|  |  |
| --- | --- |
| 3GPP TS 29.586 V19.1.0 (2025-06) | |
| Technical Specification | |
| 3rd Generation Partnership Project;  Technical Specification Group Core Network and Terminals;  5G System; SideLink Positioning Key Management Services;  Stage 3  (Release 19) | |
|  | |
|  |  |
|  | |
| The present document has been developed within the 3rd Generation Partnership Project (3GPP TM) and may be further elaborated for the purposes of 3GPP. The present document has not been subject to any approval process by the 3GPPOrganizational Partners and shall not be implemented. This Specification is provided for future development work within 3GPPonly. The Organizational Partners accept no liability for any use of this Specification. Specifications and Reports for implementation of the 3GPP TM system should be obtained via the 3GPP Organizational Partners' Publications Offices. | |

|  |
| --- |
|  |
| ***3GPP***  Postal address  3GPP support office address  650 Route des Lucioles - Sophia Antipolis  Valbonne - FRANCE  Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16  Internet  http://www.3gpp.org |
| ***Copyright Notification***  No part may be reproduced except as authorized by written permission. The copyright and the foregoing restriction extend to reproduction in all media.  © 2024, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).  All rights reserved.  UMTS™ is a Trade Mark of ETSI registered for the benefit of its members  3GPP™ is a Trade Mark of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners LTE™ is a Trade Mark of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners  GSM® and the GSM logo are registered and owned by the GSM Association |

Contents

1 Scope 8

2 References 8

3 Definitions, symbols and abbreviations 9

3.1 Definitions 9

3.2 Symbols 9

3.3 Abbreviations 9

4 Overview 9

5 Services offered by the SLPKMF 10

5.1 Introduction 10

5.2 Nslpkmf\_Discovery Service 10

5.2.1 Service Description 10

5.2.2.1 Introduction 10

5.2.2.2 AnnouncementAuthorization 10

5.2.2.2.1 General 10

5.2.2.3 MonitorAuthorization 11

5.2.2.3.1 General 11

5.2.2.4 DiscoveryAuthorization 12

5.2.2.4.1 General 12

5.3 Nslpkmf\_SLPKMFKeyRequest Service 12

5.3.1 Service Description 12

5.3.2 Service Operations 13

5.3.2.1 Introduction 13

5.3.2.2 UnicastKey 13

5.3.2.2.1 General 13

6 API Definitions 13

6.1 Nslpkmf\_Discovery Service API 13

6.1.1 Introduction 13

6.1.2 Usage of HTTP 14

6.1.2.1 General 14

6.1.2.2 HTTP standard headers 14

6.1.2.2.1 General 14

6.1.2.2.2 Content type 14

6.1.2.3 HTTP custom headers 14

6.1.3 Resources 14

6.1.3.1 Overview 14

6.1.3.2 Resource: AnnouncementAuthorization 15

6.1.3.2.1 Description 15

6.1.3.2.2 Resource Definition 15

6.1.3.2.3 Resource Standard Methods 16

6.1.3.3 Resource: MonitorAuthorization 17

6.1.3.3.1 Description 17

6.1.3.3.2 Resource Definition 17

6.1.3.3.3 Resource Standard Methods 17

6.1.3.4 Resource: DiscoveryAuthorization 19

6.1.3.4.1 Description 19

6.1.3.4.2 Resource Definition 19

6.1.3.4.3 Resource Standard Methods 19

6.1.4 Custom Operations without associated resources 21

6.1.5 Notifications 21

6.1.6 Data Model 21

6.1.6.1 General 21

6.1.6.2 Structured data types 22

6.1.6.2.1 Introduction 22

6.1.6.2.2 Type: AnnounceAuthData 22

6.1.6.2.3 Type: MonitorAuthReqData 22

6.1.6.2.4 Type: MonitorAuthRespData 22

6.1.6.2.5 Type: DiscoveryAuthReqData 23

6.1.6.2.6 Type: DiscoveryAuthRespData 23

6.1.6.2.7 Type: DiscSecMaterials 23

6.1.6.3 Simple data types and enumerations 23

6.1.6.3.1 Introduction 23

6.1.6.3.2 Simple data types 23

6.1.6.3.3 Enumeration: UeRole 24

6.1.6.4 Data types describing alternative data types or combinations of data types 24

6.1.6.5 Binary data 24

6.1.7 Error Handling 24

6.1.7.1 General 24

6.1.7.2 Protocol Errors 25

6.1.7.3 Application Errors 25

6.1.8 Feature negotiation 25

6.1.9 Security 25

6.1.10 HTTP redirection 26

6.2 Nslpkmf\_SLPKMFKeyRequest Service API 26

6.2.1 Introduction 26

6.2.2 Usage of HTTP 26

6.2.2.1 General 26

6.2.2.2 HTTP standard headers 26

6.2.2.2.1 General 26

6.2.2.2.2 Content type 26

6.2.2.3 HTTP custom headers 27

6.2.3 Resources 27

6.2.3.1 Overview 27

6.2.3.2 Resource: Ranging Keys Collection 27

6.2.3.2.1 Description 27

6.2.3.2.2 Resource Definition 27

6.2.3.2.3 Resource Standard Methods 28

6.2.3.2.4 Resource Custom Operations 28

6.2.3.2.4.1 Overview 28

6.2.3.2.4.2 Operation: request 28

6.2.3.2.4.2.1 Description 28

6.2.3.2.4.2.2 Operation Definition 28

6.2.4 Custom Operations without associated resources 29

6.2.5 Notifications 29

6.2.6 Data Model 29

6.2.6.1 General 29

6.2.6.2 Structured data types 30

6.2.6.2.1 Introduction 30

6.2.6.2.2 Type: UnicastKeyReqData 30

6.2.6.2.3 Type: UnicastKeyRspData 30

6.2.6.3 Simple data types and enumerations 30

6.2.6.3.1 Introduction 30

6.2.6.3.2 Simple data types 30

6.2.6.4 Data types describing alternative data types or combinations of data types 31

6.2.6.5 Binary data 31

6.2.7 Error Handling 31

6.2.7.1 General 31

6.2.7.2 Protocol Errors 31

6.2.7.3 Application Errors 31

6.2.8 Feature negotiation 32

6.2.9 Security 32

6.2.10 HTTP redirection 32

Annex A (normative): OpenAPI specification 32

A.1 General 32

A.2 Nslpkmf\_Discovery API 33

A.3 Nslpkmf\_SLPKMFKeyRequest API 38

Annex B (informative): Change history 41

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.1.z

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 Nslpkmf Service Based Interface to support ranging based service and sidelink positioning in 5G system. It provides stage 3 protocol definitions and message flows, and specifies the API for each service offered by the SLPKMF as specified in 3GPP TS 33.533 [2].

The 5G System stage 2 architecture and procedures for ranging based service and sidelink positioning are specified in 3GPP TS 23.586 [3].

