rpauid	M	1	This IE shall contain the RPAUID.	
targetPduid	Pduid	M	1	This IE shall contain the Target PDUID.	
appId	ApplicationId	M	1	This IE shall contain the Application ID	
targetRpauid	Rpauid	M	1	This IE shall contain the Target RPAUID.	

6.1.6.2.17 Type: AuthDataForRestricted

Table 6.1.6.2.17-1: Definition of type AuthDataForRestricted

Attribute name	Data type	P	Cardinality	Description	Applicability
proseQueryCodes	array(ProseQueryCode)	M	1..N	This IE shall contain a list of the authorised ProSe Restricted Code.	
proseRespCode	ProseResponseCode	M	1	This IE shall contain the authorised ProSe Respond Code.	
validityTime	DateTime	M	1	This IE shall contain validity timer up to which the ProSe Application Code is going to expire.	

6.1.6.2.18 Type: MatchReportReqData

Table 6.1.6.2.18-1: Definition of type MatchReportReqData

Attribute name	Data type	P	Cardinality	Description	Applicability
discType	DiscoveryType	M	1	This IE shall contain the discovery type for ProSe Service. Only value "OPEN" is allowed.	
proseAppCodes	array(ProseApplicationCode)	C	1..N	This IE shall contain a list of the ProSe Application Codes when present. If the value of DiscoveryType is "OPEN", this IE shall be present.	
moniteredPlmnId	PlmnId	C	0..1	This IE shall contain the Monitored PLMN ID when present.	

6.1.6.2.19 Type: MatchReportRespData

Table 6.1.6.2.19-1: Definition of type MatchReportRespData

Attribute name	Data type	P	Cardinality	Description	Applicability
proseAppIdNames	array(ProseApplicationIdName)	C	1..N	This IE shall contain a list of ProSe Application ID names when present. If the discovery type in the request is "OPEN", this IE shall be present.	
validityTime	DateTime	C	0..1	This IE shall contain validity timer up to which the ProSe Application Code is going to expire when present. If the discovery type in the request is "OPEN", this IE shall be present.	
metaData	MetaData	O	0..1	This IE shall contain the metadata when present.	
metaDataIndexMasks	array(MetaDataIndexMask)	O	1..N	This IE shall contain a list of the Meta Data Index Masks when present.	

6.1.6.2.20   Type: MonitorUpdateResult

Table 6.1.6.2.20-1: Definition of type MonitorUpdateResult

Attribute name	Data type	P	Cardinality	Description	Applicability
discType	DiscoveryType	M	1	This IE shall contain the discovery type for ProSe Service. Only value "RESTRICTED" is allowed.	
proseRestrictedCode	ProseRestrictedCode	M	1	This IE shall contain the ProSe Restricted Code.	
appId	ApplicationId	M	1	This IE shall contain the Application ID	
bannedRpauid	Rpauid	M	1	This IE shall contain the Banned RPAUID.	
bannedPduid	Pduid	M	1	This IE shall contain the Banned PDUID.	
revocationResult	RevocationResult	M	1	This IE shall contain the monitoring revocation results.	

6.1.6.2.21   Type: MatchInformation

Table 6.1.6.2.21-1: Definition of type MatchInformation

Attribute name	Data type	P	Cardinality	Description	Applicability
discType	DiscoveryType	M	1	This IE shall contain the discovery type for ProSe Service.	
openMatchInfoForOpen	MatchInfoForOpen	C	0..1	This IE shall contain the match report information for open discovery type when present. If the value of discType is "OPEN", this IE shall be present.	
restrictedMatchInfo	MatchInfoForRestricted	C	0..1	This IE shall contain the match report information for restricted discovery when present. If the value of discType is "RESTRICTED", this IE shall be present.	

6.1.6.2.22   Type: MatchInfoForOpen

Table 6.1.6.2.22-1: Definition of type MatchInfoForOpen

Attribute name	Data type	P	Cardinality	Description	Applicability
supi	Supi	M	1	This IE shall contain the SUPI of UE.	
appId	array(ApplicationId)	M	1	This IE shall contain a list of the Application IDs.	

6.1.6.2.23 Type: MatchInfoForRestricted

Table 6.1.6.2.23-1: Definition of type MatchInfoForRestricted

Attribute name	Data type	P	Cardinality	Description	Applicability
supi	Supi	M	1	This IE shall contain the SUPI of UE.	
rpauid	Rpauid	M	1	This IE shall contain the RPAUID.	
targetRpauid	Rpauid	M	1	This IE shall contain the Target RPAUID.	
proseRestrictedCode	ProseRestrictedCode	M	1	This IE shall contain the ProSe Restricted Code.	

6.1.6.2.24 Type: RestrictedCodeSuffixPool

Table 6.1.6.2.24-1: Definition of type RestrictedCodeSuffixPool

Attribute name	Data type	P	Cardinality	Description	Applicability
codeSuffixList	array(RestrictedCodeSuffix)	C	1..N	This IE shall contain a list of the Restricted Code Suffixes	
codeSuffixRangeList	array(RestrictedCodeSuffixRange)	C	1..N	This IE shall contain a list of ranges of the Restricted Code Suffix.	
NOTE: At least one of attributes codeSuffixList and codeSuffixRangeList shall be present.					

6.1.6.2.25 Type: RestrictedCodeSuffixRange

Table 6.1.6.2.25-1: Definition of type RestrictedCodeSuffixRange

Attribute name	Data type	P	Cardinality	Description	Applicability
beginningSuffix	RestrictedCodeSuffix	M	1	This IE shall contain the lowest ProSe Restricted Code Suffix in a consecutive sequence of ProSe Restricted Code suffixes.	
endingSuffix	RestrictedCodeSuffix	M	1	This IE shall contain the highest ProSe Restricted Code Suffix in a consecutive sequence of ProSe Restricted Code suffixes.	

