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In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

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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:

Version x.y.z

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- 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 Application Function ProSe Service of the 5G System. It provides stage 3 protocol definitions and message flows, and specifies the API for the Naf_ProSe service.

The 5G System stage 2 architecture and procedures are specified in 3GPP TS 23.501 [2], 3GPP TS 23.502 [3] and 3GPP TS 23.304 [14].

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

The Application Function ProSe Service is provided by the Application Function (AF). This service supports 5G ProSe Direct Discovery authorization.

2 References

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

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

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

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

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

[4] 3GPP TS 29.500: "5G System; Technical Realization of Service Based Architecture; Stage 3".

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

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

[7] 3GPP TR 21.900: "Technical Specification Group working methods".

[8] 3GPP TS 33.501: "Security architecture and procedures for 5G system".

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

[10] 3GPP TS 29.510: "5G System; Network Function Repository Services; Stage 3".

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

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

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

[14] 3GPP TS 23.304: "Proximity based Services (ProSe) in the 5G System (5GS); Stage 2".

[15] 3GPP TS 23.303: "Proximity-based services (ProSe); Stage 2".

[16] 3GPP TS 29.555: "5G System; 5G Direct Discovery Name Management Services; Stage 3".

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

[18] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces; Stage 3".

3 Definitions, symbols and abbreviations

3.1 Definitions

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

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

3.2 Symbols

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

<symbol> <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 Application Function ProSe (Naf_ProSe) Service, as defined in clause 5.2.19.3 of 3GPP TS 23.502 [3], is provided by the Application Function (AF).

Figure 4-1 provides the reference architecture (in service based interface representation), with focus on the ProSe Service of the Application Function.

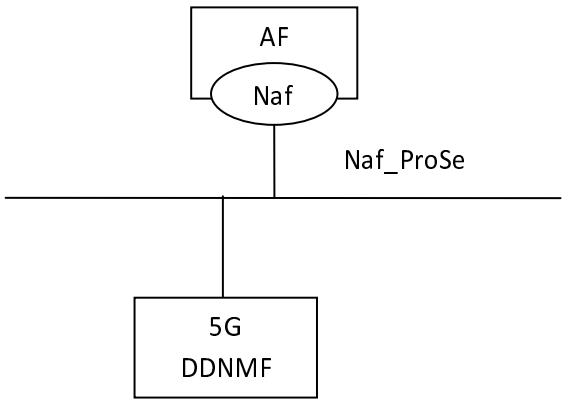

Figure 4-1: Naf_ProSe Service architecture, SBI representation

The Naf_ProSe Service is part of the Naf service-based interface exhibited by the AF. The service is provided by the AF and consumed by NF service consumers (e.g. 5G DDNMF), as shown in figure 4-1 for the SBI representation model.

5 Naf_ProSe Service offered by the AF

5.1 Introduction

Table 5.1-1 shows the Application Function ProSe Service and the corresponding Service Operations.

Table 5.1-1: Application Function ProSe Service

Service Name	Service Operations	Operation Semantics	Example Consumer(s)
Naf_ProSe	DiscoveryAuthorization	Request/Response	5G DDNMF
	DiscoveryAuthorizationUpdateNotify	Subscribe/Notify	5G DDNMF
	DiscoveryAuthorizationResultUpdate	Request/Response	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
Naf_ProSe	6.1	Application Function ProSe Service	TS29557_Naf_ProSe	naf-prose	A.2

5.2 Naf_ProSe Service

5.2.1 Service Description

The Naf_ProSe Service enables NF service consumers (e.g. 5G DDNMF) to request authorization for a UE of a 5G ProSe Discovery request.

This service hence supports the following functionalities:

- mapping of RPAUID and PDUID and authentication of the RPAUID(s) for restricted 5G ProSe Direct Discovery;
- allocation of a ProSe Application Code Suffix pool, if open 5G ProSe Direct Discovery with application-controlled extension is used;
- allocation of mask(s) for the ProSe Application Code Suffix(es), if open 5G ProSe Direct Discovery with application-controlled extension is used;
- allocation of a ProSe Restricted Code Suffix pool, if restricted 5G ProSe Direct Discovery with application-controlled extension is used; and
- allocation of mask(s) for ProSe Restricted Code Suffix, if restricted 5G ProSe Direct Discovery with application-controlled extension is used; and
- update of authorization information to revoke Restricted ProSe Direct Discovery permission(s).

5.2.2 Service Operations

5.2.2.1 Introduction

The service operations defined for the Naf_ProSe Service are as follows:

- DiscoveryAuthorization: It allows a NF service consumer (e.g. 5G DDNMF) to request the authorization for a UE of a 5G ProSe Direct Discovery request;
- DiscoveryAuthorizationUpdateNotify: It allows an AF to update the authorization information to revoke discovery permissions related to some other users at the NF service consumer for Restricted ProSe Direct Discovery;
- DiscoveryAuthorizationResultUpdate: It allows a NF service consumer (e.g. 5G DDNMF) to inform the AF of the revocation result associated to the update of authorization information for Restricted ProSe Direct Discovery.

5.2.2.2 DiscoveryAuthorization

5.2.2.2.1 General

The DiscoveryAuthorization service operation is used by a NF service consumer (e.g. 5G DDNMF) to obtain the authorization for a UE of a 5G ProSe Direct Discovery request, i.e. detect and identify other UEs in proximity using NR radio signals.

The following procedures are supported using the DiscoveryAuthorization Service Operation:

- Auth Request procedures (see 3GPP TS 23.304 [14], clause 6.3, and 3GPP TS 23.303 [15], clause 5.3).

5.2.2.2.2 Auth Request procedures using DiscoveryAuthorization service operation

These procedures are invoked by a NF service consumer (e.g. HPLMN 5G DDNMF) towards an AF to request the authorization for a UE to perform 5G ProSe Direct Discovery.

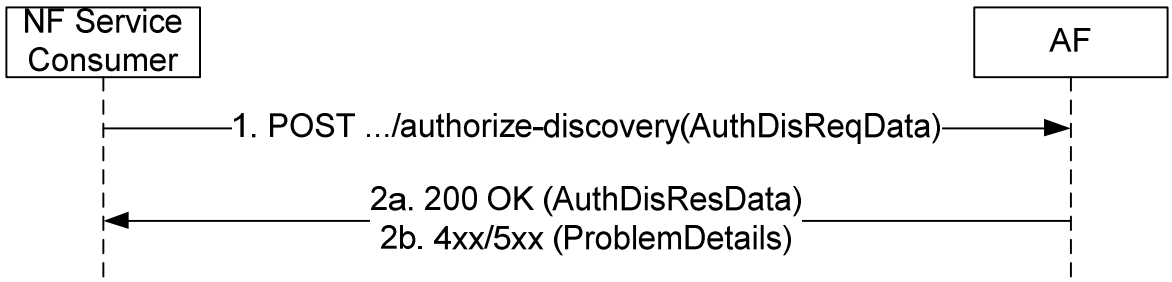

Figure 5.2.2.2.2-1: Authorization of Discovery Request for a UE

1. In order to request the authorization for a UE of a 5G ProSe Direct Discovery request, the NF service consumer shall send an HTTP POST request with the request URI set to "{apiRoot}/naf-prose/<apiVersion>/authorize-discovery" and the request body containing the AuthDisReqData data structure, as described in figure 5.2.2.2.2-1.

   The AuthDisReqData data structure shall contain the authorization request type related to the received 5G ProSe Direct Discovery request within the "authRequestType" attribute. The remaining content of the AuthDisReqData data structure differs according to the following cases, as defined in clauses 5.2.2.2.3, 5.2.2.2.4, 5.2.2.2.5, 5.2.2.2.6 and 5.2.2.2.7.