The Technical Realization of the Service Based Architecture and the Principles and Guidelines for Services Definition are specified in 3GPP TS 29.500 [4] and 3GPP TS 29.501 [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 33.533: "Security aspects of ranging based services and sidelink positioning".

[3] 3GPP TS 23.586: " Ranging based services and Sidelink Positioning ".

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

[5] Void

[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 9113: "Hypertext Transfer Protocol Version 2 (HTTP/2)".

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

[10] IETF RFC 9457: "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] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces; Stage 3".

[16] 3GPP TS 24.554: "Proximity-services (ProSe) in 5G System (5GS) protocol aspects; Stage 3".

[17] 3GPP TS 24.514: "Ranging based services and sidelink positioning in 5G system(5GS); Stage 3".

[18] 3GPP TS 23.501: "System Architecture for the 5G System; Stage 2".

# 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

## 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].

SLPKMF SideLink Positioning Key Management Function

SLPP Sidelink positioning protocol

# 4 Overview

The SideLink Positioning Key Management Function (SLPKMF) is the logical function handling network related operations required for generation and provisioning of security materials used for ranging and sidelink positioning services, including:

- the key management and the security material for the UE discovery for ranging and sidelink positioning.

- the key management for secure unicast direct link establishment between the UEs for ranging and sidelink positioning services provided by network.

- the key management for protection of SLPP signalling broadcast/groupcast.

Figure 4-1 provides the reference model (in service based interface representation and in reference point representation), with focus on the SLPKMF:



Figure 4-1: Reference model – SLPKMF

The functionalities supported by the SLPKMF are listed in clause 4.2 of 3GPP TS 33.533 [2].

# 5 Services offered by the SLPKMF

## 5.1 Introduction

The Table 5.3-1 shows the SLPKMF Services and SLPKMF Service Operations:

Table 5.1-1: List of SLPKMF Services

|  |  |  |  |
| --- | --- | --- | --- |
| Service | Service Operations | Operation Semantics | Example Consumer(s) |
| Nslpkmf\_Discovery | AnnouncementAuthorization | Request/Response | SLPKMF |
| MonitorAuthorization | Request/Response | SLPKMF |
| DiscoveryAuthorization | Request/Response | SLPKMF |
| Nslpkmf\_SLPKMFKeyRequest | UnicastKey | Request/Response | SLPKMF |

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 |
| Nslpkmf\_Discovery | 6.1 | PKMF Discovery Service | TS29586\_Nslpkmf\_Discovery.yaml | Nslpkmf-disc | A.2 |
| Nslpkmf\_SLPKMFKeyRequest | 6.2 | SLPKMF Key Request Service | TS29586\_Nslpkmf\_SLPKMFKeyRequest.yaml | nslpkmf-keyrequest | A.3 |

## 5.2 Nslpkmf\_Discovery Service

### 5.2.1 Service Description

This service enables an NF (i.e. another SLPKMF in another PLMN) to request authorization information. The following are the key functionalities of this NF service.

- Provide the authorization from the SLPKMF for announcing in the PLMN

- Provide the discovery key from the SLPKMF for monitoring in the PLMN

- Provide the discovery key from the SLPKMF for a discoverer UE in the PLMN to operate Model B restricted discovery

#### 5.2.2.1 Introduction

The Nslpkmf\_Discovery service supports following service operations:

- AnnouncementAuthorization

- MonitorAuthorization

- DiscoveryAuthorization

#### 5.2.2.2 AnnouncementAuthorization

##### 5.2.2.2.1 General

The AnnouncementAuthorizationservice operation is invoked by a NF Service Consumer, i.e. another SLPKMF in another PLMN, towards the SLPKMF to retrieve the authorization from the SLPKMF for announcing in the PLMN.

The NF Service Consumer (e.g., SLPKMF) shall request the SLPKMF to get authorization as shown in Figure 5.2.2.2.1-1



Figure 5.2.2.2.1-1: Announcement Authorization

1. The NF service consumer (e.g., SLPKMF) sends a HTTP PUT request to the resource representing the announcement-authorization. The request body shall contain the ranging and sidelink positioning application identifier and UE role.

2a. If the context indicated by the userInfoId doesn't exist, the SLPKMF 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 userInfoId already exists, the SLPKMF 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 MonitorAuthorization

##### 5.2.2.3.1 General

The MonitorAuthorization service operation is invoked by a NF Service Consumer, i.e. another SLPKMF in another PLMN, towards the SLPKMF to retrieve the discovery key from the SLPKMF for monitoring in the PLMN.

The NF Service Consumer (e.g., SLPKMF) shall request the SLPKMF to get authorization as shown in Figure 5.2.2.3.1-1



Figure 5.2.2.3.2-1: Monitor Authorization

1. The NF Service Consumer (e.g., SLPKMF) shall send an HTTP PUT request to the resource representing the monitor-authorization. The request body shall contain the ranging and sidelink positioning application identifier, UE role and PC5 UE security capability.

2a. If the context indicated by the userInfoId doesn't exist, the SLPKMF 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 userInfoId already exists, the SLPKMF 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.

#### 5.2.2.4 DiscoveryAuthorization

##### 5.2.2.4.1 General

The DiscoveryAuthorization service operation is invoked by a NF Service Consumer, i.e. another SLPKMF in another PLMN, towards the SLPKMF to retrieve the discovery key from the SLPKMF for a discoverer UE in the PLMN to operate Model B restricted discovery.

The NF Service Consumer (e.g., SLPKMF) shall request the SLPKMF to get authorization as shown in Figure 5.2.2.4.1-1



Figure 5.2.2.4.1-1: Discover Authorization

1. The NF Service Consumer (e.g., SLPKMF) shall send an HTTP PUT request to the resource representing the discovery-authorization. The request body shall contain the ranging and sidelink positioning application identifier, UE role and PC5 UE security capability.

2a. If the context indicated by the userInfoId doesn't exist, the SLPKMF 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 userInfoId already exists, the SLPKMF 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.

## 5.3 Nslpkmf\_SLPKMFKeyRequest Service

### 5.3.1 Service Description

This service enables an NF (i.e. another SLPKMF in another PLMN) to request ranging related keying material. The following are the key functionalities of this NF service.

- Provide ranging related keying material for unicast communication

### 5.3.2 Service Operations

#### 5.3.2.1 Introduction

#### 5.3.2.2 UnicastKey

##### 5.3.2.2.1 General

The UnicastKey service operation is invoked by a NF Service Consumer, i.e. another SLPKMF in another PLMN, towards the SLPKMF to retrieve the keying material related to ranging.

The UnicastKey service operation is used during the following procedure:

- Unicast direct communication for ranging and sidelink positioning services provided by network (see 3GPP TS 33.533 [2], clause 6.4.3.3)

The NF Service Consumer (i.e. another SLPKMF in another PLMN) shall retrieve the ranging related keying material by invoking the "request " custom method on the resource URI of "Ranging Keys Collection" resource, see clause 6.2.3.2.4. See also Figure 5.3.2.2.1-1.