6.1.6.2.26 Type: ProseApplicationCodeSuffixPool

Table 6.1.6.2.26-1: Definition of type ProseApplicationCodeSuffixPool

Attribute name	Data type	P	Cardinality	Description	Applicability
codeSuffix	ProseAppCodeSuffix	C	0..1	This IE shall contain the ProSe Application Code Suffix.	
codeSuffixRange	ProseAppCodeSuffixRange	C	0..1	This IE shall contain the range of the ProSe Application Code Suffix.	
NOTE: At least one of attributes codeSuffix and codeSuffixRange shall be present.					

6.1.6.2.27   Type: ProseAppCodeSuffixRange

Table 6.1.6.2.27-1: Definition of type ProseAppCodeSuffixRange

Attribute name	Data type	P	Cardinality	Description	Applicability
beginningSuffix	ProseAppCode Suffix	M	1	This IE shall contain the lowest ProSe Restricted Code Suffix in a consecutive sequence of ProSe Restricted Code suffixes.	
endingSuffix	ProseAppCode Suffix	M	1	This IE shall contain the highest ProSe Restricted Code Suffix in a consecutive sequence of ProSe Restricted Code suffixes.	

6.1.6.2.28   Type: MonitorUpdateDataForOpen

Table 6.1.6.2.28-1: Definition of type MonitorUpdateDataForOpen

Attribute name	Data type	P	Cardinality	Description	Applicability
proseAppIdName	ProseApplicatio nIdName	M	1	This IE shall contain the ProSe Application ID Name.	
ttl	integer	M	1	This IE shall contain the TTL. If it sets to zero, it indicates to revoke the previously authorized monitoring.	

6.1.6.2.29   Type: MonitorUpdateDataForRestricted

Table 6.1.6.2.29-1: Definition of type MonitorUpdateDataForRestricted

Attribute name	Data type	P	Cardinality	Description	Applicability
proseRestrictedCo de	ProseRestricted Code	M	1	This IE shall contain the ProSe Restricted Code.	
appId	ApplicationId	M	1	This IE shall contain the Application ID	
bannedRpauid	Rpauid	M	1	This IE shall contain the Banned RPAUID.	
bannedPduid	Pduid	M	1	This IE shall contain the Banned PDUID.	
monitorUpdateRes ultCallbackRef	Uri	O	0..1	A URI provided by 5G DDNMF to receive (implicitly subscribed) notifications on the monitoring revocation results.	

6.1.6.3   Simple data types and enumerations

6.1.6.3.1   Introduction

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

6.1.6.3.2   Simple data types

The simple data types defined in table 6.1.6.3.2-1 shall be supported.

Table 6.1.6.3.2-1: Simple data types

Type Name	Type Definition	Description	Applicability
DiscoveryEntryId	string	Discovery Entry ID	
ProseApplicationId	string	ProSe Application ID, the format of ProSe Application ID is defined in 3GPP TS 23.003 [17]	
ProseApplicationCode	string	ProSe Application Code, the format of ProSe Application Code is defined in 3GPP TS 23.003 [17]	
Rpauid	string	RPAUID	
ApplicationId	string	Application ID	
ProseRestrictedCode	string	ProSe Restricted Code, the format of ProSe Restricted Code is defined in 3GPP TS 23.003 [17]	
ProseRestrictedPrefix	string	ProSe Restricted Code Prefix, the format of ProSe Restricted Code Prefix is defined in 3GPP TS 23.003 [17]	
MetaData	string	metadata	
ProseApplicationIdName	string	ProSe Application ID name, the format of ProSe Application ID name is defined in 3GPP TS 23.003 [17]	
Pduid	string	PDUID	
ProseApplicationPrefix	string	Prose Application Code Prefix, the format of Prose Application Code Prefix is defined in 3GPP TS 23.003 [17]	
ProseApplicationMask	string	Prose Application Mask	
ProseQueryCode	string	ProSe Query Code, the format of ProSe Query Code is defined in 3GPP TS 23.003 [17]	
ProseResponseCode	string	ProSe Response Code, the format of ProSe Response Code is defined in 3GPP TS 23.003 [17]	
MetaDataIndexMask	string	Meta Data Index Mask	
RestrictedCodeSuffix	string	ProSe Restricted Code Suffix, the format of ProSe Restricted Code Suffix is defined in 3GPP TS 23.003 [17]	
ProseAppCodeSuffix	string	ProSe Application Code Suffix, the format of ProSe Restricted Code Suffix is defined in 3GPP TS 23.003 [17]	

6.1.6.3.3 Enumeration: DiscoveryType

The enumeration DiscoveryType represents Discovery Type for ProSe Service. It shall comply with the provisions defined in table 6.1.6.3.3-1.

Table 6.1.6.3.3-1: Enumeration DiscoveryType

Enumeration value	Description	Applicability
"OPEN"	Discovery type is "open".	
"RESTRICTED"	Discovery type is "restricted".	

6.1.6.3.4 Void

6.1.6.3.5 Enumeration: RevocationResult

The enumeration RevocationResult represents the monitoring Revocation Result for ProSe Service. It shall comply with the provisions defined in table 6.1.6.3.5-1.

Table 6.1.6.3.5-1: Enumeration RevocationResult

Enumeration value	Description	Applicability
"SUCCESSFUL"	The Monitoring Revocation is successful.	
"FAILED"	The Monitoring Revocation is failed.	