   - Open 5G ProSe Direct Discovery request with application-controlled extension initiated by an announcing UE (see clause 5.3.3 of 3GPP TS 23.303 [15]). This is defined in clause 5.2.2.2.3.
   - Open 5G ProSe Direct Discovery request with application-controlled extension initiated by a monitoring UE (see clause 5.3.3 of 3GPP TS 23.303 [15]). This is defined in clause 5.2.2.2.3.
   - Restricted 5G ProSe Direct Discovery request initiated by an announcing UE (see clause 5.3.3 of 3GPP TS 23.303 [15]). This is defined in clause 5.2.2.2.4.
   - Restricted 5G ProSe Direct Discovery request with application-controlled extension initiated by an announcing UE (see clause 5.3.3 of 3GPP TS 23.303 [15]). This is defined in clause 5.2.2.2.5.
   - Restricted 5G ProSe Direct Discovery request initiated by a monitoring UE (see clause 5.3.3 of 3GPP TS 23.303 [15]). This is defined in clause 5.2.2.2.4.

- Restricted 5G ProSe Direct Discovery request with application-controlled extension initiated by a monitoring UE (see clause 5.3.3 of 3GPP TS 23.303 [15]). This is defined in clause 5.2.2.2.5.

- Restricted 5G ProSe Direct Discovery request initiated by a discoveree UE (see clause 5.3.3A of 3GPP TS 23.303 [15]). This is defined in clause 5.2.2.2.6.

- Restricted 5G ProSe Direct Discovery request initiated by a discoverer UE (see clause 5.3.3A of 3GPP TS 23.303 [15]). This is defined in clause 5.2.2.2.7.

- Restricted 5G ProSe Direct Discovery match report (see clauses 5.3.4 and 5.3.4A of 3GPP TS 23.303 [15]). This is defined in clause 5.2.2.2.3.

2a On success, a response with HTTP "200 OK" status code shall be returned. The response body shall contain the parameters related to the 5G ProSe Direct Discovery authorization response data within the AuthDisResData data structure, which shall contain the authorization response type related to the received 5G ProSe Direct Discovery request within the "authResponseType" attribute. The remaining content of the AuthDisResData data structure also differs according to the above listed cases in step 1, as defined in clauses 5.2.2.2.3, 5.2.2.2.4, 5.2.2.2.5, 5.2.2.2.6 and 5.2.2.2.7.

2b On failure, one of the HTTP status codes listed in table 6.1.7.3-1 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 6.1.7.3-1.

5.2.2.2.3 Open 5G ProSe Direct Discovery (Model A) with application-controlled extension

When Open 5G ProSe Direct Discovery (Model A) with application-controlled extension is used, the NF service consumer (e.g. 5G DDNMF) shall provide the following attributes within the AuthDisReqData data structure, as specified in clause 6.3 of 3GPP TS 23.304 [14] and clauses 5.3.3.2, 5.3.3.3, 5.3.3.4 and 5.3.3.5 of 3GPP TS 23.303 [15].

- When the 5G ProSe Direct Discovery request is initiated by an announcing UE:

  - the ProSe Application ID within the "proseAppId" attribute, indicating what the UE is interested to announce;

  - the allowed number of suffixes within the "allowedSuffixNum" attribute, indicating how many ProSe Application Code Suffixes the ProSe Application Server can assign for the UE;

  - the application level container within the "appLevelContainer" attribute, containing the request and any relevant information for the 5G ProSe AF to assign a (set of) ProSe Application Code Suffix(es); and

  - the authorization request type set to "OPEN_DISCOVERY_EXTENSION_ANNOUNCE" within the "authRequestType" attribute.

- When the 5G ProSe Direct Discovery request is initiated by a monitoring UE:

  - the ProSe Application ID(s) within the "proseAppId" attribute, indicating what the UE is interested to monitor;

  - the application level container within the "appLevelContainer" attribute, containing the request and information corresponding to the ProSe Application Code Suffix; and

  - the authorization request type set to "OPEN_DISCOVERY_EXTENSION_MONITOR" within the "authRequestType" attribute.

If the processing of the request is successful, the 5G ProSe AF shall provide the following attributes within the AuthDisResData data structure, also as specified in clause 6.3 of 3GPP TS 23.304 [14] and clauses 5.3.3.2, 5.3.3.3, 5.3.3.4 and 5.3.3.5 of 3GPP TS 23.303 [15]:

- When the 5G ProSe Direct Discovery request is initiated by an announcing UE:

  - the ProSe Application Code Suffix Pool within the "proseAppCodeSuffixPool" attribute, containing the Suffix(es) allocated by the 5G ProSe AF based on the inputs provided by the NF service consumer (e.g. 5G DDNMF) in the associated request;

- the authorization response type set to "OPEN_DISCOVERY_EXTENSION_ANNOUNCE_ACK" within the "authResponseType" attribute.

- When the 5G ProSe Direct Discovery request is initiated by a monitoring UE:

  - the mask(s) for the ProSe Application Code Suffix(es) within the "proseAppMasks" attribute, corresponding to ProSe Application ID provided by the NF service consumer (e.g. 5G DDNMF) in the related request;

  - the authorization response type set to "OPEN_DISCOVERY_EXTENSION_MONITOR_ACK" within the "authResponseType" attribute.

5.2.2.2.4 Restricted 5G ProSe Direct Discovery (Model A)

When Restricted 5G ProSe Direct Discovery (Model A) is used, the NF service consumer (e.g. 5G DDNMF) shall provide the following attributes within the AuthDisReqData data structure, as specified in clause 6.3 of 3GPP TS 23.304 [14] and clauses 5.3.3.2A, 5.3.3.3A, 5.3.3.4A and 5.3.3.5A of 3GPP TS 23.303 [15].

- When the 5G ProSe Direct Discovery request is initiated by an announcing UE:

  - the RPAUID within the "rpauid" attribute, indicating what the UE is interested to announce; and

  - the authorization request type set to "RESTRICTED_DISCOVERY_ANNOUNCE" within the "authRequestType" attribute.

- When the 5G ProSe Direct Discovery request is initiated by a monitoring UE:

  - the authorization request type set to either "RESTRICTED_DISCOVERY_MONITOR" or "RESTRICTED_DISCOVERY_PERMISSION" within the "authRequestType" attribute; and

  - if the authorization request type is set to "RESTRICTED_DISCOVERY_MONITOR":

    - the RPAUID within the "rpauid" attribute, indicating the identity that the UE uses to obtain the permission to monitor; and

    - the application level container within the "appLevelContainer" attribute, containing the Target RPAUID(s) indicating what the UE is interested to monitor;

  otherwise,

  - if the authorization request type is set to "RESTRICTED_DISCOVERY_PERMISSION":

    - the RPAUID within the "rpauid" attribute, indicating the identity that the UE uses to obtain the permission to monitor;

    - the target RPAUID within the "targetRpauid" attribute, containing the Target RPAUID;

If the processing of the request is successful, the 5G ProSe AF shall provide the following attributes within the AuthDisResData data structure, also as specified in clause 6.3 of 3GPP TS 23.304 [14] and clauses 5.3.3.2A, 5.3.3.3A, 5.3.3.4A and 5.3.3.5A of 3GPP TS 23.303 [15]:

- When the 5G ProSe Direct Discovery request is initiated by an announcing UE:

  - the PDUID(s) within the "pduids" attribute, containing the PDUID(s) corresponding to the provided RPAUID; and

  - the authorization response type set to "RESTRICTED_DISCOVERY_ANNOUNCE_ACK" within the "authResponseType" attribute.

