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| ***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 |
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# 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

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 Nnssf Service Based Interface. It provides stage 3 protocol definitions and message flows, and specifies the API for each service offered by the NSSF.

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

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

# 2 References

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

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

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

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

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

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

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

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

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

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

[7] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces; Stage 3".

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

[9] 3GPP TS 23.003: "Numbering, addressing and identification".

[10] IETF RFC 9113: "HTTP/2".

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

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

[16] IETF RFC 1952: "GZIP file format specification version 4.3".

[17] 3GPP TR 21.900: "Technical Specification Group working methods".

[18] IETF RFC 9110: "HTTP Semantics".

[19] Void

[20] 3GPP TS 24.501: "Non-Access-Stratum (NAS) protocol for 5G System (5GS); Stage 3".

[21] 3GPP TS 38.413: "NG-RAN; NG Application Protocol (NGAP); Stage 3".

# 3 Definitions and abbreviations

## 3.1 Definitions

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

## 3.2 Abbreviations

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

NSAG Network Slice AS Group

# 4 Overview

## 4.1 Introduction

Within the 5GC, the NSSF offers services to the AMF and NSSF in a different PLMN via the Nnssf service based interface (see 3GPP TS 23.501 [2] and 3GPP TS 23.502 [3]).

Figure 4.1-1 provides the reference model (in service based interface representation and in reference point representation), with focus on the NSSF and the scope of the present specification.



Figure 4.1-1: NSSF in 5G System architecture

The functionalities supported by the NSSF are listed in clause 6.2.14 of 3GPP TS 23.501 [2].

# 5 Services offered by the NSSF

## 5.1 Introduction

The NSSF supports the following services.

Table 5.1-1: NF Services provided by NSSF

| Service Name | Description | Example Consumer |
| --- | --- | --- |
| Nnssf\_NSSelection | This service enables Network Slice selection in both the Serving PLMN and the HPLMN | AMF, V-NSSF |
| Nnssf\_NSSAIAvailability | This service enables to update the S-NSSAI(s) the NF service consumer (e.g AMF) supports on a per TA basis on the NSSF and to subscribe and notify any change in status, on a per TA basis, of the SNSSAIs available per TA (unrestricted) and the restricted S-NSSAI(s) per PLMN in that TA in the serving PLMN of the UE.  This service also enables the notification of the Network Slice Replacement and Network Slice Instance Replacement to the NF Service Consumer. | AMF, V-NSSF |

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 |
| Nnssf\_NSSelection | 6.1 | NSSF Network Slice Selection Service | TS29531\_Nnssf\_NSSelection.yaml | nnssf-nsselection | A.2 |
| Nnssf\_NSSAIAvailability | 6.2 | NSSF NSSAI Availability Service | TS29531\_Nnssf\_NSSAIAvailability.yaml | nnssf-nssaiavailability | A.3 |

## 5.2 Nnssf\_NSSelection Service

### 5.2.1 Service Description

The Nnssf\_NSSelection service is used by an NF Service Consumer (e.g. AMF or NSSF in a different PLMN) to retrieve the information related to network slice in the non-roaming and roaming case.

It also enables the NSSF to provide to the AMF the Allowed NSSAI and the Configured NSSAI for the Serving PLMN.

It also enables the NSSF to provide to the AMF the NSAG information associated with the Configured NSSAI for the Serving PLMN.

The NF service consumer discovers the NSSF based on the local configuration. The NSSF in a different PLMN is discovered based on the self-constructed FQDN as specified in 3GPP TS 23.003 [9].

### 5.2.2 Service Operations

#### 5.2.2.1 Introduction

For the Nnssf\_NSSelection service the following service operations are defined:

- Get.

#### 5.2.2.2 GET

##### 5.2.2.2.1 General

The Get operation shall be invoked by the AMF in the non-roaming or roaming scenario to retrieve:

- The slice selection information including the Allowed NSSAI, Configured NSSAI, target AMF Set or the list of candidate AMF(s), and optionally

- The Mapping Of Allowed NSSAI;

- The Mapping Of Configured NSSAI;

- NSI ID(s) associated with the Network Slice instances of the Allowed NSSAI;

- NRF(s) to be used to select NFs/services within the selected Network Slice instance(s) and NRF to be used to determine the list of candidate AMF(s) from the AMF Set, during Registration procedure;

- Information on whether the S-NSSAI(s) not included in the Allowed NSSAI which were part of the Requested NSSAI are rejected in the serving PLMN or in the current TA;

- The Target NSSAI that includes the S-NSSAI(s) as defined in clause 5.3.4.3.3 of 3GPP TS 23.501 [2], and

- The NSAG information associated with Configured NSSAI as defined in clause 5.15.14 of 3GPP TS 23.501 [2].

- The NRF to be used to select NFs/services within the selected network slice instance, and optionally the NSI ID associated with the S-NSSAI provided in the input, during the PDU Session Establishment procedure.

- The slice mapping information including the mapping of S-NSSAI(s) of the VPLMN to corresponding HPLMN S-NSSAI(s).

The Get operation shall also be invoked by the vNSSF in the roaming scenario to retrieve:

- The hNRF to be used to select NFs/services within the selected network slice instance in the HPLMN, and optionally the NSI ID associated with the S-NSSAI provided in the input, during the PDU Session Establishment procedure.

It is used in the following procedures:

- Registration procedure (see clause 4.2.2.2.2 of 3GPP TS 23.502 [3]);

- Registration with AMF re-allocation (see clause 4.2.2.2.3 of 3GPP TS 23.502 [3]);

- EPS to 5GS handover using N26 interface (see clause 4.11.1.2.2 of 3GPP TS 23.502 [3]);

- EPS to 5GS mobility registration procedure (see clauses 4.11.1.3.3, 4.11.1.3.3A, 4.11.1.3.4 and 4.23.12 of 3GPP TS 23.502 [3]);

- Xn and N2 Handover procedures with PLMN change (see clauses 4.9.1, 4.23.7 and 4.23.11 of 3GPP TS 23.502 [3]);

- UE Configuration Update procedure (see clause 4.2.4.2 of 3GPP TS 23.502 [3]);

- SMF selection for non-roaming and roaming with local breakout (see clause 4.3.2.2.3.2 of 3GPP TS 23.502 [3]) or SMF selection for home-routed roaming scenario (see clause 4.3.2.2.3.3 of 3GPP TS 23.502 [3]).

NOTE: The list of procedures above, which trigger invoking of the Nnssf\_NSSelection\_Get service operation, is not exhaustive.

##### 5.2.2.2.2 Get service operation of Nnssf\_NSSelection service

In this procedure, the NF Service Consumer (e.g. AMF) retrieves the slice selection information including the Allowed NSSAI, Configured NSSAI, target AMF Set or the list of candidate AMF(s) and other optional information.

This service operation shall also be used to retrieve the slice mapping information including the mapping of S-NSSAI(s) of the VPLMN to corresponding HPLMN S-NSSAI(s), e.g. during inter-PLMN mobility procedure and/or mobility procedure within VPLMN from EPS to 5GS.



Figure 5.2.2.2.2-1: Retrieve the network slice information during the mobility procedure

1 The AMF shall send a GET request to the NSSF.

If the AMF wants to retrieve the slice selection information, one or more of the following parameters shall be included in the slice-info-request-for-registration query parameter:

- Requested NSSAI and Subscribed S-NSSAI(s) with the indication if marked as default S-NSSAI and the associated subscribed NSSRG information;

- optionally UE support of subscription-based restrictions to simultaneous registration of network slice feature Indication;

- UDM indication to provide all subscribed S-NSSAIs for UEs not indicating support of subscription-based restrictions to simultaneous registration of network slices feature;

- Indication of the support of NSAG by the UE.

If the AMF wants to retrieve the slice mapping information, the following parameters shall be included in the slice-info-request-for-registration query parameter:

- sNssaiForMapping IE and;

- requestMapping IE.

In both scenarios, the AMF shall also include the following parameters in the message:

- PLMN ID of the SUPI in roaming scenarios;

- TAI;

- NF type of the NF service consumer and;

- Requester ID.

2a On success, "200 OK" shall be returned when the NSSF is able to find authorized network slice information for the requested network slice selection information, the response body shall include a content containing at least the following parameters:

- Allowed NSSAI and;

- target AMF Set or the list of candidate AMF(s).

The content may additionally contain the following parameters:

- a target AMF Service Set;

- Target NSSAI.

"200 OK" shall also be returned when the NSSF is able to find the requested slicing mapping information, the response body shall include a content containing the mapping of S-NSSAI(s) of the VPLMN to corresponding HPLMN S-NSSAI(s) included in the allowedNssaiList IE.

NSSFs of a PLMN that implement AMF reallocation via RAN by supporting the NGAP REROUTE NAS REQUEST procedure (see clause 8.6.5 of 3GPP TS 38.413 [21]) should return the target AMF set ID in its response. The NSSF may query the NRF to discover target AMF Set if this information is not known by other means (e.g. if not provided by AMF during Nnssf\_NSSAIAvailability\_Update service operation).

If subscribed NSSRG list is provided, the NSSF shall provide the compatible S-NSSAIs in the Allowed NSSAI as defined in clause 5.15.12 of 3GPP TS 23.501 [2] and compatible S-NSSAIs in the Target NSSAI (if provided).

If the request indicated that UE does not support subscription-based restrictions to simultaneous registration of network slice feature, and UDM has requested to provide all subscribed S-NSSAIs for such UEs, Configured NSSAI, if included, shall be provided ignoring the NSSRG restrictions.

If the AMF has indicated the support of NSAG by the UE, the NSSF shall include the "nsagInfoList" attribute with NSAG information if available.

2b If no slice instances can be found for the requested slice selection information or the requested slice mapping information, then the NSSF shall return a 403 Forbidden response with the "ProblemDetails" IE containing the Application Error "SNSSAI\_NOT\_SUPPORTED" (cf. Table 6.1.7.3-1).

On failure or redirection, the NSSF shall return one of the HTTP status codes together with the response body listed in Table 6.1.3.2.3.1-3.