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

None.

6.1.6.5 Binary data

None.

6.1.7 Error Handling

6.1.7.1 General

For the N5g-ddnmf_Discovery API, HTTP error responses shall be supported as specified in clause 4.8 of 3GPP TS 29.501 [6]. Protocol errors and application errors specified in table 5.2.7.2-1 of 3GPP TS 29.500 [5] shall be supported for an HTTP method if the corresponding HTTP status codes are specified as mandatory for that HTTP method in table 5.2.7.1-1 of 3GPP TS 29.500 [5].

In addition, the requirements in the following clauses are applicable for the N5g-ddnmf_Discovery API.

6.1.7.2 Protocol Errors

Protocol errors handling shall be supported as specified in clause 5.2.7 of 3GPP TS 29.500 [5].

6.1.7.3 Application Errors

The application errors defined for the N5g-ddnmf_Discovery service are listed in Table 6.1.7.3-1.

Table 6.1.7.3-1: Application errors

Application Error	HTTP status code	Description
PROSE_SERVICE_UNAUTHORIZED	403 Forbidden	It is used when the requested ProSe service is not authorized for this UE Identity.
ANNOUNCING_UNAUTHORIZED_IN_PLMN	403 Forbidden	It is used when the ProSe Application Code received is not authorized to be announced in the indicated monitored/announcing PLMN for the specified PC5 radio technology
INVALID_APPLICATION_CODE	403 Forbidden	It is used when none of the requested ProSe Application Code(s) is valid
CONTEXT_NOT_FOUND	404 Not Found	It is used when no corresponding context exists.
APPLICATION_NOT_FOUND	404 Not Found	It is used when the requested ProSe Application doesn't exist

6.1.8 Feature negotiation

The optional features in table 6.1.8-1 are defined for the N5g-ddnmf_Discovery API. They shall be negotiated using the extensibility mechanism defined in clause 6.6 of 3GPP TS 29.500 [5].

Table 6.1.8-1: Supported Features

Feature number	Feature Name	Description
1	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 [5].

6.1.9   Security

As indicated in 3GPP TS 33.501 [11] and 3GPP TS 29.500 [5], the access to the N5g-ddnmf_Discovery API may be authorized by means of the OAuth2 protocol (see IETF RFC 6749 [12]), based on local configuration, using the "Client Credentials" authorization grant, where the NRF (see 3GPP TS 29.510 [13]) plays the role of the authorization server.

If OAuth2 is used, an NF Service Consumer, prior to consuming services offered by the N5g-ddnmf_Discovery API, shall obtain a "token" from the authorization server, by invoking the Access Token Request service, as described in 3GPP TS 29.510 [13], 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 N5g-ddnmf_Discovery service.

The N5g-ddnmf_Discovery API defines a single scope "n5g-ddnmf_discovery" for OAuth2 authorization (as specified in 3GPP TS 33.501 [11] for the entire service, and it does not define any additional scopes at resource or operation level.

6.1.10   HTTP redirection

An HTTP request may be redirected to a different 5G DDNMF service instance, within the same 5G DDNMF or a different 5G DDNMF of an 5G DDNMF set, e.g. when an 5G DDNMF service instance is part of an 5G DDNMF (service) set or when using indirect communications (see 3GPP TS 29.500 [5]).

An SCP that reselects a different 5G DDNMF producer instance will return the NF Instance ID of the new 5G DDNMF producer instance in the 3gpp-Sbi-Producer-Id header, as specified in clause 6.10.3.4 of 3GPP TS 29.500 [5].

If an 5G DDNMF within an 5G DDNMF set redirects a service request to a different 5G DDNMF of the set using an 307 Temporary Redirect or 308 Permanent Redirect status code, the identity of the new 5G DDNMF towards which the service request is redirected shall be indicated in the 3gpp-Sbi-Target-Nf-Id header of the 307 Temporary Redirect or 308 Permanent Redirect response as specified in clause 6.10.9.1 of 3GPP TS 29.500 [5].

Annex A (normative): OpenAPI specification

A.1 General

This Annex specifies the formal definition of the API(s) defined in the present specification. It consists of OpenAPI 3.0.0 specifications in YAML format.

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

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

Informative copies of the OpenAPI specification files contained in this 3GPP Technical Specification are available on a Git-based repository that uses the GitLab software version control system (see clause 5.3.1 of 3GPP TS 29.501 [6] and clause 5B of 3GPP TR 21.900 [14]).