- When the 5G ProSe Direct Discovery request is initiated by a monitoring UE:

  - the authorization response type set to either "RESTRICTED_DISCOVERY_MONITOR_ACK" or "RESTRICTED_DISCOVERY_PERMISSION_ACK" within the "authResponseType" attribute; and

  - if the authorization response type is set to "RESTRICTED_DISCOVERY_MONITOR_ACK":

    - the PDUID within the "pduids" attribute, containing the PDUID corresponding to the provided RPAUID;

- a response application level container within the "appLevelContainer" attribute, containing the successfully authenticated Target RPAUID(s); and

- N sets of Target PDUID - Target RPAUID - Metadata Indicator within the "targetDataSet" attribute, containing N sets of Target PDUID - Target RPAUID - Metadata Indicator (Each Target PDUID is returned with the corresponding Target RPAUID(s) that the RPAUID is allowed to discover);

NOTE: The Metadata Indicator is optional. It indicates whether there is metadata associated with the RPAUID, and if so, whether updating this metadata is allowed.

otherwise,

- if the authorization response type is set to "RESTRICTED_DISCOVERY_PERMISSION_ACK":

  - the target PDUID within the "targetPduid" attribute, containing the Target PDUID;

5.2.2.2.5 Restricted 5G ProSe Direct Discovery (Model A) with application-controlled extension

When Restricted 5G ProSe Direct Discovery (Model A) is used, the NF service consumer (e.g. 5G DDNMF) shall provide the following attributes within the AuthDisReqData data structure, as specified in clause 6.3 of 3GPP TS 23.304 [14] and clauses 5.3.3.2A, 5.3.3.3A, 5.3.3.4A and 5.3.3.5A of 3GPP TS 23.303 [15].

- When the 5G ProSe Direct Discovery request is initiated by an announcing UE:

  - the RPAUID within the "rpauid" attribute, indicating what the UE is interested to announce;

  - the allowed number of suffixes within the "allowedSuffixNum" attribute, indicating how many ProSe Restricted Code Suffixes the ProSe Application Server can assign for the UE;

  - the authorization request type set to "RESTRICTED_DISCOVERY_EXTENSION_ANNOUNCE" within the "authRequestType" attribute.

- When the 5G ProSe Direct Discovery request is initiated by a monitoring UE:

  - the RPAUID within the "rpauid" attribute, indicating the identity that the UE uses to obtain the permission to monitor; and

  - the application level container within the "appLevelContainer" attribute, containing the Target RPAUID(s) indicating what the UE is interested to monitor; and

  - the authorization request type set to "RESTRICTED_DISCOVERY_EXTENSION_MONITOR" within the "authRequestType" attribute.

If the processing of the request is successful, the 5G ProSe AF shall provide the following attributes within the AuthDisResData data structure, also as specified in clause 6.3 of 3GPP TS 23.304 [14] and clauses 5.3.3.2A, 5.3.3.3A, 5.3.3.4A and 5.3.3.5A of 3GPP TS 23.303 [15]:

- When the 5G ProSe Direct Discovery request is initiated by an announcing UE:

  - the PDUID(s) within the "pduids" attribute, containing the PDUID(s) corresponding to the provided RPAUID; and

  - the ProSe Restricted Code Suffix Pool within the "restrictedCodeSuffixPool" attribute, containing the Suffix(es) allocated by the 5G ProSe AF based on the inputs provided by the NF service consumer (e.g. 5G DDNMF) in the associated request;

  - the authorization response type set to "RESTRICTED_DISCOVERY_EXTENSION_ANNOUNCE_ACK" within the "authResponseType" attribute.

- When the 5G ProSe Direct Discovery request is initiated by a monitoring UE:

  - the PDUID within the "pduids" attribute, containing the PDUID corresponding to the provided RPAUID;

  - a response application level container within the "appLevelContainer" attribute, containing the successfully authenticated Target RPAUID(s);

- N sets of Target PDUID - Target RPAUID - Metadata Indicator within the "targetDataSet" attribute, containing N sets of Target PDUID - Target RPAUID - Metadata Indicator (Each Target PDUID is returned with the corresponding Target RPAUID(s) that the RPAUID is allowed to discover); and

NOTE: The Metadata Indicator is optional. It indicates whether there is metadata associated with the RPAUID, and if so, whether updating this metadata is allowed.

- the authorization response type set to "RESTRICTED_DISCOVERY_EXTENSION_MONITOR_ACK" within the "authResponseType" attribute.

The AuthDisResData data structure may also include in this case:

- the mask(s) for the ProSe Restricted Code Suffix(es) within the "proSeRestrictedMasks" attribute, corresponding to each of the provided Target RPAUID(s);

5.2.2.2.6 Restricted 5G ProSe Direct Discovery (Model B)

When Restricted 5G ProSe Direct Discovery (Model B) is used, the NF service consumer (e.g. 5G DDNMF) shall provide the following attributes within the AuthDisReqData data structure, as specified in clause 6.3 of 3GPP TS 23.304 [14] and clauses 5.3.3A.2, 5.3.3A.3, 5.3.3A.4 and 5.3.3A.5 of 3GPP TS 23.303 [15].

- When the 5G ProSe Direct Discovery request is initiated by a discoveree UE:
  - the RPAUID within the "rpauid" attribute, indicating what the UE is interested to announce; and
  - the authorization request type set to "RESTRICTED_DISCOVERY_RESPONSE" within the "authRequestType" attribute.
- When the 5G ProSe Direct Discovery request is initiated by a discoverer UE:
  - the RPAUID within the "rpauid" attribute, indicating the identity that the UE uses to obtain the permission to discover; and
  - either:
    - the application level container within the "appLevelContainer" attribute (e.g. if the NF service consumer is the HPLMN 5G DDNMF), containing the Target RPAUID(s) indicating what the UE is interested to discover; or
    - the target RPAUID within the "targetRpauid" attribute (if the NF service consumer is a 5G DDNMF located in another PLMN), containing the Target RPAUID; and
  - the authorization request type set to "RESTRICTED_DISCOVERY_QUERY" within the "authRequestType" attribute.

If the processing of the request is successful, the 5G ProSe AF shall provide the following attributes within the AuthDisResData data structure, also as specified in clause 6.3 of 3GPP TS 23.304 [14] and clauses 5.3.3A.2, 5.3.3A.3, 5.3.3A.4 and 5.3.3A.5 of 3GPP TS 23.303 [15]:

- When the 5G ProSe Direct Discovery request is initiated by a discoveree UE:
  - the PDUID(s) within the "pduids" attribute, containing the PDUID(s) corresponding to the provided RPAUID; and
  - the authorization response type set to "RESTRICTED_DISCOVERY_RESPONSE_ACK" within the "authResponseType" attribute.
- When the 5G ProSe Direct Discovery request is initiated by a discoverer UE:
  - the PDUID within the "pduids" attribute, containing the PDUID corresponding to the provided RPAUID;
  - either:
    - N sets of Target PDUID - Target RPAUID within the "targetDataSet" attribute (e.g. if the NF service consumer is the HPLMN 5G DDNMF and an application level container was received in the associated

request), containing N sets of Target PDUID - Target RPAUID (Each Target PDUID is returned with the corresponding Target RPAUID(s) that the RPAUID is allowed to discover); or

- the target PDUID within the "targetPduid" attribute (if the NF service consumer is a 5G DDNMF located in another PLMN and only one target RPAUID was received in the associated request), containing the Target PDUID; and

- the authorization response type set to "RESTRICTED_DISCOVERY_QUERY_ACK" within the "authResponseType" attribute.

5.2.2.2.7 Restricted 5G ProSe Direct Discovery match report

For a Restricted 5G ProSe Direct Discovery match report, the NF service consumer (e.g. 5G DDNMF) shall provide the following attributes within the AuthDisReqData data structure, as specified in clause 6.3 of 3GPP TS 23.304 [14] and clauses 5.3.4.1A, 5.3.4.2A, 5.3.4A.1 and 5.3.4A.2 of 3GPP TS 23.303 [15].