Figure 5.3.2.2.1-1 UnicastKey service operation

1. The NF Service Consumer shall send a HTTP POST request to invoke "request" custom method. The content of the request shall be an object of "UnicastKeyReqData" data type. The content shall include the ranging and sidelink positioning application identifier, the KSLP freshness parameter 1, and the SLPK ID.

2a. On success, the SLPKMF shall respond with the status code "200 OK". The content of the response shall be an object of "UnicastKeyRspData" data type. They content shall include the KSLP and the KSLP freshness parameter 2.

2b. On failure or redirection, one of the HTTP status codes listed in Table 6.2.3.2.4.2.2-2 shall be returned. For a 4xx/5xx response, the message body shall contain a ProblemDetails structure with the "cause" attribute set to one of the application errors listed in Table 6.2.3.2.4.2.2-2.

# 6 API Definitions

## 6.1 Nslpkmf\_Discovery Service API

### 6.1.1 Introduction

The Nslpkmf\_Discovery shall use the Nslpkmf\_Discovery API.

The API URI of the Nslpkmf\_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 "Nslpkmf-discovery".

- 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 9113 [8], 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 [7] specification of HTTP messages and content bodies for the Nslpkmf\_Discovery API is contained in Annex A.

#### 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 [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 [4]. The use of the JSON format shall be signalled by the content type "application/json".

"Problem Details" JSON object shall be used to indicate additional details of the error in a HTTP response body and shall be signalled by the content type "application/problem+json", as defined in IETF RFC 9457 [10].

#### 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 applicable, 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 describes the resource URI structure of the Nslpkmf\_Discovery API.



Figure 6.1.3.1-1: Resource URI structure of the Nslpkmf\_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 |
| AnnouncementAuthorization | /{ueId}/announcement-authorization/{userInfoId} | PUT | Obtain the authorization from the SLPKMF for announcing in the PLMN |
| MonitorAuthorization | /{ueId}/monitor-authorization/{userInfoId} | PUT | Obtain the discovery key from the SLPKMF for monitoring in the PLMN |
| DiscoveryAuthorization | /{ueId}/discovery-authorization/{userInfoId} | PUT | Obtain the discovery key from the SLPKMF for a discoverer UE in the PLMN to operate Model B restricted discovery |

#### 6.1.3.2 Resource: AnnouncementAuthorization

##### 6.1.3.2.1 Description

##### 6.1.3.2.2 Resource Definition

Resource URI: **{apiRoot}/Nslpkmf-disc/<apiVersion>/{ueId}/announcement-authorization/{userInfoId}**

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 (see 3GPP TS 23.501 [18] clause 5.9.2) or GPSI (see 3GPP TS 23.501 [18] clause 5.9.8)  pattern: See pattern of type VarUeId in 3GPP TS 29.571 [15] |
| userInfoId | UserInfoId | Represents User Info 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 user info id. |

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 | M | 1 | 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.  (NOTE 1) |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection.  (NOTE 2) |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:  - RANGINGSL\_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 [4] also apply.  NOTE 2: RedirectResponse may be inserted by an SCP, see clause 6.10.9.1 of 3GPP TS 29.500 [4]. | | | | |

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}/Nslpkmf-disc/<apiVersion>/{ueId}/announcement-authorization/{userInfoId} |

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 SLPKMF or SLPKMF (service) set.  For the case, when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [4]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target SLPKMF (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 SLPKMF or SLPKMF (service) set.  For the case, when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [4]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target SLPKMF (service) instance ID towards which the request is redirected |

#### 6.1.3.3 Resource: MonitorAuthorization

##### 6.1.3.3.1 Description

This resource represents the Monitor Authorization.

##### 6.1.3.3.2 Resource Definition

Resource URI: **{apiRoot}/Nslpkmf-disc/<apiVersion>/{ueId}/monitor-authorization/{userInfoId}**

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 (see 3GPP TS 23.501 [18] clause 5.9.2) or GPSI (see 3GPP TS 23.501 [18] clause 5.9.8)  pattern: See pattern of type VarUeId in 3GPP TS 29.571 [15] |
| userInfoId | UserInfoId | Represents User Info 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 Key Data for the indicated UE and indicated user info id. |

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 |
| MonitorAuthRespData | M | 1 | 201 Created | Upon success of creation of the resource, a response body containing a representation of the discovery key 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. |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection.  (NOTE 1) |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection.  (NOTE 2) |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:  - RANGINGSL\_SERVICE\_UNAUTHORIZED  See Ttable 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 [4] also apply.  NOTE 2: RedirectResponse may be inserted by an SCP, see clause 6.10.9.1 of 3GPP TS 29.500 [4]. | | | | |

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}/Nslpkmf-disc/<apiVersion>/{ueId}/monitor-authorization/{userInfoId} |

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 SLPKMF or SLPKMF (service) set.  For the case, when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [4]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target SLPKMF (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 SLPKMF or SLPKMF (service) set.  For the case, when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [4]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target SLPKMF (service) instance ID towards which the request is redirected |

#### 6.1.3.4 Resource: DiscoveryAuthorization

##### 6.1.3.4.1 Description

This resource represents the Discovery Authorization.

##### 6.1.3.4.2 Resource Definition

Resource URI: **{apiRoot}/Nslpkmf-disc/<apiVersion>/{ueId}/discovery-authorization/{userInfoId}**

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 (see 3GPP TS 23.501 [18] clause 5.9.2) or GPSI (see 3GPP TS 23.501 [18] clause 5.9.8)  pattern: See pattern of type VarUeId in 3GPP TS 29.571 [15] |
| userInfoId | UserInfoId | Represents User Info 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 Key Data for the indicated UE and indicated user info id. |

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 discovery key 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.  (NOTE 2) |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection.  (NOTE 2) |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application errors:  - RANGINGSL\_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 [4] also apply.  NOTE 2: RedirectResponse may be inserted by an SCP, see clause 6.10.9.1 of 3GPP TS 29.500 [4]. | | | | |

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}/Nslpkmf-disc/<apiVersion>/{ueId}/discovery-authorization/{userInfoId} |

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 SLPKMF or SLPKMF (service) set.  For the case, when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [4]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target SLPKMF (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 SLPKMF or SLPKMF (service) set.  For the case, when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [4]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target SLPKMF (service) instance ID towards which the request is redirected |

### 6.1.4 Custom Operations without associated resources

There is no custom operation without associated resources supported in Nslpkmf\_Discovery Service.

### 6.1.5 Notifications

There is no notification defined for Nslpkmf\_Discovery service.