A.2 N5g-ddnmf_Discovery API

```
openapi: 3.0.0

info:
  title: N5g-ddnmf_Discovery API
  version: '1.0.1'
  description: |
    N5g-ddnmf_Discovery Service.
    © 2023, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.

externalDocs:
  description: 3GPP TS 29.555 V17.2.0; 5G System; 5G Direct Discovery Name Management Services;
Stage 3.
  url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.555/

servers:
  - url: '{apiRoot}/n5g-ddnmf-disc/v1'
    variables:
      apiRoot:
        default: https://example.com
        description: apiRoot as defined in clause 4.4 of 3GPP TS 29.501

security:
  - {}
  - oAuth2ClientCredentials:
    - n5g-ddnmf-disc

paths:
  /{ueId}/announce-authorize/{discEntryId}:
    put:
      summary: Obtain the authorization to announce for a UE
      operationId: ObtainAnnounceAuth
      tags:
        - Obtain the authorization to announce for a UE
      parameters:
        - name: ueId
          in: path
          description: Identifier of the UE
          required: true
          schema:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/VarUeId'
        - name: discEntryId
          in: path
          description: Discovery Entry Id
          required: true
          schema:
```

```
                $ref: '#/components/schemas/DiscoveryEntryId'
        requestBody:
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/AnnounceAuthData'
          required: true
        responses:
          '201':
            description: Successful creation of the resource
            content:
              application/json:
                schema:
                  $ref: '#/components/schemas/AnnounceAuthData'
            headers:
              Location:
                description: >
                  Contains the URI of the newly created resource, according to the structure:
                  {apiRoot}/n5g-ddnmf-disc>/<apiVersion>/{ueId}/announce-authorize/{discEntryId}
                required: true
                schema:
                  type: string
          '204':
            description: Successful update of the resource.
          '307':
            $ref: 'TS29571_CommonData.yaml#/components/responses/307'
          '308':
            $ref: 'TS29571_CommonData.yaml#/components/responses/308'
          '400':
            $ref: 'TS29571_CommonData.yaml#/components/responses/400'
          '403':
            $ref: 'TS29571_CommonData.yaml#/components/responses/403'
          '404':
            $ref: 'TS29571_CommonData.yaml#/components/responses/404'
          '500':
            $ref: 'TS29571_CommonData.yaml#/components/responses/500'
          '503':
            $ref: 'TS29571_CommonData.yaml#/components/responses/503'
          default:
            description: Unexpected error
      patch:
        summary: Update the authorization for announcing for a UE
        operationId: UpdateAnnounceAuth
        tags:
          - Update the authorization for announcing for a UE
        parameters:
          - name: ueId
            in: path
            description: Identifier of the UE
            required: true
            schema:
              $ref: 'TS29571_CommonData.yaml#/components/schemas/VarUeId'
          - name: discEntryId
            in: path
            description: Discovery Entry Id
            required: true
            schema:
              $ref: '#/components/schemas/DiscoveryEntryId'
        requestBody:
          content:
            application/merge-patch+json:
              schema:
                $ref: '#/components/schemas/AnnounceUpdateData'
          required: true
        responses:
          '200':
            description: Expected response to a valid request
            content:
              application/json:
                schema:
                  $ref: 'TS29571_CommonData.yaml#/components/schemas/PatchResult'
          '204':
            description: Expected response to a valid request
          '307':
            $ref: 'TS29571_CommonData.yaml#/components/responses/307'
          '308':
            $ref: 'TS29571_CommonData.yaml#/components/responses/308'
          '400':
```

```
                $ref: 'TS29571_CommonData.yaml#/components/responses/400'
              '403':
                $ref: 'TS29571_CommonData.yaml#/components/responses/403'
              '404':
                $ref: 'TS29571_CommonData.yaml#/components/responses/404'
              '422':
                description: Unprocessable Request
                content:
                  application/problem+json:
                    schema:
                      $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
              '500':
                $ref: 'TS29571_CommonData.yaml#/components/responses/500'
              '503':
                $ref: 'TS29571_CommonData.yaml#/components/responses/503'
              default:
                description: Unexpected error

  /{ueId}/monitor-authorize/{discEntryId}:
    put:
      summary: Obtain the authorization to monitor for a UE
      operationId: ObtainMonitorAuth
      tags:
        - Obtain the authorization to monitor for a UE
      parameters:
        - name: ueId
          in: path
          description: Identifier of the UE
          required: true
          schema:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/VarUeId'
        - name: discEntryId
          in: path
          description: Discovery Entry Id
          required: true
          schema:
            $ref: '#/components/schemas/DiscoveryEntryId'
      requestBody:
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/MonitorAuthReqData'
        required: true
      responses:
        '201':
          description: Created
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/MonitorAuthRespData'
          headers:
            Location:
              description: >
                Contains the URI of the newly created resource, according to the structure:
                {apiRoot}/n5g-ddnmf-disc>/<apiVersion>/{ueId}/monitor-authorize/{discEntryId}
              required: true
              schema:
                type: string
        '204':
          description: Successful update of the resource.
        '307':
          $ref: 'TS29571_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29571_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29571_CommonData.yaml#/components/responses/400'
        '403':
          $ref: 'TS29571_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29571_CommonData.yaml#/components/responses/404'
        '500':
          $ref: 'TS29571_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29571_CommonData.yaml#/components/responses/503'
        default:
          description: Unexpected error
    patch:
      summary: Update the authorization for monitoring for a UE
```

```
      operationId: UpdateMonitorAuth
      tags:
        - Update the authorization for monitoring for a UE
      parameters:
        - name: ueId
          in: path
          description: Identifier of the UE
          required: true
          schema:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/VarUeId'
        - name: discEntryId
          in: path
          description: Discovery Entry Id
          required: true
          schema:
            $ref: '#/components/schemas/DiscoveryEntryId'
      requestBody:
        content:
          application/merge-patch+json:
            schema:
              $ref: '#/components/schemas/MonitorUpdateData'
        required: true
      responses:
        '200':
          description: Expected response to a valid request
          content:
            application/json:
              schema:
                $ref: 'TS29571_CommonData.yaml#/components/schemas/PatchResult'
        '204':
          description: Expected response to a valid request
        '307':
          $ref: 'TS29571_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29571_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29571_CommonData.yaml#/components/responses/400'