- the RPAUID within the "rpauid" attribute, indicating what the UE is interested to announce; and

- the target RPAUID within the "targetRpauid" attribute (if the NF service consumer is a 5G DDNMF located in another PLMN), containing the Target RPAUID; and

- the authorization request type set to "RESTRICTED_DISCOVERY_MATCH" within the "authRequestType" attribute.

If the processing of the request is successful, the 5G ProSe AF shall provide the following attributes within the AuthDisResData data structure, also as specified in clause 6.3 of 3GPP TS 23.304 [14] and clauses 5.3.4.1A, 5.3.4.2A, 5.3.4A.1 and 5.3.4A.2 of 3GPP TS 23.303 [15]:

- the PDUID within the "pduids" attribute, containing the PDUID corresponding to the provided RPAUID;

- the target PDUID within the "targetPduid" attribute, containing the Target PDUID;

- the metadata within the "metaData" attribute, corresponding to the Target PDUID; and

- the authorization response type set to "RESTRICTED_DISCOVERY_MATCH_ACK" within the "authResponseType" attribute.

5.2.2.3 DiscoveryAuthorizationUpdateNotify

5.2.2.3.1 General

The DiscoveryAuthorizationUpdateNotify service operation is used by an AF to update the authorization information to revoke discovery permissions relating to some other users at the NF service consumer (e.g. 5G DDNMF) for Restricted ProSe Direct Discovery. See Figure 5.2.2.3.1-1.

The following procedures are supported using the DiscoveryAuthorizationUpdateNotify Service Operation:

- Auth Update procedures (see 3GPP TS 23.303 [15], clause 5.3.6A.2).

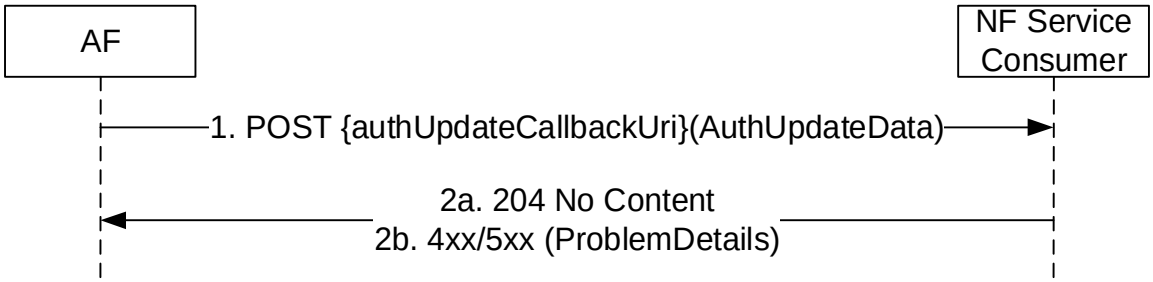

Figure 5.2.2.3.1-1: DiscoveryAuthorizationUpdate Notification

1. The AF shall send an HTTP POST request to the callback URI of the NF consumer (e.g. 5G DDNMF). The request body shall contain the AuthUpdateData data structure.

The callback URI is provided to the AF during the Auth Request procedures defined in clause 5.2.2.2.

2a. On success, a response with an HTTP "204 No content" status code shall be returned by the NF service consumer.

2b. On failure, one of the HTTP status codes listed in Table 6.1.5.2.3.1-2 may be returned. For a 4xx response, the message body may contain a ProblemDetails data structure with the "cause" attribute set to one of the application errors listed in Table 6.1.5.2.3.1-2.

5.2.2.4 DiscoveryAuthorizationResultUpdate

5.2.2.4.1 General

The DiscoveryAuthorizationResultUpdate service operation is used by a NF service consumer (e.g. 5G DDNMF) to inform the AF of the result of the revocation request to update the authorization information for Restricted ProSe Direct Discovery. See Figure 5.2.2.4.1-1.

The following procedures are supported using the DiscoveryAuthorizationResultUpdate Service Operation:

- Auth Update Result procedures (see 3GPP TS 23.303 [15], clause 5.3.6A.2).

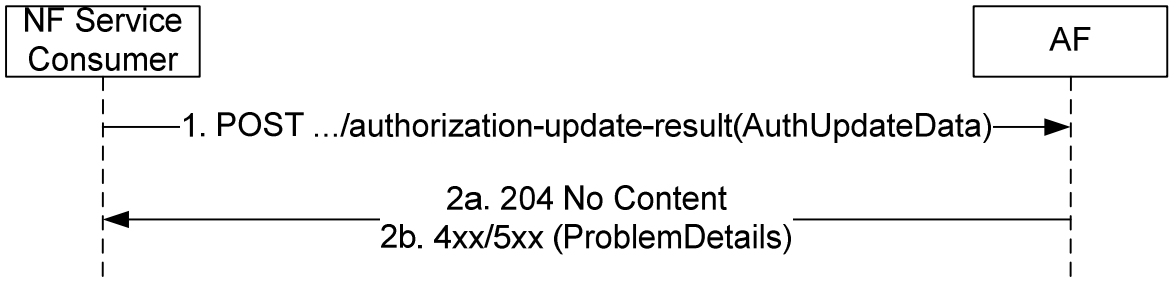

Figure 5.2.2.4.1-1: DiscoveryAuthorizationResultUpdate Request/Response

1. In order to inform the AF of the result of the revocation related to discovery authorization update, the NF service consumer shall send an HTTP POST request with the request URI set to "{apiRoot}/naf-prose/<apiVersion>/authorize-update-result" and the request body containing the AuthUpdateData data structure, as described in figure 5.2.2.4.1-1.

2a On success, a response with an HTTP "204 No Content" status code shall be returned by the AF.

2b On failure, one of the HTTP status code listed in Table 6.1.4.3.2-2 may be returned. For a 4xx response, the message body may contain a ProblemDetails structure with the "cause" attribute set to one of the application errors listed in Table 6.1.4.3.2-2.

6 API Definitions

6.1 Naf_ProSe Service API

6.1.1 Introduction

The Naf_ProSe shall use the Naf_ProSe API.

The API URI of the Naf_ProSe API shall be:

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

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

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

with the following components:

- The {apiRoot} shall be set as described in 3GPP TS 29.501 [5].
- The <apiName> shall be "naf-prose ".
- 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 [11], shall be used as specified in clause 5 of 3GPP TS 29.500 [4].

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

The OpenAPI [6] specification of HTTP messages and content bodies for the naf-prose 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 [4] for the usage of HTTP standard headers.

6.1.2.2.2 Content type

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

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

JSON Merge Patch, as defined in IETF RFC 7396 [17], 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 [4] shall be supported, and the optional HTTP custom header fields specified in clause 5.2.3.3 of 3GPP TS 29.500 [4] may be supported.

6.1.3 Resources

In this release of this specification, no resource is defined for the Naf_ProSe Service.

6.1.4 Custom Operations without associated resources

6.1.4.1 Overview

The structure of the custom operation URIs of the Naf_ProSe Service is shown in figure 6.1.4.1-1.

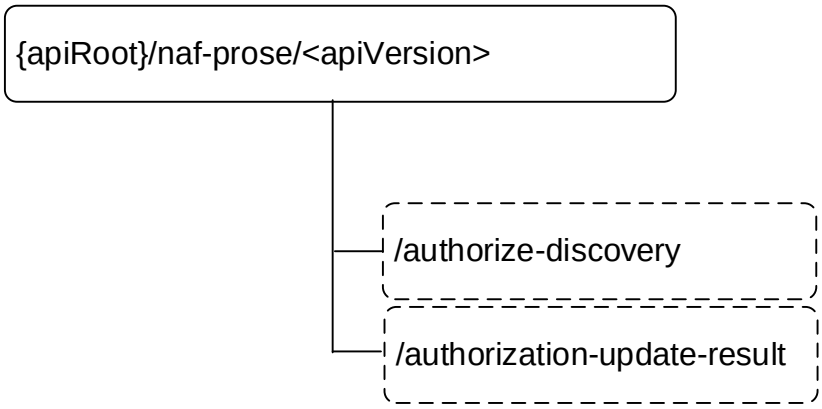

Figure 6.1.4.1-1: Resource URI structure of the Naf_ProSe API

Table 6.1.4.1-1 provides an overview of the custom operations and applicable HTTP methods.