##### 5.2.2.2.3 Get service operation of Nnssf\_NSSelection service during the PDU session establishment

In this procedure, the NF Service Consumer (e.g. AMF) retrieves the NRF and the optionally the NSI ID of the network slice instance:



Figure 5.2.2.2.3-1: Retrieve the network slice information during the PDU session establishment procedure

1 The NF Service consumer (e.g. AMF or NSSF in the different PLMN) shall send a GET request to the NSSF.

The request shall include query parameters, contain at least the following parameters:

- S-NSSAI;

- S-NSSAI from the HPLMN that maps to the S-NSSAI from the Allowed NSSAI of the Serving PLMN;

- the NF type of the NF service consumer;

- Requester ID and;

- non-roaming/LBO roaming/HR roaming indication.

For the request towards an NSSF in the Serving PLMN, the query parameters shall also contain the PLMN ID of the SUPI and TAI.

2a On success, "200 OK" shall be returned when the NSSF is able to find network slice instance information for the requested network slice selection information, the response body shall include a content containing at least the NRF to be used to select NFs/services within the selected Network Slice instance;

2b If no slice instances can be found for the requested slice selection information, then the NSSF shall return a 403 Forbidden response with the "ProblemDetails" IE containing the Application Error "SNSSAI\_NOT\_SUPPORTED" (cf. Table 6.1.7.3-1).

On failure or redirection, the NSSF shall return one of the HTTP status codes together with the response body listed in Table 6.1.3.2.3.1-3.

##### 5.2.2.2.4 Get service operation of Nnssf\_NSSelection service during UE configuration update procedure

In this procedure, the NF Service Consumer (e.g. AMF) retrieves network slice configuration information (e.g. the Allowed NSSAI and the Configured NSSAI) during the UE configuration update procedure.



Figure 5.2.2.2.4-1: Retrieve the network slice information during UE configuration update procedure

1 The NF Service consumer (e.g. AMF) shall send a GET request to the NSSF. The request shall include query parameters:

- Subscribed S-NSSAI(s) with the indication if the S-NSSAI is marked as default S-NSSAI and the associated subscribed NSSRG information;

- optionally UE support of subscription-based restrictions to simultaneous registration of network slice feature Indication;

- UDM indication to provide all subscribed S-NSSAIs for UEs not indicating support of subscription-based restrictions to simultaneous registration of network slices feature;

- Rejected S-NSSAI(s) for the Registration Area;

- PLMN ID of the SUPI;

- TAI;

- Indication of the support of NSAG by the UE;

- NF type of the NF service consumer and;

- the NF instance ID of the requester NF.

NOTE: When the AMF invokes UE Configuration Update procedure to determine the Target NSSAI to redirect the UE to the dedicated frequency band(s) for an S-NSSAI (as specified in clause 5.3.4.3.3 of 3GPP TS 23.501 [2]), the AMF provides the Allowed NSSAI and the rejected S-NSSAI(s) for the current Registration Area to the NSSF; the Allowed NSSAI and Rejected S-NSSAI(s) for the RA does not include any S-NSSAI that failed for Network Slice-Specific Authentication and Authorization. The AMF does not include the Requested NSSAI to the NSSF in this procedure, thus the NSSF will not provide Allowed NSSAI again to the AMF in the response.

2a On success, "200 OK" shall be returned when the NSSF is able to find authorized network slice information for the requested network slice selection information, the response body shall include a content containing at least the following parameters:

- Allowed NSSAI;

- Configured NSSAI and;

- optionally Target NSSAI.

If subscribed NSSRG list is provided, the NSSF shall provide the compatible S-NSSAIs in the Allowed NSSAI as defined in the clause 5.15.12 of 3GPP TS 23.501 [2] and compatible S-NSSAIs in the Target NSSAI(if provided).

If the request indicated that UE does not support subscription-based restrictions to simultaneous registration of network slice feature, and UDM has requested to provide all subscribed S-NSSAIs for such UEs, the NSSF shall provide Configured NSSAI ignoring the NSSRG restrictions.

If the AMF has indicated the support of NSAG by the UE, the NSSF shall include the "nsagInfoList" attribute with NSAG information if available.

2b If no slice instances can be found for the requested slice selection information, then the NSSF shall return a 403 Forbidden response with the "ProblemDetails" IE containing the Application Error "SNSSAI\_NOT\_SUPPORTED" (cf. Table 6.1.7.3-1).

On failure or redirection, the NSSF shall return one of the HTTP status codes together with the response body listed in Table 6.1.3.2.3.1-3.

## 5.3 Nnssf\_NSSAIAvailability Service

### 5.3.1 Service Description

The Nnssf\_NSSAIAvailability service is used by the NF service consumer (e.g AMF) to update the S-NSSAI(s) the AMF supports on a per TA basis on the NSSF, subscribe and unsubscribe the notification of any changes to the NSSAI availability information on a per TA basis, of the S-NSSAIs available per TA (unrestricted) and the restricted S-NSSAI(s) per PLMN in that TA in the serving PLMN of the UE.

It also enables the NF service consumer (e.g. AMF) to update the NSAG(s) associated with the S-NSSAI(s) supported by the AMF on a per TA basis.

It also enables the NF service consumer (e.g., AMF, V-NSSF) to receive updates for Network Slice Replacement and Network Slice Instance Replacement.

### 5.3.2 Service Operations

#### 5.3.2.1 Introduction

For the Nnssf\_NSSAIAvailability service the following service operations are defined:

- Update;

- Subscribe;

- Unsubscribe;

- Notify;

- Delete;

- Options.

#### 5.3.2.2 Update Service Operation

##### 5.3.2.2.1 General

The Update operation shall be used by an NF Service Consumer (e.g. AMF) to update the NSSF with the S-NSSAIs the NF service consumer (e.g. AMF) supports per TA, and get the availability of the S-NSSAIs per TA for the S-NSSAIs the NF service consumer (e.g. AMF) supports.

The Update operation may also be used by an NF Service Consumer (e.g. AMF) to update the NSSF with the NSAG(s) associated with the S-NSSAI(s) supported by the NF Service Consumer (e.g. AMF) on per TA basis, and to get the availability of the NSAG(s) per TA for the NSAG(s) supported by the NF Service Consumer (e.g. AMF).



Figure 5.3.2.2.1-1: Update the S-NSSAIs the AMF supports per TA

1. The NF service consumer (e.g. AMF) shall send a PUT request to the resource representing the NSSAI Availability information of the individual NF, identified by the {nfId}, to replace or create the NSSAI Availability information of the NF.

The content shall contain the NssaiAvailabilityInfo which contains one or more representations of the individual supportedSnssai information to be replaced.

The NssaiAvailabilityInfo in the content may contain NSAG information.

The NF service consumer (e.g. AMF) shall send a PATCH request to the resource representing the NSSAI Availability information of the individual NF, identified by the {nfId}, to update the NSSAI Availability information of the NF.

The content shall contain the PatchDocument which contains one or more PatchItem instructions for updating the individual supportedSnssai resources.

The content may contain the PatchDocument which contains one or more PatchItem instructions for updating the NSAG information.

2. On success, "204 No content" shall be returned if Authorized NSSAI Availability is empty after the update; otherwise, "200 OK" shall be returned, the content of the PUT/PATCH response shall contain the representation describing the status of the request and the complete AuthorizedNssaiAvailabilityData information representing the current state of the AuthorizedNssaiAvailabilityInfo.

If there is no supported S-NSSAIs authorized by the NSSF for the TA, the NSSF shall not return the AuthorizedNssaiAvailabilityData for the corresponding TA in the response.

On failure or redirection, the NSSF shall return one of the HTTP status code together with the response body listed in Table 6.2.3.2.3.1-2 / Table 6.2.3.2.3.2-2.

#### 5.3.2.3 Subscribe Service Operation

##### 5.3.2.3.1 Creation of a subscription

The Subscribe Operation is used by a NF Service Consumer (e.g. AMF, V-NSSF) to subscribe to a notification of Network Slice Replacement, Network Slice Instance Replacement and/or of any changes in status of the NSSAI availability information (e.g. S-NSSAIs available per TA and the restricted S-NSSAI(s) per PLMN in that TA in the serving PLMN of the UE) upon this is updated by another AMF.



Figure 5.3.2.3.1-1 Create a subscription

1. The NF Service Consumer shall send a POST request to create a subscription resource in the NSSF. The content of the POST request shall contain a representation of the individual event subscription resource to be created in the NssfEventSubscriptionCreateData.

The request shall indicate the type(s) of events for which the subscription is created, i.e., Network Slice Replacement, Network Slice Instance Replacement and/or of any changes in status of the NSSAI availability information.

The request may contain an expiry time, suggested by the NF Service Consumer as a hint, representing the time upto during which the subscription is desired to be kept active and describes the maximum duration after which the subscribed event shall stop generating report.

The request may also indicate a specific AMF Set to restrict the subscriptions to notifications applicable to the AMF Set (i.e. notifications related to S-NSSAIs supported by the AMF Set). If the AMF Set is provided and the NSSF support the "SATAS" feature (see clause 6.2.8), the NF Service Consumer may also indicate that the subscription is for all TAI(s) associated with the AMF Set.

If the service operation is invoked for subscription to Network Slice Replacement notification, then the request shall contain:

- for VPLMN S-NSSAI: the list of S-NSSAIs in the VPLMN served by the NF Service Consumer that may be replaced with, the NF type of the NF Service Consumer (e.g., AMF) and the NF instance ID of the requester NF.

- for HPLMN S-NSSAI: the list of S-NSSAIs in the HPLMN that the S-NSSAI may be replaced with, the NF type of the NF Service Consumer (e.g., AMF, V-NSSF), the NF instance ID of the requester NF and the HPLMN ID.

If the service operation is invoked for subscription to Network Slice Instance Replacement notification, then the request shall contain:

- the list of S-NSSAIs and/or the list of NSI IDs that may become congested or no longer available.

2. On success, "201 Created" shall be returned, and the content of the POST response shall contain the representation describing the status of the created subscription in NssfEventSubscriptionCreatedData.

For a subscription to any changes in status of the NSSAI availability information, the NssfEventSubscriptionCreatedData may contain the AuthorizedNssaiAvailabilityData information, if available.

If there is no supported S-NSSAIs authorized by the NSSF for the TA, the NSSF shall not return the AuthorizedNssaiAvailabilityData for the corresponding TA in the response.

The Location header shall contain the location (URI) of the created subscription resource.