        '403':
          $ref: 'TS29571_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29571_CommonData.yaml#/components/responses/404'
        '422':
          description: Unprocessable Request
          content:
            application/problem+json:
              schema:
                $ref: 'TS29571_CommonData.yaml#/components/schemas/ProblemDetails'
        '500':
          $ref: 'TS29571_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29571_CommonData.yaml#/components/responses/503'
        default:
          description: Unexpected error
      callbacks:
        onMonitorUpdateResult:
          '{request.body#/monitorUpdateResultCallbackRef}':
            post:
              requestBody:
                required: true
                content:
                  application/json:
                    schema:
                      $ref: '#/components/schemas/MonitorUpdateResult'
              responses:
                '204':
                  description: Successful Notification response
                '307':
                  $ref: 'TS29571_CommonData.yaml#/components/responses/307'
                '308':
                  $ref: 'TS29571_CommonData.yaml#/components/responses/308'
                '400':
                  $ref: 'TS29571_CommonData.yaml#/components/responses/400'
                '404':
                  $ref: 'TS29571_CommonData.yaml#/components/responses/404'
                '500':
                  $ref: 'TS29571_CommonData.yaml#/components/responses/500'
                '503':
                  $ref: 'TS29571_CommonData.yaml#/components/responses/503'
```

```
                    default:
                      description: Unexpected error
          onMatchInformation:
            '{request.body#/matchInfoCallbackRef}':
              post:
                requestBody:
                  required: true
                  content:
                    application/json:
                      schema:
                        $ref: '#/components/schemas/MatchInformation'
                responses:
                  '204':
                    description: Successful Notification response
                  '307':
                    $ref: 'TS29571_CommonData.yaml#/components/responses/307'
                  '308':
                    $ref: 'TS29571_CommonData.yaml#/components/responses/308'
                  '400':
                    $ref: 'TS29571_CommonData.yaml#/components/responses/400'
                  '404':
                    $ref: 'TS29571_CommonData.yaml#/components/responses/404'
                  '500':
                    $ref: 'TS29571_CommonData.yaml#/components/responses/500'
                  '503':
                    $ref: 'TS29571_CommonData.yaml#/components/responses/503'
                  default:
                    description: Unexpected error


  /{ueId}/discovery-authorize/{discEntryId}:
    put:
      summary: Obtain the authorization from the 5G DDNMF for a discoverer UE in the PLMN to operate
Model B restricted discovery
      operationId: ObtainDiscAuth
      tags:
        - Obtain the authorization for a discoverer UE
      parameters:
        - name: ueId
          in: path
          description: Identifier of the UE
          required: true
          schema:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/VarUeId'
        - name: discEntryId
          in: path
          description: Discovery Entry Id
          required: true
          schema:
            $ref: '#/components/schemas/DiscoveryEntryId'
      requestBody:
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/DiscoveryAuthReqData'
        required: true
      responses:
        '201':
          description: Created
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/DiscoveryAuthRespData'
          headers:
            Location:
              description: >
                Contains the URI of the newly created resource, according to the structure:
                {apiRoot}/n5g-ddnmf-disc>/<apiVersion>/{ueId}/discovery-authorize/{discEntryId}
              required: true
              schema:
                type: string
        '204':
          description: Successful update of the resource.
        '307':
          $ref: 'TS29571_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29571_CommonData.yaml#/components/responses/308'
        '400':
```

```
                 $ref: 'TS29571_CommonData.yaml#/components/responses/400'
               '403':
                 $ref: 'TS29571_CommonData.yaml#/components/responses/403'
               '404':
                 $ref: 'TS29571_CommonData.yaml#/components/responses/404'
               '500':
                 $ref: 'TS29571_CommonData.yaml#/components/responses/500'
               '503':
                 $ref: 'TS29571_CommonData.yaml#/components/responses/503'
             default:
               description: Unexpected error
         callbacks:
           onMatchInformation:
             '{request.body#/matchInfoCallbackRef}':
               post:
                 requestBody:
                   required: true
                   content:
                     application/json:
                       schema:
                         $ref: '#/components/schemas/MatchInformation'
                 responses:
                   '204':
                     description: Successful Notification response
                   '307':
                     $ref: 'TS29571_CommonData.yaml#/components/responses/307'
                   '308':
                     $ref: 'TS29571_CommonData.yaml#/components/responses/308'
                   '400':
                     $ref: 'TS29571_CommonData.yaml#/components/responses/400'
                   '404':
                     $ref: 'TS29571_CommonData.yaml#/components/responses/404'
                   '500':
                     $ref: 'TS29571_CommonData.yaml#/components/responses/500'
                   '503':
                     $ref: 'TS29571_CommonData.yaml#/components/responses/503'
                   default:
                     description: Unexpected error


  /{ueId}/match-report:
    post:
      summary: Obtain the information about the indicated discovery code from the 5G DDNMF
      operationId: MatchReport
      tags:
        - Obtain the information about the indicated discovery code
      parameters:
        - name: ueId
          in: path
          description: Identifier of the UE
          required: true
          schema:
            $ref: 'TS29571_CommonData.yaml#/components/schemas/VarUeId'
      requestBody:
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/MatchReportReqData'
      responses:
        '200':
          description: Expected response to a valid request
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/MatchReportRespData'
        '307':
          $ref: 'TS29571_CommonData.yaml#/components/responses/307'
        '308':
          $ref: 'TS29571_CommonData.yaml#/components/responses/308'
        '400':
          $ref: 'TS29571_CommonData.yaml#/components/responses/400'
        '403':
          $ref: 'TS29571_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29571_CommonData.yaml#/components/responses/404'
        '500':
          $ref: 'TS29571_CommonData.yaml#/components/responses/500'
        '503':
```

```
          $ref: 'TS29571_CommonData.yaml#/components/responses/503'
        default:
          description: Unexpected error

components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{nrfApiRoot}/oauth2/token'
          scopes:
            n5g-ddnmf-disc: Access to the N5g-ddnmf_Discovery API

  schemas:

# COMPLEX TYPES:

    AnnounceAuthData:
      type: object
      description: Represents Data used to request the authorization to announce for a UE
      required:
        - discType
      properties:
        discType:
          $ref: '#/components/schemas/DiscoveryType'
        openDiscData:
          $ref: '#/components/schemas/AnnounceDiscDataForOpen'