### 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 Nslpkmf\_Discovery service based interface protocol.

Table 6.1.6.1-1: Nslpkmf\_Discovery 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 |  |
| MonitorAuthReqData | 6.1.6.2.3 |  | Represents Data used to request the discovery key data to monitor for a UE |  |
| MonitorAuthRespData | 6.1.6.2.4 |  | Represents the obtained Monitor discovery key data for a UE |  |
| DiscoveryAuthReqData | 6.1.6.2.5 |  | Represents Data used to request the discovery key data for a discoverer UE |  |
| DiscoveryAuthRespData | 6.1.6.2.6 |  | Represents the obtained the discovery key data for a discoverer UE. |  |
| DiscSecMaterials | 6.1.6.2.7 |  | Represents the discovery security materials |  |
| UeSecurityCapability | 6.1.6.3 |  | Ranging and sidelink positioning UE security capability |  |
| ChosenPc5CipheringAlgorithm | 6.1.6.3 |  | The chosen PC5 ciphering algorithm |  |
| UeRole | 6.1.6.3 |  | Represents ranging and sidelink positioning UE role |  |

Table 6.1.6.1-2 specifies data types re-used by the Nslpkmf\_Discovery 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 Nslpkmf\_Discovery service based interface.

Table 6.1.6.1-2: Nslpkmf\_Discovery re-used Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Reference | Comments | Applicability |
| VarUeId | 3GPP TS 29.571 [15] | String represents the SUPI or GPSI. |  |
| ApplicationId | 3GPP TS 29.571 [15] | Represents the identifier of an application. |  |

#### 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 |
| rangingSlAppId | ApplicationId | M | 1 | This IE shall indicate the application identifier for ranging and sidelink positioning service. |  |
| ueRole | UeRole | M | 1 | This IE shall indicate the role of the UE for ranging and sidelink positioning service. |  |

##### 6.1.6.2.3 Type: MonitorAuthReqData

Table 6.1.6.2.3-1: Definition of type MonitorAuthReqData

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| rangingSlAppId | ApplicationId | M | 1 | This IE shall indicate the application identifier for ranging and sidelink positioning service. |  |
| ueRole | UeRole | M | 1 | This IE shall indicate the role of the UE for ranging and sidelink positioning service. |  |
| ueSecurityCapability | UeSecurityCapability | M | 1 | This IE shall indicate the PC5 UE security capability for ranging and sidelink positioning sevice. |  |

##### 6.1.6.2.4 Type: MonitorAuthRespData

Table 6.1.6.2.4-1: Definition of type MonitorAuthRespData

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| chosenPc5CipheringAlgorithm | ChosenPc5CipheringAlgorithm | M | 1 | This IE shall indicate the chosen PC5 ciphering algorithm for ranging and sidelink positioning sevice |  |
| discSecMaterials | DiscSecMaterials | M | 1 | This IE shall indicate the discovery security materials |  |

##### 6.1.6.2.5 Type: DiscoveryAuthReqData

Table 6.1.6.2.5-1: Definition of type DiscoveryAuthReqData

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| rangingSlAppId | ApplicationId | M | 1 | This IE shall indicate the application identifier for ranging and sidelink positioning service. |  |
| ueRole | UeRole | M | 1 | This IE shall indicate the role of the UE for ranging and sidelink positioning service. |  |
| ueSecurityCapability | UeSecurityCapability | M | 1 | This IE shall indicate the PC5 UE security capability for ranging and sidelink positioning sevice. |  |

##### 6.1.6.2.6 Type: DiscoveryAuthRespData

Table 6.1.6.2.6-1: Definition of type DiscoveryAuthRespData

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| chosenPc5CipheringAlgorithm | ChosenPc5CipheringAlgorithm | M | 1 | This IE shall indicate the chosen PC5 ciphering algorithm for ranging and sidelink positioning service. |  |
| discSecMaterials | DiscSecMaterials | M | 1 | This IE shall indicate the discovery security materials for ranging and sidelink positioning service. |  |

##### 6.1.6.2.7 Type: DiscSecMaterials

Table 6.1.6.2.7-1: Definition of type DiscSecMaterials

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| duik | Duik | O | 0..1 | Discovery User Integrity Key |  |
| duck | Duck | O | 0..1 | Discovery User Confidentility Key |  |
| dusk | Dusk | O | 0..1 | Discovery User Scrambling Key |  |

#### 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 |
| UserInfoId | string | String identifying an User Info ID as Application layer ID as specified in 3GPP TS 24.514 [17]. |  |
| UeSecurityCapability | Bytes | String with format "byte" as defined in OpenAPI Specification [7], i.e. base64-encoded characters, encoding the "UE security capability" IE as specified in 3GPP TS 24.514 [17] (starting from octet 1). |  |
| ChosenPc5CipheringAlgorithm | integer | This IE shall indicate the chosen PC5 ciphering algorithm as specified in 3GPP TS 24.514 [17] |  |
| Duik | Bytes | String with format "byte" as defined in OpenAPI Specification [7], i.e. base64-encoded characters, encoding the "DUIK" IE as specified in 3GPP TS 24.514 [17] |  |
| Duck | Bytes | String with format "byte" as defined in OpenAPI Specification [7], i.e. base64-encoded characters, encoding the "DUCK" IE as specified in 3GPP TS 24.514 [17] |  |
| Dusk | Bytes | String with format "byte" as defined in OpenAPI Specification [7], i.e. base64-encoded characters, encoding the "DUSK" IE as specified in 3GPP TS 24.514 [17] |  |

##### 6.1.6.3.3 Enumeration: UeRole

The enumeration UeRole represents the different roles of UE for ranging and sidelink positioning service.

Table 6.1.6.3.28-1: Enumeration UeRole

|  |  |
| --- | --- |
| Enumeration value | Description |
| "TARGET\_UE" | UE as target UE for the ranging and sidelink positioning service |
| "REFERENCE\_UE" | UE as sidelink reference UE for the ranging and sidelink positioning service |
| "LOCATED\_UE" | UE as located UE for the ranging and sidelink positioning service |
| "CLIENT\_UE" | UE as sidelink positioning client UE for the ranging and sidelink positioning service |
| "SERVER\_UE" | UE as sidelink positioning server UE for the ranging and sidelink positioning service |

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

There is no data type describing alternative data types or combinations of data types in Nslpkmf\_Discovery Service.

#### 6.1.6.5 Binary data

There is no binary data type in Nslpkmf\_Discovery Service.

### 6.1.7 Error Handling

#### 6.1.7.1 General

For the Nslpkmf\_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 [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 Nslpkmf\_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 [4].

#### 6.1.7.3 Application Errors

The application errors defined for the Nslpkmf\_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 |
| RANGINGSL\_SERVICE\_UNAUTHORIZED | 403 Forbidden | It is used when the requested ProSe service, which is a ranging and sidelink positioning service, is not authorized for this UE Identity. |
| APPLICATION\_NOT\_FOUND | 404 Not Found | It is used when the requested application doesn't exist |

### 6.1.8 Feature negotiation

The optional features in Table 6.1.8-1 are defined for the Nslpkmf\_Discovery 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 |
| N/A |  |  |

### 6.1.9 Security

As indicated in 3GPP TS 33.501 [11] and 3GPP TS 29.500 [4], the access to the Nslpkmf\_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 Nslpkmf\_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 Nslpkmf\_Discovery service.