The response, based on operator policy and taking into account the expiry time included in the request, may contain the expiry time, as determined by the NSSF, after which the subscription becomes invalid. Once the subscription expires, if the NF Service Consumer wants to keep receiving notifications, it shall create a new subscription in the NSSF. The NSSF shall not provide the same expiry time for many subscriptions in order to avoid all of them expiring and recreating the subscription at the same time. If the expiry time is not included in the response, the NF Service Consumer shall consider the subscription to be valid without an expiry time.

On failure or redirection, the NSSF shall return one of the HTTP status code together with the response body listed in Table 6.2.3.3.3.1-2.

##### 5.3.2.3.2 Modification of a subscription

The Subscribe Operation may be used by a NF Service Consumer (e.g. AMF, V-NSSF) towards an NSSF supporting the SUMOD feature, when it needs to modify an existing subscription previously created by itself.

The NF Service Consumer shall modify the subscription by using HTTP method PATCH with the URI of the individual subscription resource to be modified.



Figure 5.3.2.3.2-1 Modify a subscription

1. The NF Service Consumer (e.g. AMF, V-NSSF) shall send a PATCH request to the resource URI identifying the individual subscription resource. The content shall contain the PatchDocument which contains one or more PatchItem instructions for updating the subscription data.

The NF Service Consumer shall not change the event IE included in the NssfEventSubscriptionCreateData by invoking the PATCH request message.

For a subscription to any changes in status of the NSSAI availability information, the taiList IE may only be set to an empty array in PATCH request if the NF service consumer and NSSF support the ONSSAI feature.

2. On success, "200 OK" shall be returned, the content of the PATCH response shall contain the representation describing the updated subscription in NssfEventSubscriptionCreatedData.

For a subscription to any changes in status of the NSSAI availability information, if there is no supported S-NSSAIs authorized by the NSSF for the TA, the NSSF shall not return the AuthorizedNssaiAvailabilityData for the corresponding TA in the response.

On failure or redirection, the NSSF shall return one of the HTTP status code together with the response body listed in Table 6.2.3.4.3.2-2.

#### 5.3.2.4 Unsubscribe Service Operation

##### 5.3.2.4.1 General

The Unsubscribe Operation is used by a NF Service Consumer (e.g. AMF, V-NSSF) to unsubscribe to a notification of any previously subscribed changes to the NSSAI availability information, Network Slice Replacement and/or Network Slice Instance Replacement.



Figure 5.3.2.4.1-1 Unsubscribe a subscription

1. The NF Service Consumer shall send a DELETE request to delete an existing subscription resource in the NSSF.

2. If the request is accepted, the NSSF shall respond with the status code 204 indicating the resource identified by subscription ID is successfully deleted.

On failure or redirection, the NSSF shall return one of the HTTP status code together with the response body listed in Table 6.2.3.4.3.1-2.

#### 5.3.2.5 Notify Service Operation

##### 5.3.2.5.1 General

The Notify Service operation shall be used by the NSSF to update the NF Service Consumer (e.g. AMF) with any change in status, on a per TA basis, of the S-NSSAIs available per TA (unrestricted) and the S-NSSAIs restricted per PLMN in that TA in the serving PLMN of the UE. The service operation is also used to notify the NF Service Consumer (e.g., AMF, V-NSSF) of Network Slice Replacement and/or Network Slice Instance Replacement.



Figure 5.3.2.5.1-1: Update the AMF with any S-NSSAIs restricted per TA

1. The NSSF shall send a POST request to the resource representing the NSSF availability resource in the NF service consumer (e.g. AMF, V-NSSF). The content of the POST request shall contain the one representations of the individual NssfEventNotification resource.

For a subscription to any changes in status of the NSSAI availability information:

- If there is no supported S-NSSAIs authorized by the NSSF for the TA, the NSSF shall not return the AuthorizedNssaiAvailabilityData for the corresponding TA in the notification.

- If there is no supported S-NSSAIs authorized by the NSSF for all TAs and the NF Service Consumer has indicated support of "EANAN" feature, the NSSF shall set authorizedNssaiAvailabilityData attribute to an empty array.

For a subscription to Network Slice Instance Replacement:

- If the NSSF supports the NSIUN feature (see clause 6.2.8) and if the Network Slice instance becomes no longer available, the NSSF shall notify the NF Service Consumer (e.g., AMF, V-NSSF) having subscribed to this event for the related S-NSSAI and/or NSI ID that the NSI is no longer available. In that case, the POST request from the NSSF shall contain the list of S-NSSAIs and the associated NSI IDs for which the status is changed (e.g., which become congested or no longer available). The request may also contain congestion mitigation information.

For a subscription to Netwok Slice Replacement:

- If the NSSF supports the NSRP feature (see clause 6.2.8) and if the NSSF detects that an S-NSSAI becomes unavailable (e.g., based on OAM or NWDAF analytics output), the NSSF shall send Network Slice Replacement for the S-NSSAI to the NF service consumer if the NF service consumer has subscribed to this event for the related S-NSSAI. The notification shall include an alternative S-NSSAI which can be used by the NF service consumer to replace the unavailable S-NSSAI. In case of roaming, the notification shall include:

- for VPLMN S-NSSAI replacement: the alternative VPLMN S-NSSAI for the S-NSSAI and the corresponding mapping to the S-NSSAI to be replaced.

- for HPLMN S-NSSAI replacement: the alternative HPLMN S-NSSAI for the S-NSSAI and the corresponding mapping to the HPLMN S-NSSAI to be replaced and the HPLMN ID.

- The NSSF shall notify the NF service consumer when the S-NSSAI becomes available again. The notification shall contain:

- an indication to stop Network Slice replacement for new UEs; or

- an indication to terminate Network Slice Replacement for all the UEs and move back the PDU sessions from the alternative S-NSSAI to the S-NSSAI.

If the notification is triggered by the AMF that updates the supported S-NSSAIs per TA by using the Update operation, the NSSF shall not send the notification to the same AMF.

2. On success, "204 No Content" shall be returned and the content of the POST response shall be empty.

On failure or redirection, the NF service consumer shall return one of the HTTP status code together with the response body listed in Table 6.2.5.2.3.1-2.

#### 5.3.2.6 Delete Service Operation

##### 5.3.2.6.1 General

The Delete Service operation shall be used by the NF service consumer (e.g. AMF) to delete the NSSAI availability information stored for the NF service consumer in the NSSF.



Figure 5.3.2.6.1-1: Delete the NSSAI Availability Information at NSSF

1. The NF service consumer (e.g. AMF) shall send a DELETE request to remove the NSSAI availability information for the NF service consumer represented by the {nfId} (e.g. AMF ID).

2. The NSSF shall delete the NSSAI Availability information for the individual AMF and shall return the 204 No Content status code.

On failure or redirection, the NSSF shall return one of the HTTP status code together with the response body listed in Table 6.2.3.2.3.3-2.

#### 5.3.2.7 Options Service Operation

##### 5.3.2.7.1 General

The Options service operation is used by a NF Service Consumer (e.g. AMF) to discover the communication options supported by the NSSF for the resource.



Figure 5.3.2.7.1-1: Procedure for the discovery of communication options supported by the NSSF

1. The NF service consumer (e.g. AMF) shall send an OPTIONS request to discover the communication options supported by the NSSF for the resource.

2. If the request is accepted, the NSSF shall respond with the status code 200 OK and include an Accept-Encoding header (as described in IETF RFC 9110 [18]).

On failure or redirection, the NSSF shall return one of the HTTP status code listed in Table 6.2.3.5.3.1-3.

# 6 API Definitions

## 6.1 Nnssf\_NSSelection Service API

### 6.1.1 API URI

The Nnssf\_NSSelection service shall use the Nnssf\_NSSelection API.

The API URI of the Nnssf\_NSSelection API shall be:

**{apiRoot}/nnssf-nsselection/<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}/nnssf-nsselection/<apiVersion>/<apiSpecificResourceUriPart>**

with the following components:

- The {apiRoot} shall be set as described in 3GPP TS 29.501 [5].

- The **<**apiVersion**>** shall be "v2".

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

### 6.1.2 Usage of HTTP

#### 6.1.2.1 General

HTTP/2, IETF RFC 9113 [10], shall be used as specified in clause 5 of 3GPP TS 29.500 [4].

An OpenAPI [6] specification of HTTP messages and content bodies for the Nnssf\_NSSelection service is specified 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

The following content types shall be supported:

- JSON, as defined in IETF RFC 8259 [14], shall be used as content type of the HTTP bodies specified in the present specification as indicated in clause 5.4 of 3GPP TS 29.500 [4].

- The Problem Details JSON Object (IETF RFC 9457 [15]. The use of the Problem Details JSON object in a HTTP response body shall be signalled by the content type "application/problem+json".6.1.2.3 HTTP custom headers

##### 6.1.2.3.1 General

In this release of this specification, no custom headers specific to the Nnssf\_NSSelection service are defined. For 3GPP specific HTTP custom headers used across all service based interfaces, see clause 5.2.3 of 3GPP TS 29.500 [4].

### 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 Nnssf\_NSSelection API.



Figure 6.1.3.1-1: Resource URI structure of the nnssf\_nsselection 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 |
| Network Slice Information | /  **n**etwork**-**slice**-**information | GET | To retrieve network slice information. See clause 6.1.3.2.3.1.  Maps to Nnssf\_NSSelection\_Get service operation. |

#### 6.1.3.2 Resource: Network Slice Information

##### 6.1.3.2.1 Description

This resource represents the network slice related information maintained by the NSSF.This resource is modelled with the Document resource archetype (see clause C.1 of 3GPP TS 29.501 [5]).

##### 6.1.3.2.2 Resource Definition

Resource URI: **{apiRoot}/nnssf-nsselection/<apiVersion>/network-slice-information**

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 |

##### 6.1.3.2.3 Resource Standard Methods

6.1.3.2.3.1 GET

This method retrieves the information related to the selected slice based on the input query parameters provided by the NF service consumer specified in table 6.1.3.2.3.1-1.

This method shall support input query parameters specified in table 6.1.3.2.3.1-1 and the response data structure and response codes specified in table 6.1.3.2.3.1-3.