        restrictedDiscData:
          $ref: '#/components/schemas/AnnounceDiscDataForRestricted'

    AnnounceDiscDataForOpen:
      type: object
      description: Represents Data for open discovery used to request the authorization to announce
for a UE
      required:
        - proseAppId
        - validityTime
      properties:
        proseAppId:
          $ref: '#/components/schemas/ProseApplicationId'
        validityTime:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
        proseAppCode:
          $ref: '#/components/schemas/ProseApplicationCode'
        proseAppCodePrefix:
          $ref: '#/components/schemas/ProseApplicationPrefix'
        proseAppCodeSuffixPool:
          $ref: '#/components/schemas/ProseApplicationCodeSuffixPool'
        metaData:
          $ref: '#/components/schemas/MetaData'

    AnnounceDiscDataForRestricted:
      type: object
      description: Represents Data for restricted discovery used to request the authorization to
announce for a UE
      required:
        - rpauid
        - appId
        - validityTime
      properties:
        rpauid:
          $ref: '#/components/schemas/Rpauid'
        appId:
          $ref: '#/components/schemas/ApplicationId'
        validityTime:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
        proseRestrictedCode:
          $ref: '#/components/schemas/ProseRestrictedCode'
        proseRestrictedPrefix:
          $ref: '#/components/schemas/ProseRestrictedPrefix'
        codeSuffixPool:
          $ref: '#/components/schemas/RestrictedCodeSuffixPool'

    AnnounceUpdateData:
      type: object
      description: Represents Announce Authorize Data to update
      required:
```

```
              - discType
              - validityTime
            properties:
              discType:
                $ref: '#/components/schemas/DiscoveryType'
              validityTime:
                $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
              proseAppCode:
                $ref: '#/components/schemas/ProseApplicationCode'

        MonitorAuthReqData:
          type: object
          description: Represents Data used to request the authorization to monitor for a UE
          required:
            - discType
          properties:
            discType:
              $ref: '#/components/schemas/DiscoveryType'
            openDiscData:
              $ref: '#/components/schemas/MonitorDiscDataForOpen'
            restrictedDiscData:
              $ref: '#/components/schemas/MonitorDiscDataForRestricted'

        MonitorAuthRespData:
          type: object
          description: Represents the obtained Monitor Authorize Data for a UE
          properties:
            authDataOpen:
              $ref: '#/components/schemas/MonitorAuthDataForOpen'
            authDataRestricted:
              $ref: '#/components/schemas/MonitorAuthDataForRestricted'

        MonitorDiscDataForOpen:
          type: object
          description: Represents Data for open discovery used to request the authorization to monitor
    for a UE
          required:
            - proseAppIdNames
          properties:
            proseAppIdNames:
              type: array
              items:
                $ref: '#/components/schemas/ProseApplicationIdName'
              minItems: 1

        MonitorDiscDataForRestricted:
          type: object
          description: Represents Data for restricted discovery used to request the authorization to
    monitor for a UE
          required:
            - rpauid
            - targetPduid
            - appId
            - targetRpauid
          properties:
            rpauid:
              $ref: '#/components/schemas/Rpauid'
            targetPduid:
              $ref: '#/components/schemas/Pduid'
            appId:
              $ref: '#/components/schemas/ApplicationId'
            targetRpauid:
              $ref: '#/components/schemas/Rpauid'

        MonitorAuthDataForOpen:
          type: object
          description: Represents the obtained Announce Authorize Data for open discovery for a UE
          required:
            - proseAppMasks
            - ttl
          properties:
            proseAppCodes:
              type: array
              items:
                $ref: '#/components/schemas/ProseApplicationCode'
              minItems: 1
            proseAppPrefix:
              $ref: '#/components/schemas/ProseApplicationPrefix'
```

```
      proseAppMasks:
        type: array
        items:
          $ref: '#/components/schemas/ProseApplicationMask'
        minItems: 1
      ttl:
        type: integer

  MonitorAuthDataForRestricted:
    type: object
    description: Represents the obtained Announce Authorize Data for restricted discovery for a UE
    required:
      - proseRestrictedCode
      - validityTime
    properties:
      proseRestrictedCode:
        $ref: '#/components/schemas/ProseRestrictedCode'
      validityTime:
        $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'

  MonitorUpdateData:
    type: object
    description: Represents Monitor Authorize Data to update.
    required:
      - discType
    properties:
      discType:
        $ref: '#/components/schemas/DiscoveryType'
      openUpdateData:
        $ref: '#/components/schemas/MonitorUpdateDataForOpen'
      restrictedUpdateData:
        $ref: '#/components/schemas/MonitorUpdateDataForRestricted'

  DiscoveryAuthReqData:
    type: object
    description: Represents Data used to request the authorization for a discoverer UE.
    required:
      - discType
    properties:
      discType:
        $ref: '#/components/schemas/DiscoveryType'
      restrictedDiscData:
        $ref: '#/components/schemas/DiscDataForRestricted'

  DiscoveryAuthRespData:
    type: object
    description: Represents the obtained authorization Data for a discoverer UE
    properties:
      authDataRestricted:
        $ref: '#/components/schemas/AuthDataForRestricted'

  DiscDataForRestricted:
    type: object
    description: Represents Data for restricted discovery used to request the authorization for a
discoverer UE
    required:
      - rpauid
      - targetPduid
      - appId
      - targetRpauid
    properties:
      rpauid:
        $ref: '#/components/schemas/Rpauid'
      targetPduid:
        $ref: '#/components/schemas/Pduid'
      appId:
        $ref: '#/components/schemas/ApplicationId'
      targetRpauid:
        $ref: '#/components/schemas/Rpauid'

  AuthDataForRestricted:
    type: object
    description: Represents obtained authorization Data for restricted discovery for a discoverer
UE
    required:
      - proseQueryCodes
      - proseRespCode
      - validityTime
```

```
      properties:
        proseQueryCodes:
          items:
            $ref: '#/components/schemas/ProseQueryCode'
          minItems: 1
        proseRespCode:
          $ref: '#/components/schemas/ProseResponseCode'
        validityTime:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'

    MatchReportReqData:
      type: object
      description: Represents the Match Report information
      required:
        - discType
      properties:
        discType:
          $ref: '#/components/schemas/DiscoveryType'
        proseAppCodes:
          items:
            $ref: '#/components/schemas/ProseApplicationCode'
          minItems: 1
        moniteredPlmnId:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/PlmnId'

    MatchReportRespData:
      type: object
      description: Represents Match Report Acknowledgement
      properties:
        proseAppIdNames:
          items:
            $ref: '#/components/schemas/ProseApplicationIdName'
          minItems: 1
        validityTime:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/DateTime'
        metaData:
          $ref: '#/components/schemas/MetaData'
        metaDataIndexMasks:
          items:
            $ref: '#/components/schemas/MetaDataIndexMask'
          minItems: 1

    MonitorUpdateResult:
      type: object