The Nslpkmf\_Discovery API defines the following OAuth2 authorization as specified in 3GPP TS 33.501 [11]:

Table 6.1.9-1: OAuth2 scopes defined in Nslpkmf\_Discovery API

|  |  |
| --- | --- |
| Scope | Description |
| "Nslpkmf-disc" | Access to the Nslpkmf\_Discovery API |
| "Nslpkmf-disc: announcement-authorization:modify" | Access to modify the authorization to announce for a UE in the PLMN |
| "Nslpkmf-disc:monitor-authorization:modify" | Access to modify the authorization for monitoring for a UE in the PLMN |
| "Nslpkmf-disc:discovery-authorization:modify" | Access to modify the authorization from the SLPKMF for a discoverer UE in the PLMN to operate Model B restricted discovery |

### 6.1.10 HTTP redirection

An HTTP request may be redirected to a different SLPKMF service instance, within the same SLPKMF or a different SLPKMF of an SLPKMF set, e.g. when an SLPKMF service instance is part of an SLPKMF (service) set or when using indirect communications (see 3GPP TS 29.500 [4]).

An SCP that reselects a different SLPKMF producer instance will return the NF Instance ID of the new SLPKMF producer instance in the 3gpp-Sbi-Producer-Id header, as specified in clause 6.10.3.4 of 3GPP TS 29.500 [4].

If an SLPKMF within an SLPKMF set redirects a service request to a different SLPKMF of the set using an 307 Temporary Redirect or 308 Permanent Redirect status code, the identity of the new SLPKMF 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 [4].

## 6.2 Nslpkmf\_SLPKMFKeyRequest Service API

### 6.2.1 Introduction

The Nslpkmf\_SLPKMFKeyRequest shall use the Nslpkmf\_SLPKMFKeyRequest API.

The API URI of the Nslpkmf\_SLPKMFKeyRequest 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 "nslpkmf-keyrequest ".

- The <apiVersion> shall be "v1".

- The <apiSpecificResourceUriPart> shall be set as described in clause 6.2.3.

### 6.2.2 Usage of HTTP

#### 6.2.2.1 General

HTTP/2, IETF RFC 9113 [8], 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 [7] specification of HTTP messages and content bodies for the Nslpkmf\_SLPKMFKeyRequest API is contained in Annex A.

#### 6.2.2.2 HTTP standard headers

##### 6.2.2.2.1 General

See clause 5.3.2 of 3GPP TS 29.500 [4] for the usage of HTTP standard headers.

##### 6.2.2.2.2 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 [4]. The use of the JSON format shall be signalled by the content type "application/json".

"Problem Details" JSON object shall be used to indicate additional details of the error in a HTTP response body and shall be signalled by the content type "application/problem+json", as defined in IETF RFC 9457 [10].

#### 6.2.2.3 HTTP custom headers

The mandatory HTTP custom header fields specified in clause 5.3.3.2 of 3GPP TS 29.500 [4] shall be applicable, and the optional HTTP custom header fields specified in clause 5.3.3.3 of 3GPP TS 29.500 [4] may be supported.

### 6.2.3 Resources

#### 6.2.3.1 Overview

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

Figure 6.2.3.1-1 describes the resource URI structure of the Nslpkmf\_SLPKMFKeyRequest API.



Figure 6.2.3.1-1: Resource URI structure of the Nslpkmf\_SLPKMFKeyRequest API

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

Table 6.2.3.1-1: Resources and methods overview

|  |  |  |  |
| --- | --- | --- | --- |
| Resource name | Resource URI | HTTP method or custom operation | Description |
| Ranging Keys Collection | /ranging-keys | request  (POST) | UnicastKey service operation |

#### 6.2.3.2 Resource: Ranging Keys Collection

##### 6.2.3.2.1 Description

This resource represents the collection of the ranging keys managed by the SLPKMF.

This resource is modelled with the Collection resource archetype (see clause C.2 of 3GPP TS 29.501 [6]).

##### 6.2.3.2.2 Resource Definition

Resource URI: **{apiRoot}/<apiName>/<apiVersion>/ranging-keys**

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

Table 6.2.3.2.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.2.1 |

##### 6.2.3.2.3 Resource Standard Methods

There is no standard method supported by the resource.

##### 6.2.3.2.4 Resource Custom Operations

###### 6.2.3.2.4.1 Overview

Table 6.2.3.2.4.1-1: Custom operations

|  |  |  |  |
| --- | --- | --- | --- |
| Operation name | Custom operaration URI | Mapped HTTP method | Description |
| request | {resourceUri}/request | POST | UnicastKey service operation |

###### 6.2.3.2.4.2 Operation: request

6.2.3.2.4.2.1 Description

This custom operation requests the keying material related to ranging in the SLPKMF.

6.2.3.2.4.2.2 Operation Definition

This operation shall support the request data structures specified in Table 6.2.3.2.4.2.2-1 and the response data structure and response codes specified in Table 6.2.3.2.4.2.2-2.

Table 6.2.3.2.4.2.2-1: Data structures supported by the POST Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| UnicastKeyReqData | M | 1 | Representation of the input to request the keying material. |

Table 6.2.3.2.4.2.2-2: Data structures supported by the POST Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| UnicastKeyRspData | M | 1 | 200 OK | Representation of the successfully requested keying material. |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection.  (NOTE 1) |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection.  (NOTE 2) |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute shall be set to one of the following application error:  - UE\_NOT\_AUTHORIZED  See Table 6.2.7.3-1 for the description of these errors. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute shall be set to one of the following application error:  - UE\_NOT\_FOUND  See Table 6.2.7.3-1 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 [4] also apply.  NOTE 2: RedirectResponse may be inserted by an SCP, see clause 6.10.9.1 of 3GPP TS 29.500 [4]. | | | | |

Table 6.2.3.2.4.2.2-3: 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 SLPKMF or SLPKMF (service) set.  For the case, when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [4]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target SLPKMF (service) instance ID towards which the request is redirected |

Table 6.2.3.2.4.2.2-4: 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 SLPKMF or SLPKMF (service) set.  For the case, when a request is redirected to the same target resource via a different SCP, see clause 6.10.9.1 in 3GPP TS 29.500 [4]. |
| 3gpp-Sbi-Target-Nf-Id | string | O | 0..1 | Identifier of the target SLPKMF (service) instance ID towards which the request is redirected |

### 6.2.4 Custom Operations without associated resources

There is no custom operation without associated resources supported in Nslpkmf\_SLPKMFKeyRequest Service.

### 6.2.5 Notifications

There is no notification defined for Nslpkmf\_SLPKMFKeyRequest service.

### 6.2.6 Data Model

#### 6.2.6.1 General

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

Table 6.2.6.1-1 specifies the data types defined for the Nslpkmf\_SLPKMFKeyRequest service based interface protocol.