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| nf-type | NFType | M | 1 | This IE shall contain the NF type of the NF service consumer. |
| nf-id | NfInstanceId | M | 1 | This IE shall contain the NF identifier of the NF service consumer. |
| slice-info-request-for-registration | SliceInfoForRegistration | C | 0..1 | This IE shall be present when the network slice information is requested during the Registration procedure or during EPS to 5GS handover procedure using N26 interface towards an NSSF in the serving PLMN. |
| slice-info-request-for-pdu-session | SliceInfoForPDUSession | C | 0..1 | This IE shall be present when the network slice information is requested during the PDU session establishment procedure. |
| slice-info-request-for-ue-cu | SliceInfoForUEConfigurationUpdate | C | 0..1 | This IE shall be present when the network slice information is requested during UE configuration update procedure. |
| home-plmn-id | PlmnId | C | 0..1 | This IE shall be present in the request towards an NSSF in the serving PLMN if the subscriber is a roamer to the serving PLMN. When present, this IE shall contain the home PLMN Id of the UE. |
| tai | Tai | C | 0..1 | This IE shall be present in the request towards an NSSF in the serving PLMN. When present, this IE shall contain the TAI the UE is currently located. |
| supported-features | SupportedFeatures | C | 0..1 | This IE shall be present if at least one optional feature defined in clause 6.1.8 is supported. |

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

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| n/a |  |  |  |

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| AuthorizedNetworkSliceInfo | M | 1 | 200 OK | This case represents a successful return of the authorized network slice information selected for the corresponding request. |
| 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 | This represents the case, where the NF service consumer is not authorized to retrieve the slice selection information or the all of the SNSSAIs included in the requested slice selection information is not supported in the PLMN.  The application specific error information shall be provided in the "cause" attribute. The "cause" attribute shall be set to:  - SNSSAI\_NOT\_SUPPORTED, if the SNSSAI included in the requested slice selection information is not allowed and there is no default NSSAI value provided in the request.  - NOT\_AUTHORIZED, if the NF service consumer identified by the NF Id is not authorized to retrieve the slice selection information.  See table 6.1.7.3-1 for the description of this error. |
| NOTE 1: The mandatory HTTP error status codes for the GET method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] other than those specified in the table above also apply, with a ProblemDetails data type (see clause 5.2.7 of 3GPP TS 29.500 [4]).  NOTE 2: RedirectResponse may be inserted by an SCP or SEPP, see clause 6.10.9.1 of 3GPP TS 29.500 [4]. | | | | |

Table 6.1.3.2.3.1-4: Headers supported by the 307 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI of the resource located on an alternative service instance within the same NSSF or NSSF (service) set.  For the case, when a request is redirected to the same target resource via a different SCP or SEPP, 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 NF (service) instance ID towards which the request is redirected |

Table 6.1.3.2.3.1-5: Headers supported by the 308 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | An alternative URI of the resource located on an alternative service instance within the same NSSF or NSSF (service) set.  For the case, when a request is redirected to the same target resource via a different SCP or SEPP, 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 NF (service) instance ID towards which the request is redirected |

##### 6.1.3.2.4 Resource Custom Operations

There are no custom methods supported on the network-slice-information collection resource.

### 6.1.4 Custom Operations without associated resources

There are no custom operations without associated resources defined for the Nnssf\_NSSelection service in this version of this API.

### 6.1.5 Notifications

In this release of this specification, there are no notifications defined for the Nnssf\_NSSelection 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 Nnssf service based interface protocol.

Table 6.1.6.1-1: Nnssf\_NSSelection specific Data Types

|  |  |  |
| --- | --- | --- |
| Data type | Clause defined | Description |
| AuthorizedNetworkSliceInfo | 6.1.6.2.2 | Contains the authorized network slice information. |
| SubscribedSnssai | 6.1.6.2.3 | Contains the subscribed S-NSSAI. |
| AllowedSnssai | 6.1.6.2.5 | Contains the authorized S-NSSAI and optional mapped home S-NSSAI and network slice instance information. |
| AllowedNssai | 6.1.6.2.6 | Contains an array of allowed S-NSSAI that constitute the Allowed NSSAI information for the authorized network slice information. |
| NsiInformation | 6.1.6.2.7 | Contains the API URIs of NRF services to be used to discover NFs/services, subscribe to NF status changes and/or request access tokens within the selected Network Slice instance and optional the Identifier of the selected Network Slice instance. |
| MappingOfSnssai | 6.1.6.2.8 | Contains the mapping of S-NSSAI in the serving network and the value of the home network. |
| SliceInfoForRegistration | 6.1.6.2.10 | Contains the slice information requested during a Registration procedure. |
| SliceInfoForPDUSession | 6.1.6.2.11 | Contains the slice information requested during PDU Session establishment procedure. |
| ConfiguredSnssai | 6.1.6.2.12 | Contains the configured S-NSSAI(s) authorized by the NSSF in the serving PLMN and optional mapped home S-NSSAI. |
| SliceInfoForUEConfigurationUpdate | 6.1.6.2.13 | Contains the slice information requested during UE configuration update procedure. |
| NsagInfo | 6.1.6.2.14 | Contains NSAG information. |
| NsiId | 6.1.6.3.2 | Contains the Identifier of the selected Network Slice instance. |
| RoamingIndication | 6.1.6.3.3 | Contains the indication on roaming. |

Table 6.1.6.1-2 specifies data types re-used by the Nnssf- 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 Nnssf service based interface.

Table 6.1.6.1-2: Nnssf re-used Data Types

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | | Reference | Comments | |
| SupportedFeatures | | 3GPP TS 29.571 [7] | Used to negotiate the applicability of the optional features defined in table 6.1.8-1. | |
| AccessType | | 3GPP TS 29.571 [7] | Used to specify the access type for which a slice information is applicable. | |
| NfServiceSetId | | 3GPP TS 29.571 [7] | NF Service Set Identifier | |
| RedirectResponse | | 3GPP TS 29.571 [7] |  | |
| NFType | 3GPP TS 29.510 [13] | | | Type of Network Function. |
| NsSrg | 3GPP TS 29.571 [7] | | | Network slice simultaneous registration groups |
| NsagId | 3GPP TS 29.571 [7] | | | Network Slice AS Group ID |
| TaiRange | 3GPP TS 29.510 [13] | | | Range of TAIs |
| Tai | 3GPP TS 29.571 [7] | | |  |
| Snssai | 3GPP TS 29.571 [7] | | |  |
| NfInstanceId | 3GPP TS 29.571 [7] | | |  |

#### 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: AuthorizedNetworkSliceInfo

Table 6.1.6.2.2-1: Definition of type AuthorizedNetworkSliceInfo

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| allowedNssaiList | array(AllowedNssai) | C | 1..N | This IE shall be included if:  - the NSSF received the Requested NSSAI and the subscribed S-NSSAI(s); or  - the "requestMapping" flag in the corresponding request was set to "true"; or  - if neither Requested NSSAI nor the mapping of Requested NSSAI was provided to the NSSF or none of the S-NSSAIs in the Requested NSSAI are permitted (provided that there is at least a subscribed S-NSSAI marked as default which is available in the current TA).  When present, this IE shall contain the allowed S-NSSAI(s) authorized by the NSSF in the serving PLMN per access type if the Requested NSSAI and the subscribed S-NSSAI(s) received, or this IE shall contain the mapping of S-NSSAI(s) of the VPLMN to corresponding HPLMN S-NSSAI(s) if requestMapping flag was set to "true".  NSSF may consider load level information of a Network Slice instance, provided by the NWDAF, to exclude slices that are overloaded. |  |
| configuredNssai | array(ConfiguredSnssai) | C | 1..N | This IE shall be included if:  - the NSSF did not receive any Requested NSSAI; or  - the Requested NSSAI includes an S-NSSAI that is not valid in the Serving PLMN; or  - the NSSF has received "defaultConfiguredSnssaiInd" set to "true"; or  - the network slice information is requested during UE configuration update procedure.  When present, this IE shall contain the configured S-NSSAI(s) authorized by the NSSF in the serving PLMN.  This IE shall not be included if the "requestMapping" IE was included in the request message and was set to "true".  NSSF may consider load level information of a Network Slice instance, provided by the NWDAF, to exclude slices that are overloaded. |  |
| targetAmfSet | string | O | 0..1 | This IE may be included by the NSSF based on configuration and if the NSSF received the Requested NSSAI and the subscribed S-NSSAI(s). When present, this IE shall contain the target AMF set which shall be constructed from PLMN-ID (i.e. three decimal digits MCC and two or three decimal digits MNC), AMF Region Id (8 bit), and AMF Set Id (10 bit).  This IE shall not be included if the "requestMapping" IE was included in the request message and was set to "true".  Pattern: '^[0-9]{3}-[0-9]{2,3}-[A-Fa-f0-9]{2}-[0-3][A-Fa-f0-9]{2}$'  (NOTE 1, NOTE 2, NOTE 3) |  |
| candidateAmfList | array(NfInstanceId) | O | 1..N | This IE may be included by the NSSF based on configuration and if the NSSF received the Requested NSSAI and the subscribed S-NSSAI(s). When present, this IE shall contain the list of candidate AMF(s).  This IE shall not be included if the "requestMapping" IE was included in the request message and was set to "true".  (NOTE 2, NOTE 3) |  |
| rejectedNssaiInPlmn | array(Snssai) | O | 1..N | This IE may be included by the NSSF if the NSSF received the Requested NSSAI and the subscribed S-NSSAI(s). When present, this IE shall contain the rejected NSSAI in the PLMN.  NSSF may consider load level information of a Network Slice instance, provided by the NWDAF, to exclude slices that are overloaded. Such slices may be included in this attribute. |  |
| rejectedNssaiInTa | array(Snssai) | O | 1..N | This IE may be included by the NSSF if the NSSF received the Requested NSSAI and the subscribed S-NSSAI(s). When present, this IE shall contain the rejected NSSAI in the current TA.  NSSF may consider load level information of a Network Slice instance, provided by the NWDAF, to exclude slices that are overloaded. Such slices may be included in this attribute. |  |
| nsiInformation | NsiInformation | C | 0..1 | This IE shall be included by the NSSF if the NSSF received the S-NSSAI (i.e. during PDU session establishment procedure in non-roaming or LBO roaming).  This IE shall also be included by the hNSSF and forwarded by the vNSSF if the hNSSF received the S-NSSAI (i.e. during PDU session establishment procedure in HR roaming).  This IE shall not be included if the "requestMapping" IE was included in the request message and was set to "true". |  |
| supportedFeatures | SupportedFeatures | C | 0..1 | This IE shall be present if at least one optional feature defined in clause 6.1.8 is supported. |  |
| nrfAmfSet | Uri | O | 0..1 | This IE may be included by the NSSF based on configuration and if the target AMF Set is included.  When present, this IE shall contain the API URI of the NRF NFDiscovery Service (see clause 6.2.1 of 3GPP TS 29.510 [13]) to be used to determine the list of candidate AMF(s) from the AMF Set.  (NOTE 2) |  |
| nrfAmfSetNfMgtUri | Uri | C | 0..1 | This IE should be present if the nrfAmfSet is present. When present, it shall contain the API URI of the NRF NFManagement Service (see clause 6.1.1 of 3GPP TS 29.510 [13]).  (NOTE 2) |  |
| nrfAmfSetAccessTokenUri | Uri | O | 0..1 | When present, this IE shall contain the API URI of the NRF Access Token Service (see clause 6.3.2 of 3GPP TS 29.510 [13]).  (NOTE 2) |  |
| nrfOauth2Required | map(boolean) | O | 1..N | This IE may be present if the nrfAmfSet IE or the nrfAmfSetNfMgtUri IE is present.  When present, this IE shall indicate whether the NRF requires Oauth2-based authorization for accessing its services.  The key of the map shall be the name of an NRF service, e.g. "nnrf-nfm" or "nnrf-disc".  The value of each entry of the map shall be encoded as follows:  - true: OAuth2 based authorization is required.  - false: OAuth2 based authorization is not required.  If this IE is present and set to true, then the nrfAmfSetAccessTokenUri IE shall be present and shall be used to request access token for NRF services.  The absence of this IE means that the NRF has not provided any indication about its usage of Oauth2 for authorization.  (NOTE 2) |  |
| targetAmfServiceSet | NfServiceSetId | O | 0..1 | When present, this IE shall contain the target AMF service set.  (NOTE 1, NOTE 2) |  |
| targetNssai | array(Snssai) | O | 1..N | This IE may be included by the NSSF if the NSSF received the Requested NSSAI and TAI, or the NSSF received the rejected NSSAI of current Registration Area.  When present, this IE shall contain S-NSSAI(s) as defined in clause 5.3.4.3.3 of 3GPP TS 23.501 [2]. | TargetNssai |
| nsagInfos | array(NsagInfo) | C | 1..N | This attribute shall be present if the AMF has indicated the support of NSAG by the UE, and the NSAG information is available to the NSSF.  This attribute contains the list of NSAG information. |  |
| NOTE 1: The NF Service Consumer uses the PLMN ID, AMF Region, AMF Set and AMF Service Set to perform a NF Discovery to the NRF.  NOTE 2: These attributes should be absent if the NSSF provides a Target NSSAI in targetNssai attribute in order to redirect or handover the UE to a cell of another TA as defined in clause 5.15.5.2.1 of 3GPP TS 23.501 [2].  NOTE 3: The targetAmfSet attribute and the candidateAmfList attribute should not be present simultaneously. | | | | | |