Table 6.1.4.1-1: Custom operations

Custom operation URI	Mapped HTTP method	Description
/authorize-discovery	POST	Obtain the authorization of Discovery Request from the 5G DDNMF for a UE.
/authorization-update-result	POST	Inform the AF of the result of the revocation request to update authorization information

6.1.4.2 Operation: authorize-discovery

6.1.4.2.1 Description

This clause represents the custom operation and what it is used for, and the custom operation URI.

6.1.4.2.2 Operation Definition

This operation shall support request data structures specified in table 6.1.4.2.2-1 and response data structures specified in table 6.1.4.2.2-2.

Table 6.1.4.2.2-1: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
AuthDisReqData	M	1	Contains the request data to obtain the authorization for a UE of a 5G ProSe Discovery Request.

Table 6.1.4.2.2-2: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
AuthDisResData	M	1	200 OK	Contains the response data for the authorization of a 5G ProSe Direct Discovery Request for a UE.
NOTE: The manadatory HTTP error status code for the POST method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply.				

6.1.4.3 Operation: authorization-update-result

6.1.4.3.1 Description

This clause represents the custom operation and what it is used for, and the custom operation URI.

6.1.4.3.2 Operation Definition

This operation shall support request data structures specified in table 6.1.4.3.2-1 and response data structures specified in table 6.1.4.3.2-2.

Table 6.1.4.3.2-1: Data structures supported by the POST Request Body on this resource

Data type	P	Cardinality	Description
AuthUpdateData	M	1	Contains the result of the revocation request to update authorization information for Restricted ProSe Direct Discovery.

Table 6.1.4.3.2-2: Data structures supported by the POST Response Body on this resource

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	This case represents successful report of discovery authorization update result.
ProblemDetails	O	0..1	403 Forbidden	The "cause" attribute may be used to indicate one of the following application errors: - UNSPECIFIED See table 6.1.7.3-1 for the description of this error.
NOTE: The mandatory HTTP error status code for the POST method listed in table 5.2.7.1-1 of 3GPP TS 29.500 [4] also apply.				

6.1.5 Notifications

6.1.5.1 General

Table 6.1.5.1-1 provides an overview of the notification operation and applicable HTTP method.

Table 6.1.5.1-1: Notifications overview

Notification	Callback URI	HTTP method	Description
DiscoveryAuthorization UpdateNotify	{authUpdateCallbackUri}	POST	Update the authorization information to revoke discovery permissions related to some other users in the NF service consumer (e.g. 5G DDNMF).

6.1.5.2 DiscoveryAuthorizationUpdateNotify

6.1.5.2.1 Description

The DiscoveryAuthorizationUpdateNotify service operation is used to update the authorization information to revoke discovery permissions related to some other users in the NF service consumer (e.g. 5G DDNMF).

6.1.5.2.2 Notification Definition

Call-back URI: {authUpdateCallbackUri}

See clause 5.2.2.2.1 for the description of how the AF obtains the Call-back URI of the NF service consumer.

6.1.5.2.3 Notification Standard Methods

6.1.5.2.3.1 POST

This method sends a discovery authorization update notification to the NF service consumer.

This method shall support the request and response data structures and response codes specified in table 6.1.5.2.3.1-1 and table 6.1.5.2.3.1-2.

Table 6.1.5.2.3.1-1: Data structures supported by the POST Request Body

Data type	P	Cardinality	Description
AuthUpdateData	M	1	Input parameters to the "DiscoveryAuthorizationUpdateNotify" service operation, including the updated authorization information for Restricted ProSe Direct Discovery.

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

Data type	P	Cardinality	Response codes	Description
n/a			204 No Content	This case represents successful notification of the event.
ProblemDetails	O	0..1	403 Forbidden	The "cause" attribute may be used to indicate one of the following application errors: - UNSPECIFIED See table 6.1.7.3-1 for the description of this error.

6.1.6 Data Model

6.1.6.1 General

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

Table 6.1.6.1-1 specifies the data types defined for the Naf_ProSe service based interface.

Table 6.1.6.1-1: Naf_ProSe specific Data Types

Data type	Clause defined	Description	Applicability
AuthDisReqData	6.1.6.2.2	Represents Data used to request the authorization for a UE of 5G ProSe Direct Discovery Request.	
AuthDisResData	6.1.6.2.3	Represents the obtained authorization Data for a UE of 5G ProSe Direct Discovery Request.	
TargetData	6.1.6.2.4	Represents a combination of Target PDUID - Target RPAUID - Metadata Indicator.	
AllowedSuffixNum	6.1.6.3.2	Represents the allowed number of suffixes.	
AppLevelContainer	6.1.6.3.2	Represents an Application Layer Container.	
MetadataIndic	6.1.6.3.5	Contains Metadata Indicator.	
AuthRequestType	6.1.6.3.3	Represents the authorization request type.	
AuthResponseType	6.1.6.3.4	Represents the authorization response type.	
ProSeRestrictedMask	6.1.6.3.2	Represents a Prose Restricted Mask.	
AuthUpdateData	6.1.6.2.5	Represents the updated authorization information for Restricted ProSe Direct Discovery.	
BannedAuthData	6.1.6.2.6	Represents a set of Banned RPAUID - Banned PDUID that are no longer allowed to discover the ProSe Restricted Code corresponding to the user's RPAUID for the Application ID associated with that AF.	
RevocationResult	6.1.6.3.6	Represents the revocation result of a set of Banned RPAUID - Banned PDUID for Restricted ProSe Direct Discovery.	

Table 6.1.6.1-2 specifies data types re-used by the Naf_ProSe service based interface from other specifications, including a reference to their respective specifications, and when needed, a short description of their use within the Naf_ProSe Service based interface.

Table 6.1.6.1-2: Naf_ProSe re-used Data Types

Data type	Reference	Comments	Applicability
ProseApplicationId	3GPP TS 29.555 [16]	A string representing the ProSe Application ID.	
ProseApplicationCodeSuffixPool	3GPP TS 29.555 [16]	Contains a ProSe Application Code Suffix Pool.	
Rpauid	3GPP TS 29.555 [16]	Represents a Restricted ProSe Application User ID.	
Pduid	3GPP TS 29.555 [16]	Represents a ProSe Discovery UE ID.	
ProseApplicationMask	3GPP TS 29.555 [16]	Represents a Mask for a ProSe Application Code Suffix corresponding to a ProSe Applicantation ID.	
MetaData	3GPP TS 29.555 [16]	Contains Metadata.	
RestrictedCodeSuffixPool	3GPP TS 29.555 [16]	Contains a ProSe Restricted Code Suffix pool.	
Uri	3GPP TS 29.571 [18]	Contains a URI.	

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: AuthDisReqData

Table 6.1.6.2.2-1: Definition of type AuthDisReqData

Attribute name	Data type	P	Cardinality	Description	Applicability
authRequestType	AuthRequestType	M	1	This attribute contains the authorization request type for 5G ProSe Direct Discovery.	
proseAppId	array(ProseApplicationId)	O	0..1	This attribute contains the ProSe Application ID(s).	
allowedSuffixNum	AllowedSuffixNum	O	0..1	This attribute contains the allowed number of suffixes.	
appLevelContainer	AppLevelContainer	O	0..1	This attribute contains an Application level container.	
rpauid	Rpauid	O	0..1	This attribute contains the RPAUID.	
targetRpauid	Rpauid	O	0..1	This attribute contains the Target RPAUID.	
authUpdateCallbackUri	Uri	O	0..1	The call-back URI of the NF service consumer (i.e. 5G DDNMF) for implicit subscription to notification of DiscoveryAuthorizationUpdateNotify.	