      description: Represents the monitoring revocation results.
      required:
        - discType
        - proseRestrictedCode
        - appId
        - bannedRpauid
        - bannedPduid
        - revocationResult
      properties:
        discType:
            $ref: '#/components/schemas/DiscoveryType'
        proseRestrictedCode:
            $ref: '#/components/schemas/ProseRestrictedCode'
        appId:
            $ref: '#/components/schemas/ApplicationId'
        bannedRpauid:
            $ref: '#/components/schemas/Rpauid'
        bannedPduid:
            $ref: '#/components/schemas/Pduid'
        revocationResult:
            $ref: '#/components/schemas/RevocationResult'

    MatchInformation:
      type: object
      description: >
        Represents a report including a matching result, and the information that
        can be used for charging purpose.
      required:
        - discType
      properties:
        discType:
            $ref: '#/components/schemas/DiscoveryType'
        openMatchInfoForOpen:
            $ref: '#/components/schemas/MatchInfoForOpen'
```

```
            restrictedMatchInfo:
                $ref: '#/components/schemas/MatchInfoForRestricted'

        MatchInfoForOpen:
          type: object
          description: >
            Represents a report including a matching result, and the information that
            can be used for charging purpose for the open discovery type.
          required:
            - supi
            - appId
          properties:
            supi:
              $ref: 'TS29571_CommonData.yaml#/components/schemas/Supi'
            appId:
              items:
                $ref: '#/components/schemas/ApplicationId'
              minItems: 1

        MatchInfoForRestricted:
          type: object
          description: >
            Represents a report including a matching result, and the information that
            can be used for charging purpose for the restricted discovery type.
          required:
            - supi
            - rpauid
            - targetRpauid
            - proseRestrictedCode
          properties:
            supi:
              $ref: 'TS29571_CommonData.yaml#/components/schemas/Supi'
            rpauid:
                $ref: '#/components/schemas/Rpauid'
            targetRpauid:
                $ref: '#/components/schemas/Rpauid'
            proseRestrictedCode:
                $ref: '#/components/schemas/ProseRestrictedCode'

        RestrictedCodeSuffixPool:
          type: object
          description: Contains the Restricted Code Suffix Pool.
          anyOf:
            - required: [ codeSuffixList ]
            - required: [ codeSuffixRangeList ]
          properties:
            codeSuffixList:
              type: array
              items:
                $ref: '#/components/schemas/RestrictedCodeSuffix'
              minItems: 1
            codeSuffixRangeList:
              type: array
              items:
                $ref: '#/components/schemas/RestrictedCodeSuffixRange'
              minItems: 1

        RestrictedCodeSuffixRange:
          type: object
          description: Contains a range of the Restricted Code Suffixes which are consecutive.
          required:
            - beginningSuffix
            - endingSuffix
          properties:
            beginningSuffix:
              $ref: '#/components/schemas/RestrictedCodeSuffix'
            endingSuffix:
              $ref: '#/components/schemas/RestrictedCodeSuffix'

        ProseApplicationCodeSuffixPool:
          type: object
          description: Contains the Prose Application Code Suffix Pool.
          anyOf:
            - required: [ codeSuffix ]
            - required: [ codeSuffixRange ]
          properties:
            codeSuffix:
              $ref: '#/components/schemas/ProseAppCodeSuffix'
```

```
          codeSuffixRange:
            $ref: '#/components/schemas/ProseAppCodeSuffixRange'

    ProseAppCodeSuffixRange:
      type: object
      description: Contains a range of the Prose Application Code Suffixes which are consecutive.
      required:
        - beginningSuffix
        - endingSuffix
      properties:
        beginningSuffix:
          $ref: '#/components/schemas/ProseAppCodeSuffix'
        endingSuffix:
          $ref: '#/components/schemas/ProseAppCodeSuffix'

    MonitorUpdateDataForOpen:
      type: object
      description: Represents Monitor Update Data for the Discovery Type "OPEN".
      required:
        - proseAppIdName
        - ttl
      properties:
        proseAppIdName:
          $ref: '#/components/schemas/ProseApplicationIdName'
        ttl:
          type: integer
          minimum: 0

    MonitorUpdateDataForRestricted:
      type: object
      description: Represents Monitor Update Data for the Discovery Type "RESTRICTED".
      required:
        - proseRestrictedCode
        - appId
        - bannedRpauid
        - bannedPduid
      properties:
        proseRestrictedCode:
          $ref: '#/components/schemas/ProseRestrictedCode'
        appId:
          $ref: '#/components/schemas/ApplicationId'
        bannedRpauid:
          $ref: '#/components/schemas/Rpauid'
        bannedPduid:
          $ref: '#/components/schemas/Pduid'
        monitorUpdateResultCallbackRef:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'


# SIMPLE TYPES:
    DiscoveryEntryId:
      description: Contains the Discovery Entry ID.
      type: string

    ProseApplicationId:
      description: Contains the ProSe Application ID.
      type: string

    ProseApplicationCode:
      description: Contains the ProSe Application Code.
      type: string

    Rpauid:
      description: Contains the RPAUID.
      type: string

    ApplicationId:
      description: Contains the Application ID.
      type: string

    ProseRestrictedCode:
      description: Contains the ProSe Restricted Code.
      type: string

    ProseRestrictedPrefix:
      description: Contains the ProSe Restricted Code Prefix.
      type: string
```

```
    MetaData:
      description: Contains the metadata.
      type: string

    ProseApplicationIdName:
      description: Contains the ProSe Application ID name.
      type: string

    Pduid:
      description: Contains the PDUID.
      type: string

    ProseApplicationPrefix:
      description: Contains the Prose Application Code Prefix.
      type: string

    ProseApplicationMask:
      description: Contains the Prose Application Mask.
      type: string

    ProseQueryCode:
      description: Contains the ProSe Query Code.
      type: string

    ProseResponseCode:
      description: Contains the ProSe Response Code.
      type: string

    MetaDataIndexMask:
      description: Contains the Meta Data Index Mask.
      type: string

    RestrictedCodeSuffix:
      description: Contains the ProSe Restricted Code Suffix.
      type: string

    ProseAppCodeSuffix:
      description: Contains the ProSe Application Code Suffix.
      type: string

# ENUMS:

    DiscoveryType:
      anyOf:
      - type: string
        enum:
          - OPEN
          - RESTRICTED
      - type: string
        description: >
          This string provides forward-compatibility with future
          extensions to the enumeration but is not used to encode
          content defined in the present version of this API.
      description: >
        Possible values are
        - OPEN: Discovery type is "open".
        - RESTRICTED: Discovery type is "restricted".


    RevocationResult:
      anyOf:
      - type: string
        enum:
          - SUCCESSFUL
          - FAILED
      - type: string
        description: >
          This string provides forward-compatibility with future
          extensions to the enumeration but is not used to encode
          content defined in the present version of this API.
      description: >
        Possible values are
        - SUCCESSFUL: The Monitoring Revocation is successful.
        - FAILED: The Monitoring Revocation is failed.
```