##### 6.1.6.2.3 Type: SubscribedSnssai

Table 6.1.6.2.3-1: Definition of type SubscribedSnssai

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| subscribedSnssai | Snssai | M | 1 | This IE shall contain the subscribed S-NSSAI. |
| defaultIndication | boolean | O | 0..1 | If it is set, the subscribed S-NSSAI is a default subscribed S-NSSAI. |
| subscribedNsSrgList | array(NsSrg) | O | 1..N | If present, this IE shall contain the subscribed network slice simultaneous registration groups applicable to the subscribedSnssai. |

##### 6.1.6.2.4 Void

##### 6.1.6.2.5 Type: AllowedSnssai

Table 6.1.6.2.5-1: Definition of type AllowedSnssai

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| allowedSnssai | Snssai | M | 1 | This IE shall contain the allowed S-NSSAI in the serving PLMN. |
| nsiInformationList | array(NsiInformation) | O | 1..N | This IE may be present when the NSSF provides the Allowed NSSAI information to the NF service consumer (e.g AMF). If present, this IE shall include the information related to the network slice instance corresponding to the allowed S-NSSAI. |
| mappedHomeSnssai | Snssai | O | 0..1 | When present, this IE shall contain the mapped S-NSSAI value of home network corresponding to the allowed S-NSSAI in the serving PLMN. |

##### 6.1.6.2.6 Type: AllowedNssai

Table 6.1.6.2.6-1: Definition of type AllowedNssai

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| allowedSnssaiList | array(AllowedSnssai) | M | 1..N | This IE shall contain the allowed S-NSSAI in the serving PLMN.  (NOTE) |
| accessType | AccessType | M | 1 | This IE shall contain the access type to which this Allowed NSSAI belongs. |
| NOTE: The maximum number of allowed S-NSSAIs shall not exceed the maximum number defined in 3GPP TS 24.501 [20]. | | | | |

##### 6.1.6.2.7 Type: NsiInformation

Table 6.1.6.2.7-1: Definition of type NsiInformation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| nrfId | Uri | M | 1 | This IE shall contain the API URI of the NRF NFDiscovery Service (see clause 6.2.1 of 3GPP TS 29.510 [13]) to be used to select the NFs/services within the selected Network Slice instance. |
| nsiId | NsiId | O | 0..1 | This IE may be optionally included by the NSSF. When present, this IE shall contain the Identifier of the selected Network Slice instance |
| nrfNfMgtUri | Uri | O | 0..1 | This IE should be present. When present, it shall contain the API URI of the NRF NFManagement Service (see clause 6.1.1 of 3GPP TS 29.510 [13]). |
| nrfAccessTokenUri | Uri | O | 0..1 | When present, this IE shall contain the API URI of the NRF Access Token Service (see clause 6.3.2 of 3GPP TS 29.510 [13]). |
| nrfOauth2Required | map(boolean) | O | 1..N | This IE may be present if the nrfId IE or the nrfNfMgtUri IE is present.  When present, this IE shall indicate whether the NRF requires Oauth2-based authorization for accessing its services.  The key of the map shall be the name of an NRF service, e.g. "nnrf-nfm" or "nnrf-disc".  The value of each entry of the map shall be encoded as follows:  - true: OAuth2 based authorization is required.  - false: OAuth2 based authorization is not required.  The absence of this IE means that the NRF has not provided any indication about its usage of Oauth2 for authorization. |

##### 6.1.6.2.8 Type: MappingOfSnssai

Table 6.1.6.2.8-1: Definition of type MappingOfSnssai

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| servingSnssai | Snssai | M | 1 | This IE shall contain the S-NSSAI value of serving network. |
| homeSnssai | Snssai | M | 1 | This IE shall contain the mapped S-NSSAI value of home network. |

##### 6.1.6.2.9 Void

##### 6.1.6.2.10 Type: SliceInfoForRegistration

Table 6.1.6.2.10-1: Definition of type SliceInfoForRegistration

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| subscribedNssai | array(SubscribedSnssai) | C | 1..N | This IE shall be included during the initial registration procedure or during mobility registration procedure in 5GS. This IE may also be included during EPS to 5GS handover procedure/Idle mode Mobility Registration Procedure using N26 interface or the handover procedure within 5GS. When present, this IE shall contain the list of subscribed S-NSSAIs along with an indication for each S-NSSAI if it is a default S-NSSAI. |
| allowedNssaiCurrentAccess | AllowedNssai | C | 0..1 | This IE shall be included during an initial registration procedure in 5GS or during mobility registration update procedure in 5GS with a native 5G-GUTI as the old GUTI, and an Allowed NSSAI for the current access type of the UE is available at the NF service consumer (e.g. AMF). |
| allowedNssaiOtherAccess | AllowedNssai | C | 0..1 | This IE shall be present during an initial registration procedure in 5GS or during mobility registration update procedure in 5GS with a native 5G-GUTI as the old GUTI, and if the UE was registered with the NF service consumer (e.g. AMF) earlier for another access type and an Allowed NSSAI for the other access type is available at the NF service consumer (e.g. AMF). |
| sNssaiForMapping | array(Snssai) | C | 1..N | This IE shall be included if the requestMapping IE is set to true. When included, this IE shall contain the set of S-NSSAIs obtained from PGW+SMF in the HPLMN for PDU sessions that are handed over from EPS to 5GS, or shall contain the set of HPLMN S-NSSAIs obtained from source AMF during handover procedure within 5GS, or shall contain the S-NSSAIs for the HPLMN received from the UE during EPS to 5GS Idle mode Mobility Registration Procedure using N26 interface/idle state mobility registration procedure in 5GS. |
| mappingOfNssai | array(MappingOfSnssai) | O | 1..N | This IE may be present when the network slice information is requested during the Registration procedure in roaming scenarios. If present, this IE shall contain the mapping of S-NSSAI of the VPLMN to corresponding HPLMN S-NSSAI, for the S-NSSAIs included in the requestedNssai and allowedNssai IEs for the current and other access types.  This IE may also be present when the network slice information is requested during EPS to 5GS handover procedure using N26 interface or the handover procedure within 5GS. If present, this IE shall contain the mapping of S-NSSAI of the VPLMN to corresponding HPLMN S-NSSAI, for the S-NSSAIs included in the requestedNssai IE. |
| requestedNssai | array(Snssai) | O | 1..N | This IE may contain the set of S-NSSAIs requested by the UE, it shall be the S-NSSAIs in hPLMN in non-roaming scenario, or the S-NSSAIs in vPLMN in LBO/HR roaming scenario.  During EPS to 5GS handover procedure using N26 interface, this IE may contain the set of S-NSSAIs in the serving PLMN obtained from PGW+SMF in VPLMN, or mapped from the set of S-NSSAIs obtained from PGW+SMF in the HPLMN.  During handover procedure within 5GS, this IE may contain the set of S-NSSAIs in the serving PLMN obtained from the source AMF, or mapped from the set of HPLMN S-NSSAIs obtained from source AMF. |
| defaultConfiguredSnssaiInd | boolean | C | 0..1 | This IE shall be present when the UE includes the Default Configured NSSAI Indication during the Registration procedure or if the AMF indicates the NSSF to return Configured NSSAI in case of the network slice subscription change indication (NSSCI) is received from UDM.  true: The Default Configured NSSAI is indicated by the UE and/or the AMF indicates the NSSF to return Configured NSSAI; false (default): The Default Configured NSSAI is not indicated by the UE and the AMF does not indicate the NSSF to return Configured NSSAI. |
| requestMapping | boolean | O | 0..1 | This IE may be present when the Nnssf\_NSSelection\_Get procedure is invoked during EPS to 5GS Mobility Registration Procedure (Idle State) using N26 interface or during EPS to 5GS handover procedure using N26 interface.  This IE may also be present when Nnssf\_NSSelection\_Get procedure is invoked during idle state Mobility Registration Procedure or handover procedure in 5GS.  When present this IE shall indicate to the NSSF that the NSSF shall return the VPLMN specific mapped SNSSAI values for the S-NSSAI values in the sNssaiForMapping IE. |
| ueSupNssrgInd | boolean | C | 0..1 | This IE shall be present in the request towards an NSSF in the serving PLMN when UE has indicated the support of NSSRG feature. When present, this IE shall contain the indication of UE support of subscription-based restrictions to simultaneous registration of network slice feature.  This IE shall be set as follows:  - true: the UE supports NSSRG feature  - false: the UE does not support NSSRG feature. |
| suppressNssrgInd | boolean | O | 0..1 | When present, this IE shall contain the UDM indication to provide all subscribed S-NSSAIs for UEs not indicating support of subscription-based restrictions to simultaneous registration of network slices. This IE may be present and set to true if the ueSupNssrgInd is set to false.  This IE shall be set as follows:  - true: UDM Indication to suppress NSSRG is present and set to TRUE  - false: UDM Indication to suppress NSSRG is set to FALSE or not present |
| nsagSupported | boolean | C | 0..1 | This IE shall be present if the UE has indicated support of NSAG in the 5GMM procedure.  true: the UE supports NSAG.  false (default): the UE does not support NSAG. |