6.1.6.2.3 Type: AuthDisResData

Table 6.1.6.2.3-1: Definition of type AuthDisResData

Attribute name	Data type	P	Cardinality	Description	Applicability
authResponseType	AuthResponseType	M	1	This attribute contains the authorization response type for 5G ProSe Direct Discovery.	
proseAppCodeSuffixPool	ProSeApplicationCodeSuffixPool	O	0..N	This attribute contains the ProSe Application Code Suffix Pool.	
pduids	array(Pduid)	O	0..N	This attribute contains the PDUID(s) corresponding to the provided RPAUID.	
restrictedCodeSuffixPool	RestrictedCodeSuffixPool	O	0..N	This attribute contains a ProSe Restricted Code Suffix pool.	
proseAppMasks	array(ProseApplicationMask)	O	0..N	This attribute contains the mask(s) for the ProSe Application Code Suffix(es) corresponding to the ProSe Application ID.	
proSeRestrictedMasks	array(ProSeRestrictedMask)	O	0..N	This attribute contains the mask(s) for the ProSe Restricted Code Suffix(es) corresponding to each of the Target RPAUID(s).	
resAppLevelContainer	AppLevelContainer	O	0..1	This attribute contains the Application Level Container.	
targetDataSet	array(TargetData)	O	0..N	This attribute contains N sets of Target PDUID - Target RPAUID - Metadata Indicator.	
targetPduid	Pduid	O	0..1	This attribute contains the Target PDUID.	
metaData	MetaData	O	0..1	This attribute contains metadata corresponding to the Target PDUID.	

6.1.6.2.4 Type: TargetData

Table 6.1.6.2.4-1: Definition of type TargetData

Attribute name	Data type	P	Cardinality	Description	Applicability
targetRpauid	Rpauid	M	1	This attribute contains the RPAUID.	
pduid	Pduid	M	1	This attribute contains the Target PDUID.	
metadataIndic	MetadataIndic	O	0..1	This attribute is optional and contains the Metadata Indicator to indicate whether there is metadata associated with the RPAUID, and if so, whether updates of metadata is allowed. (NOTE)	
NOTE: The default value of metadataIndic is “NO_METADATA” if this attribute is not supplied.					

6.1.6.2.5 Type: AuthUpdateData

Table 6.1.6.2.5-1: Definition of type AuthUpdateData

Attribute name	Data type	P	Cardinality	Description	Applicability
targetRpauid	Rpauid	M	1	This attribute contains the RPAUID of the user that would like to revoke discovery permissions of some other users in the AF.	
bannedAuthData	array(BannedAuthData)	M	1..N	The attribute contains N sets of Banned RPAUID - Banned PDUID that are no longer allowed to discover the ProSe Restricted Code corresponding to the user's RPAUID for the Application ID associated with that AF.	

6.1.6.2.6 Type: BannedAuthData

Table 6.1.6.2.6-1: Definition of type BannedAuthData

Attribute name	Data type	P	Cardinality	Description	Applicability
bannedRpauid	Rpauid	M	1	The attribute contains a RPAUID within a Banned RPAUID - Banned PDUID set that is no longer allowed to discover the ProSe Restricted Code corresponding to the user's RPAUID for the Application ID associated with the AF.	
bannedPduid	Pduid	M	1	The attribute contains the PDUID within a Banned RPAUID - Banned PDUID set that is no longer allowed to discover the ProSe Restricted Code corresponding to the user's RPAUID for the Application ID associated with the AF.	
revocationResult	RevocationResult	C	0..1	The attribute contains the revocation result of a set of Banned RPAUID - Banned PDUID for Restricted ProSe Direct Discovery, which is only conveyed in within a DiscoveryAuthorizationResultUpdate service operation	

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
AllowedSuffixNum	integer	Contains the allowed number of suffixes.	
AppLevelContainer	sting	Contains the Application Level Container.	
ProSeRestrictedMask	string	Contains a ProSe Restricted Mask.	

6.1.6.3.3 Enumeration: AuthRequestType

The enumeration AuthRequestType represents the Authorization Request Type. It shall comply with the provisions of table 6.1.6.3.3-1.

Table 6.1.6.3.3-1: Enumeration AuthRequestType

Enumeration value	Description	Applicability
"OPEN_DISCOVERY_EXTENSION_ANNOUNCE"	This value may be used to indicate that the Authorization Request Type is “open discovery with application-controlled extension/announce.	
"RESTRICTED_DISCOVERY_ANNOUNCE"	This value shall be used to indicate that the Authorization Request Type is “restricted discovery/announce”.	
"RESTRICTED_DISCOVERY_EXTENSION_ANNOUNCE"	This value shall be used to indicate that the Authorization Request Type is “restricted discovery with application-controlled extension/announce”.	
"OPEN_DISCOVERY_EXTENSION_MONITOR"	This value shall be used to indicate that the Authorization Request Type is “open discovery with application-controlled extension/monitor.	
"RESTRICTED_DISCOVERY_MONITOR"	This value shall be used to indicate that the Authorization Request Type is “restricted discovery/monitor”.	
"RESTRICTED_DISCOVERY_EXTENSION_MONITOR"	This value shall be used to indicate that the Authorization Request Type is “restricted discovery with application-controlled extension/monitor”.	
"RESTRICTED_DISCOVERY_PERMISSION"	This value shall be used to indicate that the Authorization Request Type is “restricted discovery/permission”.	
"RESTRICTED_DISCOVERY_RESPONSE"	This value shall be used to indicate that the Authorization Request Type is “restricted discovery/response”.	
"RESTRICTED_DISCOVERY_QUERY"	This value shall be used to indicate that the Authorization Response Type is “restricted discovery/query”.	
"RESTRICTED_DISCOVERY_MATCH"	This value shall be used to indicate that the Authorization Response Type is “restricted discovery/match”.	

6.1.6.3.4 Enumeration: AuthResponseType

The enumeration AuthRequestType represents the Authorization Response Type. It shall comply with the provisions defined in table 6.1.6.3.4-1.

Table 6.1.6.3.4-1: Enumeration AuthResponseType

Enumeration value	Description	Applicability
"OPEN_DISCOVERY_EXTENSION_ANNOUNCE_ACK"	This value may be used to indicate that the Authorization Response Type is “open discovery with application-controlled extension/announce ack.	
"RESTRICTED_DISCOVERY_ANNOUNCE_ACK"	This value shall be used to indicate that the Authorization Response Type is “restricted discovery/announce ack”.	
"RESTRICTED_DISCOVERY_EXTENSION_ANNOUNCE_ACK"	This value shall be used to indicate that the Authorization Response Type is “restricted discovery with application-controlled extension/announce ack”.	
"OPEN_DISCOVERY_EXTENSION_MONITOR_ACK"	This value shall be used to indicate that the Authorization Response Type is “open discovery with application-controlled extension/monitor ack”.	
"RESTRICTED_DISCOVERY_MONITOR_ACK"	This value shall be used to indicate that the Authorization Response Type is “restricted discovery/monitor ack”.	
"RESTRICTED_DISCOVERY_EXTENSION_MONITOR_ACK"	This value shall be used to indicate that the Authorization Response Type is “restricted discovery with application-controlled extension/monito ack”.	
"RESTRICTED_DISCOVERY_PERMISSION_ACK"	This value shall be used to indicate that the Authorization Response Type is “restricted discovery /permission ack”.	
"RESTRICTED_DISCOVERY_RESPONSE_ACK"	This value shall be used to indicate that the Authorization Response Type is “restricted discovery /response ack”.	
"RESTRICTED_DISCOVERY_QUERY_ACK"	This value shall be used to indicate that the Authorization Response Type is “restricted discovery /query ack”.	
"RESTRICTED_DISCOVERY_MATCH_ACK"	This value shall be used to indicate that the Authorization Response Type is “restricted discovery /match ack”.	