Table 6.2.6.1-1: Nslpkmf\_SLPKMFKeyRequest specific Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Clause defined | Description | Applicability |
| UnicastKeyReqData | 6.2.6.2.2 | Representation of the input to request the keying material. |  |
| UnicastKeyRspData | 6.2.6.2.3 | Representation of the successfully requested keying material. |  |
| SlpkId | 6.2.6.3 | Sidelink positioning Key ID for user |  |
| Kslp | 6.2.6.3 | Key for Sidelink positioning |  |
| KslpFreshnessParameter1 | 6.2.6.3 | KSLP Freshness Parameter 1 |  |
| KslpFreshnessParameter2 | 6.2.6.3 | KSLP Freshness Parameter 2 |  |

Table 6.2.6.1-2 specifies data types re-used by the Nslpkmf\_SLPKMFKeyRequest 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 Nslpkmf\_SLPKMFKeyRequest service based interface.

Table 6.2.6.1-2: Nslpkmf\_SLPKMFKeyRequest re-used Data Types

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Reference | Comments | Applicability |
| ApplicationId | 3GPP TS 29.571 [15] | Represents the identifier of an application. |  |

#### 6.2.6.2 Structured data types

##### 6.2.6.2.1 Introduction

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

##### 6.2.6.2.2 Type: UnicastKeyReqData

Table 6.2.6.2.2-1: Definition of type UnicastKeyReqData

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| rangingSlAppId | ApplicationId | M | 1 | This IE shall indicate the application identifier for ranging and sidelink positioning service. |  |
| kslpFreshness1 | KslpFreshnessParameter1 | M | 1 | This IE shall carry the KSLP Freshness Parameter 1 in the ranging UE. |  |
| slpkId | SlpkId | M | 1 | This IE shall indicate the SLPK ID from the ranging UE. |  |

##### 6.2.6.2.3 Type: UnicastKeyRspData

Table 6.2.6.2.3-1: Definition of type UnicastKeyRspData

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| kslp | Kslp | M | 1 | This IE shall carry the KSLP derived by the SLPKMF. |  |
| kslpFreshness2 | KslpFreshnessParameter2 | M | 1 | This IE shall carry the KSLP Freshness Parameter 2 generated by the SLPKMF. |  |

#### 6.2.6.3 Simple data types and enumerations

##### 6.2.6.3.1 Introduction

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

##### 6.2.6.3.2 Simple data types

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

Table 6.2.6.3.2-1: Simple data types

|  |  |  |  |
| --- | --- | --- | --- |
| Type Name | Type Definition | Description | Applicability |
| SlpkId | string | Ranging User Key ID  String type as defined in OpenAPI Specification [7], carrying the value of the "SLPK ID" parameter via PC8\* (with "xs:string" type in XML schema) as specified in 3GPP TS 24.554 [16]. |  |
| Kslp | string | Key for RANGING AND SIDELINK POSITIONING  String type as defined in OpenAPI Specification [7], carrying the value of the "KSLP" parameter via PC8\* (with "xs:hexBinary" type in XML schema) as specified in 3GPP TS 24.554 [16]. |  |
| KslpFreshnessParameter1 | string | KSLP Freshness Parameter 1  String type as defined in OpenAPI Specification [7], carrying the value of the "KSLP freshness parameter 1" parameter via PC8 (with "xs:hexBinary" type in XML schema) as specified in 3GPP TS 24.554 [16]. |  |
| KslpFreshnessParameter2 | string | KSLP Freshness Parameter 2  String type as defined in OpenAPI Specification [7], carrying the value of the "KSLP freshness parameter 2" parameter via PC8 (with "xs:hexBinary" type in XML schema) as specified in 3GPP TS 24.554 [16]. |  |

#### 6.2.6.4 Data types describing alternative data types or combinations of data types

There is no data type describing alternative data types or combinations of data types in Nslpkmf\_SLPKMFKeyRequest Service.

#### 6.2.6.5 Binary data

There is no binary data type in Nslpkmf\_SLPKMFKeyRequest Service.

### 6.2.7 Error Handling

#### 6.2.7.1 General

For the Nslpkmf\_SLPKMFKeyRequest 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 5.3.7.2-1 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 5.3.7.1-1 of 3GPP TS 29.500 [4].

In addition, the requirements in the following clauses are applicable for the Nslpkmf\_SLPKMFKeyRequest API.

#### 6.2.7.2 Protocol Errors

Protocol errors handling shall be supported as specified in clause 5.3.7 of 3GPP TS 29.500 [4].

#### 6.2.7.3 Application Errors

The application errors defined for the Nslpkmf\_SLPKMFKeyRequest service are listed in Table 6.2.7.3-1.

Table 6.2.7.3-1: Application errors

|  |  |  |
| --- | --- | --- |
| Application Error | HTTP status code | Description |
| UE\_NOT\_AUTHORIZED | 403 Forbidden | The UE is not authorized for the requested service. |
| UE\_NOT\_FOUND | 404 Not Found | The UE related to the SLPK ID is not found in the SLPKMF. |

### 6.2.8 Feature negotiation

The optional features in Table 6.2.8-1 are defined for the Nslpkmf\_SLPKMFKeyRequest API. They shall be negotiated using the extensibility mechanism defined in clause 6.6 of 3GPP TS 29.500 [4].

Table 6.2.8-1: Supported Features

|  |  |  |
| --- | --- | --- |
| Feature number | Feature Name | Description |
| N/A |  |  |

### 6.2.9 Security

As indicated in 3GPP TS 33.501 [11] and 3GPP TS 29.500 [4], the access to the Nslpkmf\_SLPKMFKeyRequest 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 Nslpkmf\_SLPKMFKeyRequest 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 Nslpkmf\_SLPKMFKeyRequest service.

The Nslpkmf\_SLPKMFKeyRequest API defines a single scope "nslpkmf-keyrequest" 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.

### 6.2.10 HTTP redirection

An HTTP request may be redirected to a different SLPKMF service instance, within the same SLPKMF or a different SLPKMF of an SLPKMF set, e.g. when an SLPKMF service instance is part of an SLPKMF (service) set or when using indirect communications (see 3GPP TS 29.500 [4]).

An SCP that reselects a different SLPKMF producer instance will return the NF Instance ID of the new SLPKMF producer instance in the 3gpp-Sbi-Producer-Id header, as specified in clause 6.10.3.4 of 3GPP TS 29.500 [4].

If an SLPKMF within an SLPKMF set redirects a service request to a different SLPKMF of the set using an 307 Temporary Redirect or 308 Permanent Redirect status code, the identity of the new SLPKMF 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 [4].

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 3GPP TR 21.900 [14]).

# A.2 Nslpkmf\_Discovery API

openapi: 3.0.0

info:

title: Nslpkmf\_Discovery API

version: '1.1.0-alpha.2'

description: |

Nslpkmf\_Discovery Service.