##### 6.1.6.2.11 Type: SliceInfoForPDUSession

Table 6.1.6.2.11-1: Definition of type SliceInfoForPDUSession

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| sNssai | Snssai | M | 1 | This IE shall contain the requested S-NSSAI for the PDU session, when the AMF queries the NSSF in the serving PLMN. When the vNSSF queries the hNSSF during PDU session establishment for home routed roaming case, this IE shall contain the S-NSSAI from the HPLMN that maps to the S-NSSAI from the Allowed NSSAI of the Serving PLMN, as obtained from the NF Service Consumer of the vNSSF. |
| roamingIndication | RoamingIndication | M | 1 | This IE shall contain the indication whether the UE is in non-roaming, LBO roaming or HR roaming. |
| homeSnssai | Snssai | C | 0..1 | This IE shall be included by the NF Service Consumer (e.g. AMF) towards the vNSSF during PDU session establishment procedure in home routed roaming scenario. This IE shall contain the S-NSSAI of the HPLMN that maps to the S-NSSAI from the Allowed NSSAI of the Serving PLMN when the UE in the roaming scenario. |

##### 6.1.6.2.12 Type: ConfiguredSnssai

Table 6.1.6.2.12-1: Definition of type ConfiguredSNssai

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| configuredSnssai | Snssai | M | 1 | This IE shall contain the configured S-NSSAI in the serving PLMN. |
| mappedHomeSnssai | Snssai | O | 0..1 | When present, this IE shall contain the mapped S-NSSAI value of home network corresponding to the configured S-NSSAI in the serving PLMN. |

##### 6.1.6.2.13 Type: SliceInfoForUEConfigurationUpdate

Table 6.1.6.2.13-1: Definition of type SliceInfoForUEConfigurationUpdate

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| subscribedNssai | array(SubscribedSnssai) | C | 1..N | This IE shall be included during UE configuration update procedure in 5GS. When present, this IE shall contain the list of subscribed S-NSSAIs along with an indication for each S-NSSAI if it is a default S-NSSAI. |  |
| allowedNssaiCurrentAccess | AllowedNssai | O | 0..1 | This IE may be included during UE configuration update procedure in 5GS. When present, this IE shall contain the list of allowed S-NSSAIs in the AMF for the current access type of the UE. |  |
| allowedNssaiOtherAccess | AllowedNssai | O | 0..1 | This IE may be included during UE configuration update procedure in 5GS. When present, this IE shall contain the list of allowed S-NSSAIs in the AMF for the other access type of the UE. |  |
| defaultConfiguredSnssaiInd | boolean | O | 0..1 | This IE may be present if the UE included the Default Configured NSSAI Indication during the recent Registration procedure. |  |
| requestedNssai | array(Snssai) | O | 1..N | This IE may contain the set of S-NSSAIs requested by the UE in the recent registration procedure, it shall be the S-NSSAIs in hPLMN in non-roaming scenario, or the S-NSSAIs in vPLMN in LBO/HR roaming scenario. |  |
| mappingOfNssai | array(MappingOfSnssai) | O | 1..N | This IE may be present when the network slice information is requested during UE configuration update procedure in roaming scenarios. If present, this IE shall contain the mapping of S-NSSAI of the VPLMN to corresponding HPLMN S-NSSAI, for the S-NSSAIs included in the requestedNssai and the allowedNssai IEs for the current and other access types. |  |
| ueSupNssrgInd | boolean | C | 0..1 | This IE shall be present in the request towards an NSSF in the serving PLMN when UE has indicated the support of NSSRG feature. When present, this IE shall contain the indication of UE support of subscription-based restrictions to simultaneous registration of network slice feature.  This IE shall be set as follows:  - true: the UE supports NSSRG feature  - false: the UE does not support NSSRG feature. |  |
| suppressNssrgInd | boolean | O | 0..1 | When present, this IE shall contain the UDM indication to provide all subscribed S-NSSAIs for UEs not indicating support of subscription-based restrictions to simultaneous registration of network slices. This IE may be present and set to true if the ueSupNssrgInd is set to false.  This IE shall be set as follows:  - true: UDM Indication to suppress NSSRG is present and set to TRUE  - false: UDM Indication to suppress NSSRG is set to FALSE or not present |  |
| rejectedNssaiRa | array(Snssai) | O | 1..N | This IE may be present when the UE is needed to be redirected to the dedicated frequency band(s) for an S-NSSAI (as specified in clause 5.3.4.3.3 of 3GPP TS 23.501 [2]).  When present, this IE shall indicate the rejected S-NSSAI(s) of the Registration Area. | TargetNssai |
| nsagSupported | boolean | C | 0..1 | This IE shall be present if the UE has indicated support of NSAG in the 5GMM procedure.  true: the UE supports NSAG.  false (default): the UE does not support NSAG. |  |

##### 6.1.6.2.14 Type: NsagInfo

Table 6.1.6.2.14-1: Definition of type NsagInfo

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| nsagIds | array(NsagId) | M | 1..N | The list of NSAG IDs, see 3GPP TS 38.413 [21] |
| snssaiList | array(Snssai) | M | 1..N | This attribute contains the S-NSSAI(s) which are associated with the NSAGs identified by the nsagIds. |
| taiList | array(Tai) | O | 1..N | This attribute indicates the TA(s) within which the association between the NSAGs identified by the nsagIds and the S-NSSAI(s) is valid.  (NOTE) |
| taiRangeList | array(TaiRange) | O | 1..N | This attribute indicates the TA(s) within which the association between the NSAGs identified by the nsagIds and the S-NSSAI(s) is valid.  (NOTE) |
| NOTE: The absence of both taiList and taiRangeList attributes means the association between the NSAGs identified by the nsagIds and the S-NSSAI(s) is valid across the PLMN | | | | |

#### 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 |
| NsiId | string | Represents the Network Slice Instance Identifier |

##### 6.1.6.3.3 Enumeration: RoamingIndication

Table 6.1.6.3.3-1: Enumeration RoamingIndication

|  |  |
| --- | --- |
| Enumeration value | Description |
| NON\_ROAMING | This value indicates that the UE is not roaming. |
| LOCAL\_BREAKOUT | This value indicates that the UE is roaming but is using a local breakout PDU session. |
| HOME\_ROUTED\_ROAMING | This value indicates that the UE is roaming and is using a home routed PDU session. |

#### 6.1.6.4 Binary data

There is no binary data used for the Nnssf\_NSSelection service in this version of the API.

### 6.1.7 Error Handling

#### 6.1.7.1 General

HTTP error handling shall be supported as specified in clause 5.2.4 of 3GPP TS 29.500 [4].

#### 6.1.7.2 Protocol Errors

Protocol Error Handling shall be supported as specified in clause 5.2.7.2 of 3GPP TS 29.500 [4].

#### 6.1.7.3 Application Errors

The common application errors defined in the Table 5.2.7.2-1 in 3GPP TS 29.500 [4] may also be used for the Nnssf\_NSSelection service. The following application errors listed in Table 6.1.7.3-1 are specific for the Nnssf\_NSSelection service.

Table 6.1.7.3-1: Application errors

|  |  |  |
| --- | --- | --- |
| Application Error | HTTP status code | Description |
| SNSSAI\_NOT\_SUPPORTED | 403 Forbidden | This cause value shall be set when the requested slice selection information is for SNSSAI(s) not supported. |
| NOT\_AUTHORIZED | 403 Forbidden | The request is rejected due to the NF service consumer is not authorized to retrieve the slice selection information. |

### 6.1.8 Feature negotiation

The feature negotiation mechanism specified in clause 6.6 of 3GPP TS 29.500 [4] shall be used to negotiate the optional features applicable between the NSSF and the NF Service Consumer, for the Nnssf\_NSSelection service, if any.

The NF Service Consumer shall indicate the optional features it supports for the Nnssf\_NSSelection service, if any, by including the supportedFeatures attribute in the HTTP GET request when requesting the NSSF to provide the Allowed NSSAI information.

The NSSF shall determine the supported features for the requested network slice information resource as specified in clause 6.6 of 3GPP TS 29.500 [4] and shall indicate the supported features by including the supportedFeatures attribute in the Allowed NSSAI information it returns in the HTTP response.

The syntax of the supportedFeatures attribute is defined in clause 5.2.2 of 3GPP TS 29.571 [7].