6.1.6.3.5 Enumeration: MetadataIndic

The enumeration MetadataIndic represents the possible options for metadata associated with a particular target RPAUID. It shall comply with the provisions of table 6.1.6.3.5-1.

Table 6.1.6.3.5-1: Enumeration MetadataIndic

Enumeration value	Description	Applicability
"NO_METADATA"	This value indicates that there is no metadata associated with the target RPAUID.	
"METADATA_UPDATE_DISALLOWED"	This value indicates that there is metadata associated with the target RPAUID, but it is not allowed to update this metadata.	
“METADATA_UPDATE_ALLOWED”	This value indicates that there is metadata associated with the target RPAUID, and it is allowed to update this metadata.	

6.1.6.3.6 Enumeration: RevocationResult

The enumeration RevocationResult represents the revocation result of a set of Banned RPAUID - Banned PDUID for Restricted ProSe Direct Discovery. It shall comply with the provisions of table 6.1.6.3.6-1.

Table 6.1.6.3.6-1: Enumeration MetadataIndic

Enumeration value	Description	Applicability
"REVOCATION_SUCCESSFUL"	This value indicates the successful revocation for a set of Banned RPAUID - Banned PDUID for Restricted ProSe Direct Discovery.	
"REVOCATION_NOT_SUCCESSFUL"	This value indicates that unsuccessful revocation for a set of Banned RPAUID - Banned PDUID for Restricted ProSe Direct Discovery..	

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

In addition, the requirements in the following clauses are applicable for the Naf_ProSe 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 [4].

6.1.7.3 Application Errors

The application errors defined for the Naf_ProSe service are listed in table 6.1.7.3-1.

Table 6.1.7.3-1: Application errors

Application Error	HTTP status code	Description
UNSPECIFIED	403 Forbidden	The request is rejected due to unspecified reasons.

6.1.8 Feature negotiation

The optional features in table 6.1.8-1 are defined for the Naf_ProSe API. They shall be negotiated using the extensibility mechanism defined in clause 6.6 of 3GPP TS 29.500 [4].

Table 6.1.8-1: Supported Features

Feature number	Feature Name	Description

6.1.9 Security

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

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

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

The Naf_ProSe API defines a single scope "naf_prose" for OAuth2 authorization (as specified in 3GPP TS 33.501 [8]) for the entire service, and it does not define any additional scopes at resource or operation level.

Annex A (normative): OpenAPI specification

A.1 General

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

This Annex shall take 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 [5] and clause 5B of 3GPP TR 21.900 [7]).