© 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).

All rights reserved.

externalDocs:

description: >

3GPP TS 29.586 V19.1.0; 5G System; SideLink Positioning Key Management Services; Stage 3.

url: https://www.3gpp.org/ftp/Specs/archive/29\_series/29.586/

servers:

- url: '{apiRoot}/Nslpkmf-discovery/v1'

variables:

apiRoot:

default: https://example.com

description: apiRoot as defined in clause 4.4 of 3GPP TS 29.501

security:

- {}

- oAuth2ClientCredentials:

- Nslpkmf-discovery

paths:

/{ueId}/announcement-authorization/{userInfoId}:

put:

summary: Obtain the authorization from the SLPKMF for announcing in the PLMN

operationId: ObtainAnnounceAuth

tags:

- Obtain the authorization from the SLPKMF for announcing in the PLMN

security:

- {}

- oAuth2ClientCredentials:

- Nslpkmf-disc

- oAuth2ClientCredentials:

- Nslpkmf-disc

- Nslpkmf-disc:announcement-authorization:modify

parameters:

- name: ueId

in: path

description: Identifier of the UE

required: true

schema:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/VarUeId'

- name: userInfoId

in: path

description: User Info Id

required: true

schema:

$ref: '#/components/schemas/UserInfoId'

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}/Nslpkmf-disc>/<apiVersion>/{ueId}/announcement-authorization/{userInfoId}

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'

'401':

$ref: 'TS29571\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29571\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29571\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29571\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29571\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'502':

$ref: 'TS29571\_CommonData.yaml#/components/responses/502'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/{ueId}/monitor-authorization/{userInfoId}:

put:

summary: Obtain the discovery key from the SLPKMF for monitoring in the PLMN

operationId: ObtainMonitorAuthorize

tags:

- Obtain the discovery key from the SLPKMF for monitoring in the PLMN

security:

- {}

- oAuth2ClientCredentials:

- Nslpkmf-disc

- oAuth2ClientCredentials:

- Nslpkmf-disc

- Nslpkmf-disc:monitor-authorization:modify

parameters:

- name: ueId

in: path

description: Identifier of the UE

required: true

schema:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/VarUeId'

- name: userInfoId

in: path

description: User Info Id

required: true

schema:

$ref: '#/components/schemas/UserInfoId'

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}/Nslpkmf-disc>/<apiVersion>/{ueId}/monitor-authorization/{userInfoId}

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'

'401':

$ref: 'TS29571\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29571\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29571\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29571\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29571\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'502':

$ref: 'TS29571\_CommonData.yaml#/components/responses/502'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

/{ueId}/discovery-authorization/{userInfoId}:

put:

summary: Obtain the discovery key from the SLPKMF for a discoverer UE

operationId: ObtainDiscAuth

tags:

- Obtain the discovery key for a discoverer UE

security:

- {}

- oAuth2ClientCredentials:

- Nslpkmf-disc

- oAuth2ClientCredentials:

- Nslpkmf-disc

- Nslpkmf-disc:discovery-authorization:modify

parameters:

- name: ueId

in: path

description: Identifier of the UE

required: true

schema:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/VarUeId'

- name: userInfoId

in: path

description: User Info Id

required: true

schema:

$ref: '#/components/schemas/UserInfoId'

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}/Nslpkmf-disc>/<apiVersion>/{ueId}/discovery-authorization/{userInfoId}

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'

'401':

$ref: 'TS29571\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29571\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29571\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29571\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29571\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'502':

$ref: 'TS29571\_CommonData.yaml#/components/responses/502'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

description: Unexpected error

components:

securitySchemes:

oAuth2ClientCredentials:

type: oauth2

flows:

clientCredentials:

tokenUrl: '{nrfApiRoot}/oauth2/token'

scopes:

Nslpkmf-disc: Access to the Nslpkmf\_Discovery API

Nslpkmf-disc:announcement-authorization:modify: >

Access to modify the authorization to announce for a UE in the PLMN

Nslpkmf-disc:monitor-authorization:modify: >

Access to modify the authorization for monitoring for an UE in the PLMN

Nslpkmf-disc:discovery-authorization:modify: >

Access to modify the authorization from the SLPKMF for a discoverer UE

in the PLMN to operate Model B restricted discovery

schemas:

# COMPLEX TYPES:

AnnounceAuthData:

type: object

description: Represents Data used to request the authorization to announce for a UE

required:

- rangingSlAppId

- ueRole

properties:

rangingSlAppId:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ApplicationId'

ueRole:

$ref: '#/components/schemas/UeRole'

MonitorAuthReqData:

type: object

description: Data used to request the discovery key to monitor for a UE

required:

- rangingSlAppId

- ueRole

- ueSecurityCapability

properties:

rangingSlAppId:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ApplicationId'

ueRole:

$ref: '#/components/schemas/UeRole'

ueSecurityCapability:

$ref: '#/components/schemas/UeSecurityCapability'

MonitorAuthRespData:

type: object

description: Represents the obtained Monitor Discovery Key Data for a UE

required:

- chosenPc5CipheringAlgorithm

- discSecMaterials

properties:

chosenPc5CipheringAlgorithm:

$ref: '#/components/schemas/ChosenPc5CipheringAlgorithm'

discSecMaterials:

$ref: '#/components/schemas/DiscSecMaterials'

DiscoveryAuthReqData:

type: object

description: Data used to request the discovery key to monitor for a discoverer UE

required:

- rangingSlAppId

- ueRole

- ueSecurityCapability

properties:

rangingSlAppId:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ApplicationId'

ueRole:

$ref: '#/components/schemas/UeRole'

ueSecurityCapability:

$ref: '#/components/schemas/UeSecurityCapability'

DiscoveryAuthRespData:

type: object

description: Represents the obtained Monitor Discovery Key Data for a discoverer UE

required:

- chosenPc5CipheringAlgorithm

- discSecMaterials

properties:

chosenPc5CipheringAlgorithm:

$ref: '#/components/schemas/ChosenPc5CipheringAlgorithm'

discSecMaterials:

$ref: '#/components/schemas/DiscSecMaterials'

DiscSecMaterials:

type: object

description: Represents the discovery security materials

properties:

duik:

$ref: '#/components/schemas/Duik'

dusk:

$ref: '#/components/schemas/Dusk'

duck:

$ref: '#/components/schemas/Duck'

# SIMPLE TYPES:

UserInfoId:

description: Contains the identifier of User Info

type: string

UeSecurityCapability:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Bytes'

ChosenPc5CipheringAlgorithm:

description: Contains the chosen PC5 ciphering algorithm.

type: integer

Duik:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Bytes'

Duck:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Bytes'

Dusk:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/Bytes'

UeRole:

description: Specifies the different roles of UE for ranging and sidelink positioning service.

anyOf:

- type: string

enum:

- TARGET\_UE

- REFERENCE\_UE

- LOCATED\_UE

- CLIENT\_UE

- SERVER\_UE

- type: string

# ENUMS:

# A.3 Nslpkmf\_SLPKMFKeyRequest API

openapi: 3.0.0

info:

title: Nslpkmf\_SLPKMFKeyRequest

version: '1.1.0-alpha.1'

description: |

SLPKMF KeyRequest Service.