The following features are defined for the Nnssf\_NSSelection service.

Table 6.1.8-1: Features of supportedFeatures attribute used by Nnssf\_NSSelection service

|  |  |  |  |
| --- | --- | --- | --- |
| Feature Number | Feature | M/O | Description |
| 1 | ES3XX | M | Extended Support of HTTP 307/308 redirection  An NF Service Consumer (e.g. AMF) that supports this feature shall support handling of HTTP 307/308 redirection for any service operation of the Nnssf\_NSSelection service. An NF Service Consumer that does not support this feature does only support HTTP redirection as specified for 3GPP Release 15. |
| 2 | TargetNssai | O | Target NSSAI  An NF Service Consumer (e.g. AMF) and NSSF that supports this feature shall support handling of Target NSSAI as specified in clause 5.3.4.3.3 and clause 5.15.5.2.1 of 3GPP TS 23.501 [2]. |
| Feature number: The order number of the feature within the supportedFeatures attribute (starting with 1).  Feature: A short name that can be used to refer to the bit and to the feature.  M/O: Defines if the implementation of the feature is mandatory ("M") or optional ("O").  Description: A clear textual description of the feature. | | | |

### 6.1.9 Security

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

The Nnssf\_NSSelection API does not define any scopes for OAuth2 authorization.

### 6.1.10 HTTP redirection

An HTTP request may be redirected to a different NSSF service instance, within the same NSSF or a different NSSF of an NSSF set, e.g. when an NSSF service instance is part of an NSSF (service) set or when using indirect communications (see 3GPP TS 29.500 [4]). See the ES3XX feature in clause 6.1.8.

An SCP that reselects a different NSSF producer instance will return the NF Instance ID of the new NSSF 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 NSSF within an NSSF set redirects a service request to a different NSSF of the set using a 307 Temporary Redirect or 308 Permanent Redirect status code, the identity of the new NSSF 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 Nnssf\_NSSAIAvailability Service API

### 6.2.1 API URI

The Nnssf\_NSSAIAvailability service shall use the Nnssf\_ NSSAIAvailability API.

The API URI of the Nnssf\_NSSAIAvailability API shall be:

**{apiRoot}/nnssf-** **nssaiavailability/<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}/nnssf-** **nssaiavailability/<apiVersion>/<apiSpecificResourceUriPart>**

with the following components:

- The {apiRoot} shall be set as described in 3GPP TS 29.501 [5].

- 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 [10], shall be used as specified in clause 5 of 3GPP TS 29.500 [4].

An OpenAPI [6] specification of HTTP messages and content bodies for the Nnssf\_NSSAIAvailability service is specified in Annex A.

#### 6.2.2.2 HTTP standard headers

##### 6.2.2.2.1 General

See clause 5.2.2 of 3GPP TS 29.500 [4] for the usage of HTTP standard headers.

##### 6.2.2.2.2 Content type

The JSON format shall be supported. The use of JSON format shall be as specified in clause 5.4 of 3GPP TS 29.500 [4].

The following content types shall be supported:

- JSON, as defined in IETF RFC 8259 [14], shall be used as content type of the HTTP bodies specified in the present specification as indicated in clause 5.4 of 3GPP TS 29.500 [4].

- The Problem Details JSON Object (IETF RFC 9457 [15]). The use of the Problem Details JSON object in a HTTP response body shall be signalled by the content type "application/problem+json".

- JSON Patch (IETF RFC 6902 [8]). The use of the JSON Patch format in a HTTP request body shall be signalled by the content type "application/json-patch+json".

##### 6.2.2.2.3 Accept-Encoding

The NSSF should support gzip coding (see IETF RFC 1952 [16]) in HTTP requests and responses and indicate so in the Accept-Encoding header, as described in clause 6.9 of 3GPP TS 29.500 [4].

#### 6.2.2.3 HTTP custom headers

##### 6.2.2.3.1 General

In this release of this specification, no custom headers specific to the Nnssf\_NSSAIAvailability service are defined. For 3GPP specific HTTP custom headers used across all service based interfaces, see clause 5.2.3 of 3GPP TS 29.500 [4].

### 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 Nnssf\_NSSAIAvailability API.



Figure 6.2.3.1-1: Resource URI structure of the Nnssf\_NSSAIAvailability 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 |
| NSSAI Availability Store | /nssai-availability | OPTIONS | Discover the communication options supported by the NSSF for this resource. |
| NSSAI Availability Document | /nssai-availability/{nfId} | PUT | Updates the NSSF with the S-NSSAIs the NF service consumer (e.g. AMF) supports per TA. |
| PATCH | Updates the NSSF with the S-NSSAIs the NF service consumer (e.g. AMF) supports per TA. |
| DELETE | Delete the resource of the S-NSSAIs supported per TA by the NF service consumer (e.g. AMF) |
| NSSAI Availability Notification Subscriptions Collection | /nssai-availability/subscriptions | POST | Create a subscription to the notification of any changes to the NSSAI availability information, Network Slice Replacement or Network Slice Instance Replacement. |
| Individual NSSAI Availability Notification Subscriptions | /nssai-availability/subscriptions/{subscriptionId} | DELETE | Unsubscribe to the notification of any changes to the NSSAI availability information, Network Slice Replacement or Network Slice Instance Replacement. |
| PATCH | Modify a subscription. |

#### 6.2.3.2 Resource: NSSAI Availability Document

##### 6.2.3.2.1 Description

This resource represents a single NSSAI Availability resource.

This resource is modelled with the Document resource archetype (see clause C.1 of 3GPP TS 29.501 [5]).

##### 6.2.3.2.2 Resource Definition

Resource URI: {apiRoot}/nnssf-nssaiavailability/<apiVersion>/nssai-availability/{nfId}

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 |
| nfId | NfInstanceId | Represents the Identifier of the AMF for which the NSSAI Availability information is updated. |

##### 6.2.3.2.3 Resource Standard Methods

6.2.3.2.3.1 PUT

This method shall support the request data structures specified in table 6.2.3.2.3.1-1 and the response data structures and response codes specified in table 6.2.3.2.3.1-2.

Table 6.2.3.2.3.1-1: Data structures supported by the PUT Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| NssaiAvailabilityInfo | M | 1 | This IE contains the information regarding the NssaiAvailabilityData for the NF Service Consumer (e.g AMF). |

Table 6.2.3.2.3.1-2: Data structures supported by the PUT Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| AuthorizedNssaiAvailabilityInfo | M | 1 | 200 OK | This case represents a successful update of the NSSF with the S-NSSAIs the AMF supports per TA.  The authorized NSSAI availability (i.e. S-NSSAIs available per TA (unrestricted) and any S-NSSAIs restricted per PLMN in that TA in the serving PLMN of the UE) information shall be returned in the response content. |
| N/A |  |  | 204 No Content | This case represents a successful update of the NSSF with the S-NSSAIs the AMF supports per TA, and the authorized NSSAI availability is empty after the update. |
| 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 | When the NF service consumer is not authorized to update the NSSAI availability information or the TAI/S-NSSAI information provided is not supported in the PLMN, the "cause" attribute shall be set to:  - SNSSAI\_NOT\_SUPPORTED, if the S-NSSAI provided is not supported in the PLMN.  - NOT\_AUTHORIZED, if the NF service consumer identified by the NF Id is not authorized to update the NSSAI availability information.  See table 6.2.7.3-1 for the description of this error. |
| NOTE 1: The mandatory HTTP error status codes for the PUT method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] other than those specified in the table above also apply, with a ProblemDetails data type (see clause 5.2.7 of 3GPP TS 29.500 [4]).  NOTE 2: RedirectResponse may be inserted by an SCP, see clause 6.10.9.1 of 3GPP TS 29.500 [4]. | | | | |

Table 6.2.3.2.3.1-3: Headers supported by the PUT method on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Content-Encoding | string | O | 0..1 | Content-Encoding, described in IETF RFC 9110 [18] |

Table 6.2.3.2.3.1-4: Headers supported by the 200 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Accept-Encoding | string | O | 0..1 | Accept-Encoding, described in IETF RFC 9110 [18] |

Table 6.2.3.2.3.1-5: 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 NSSF or NSSF (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 NF (service) instance ID towards which the request is redirected |

Table 6.2.3.2.3.1-6: 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 NSSF or NSSF (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 NF (service) instance ID towards which the request is redirected |

6.2.3.2.3.2 PATCH

This method shall support the request data structures specified in table 6.2.3.2.3.2-1 and the response data structures and response codes specified in table 6.2.3.2.3.2-2.

Table 6.2.3.2.3.2-1: Data structures supported by the PATCH Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| PatchDocument | M | 1 | This IE contains the information regarding the JSON patch instructions for updating the supportedSnssai(s) in NssaiAvailabilityInfo. |

Table 6.2.3.2.3.2-2: Data structures supported by the PATCH Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| AuthorizedNssaiAvailabilityInfo | M | 1 | 200 OK | This case represents a successful update of the NSSF with the S-NSSAIs the AMF supports per TA.  If the authorized NSSAI availability (i.e. S-NSSAIs available per TA (unrestricted) and any S-NSSAIs restricted per PLMN in that TA in the serving PLMN of the UE) is changed, the NSSF shall return a data structure of type "AuthorizedNssaiAvailabilityInfo" in the response payload body. |
| N/A |  |  | 204 No Content | This case represents a successful update of the NSSF with the S-NSSAIs the AMF supports per TA, and the authorized NSSAI availability is empty after the update. |
| 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 | When the NF service consumer is not authorized to update the NSSAI availability information or the S-NSSAI information provided is not supported in the PLMN, the "cause" attribute shall be set to:  - SNSSAI\_NOT\_SUPPORTED, if the S-NSSAI provided is not supported in the PLMN.  - NOT\_AUTHORIZED, if the NF service consumer identified by the NF Id is not authorized to update the NSSAI availability information.  See table 6.2.7.3-1 for the description of this error. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application error:  - RESOURCE\_NOT\_FOUND  See table 6.2.7.3-1 for the description of this error. |
| NOTE 1: The mandatory HTTP error status codes for the PATCH method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] other than those specified in the table above also apply, with a ProblemDetails data type (see clause 5.2.7 of 3GPP TS 29.500 [4]).  NOTE 2: RedirectResponse may be inserted by an SCP, see clause 6.10.9.1 of 3GPP TS 29.500 [4]. | | | | |

Table 6.2.3.2.3.2-3: 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 NSSF or NSSF (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 NF (service) instance ID towards which the request is redirected |

Table 6.2.3.2.3.2-4: 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 NSSF or NSSF (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 NF (service) instance ID towards which the request is redirected |

6.2.3.2.3.3 DELETE

This method shall support the request data structures specified in table 6.2.3.2.3.3-1 and the response data structures and response codes specified in table 6.2.3.2.3.3-2.