Annex B (informative):
Change history

Change history							
Date	**Meeting**	**TDoc**	**CR**	**Rev**	**Cat**	**Subject/Comment**	**New version**
2021-04	C4#103-e	C4-212597				Implementation of pCRs agreed in CT4 # 103-e including C4-212149, C4-212151, C4-212455.	0.1.0
2021-06	C4#104-e	C4-213528				Implementation of pCRs agreed in CT4#104-e including C4-213188, C4-213207, C4-213338, C4-213340, C4-213341, C4-213342, C4-213455, C4-213457, C4-213463.	0.2.0
2021-09	C4#105-e	C4-214757				Implementation of pCRs agreed in CT4#105-e including C4-214266, C4-214267, C4-214268, C4-214269, C4-214433, C4-214435, C4-214436, C4-214437, C4-214438, C4-214439, C4-214441, C4-214442, C4-214604, C4-214605, C4-214830, C4-214832.	0.3.0
2021-10	C4#105-e	C4-215521				Implementation of pCRs agreed in CT4#106-e including C4-215097, C4-215353, C4-215448, C4-215449.	0.4.0
2021-12	CT#94e	CP-213159				V1.0.0 presented for information	1.0.0
2022-01	CT4#107-bis-e	C4-220455				Implementation of pCRs agreed in CT4#107-bis-e including C4-220281	1.1.0
2022-03	CT4#108-e	C4-221593				Implementation of pCRs agreed in CT4#108-e including C4-221337, C4-221349	1.2.0
2022-03	CT#95e	CP-220108				TS presented for information	2.0.0
2022-03	CT#95e					TS approved	17.0.0
2022-06	CT#96	CP-221043	0001	1	F	Correction on the description of RevocationResult	17.1.0
2022-06	CT#96	CP-221029	0002	1	F	Remove the apiVersion placeholder from the resource URI variables table	17.1.0
2022-06	CT#96	CP-221299	0003	1	F	29.555 0003 Rel-17 API version and External doc update	17.1.0
2023-12	CT#102	CP-233062	0016	1	F	Corrections on Announce Auth	17.2.0
2023-12	CT#102	CP-233061	0019	-	F	29.555 Rel-17 API version and External doc update	17.2.0

History

Document history		
V17.0.0	May 2022	Publication
V17.1.0	July 2022	Publication
V17.2.0	January 2024	Publication