© 2025, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).

All rights reserved.

externalDocs:

description: >

3GPP TS 29.586 V19.1.0; 5G System; SideLink Positioning Key Management Services; Stage 3.

url: https://www.3gpp.org/ftp/Specs/archive/29\_series/29.586/

servers:

- url: '{apiRoot}/nslpkmf-keyrequest/v1'

variables:

apiRoot:

default: https://example.com

description: apiRoot as defined in clause 4.4 of 3GPP TS 29.501

security:

- {}

- oAuth2ClientCredentials:

- nslpkmf-keyrequest

paths:

/ranging-keys/request:

post:

summary: Request Keying Materials for ranging

operationId: UnicastKey

tags:

- Ranging Keys Collection (Collection)

requestBody:

required: true

content:

application/json:

schema:

$ref: '#/components/schemas/UnicastKeyReqData'

responses:

'200':

description: Success

content:

application/json:

schema:

$ref: '#/components/schemas/UnicastKeyRspData'

'307':

$ref: 'TS29571\_CommonData.yaml#/components/responses/307'

'308':

$ref: 'TS29571\_CommonData.yaml#/components/responses/308'

'400':

$ref: 'TS29571\_CommonData.yaml#/components/responses/400'

'401':

$ref: 'TS29571\_CommonData.yaml#/components/responses/401'

'403':

$ref: 'TS29571\_CommonData.yaml#/components/responses/403'

'404':

$ref: 'TS29571\_CommonData.yaml#/components/responses/404'

'411':

$ref: 'TS29571\_CommonData.yaml#/components/responses/411'

'413':

$ref: 'TS29571\_CommonData.yaml#/components/responses/413'

'415':

$ref: 'TS29571\_CommonData.yaml#/components/responses/415'

'429':

$ref: 'TS29571\_CommonData.yaml#/components/responses/429'

'500':

$ref: 'TS29571\_CommonData.yaml#/components/responses/500'

'502':

$ref: 'TS29571\_CommonData.yaml#/components/responses/502'

'503':

$ref: 'TS29571\_CommonData.yaml#/components/responses/503'

default:

$ref: 'TS29571\_CommonData.yaml#/components/responses/default'

components:

securitySchemes:

oAuth2ClientCredentials:

type: oauth2

flows:

clientCredentials:

tokenUrl: '{nrfApiRoot}/oauth2/token'

scopes:

nslpkmf-keyrequest: Access to the Nslpkmf\_SLPKMFKeyRequest API

schemas:

#

# Structured Data Types

#

UnicastKeyReqData:

description: Representation of the input to request the keying material.

type: object

properties:

rangingSlAppId:

$ref: 'TS29571\_CommonData.yaml#/components/schemas/ApplicationId'

kslpFreshness1:

$ref: '#/components/schemas/KslpFreshnessParameter1'

slpkId:

$ref: '#/components/schemas/SlpkId'

required:

- rangingSlAppId

- kslpFreshness1

- slpkId

UnicastKeyRspData:

description: Representation of the successfully requested keying material.

type: object

properties:

kslp:

$ref: '#/components/schemas/Kslp'

kslpFreshness2:

$ref: '#/components/schemas/KslpFreshnessParameter2'

required:

- kslp

- kslpFreshness2

#

# Simple Data Types

#

SlpkId:

description: Ranging User Key ID

type: string

Kslp:

description: Key for RANGING AND SIDELINK POSITIONING

type: string

KslpFreshnessParameter1:

description: KSLP Freshness Parameter 1

type: string

KslpFreshnessParameter2:

description: KSLP Freshness Parameter 2

type: string

#

# Enumeration Data Types

#

Annex B (informative):  
Change history

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Change history** | | | | | | | |
| **Date** | **Meeting** | **TDoc** | **CR** | **Rev** | **Cat** | **Subject/Comment** | **New version** |
| 2023-11 | CT4#119 | C4-235487  C4-235690  C4-235691 |  |  |  | Implementing the following p-CR agreed by CT4: C4-235487, C4-235690, and C4-235691; and Editorial change from the rapporteur. | 0.1.0 |
| 2023-12 | CT#102 | CP-233170 |  |  |  | TS presented for information | 1.0.0 |
| 2024-03 | CT4#121 | C4-240751 |  |  |  | Implementing the following p-CR agreed by CT4: C4-240751; and Editorial change from the rapporteur. | 1.1.0 |
| 2024-03 | CT#103 | CP-240027 |  |  |  | TS Presented for approval | 2.0.0 |
| 2024-03 | CT#103 |  |  |  |  | TS approved in CT#103 | 18.0.0 |
| 2024-06 | CT#104 | CP-241045 | 0001 | 1 | F | Update the incorrect description | 18.1.0 |
| 2024-06 | CT#104 | CP-241045 | 0002 |  | F | Update the references | 18.1.0 |
| 2024-06 | CT#104 | CP-241045 | 0003 | 1 | F | Updates on announce-authorize URI | 18.1.0 |
| 2024-06 | CT#104 | CP-241045 | 0004 | 1 | F | Updates on discovery-authorize URI | 18.1.0 |
| 2024-06 | CT#104 | CP-241045 | 0005 | 1 | F | Updates on monitor-authorize URI | 18.1.0 |
| 2024-06 | CT#104 | CP-241045 | 0006 | 1 | F | Updates on the API Description | 18.1.0 |
| 2024-06 | CT#104 | CP-241045 | 0007 | 1 | F | General update for the specification for SLPKMF services | 18.1.0 |
| 2024-06 | CT#104 | CP-241045 | 0009 | 1 | F | Remove unused data type | 18.1.0 |
| 2024-06 | CT#104 | CP-241045 | 0010 | 1 | F | Update on UserInfoId | 18.1.0 |
| 2024-06 | CT#104 | CP-241045 | 0011 |  | F | 29.586 Rel-18 API version and External doc update | 18.1.0 |
| 2024-09 | CT#105 | CP-242030 | 0012 | 1 | F | UserInfoId description | 19.0.0 |
| 2024-09 | CT#105 | CP-242030 | 0013 | 1 | F | The term Payload is replaced with Content due to RFC 9113 | 19.0.0 |
| 2024-09 | CT#105 | CP-242030 | 0014 | 1 | F | Updates on UEID reference and editorial errors for SLPKMF services | 19.0.0 |
| 2024-09 | CT#105 | CP-242038 | 0015 |  | F | 29.586 Rel-19 API version and External doc update | 19.0.0 |
| 2024-09 | CT#108 | C4-252512 | 0016 |  | F | 29.586 Rel19 API version and External doc update | 19.1.0 |