A.2 Naf_ProSe API

```
openapi: 3.0.0

info:
  title: Naf_ProSe API
  version: 1.0.0-alpha.5
  description: |
    Naf_ProSe Service.
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    All rights reserved.

externalDocs:
  description: 3GPP TS 29.557 V17.0.0; 5G System; Application Function ProSe Service; Stage 3.
  url: https://www.3gpp.org/ftp/Specs/archive/29_series/29.557/

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

security:
  - {}
  - oAuth2ClientCredentials:
    - naf-prose

paths:
  /authorize-discovery:
    post:
      summary: Obtain the authorization of Discovery Request from 5G DDNMF for a UE
      operationId: ObtainDiscAuth
      tags:
        - Obtain the authorization of Discovery Request for a UE
      requestBody:
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/AuthDisReqData'
      responses:
        '200':
          description: Expected response to a valid request
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/AuthDisResData'
        '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':
          $ref: 'TS29571_CommonData.yaml#/components/responses/503'
        default:
          description: Unexpected error
      callbacks:
        DiscoveryAuthorizationUpdateNotify:
          '{$request.body#/authUpdateCallBackUri}':
            post:
              requestBody:
                description: update of authorization information to revoke discovery permissions
relating to some other users in the NF consumer for Restricted ProSe Direct Discovery
                content:
                  application/json:
                    schema:
                      $ref: '#/components/schemas/AuthUpdateData'
              responses:
                '204':
                  description: Expected response to a valid notification
                '400':
                  $ref: 'TS29571_CommonData.yaml#/components/responses/400'
                '401':
                  $ref: 'TS29571_CommonData.yaml#/components/responses/401'
                '403':
                  $ref: 'TS29571_CommonData.yaml#/components/responses/403'
                '404':
                  $ref: 'TS29571_CommonData.yaml#/components/responses/404'
                '411':
                  $ref: 'TS29571_CommonData.yaml#/components/responses/411'
                '413':
                  $ref: 'TS29571_CommonData.yaml#/components/responses/413'
                '415':
                  $ref: 'TS29571_CommonData.yaml#/components/responses/415'
                '429':
                  $ref: 'TS29571_CommonData.yaml#/components/responses/429'
                '500':
                  $ref: 'TS29571_CommonData.yaml#/components/responses/500'
                '503':
                  $ref: 'TS29571_CommonData.yaml#/components/responses/503'
                '504':
                  $ref: 'TS29571_CommonData.yaml#/components/responses/504'
                default:
                  $ref: 'TS29571_CommonData.yaml#/components/responses/default'
  /authorization-update-result:
    post:
      summary: report the result of update of authorization information to revoke discovery
permissions relating to some other users in the NF consumer for Restricted ProSe Direct Discovery
      operationId: AuthorizationUpdateResult
      tags:
        - Authorization Information Update Result
      requestBody:
        content:
          application/json:
            schema:
              $ref: '#/components/schemas/AuthUpdateData'
        required: true
      responses:
        '204':
          description: Expected response to a successful cancellation
        '400':
          $ref: 'TS29571_CommonData.yaml#/components/responses/400'
        '401':
          $ref: 'TS29571_CommonData.yaml#/components/responses/401'
        '403':
          $ref: 'TS29571_CommonData.yaml#/components/responses/403'
        '404':
          $ref: 'TS29571_CommonData.yaml#/components/responses/404'
        '411':
          $ref: 'TS29571_CommonData.yaml#/components/responses/411'
        '413':
          $ref: 'TS29571_CommonData.yaml#/components/responses/413'
        '415':
          $ref: 'TS29571_CommonData.yaml#/components/responses/415'
        '429':
```

```
          $ref: 'TS29571_CommonData.yaml#/components/responses/429'
        '500':
          $ref: 'TS29571_CommonData.yaml#/components/responses/500'
        '503':
          $ref: 'TS29571_CommonData.yaml#/components/responses/503'
        '504':
          $ref: 'TS29571_CommonData.yaml#/components/responses/504'
        default:
          $ref: 'TS29571_CommonData.yaml#/components/responses/default'

components:
  securitySchemes:
    oAuth2ClientCredentials:
      type: oauth2
      flows:
        clientCredentials:
          tokenUrl: '{nrfApiRoot}/oauth2/token'
          scopes:
            naf-prose: Access to the Naf_ProSe API

  schemas:

# COMPLEX TYPES:

    AuthDisReqData:
      type: object
      description: Represents Data used to request the authorization for a UE of a 5G ProSe Direct
Discovery request.
      required:
        - authRequestType
      properties:
        authRequestType:
          $ref: '#/components/schemas/AuthRequestType'
        proseAppId:
          type: array
          items:
            $ref: 'TS29555_N5g-ddnmf_Discovery.yaml#/components/schemas/ProseApplicationId'
        allowedSuffixNum:
          $ref: '#/components/schemas/AllowedSuffixNum'
        appLevelContainer:
          $ref: '#/components/schemas/AppLevelContainer'
        rpauid:
          $ref: 'TS29555_N5g-ddnmf_Discovery.yaml#/components/schemas/Rpauid'
        targetRpauid:
          $ref: 'TS29555_N5g-ddnmf_Discovery.yaml#/components/schemas/Rpauid'
        authUpdateCallbackUri:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Uri'

    AuthDisResData:
      type: object
      description: Represents the obtained authorization Data for a UE of a 5G ProSe Direct
Discovery request.
      required:
        - authResponseType
      properties:
        authResponseType:
          $ref: '#/components/schemas/AuthResponseType'
        proseAppCodeSuffixPool:
          $ref: 'TS29555_N5g-
ddnmf_Discovery.yaml#/components/schemas/ProseApplicationCodeSuffixPool'
        pduids:
          type: array
          items:
            $ref: 'TS29555_N5g-ddnmf_Discovery.yaml#/components/schemas/Pduid'
        restrictedCodeSuffixPool:
          type: array
          items:
            $ref: 'TS29555_N5g-ddnmf_Discovery.yaml#/components/schemas/RestrictedCodeSuffixPool'
        proseAppMasks:
          type: array
          items:
            $ref: 'TS29555_N5g-ddnmf_Discovery.yaml#/components/schemas/ProseApplicationMask'
        proSeRestrictedMasks:
          type: array
          items:
            $ref: '#/components/schemas/ProSeRestrictedMask'
        resAppLevelContainer:
          $ref: '#/components/schemas/AppLevelContainer'
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        targetDataSet:
          type: array
          items:
            $ref: '#/components/schemas/TargetData'
        targetPduid:
          $ref: 'TS29555_N5g-ddnmf_Discovery.yaml#/components/schemas/Pduid'
        metaData:
          $ref: 'TS29555_N5g-ddnmf_Discovery.yaml#/components/schemas/MetaData'


    TargetData:
      type: object
      description: Represents a set of Target PDUID - Target RPAUID - Metadata Indicator.
      required:
        - targetRpauid
        - pduid
      properties:
        targetRpauid:
          $ref: 'TS29555_N5g-ddnmf_Discovery.yaml#/components/schemas/Rpauid'
        pduid:
          $ref: 'TS29555_N5g-ddnmf_Discovery.yaml#/components/schemas/Pduid'
        metadataIndic:
          $ref: '#/components/schemas/MetadataIndic'
    AuthUpdateData:
      type: object
      description: Represents the update data and resulting update data of authorization information
for Restricted ProSe Direct Discovery.
      required:
        - targetRpauid
        - bannedAuthData
      properties:
        targetRpauid:
          $ref: 'TS29555_N5g-ddnmf_Discovery.yaml#/components/schemas/Rpauid'
        bannedAuthData:
          type: array
          items:
            $ref: '#/components/schemas/BannedAuthData'
          minItems: 1

    BannedAuthData:
      type: object
      description: Represents a set of Banned PDUID - Banned RPAUID.
      required:
        - bannedRpauid
        - bannedPduid
      properties:
        bannedRpauid:
          $ref: 'TS29555_N5g-ddnmf_Discovery.yaml#/components/schemas/Rpauid'
        bannedPduid:
          $ref: 'TS29555_N5g-ddnmf_Discovery.yaml#/components/schemas/Pduid'
        revocationResult:
          $ref: '#/components/schemas/RevocationResult'

# SIMPLE TYPES:

    AllowedSuffixNum:
      description: contains the allowed number of suffixes.
      type: integer

    AppLevelContainer:
      description: Contains the Application Level Container.
      type: string

    ProSeRestrictedMask:
      description: Contains a ProSe Restricted Mask.
      type: string

# ENUMS:

    AuthRequestType:
      anyOf:
      - type: string
        enum:
          - OPEN_DISCOVERY_EXTENSION_ANNOUNCE
          - RESTRICTED_DISCOVERY_ANNOUNCE
          - RESTRICTED_DISCOVERY_EXTENSION_ANNOUNCE
          - OPEN_DISCOVERY_EXTENSION_MONITOR
          - RESTRICTED_DISCOVERY_MONITOR
```

```
          - RESTRICTED_DISCOVERY_EXTENSION_MONITOR
          - RESTRICTED_DISCOVERY_PERMISSION
          - RESTRICTED_DISCOVERY_RESPONSE
          - RESTRICTED_DISCOVERY_QUERY
          - RESTRICTED_DISCOVERY_MATCH
      - type: string
        description: >
          This string indicates the authorization request type for a 5G ProSe Direct Discovery
request.
      description: >

    AuthResponseType:
      anyOf:
      - type: string
        enum:
          - OPEN_DISCOVERY_EXTENSION_ANNOUNCE_ACK
          - RESTRICTED_DISCOVERY_ANNOUNCE_ACK
          - RESTRICTED_DISCOVERY_EXTENSION_ANNOUNCE_ACK
          - OPEN_DISCOVERY_EXTENSION_MONITOR_ACK
          - RESTRICTED_DISCOVERY_MONITOR_ACK
          - RESTRICTED_DISCOVERY_EXTENSION_MONITOR_ACK
          - RESTRICTED_DISCOVERY_PERMISSION_ACK
          - RESTRICTED_DISCOVERY_RESPONSE_ACK
          - RESTRICTED_DISCOVERY_QUERY_ACK
          - RESTRICTED_DISCOVERY_MATCH_ACK
      - type: string
        description: >
          This string indicates the authorization response type for a 5G ProSe Direct Discovery
response.
      description: >

    MetadataIndic:
      anyOf:
      - type: string
        enum:
          - NO_METADATA
          - METADATA_UPDATE_DISALLOWED
          - METADATA_UPDATE_ALLOWED
      - type: string
        description: >
          This string provides an indicator on whether metadata is allowed to be updated or not.
      description: >
        Possible values are
        - NO_METADATA: This value may be used to indicate that there is no metadata associated with
the target RPAUID. This is the default value applicable if this IE is not supplied.
        - METADATA_UPDATE_DISALLOWED: This value shall be used to indicate that there exists
metadata associated with the target RPAUID, but the metadata is not allowed to be updated.
        - METADATA_UPDATE_ALLOWED: This value shall be used to indicate that there exists metadata
associated with the target RPAUID, and the metadata is allowed to be updated.

    RevocationResult:
      anyOf:
      - type: string
        enum:
          - REVOCATION_SUCCESSFUL
          - REVOCATION_NOT_SUCCESSFUL
      - type: string
        description: >
          This string indicates the revocation result of a set of Banned RPAUID - Banned PDUID for
Restricted ProSe Direct Discovery.
      description: >
```

Annex B (informative): Change history

Change history							
Date	**Meeting**	**TDoc**	**CR**	**Rev**	**Cat**	**Subject/Comment**	**New version**
2021-04	CT3#115-e	C3-212446				Draft skeleton provided by the rapporteur.	0.0.0
2021-05	CT3#116-e	C3-213504				Implementing the following p-CR agreed by CT3: C3-212447 Editorial change from the rapporteur. Specification number added.	0.1.0
2021-08	CT3#117-e	C3-214590				Implementing the following p-CR agreed by CT3: C3-214021 and C3-214022. Editorial change from the rapporteur.	0.2.0
2021-09	CT3#117-e	C3-214590				Change filename – removed Stable .	0.2.1
2021-09	CT#93-e	CP-212188				The p-CRs are agreed in CT#93-e.	0.2.1
2021-10	CT3#118-e	C3-215453				Implementing the following p-CR agreed by CT3: C3-215453	0.3.0
2021-12	CT#94-e	CP-213209				Presentation for information	1.0.0
2022-01	CT3#119bis-e	C3-220451				Implementing the following p-CR agreed by CT3: C3-220417	1.1.0
2022-02	CT3#120-e	C3-221556				Implementing the following p-CR agreed by CT3: C3-221166	1.2.0
2022-03	CT#95e	CP-220157				Presentation to TSG CT for approval	2.0.0
2022-03	CT#95e	CP-220157				Approved by TSG CT	17.0.0

History

Document history		
V17.0.0	May 2022	Publication