Table 6.2.3.2.3.3-1: Data structures supported by the DELETE Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| n/a |  |  |  |

Table 6.2.3.2.3.3-2: Data structures supported by the DELETE Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| n/a |  |  | 204 No Content |  |
| 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 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application error:  - RESOURCE\_NOT\_FOUND  See table 6.2.7.3-1 for the description of this error. |
| NOTE 1: The mandatory HTTP error status codes for the DELETE method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] other than those specified in the table above also apply, with a ProblemDetails data type (see clause 5.2.7 of 3GPP TS 29.500 [4]).  NOTE 2: RedirectResponse may be inserted by an SCP, see clause 6.10.9.1 of 3GPP TS 29.500 [4]. | | | | |

Table 6.2.3.2.3.3-3: 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 NSSF or NSSF (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 NF (service) instance ID towards which the request is redirected |

Table 6.2.3.2.3.3-4: 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 NSSF or NSSF (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 NF (service) instance ID towards which the request is redirected |

#### 6.2.3.3 Resource: NSSAI Availability Notification Subscriptions Collection

##### 6.2.3.3.1 Description

This resource represents the collection of NSSAI Availability Notification Subscriptions in the NSSF.

This resource is modelled with the Collection resource archetype (see clause C.2 of 3GPP TS 29.501 [5]).

##### 6.2.3.3.2 Resource Definition

Resource URI: {apiRoot}/nnssf-nssaiavailability/<apiVersion>/nssai-availability/subscriptions

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

Table 6.2.3.3.2-1: Resource URI variables for this resource

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

##### 6.2.3.3.3 Resource Standard Methods

6.2.3.3.3.1 POST

This method shall support the request data structures specified in table 6.2.3.3.3.1-1 and the response data structures and response codes specified in table 6.2.3.3.3.1-2.

Table 6.2.3.3.3.1-1: Data structures supported by the POST Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| NssfEventSubscriptionCreateData | M | 1 | This IE contains the information of an NSSF Event Subscription to be created. |

Table 6.2.3.3.3.1-2: Data structures supported by the POST Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| NssfEventSubscriptionCreatedData | M | 1 | 201 Created | This case represents a successful creation of an NSSF Event subscription. |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection. The response shall include a Location header field containing a different URI, or the same URI if this is a redirection triggered by an SCP to the same target resource via another SCP. In the former case, the URI shall be an alternative URI of the resource located on an alternative service instance within the same NSSF or NSSF (service) set.  (NOTE 2) |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection. The response shall include a Location header field containing a different URI, or the same URI if this is a redirection triggered by an SCP to the same target resource via another SCP. In the former case, the URI shall be an alternative URI of the resource located on an alternative service instance within the same NSSF or NSSF (service) set.  (NOTE 2) |
| ProblemDetails | O | 0..1 | 403 Forbidden | The "cause" attribute may be used to indicate one of the following application error:  - NOT\_AUTHORIZED  See table 6.2.7.3-1 for the description of these errors. |
| NOTE 1: The mandatory HTTP error status codes for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] other than those specified in the table above also apply, with a ProblemDetails data type (see clause 5.2.7 of 3GPP TS 29.500 [4]).  NOTE 2: RedirectResponse may be inserted by an SCP, see clause 6.10.9.1 of 3GPP TS 29.500 [4]. | | | | |

Table 6.2.3.3.3.1-3: 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}/nnssf-nssaiavailability/<apiVersion>/nssai-availability/subscriptions/{subscriptionId} |

Table 6.2.3.3.3.1-4: Headers supported by the 307 Response Code on this resource

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

Table 6.2.3.3.3.1-5: Headers supported by the 308 Response Code on this resource

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

#### 6.2.3.4 Resource: Individual NSSAI Availability Notification Subscriptions

##### 6.2.3.4.1 Description

This resource represents an Individual NSSAI Availability Notification Subscriptions resources generated by the NSSF.

This resource is modelled with the Document resource archetype (see clause C.1 of 3GPP TS 29.501 [5]).

##### 6.2.3.4.2 Resource Definition

Resource URI: {apiRoot}/nnssf-nssaiavailability/{apiVersion}/nssai-availability/subscriptions/{subscriptionId}

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

Table 6.2.3.4.2-1: Resource URI variables for this resource

|  |  |  |
| --- | --- | --- |
| Name | Data type | Definition |
| apiRoot | string | See clause 6.2.1 |
| subscriptionId | string | Represents the Identifier of the subscription. |

##### 6.2.3.4.3 Resource Standard Methods

6.2.3.4.3.1 DELETE

This method shall support the request data structures specified in table 6.2.3.4.3.1-1 and the response data structures and response codes specified in table 6.2.3.4.3.1-2.

Table 6.2.3.4.3.1-1: Data structures supported by the DELETE Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| N/A |  |  |  |

Table 6.2.3.4.3.1-2: Data structures supported by the DELETE Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| N/A |  |  | 204 No Content | This case represents a successful deletion of the subscription. |
| 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 | 404 Not Found | This represents the case when the subscription resource is unavailable. |
| NOTE 1: The mandatory HTTP error status codes for the DELETE method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] other than those specified in the table above also apply, with a ProblemDetails data type (see clause 5.2.7 of 3GPP TS 29.500 [4]).  NOTE 2: RedirectResponse may be inserted by an SCP, see clause 6.10.9.1 of 3GPP TS 29.500 [4]. | | | | |

Table 6.2.3.4.3.1-3: 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 NSSF or NSSF (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 NF (service) instance ID towards which the request is redirected |

Table 6.2.3.4.3.1-4: 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 NSSF or NSSF (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 NF (service) instance ID towards which the request is redirected |

6.2.3.4.3.2 PATCH

This method shall support the request data structures specified in table 6.2.3.4.3.2-1 and the response data structures and response codes specified in table 6.2.3.4.3.2-2.

Table 6.2.3.4.3.2-1: Data structures supported by the PATCH Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| PatchDocument | M | 1 | This IE contains the information regarding the JSON patch instructions for updating the NssfEventSubscriptionCreateData. |

Table 6.2.3.4.3.2-2: Data structures supported by the PATCH Response Body on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| NssfEventSubscriptionCreatedData | M | 1 | 200 OK | This case represents a successful update of the subscription. |
| 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 | 404 Not Found | Indicates the modification of subscription has failed due to application error.  The "cause" attribute may be used to indicate one of the following application errors:  - SUBSCRIPTION\_NOT\_FOUND. |
| NOTE 1: The mandatory HTTP error status codes for the PATCH method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] other than those specified in the table above also apply, with a ProblemDetails data type (see clause 5.2.7 of 3GPP TS 29.500 [4]).  NOTE 2: RedirectResponse may be inserted by an SCP, see clause 6.10.9.1 of 3GPP TS 29.500 [4]. | | | | |

Table 6.2.3.4.3.2-3: 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 NSSF or NSSF (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 NF (service) instance ID towards which the request is redirected |

Table 6.2.3.4.3.2-4: 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 NSSF or NSSF (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 NF (service) instance ID towards which the request is redirected |

#### 6.2.3.5 Resource: NSSAI Availability Store

##### 6.2.3.5.1 Description

This resource represents a collection of NSSAI Availability resources.

This resource is modelled with the Store resource archetype (see clause C.1 of 3GPP TS 29.501 [5]).

##### 6.2.3.5.2 Resource Definition

Resource URI: {apiRoot}/nnssf-nssaiavailability/<apiVersion>/nssai-availability

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

Table 6.2.3.5.2-1: Resource URI variables for this resource

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

##### 6.2.3.5.3 Resource Standard Methods

6.2.3.5.3.1 OPTIONS

This method queries the communication options supported by the NSSF (see clause 6.9 of 3GPP TS 29.500 [4]). This method shall support the URI query parameters specified in table 6.1.3.5.3.1-1.

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| n/a |  |  |  |  |

This method shall support the request data structures specified in table 6.2.3.5.3.1-2 and the response data structures and response codes specified in table 6.2.3.5.3.2-3.

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

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| n/a |  |  |  |

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data type | P | Cardinality | Response  codes | Description |
| n/a |  |  | 200 OK |  |
| 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 | 405 Method Not Allowed |  |
| ProblemDetails | O | 0..1 | 501 Not Implemented |  |
| NOTE 1: The mandatory HTTP error status codes for the OPTIONS method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] other than those specified in the table above also apply, with a ProblemDetails data type (see clause 5.2.7 of 3GPP TS 29.500 [4]).  NOTE 2: RedirectResponse may be inserted by an SCP, see clause 6.10.9.1 of 3GPP TS 29.500 [4]. | | | | |

Table 6.2.3.5.3.1-4: Headers supported by the 200 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Accept-Encoding | string | O | 0..1 | Accept-Encoding, described in IETF RFC 9110 [18] |

Table 6.2.3.5.3.1-5: 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 NSSF or NSSF (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 NF (service) instance ID towards which the request is redirected |

Table 6.2.3.5.3.1-6: 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 NSSF or NSSF (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 NF (service) instance ID towards which the request is redirected |

### 6.2.4 Custom Operations without associated resources

There are no custom operations without associated resources for the Nnssf\_NSSAIAvailability service in this version of the API.

### 6.2.5 Notifications

#### 6.2.5.1 General

This clause specifies the notifications provided by the Nnssf\_NSSAIAvailability service.

Table 6.2.5.1-1: Notifications overview

|  |  |  |  |
| --- | --- | --- | --- |
| Notification | Callback URI | HTTP method or custom operation | Description  (service operation) |
| NSSAI Availability Notification | {nfNssaiAvailabilityUri} | POST |  |

#### 6.2.5.2 NSSAI Availability Notification

##### 6.2.5.2.1 Description

If the NF Service Consumer (e.g. AMF or V-NSSF) has provided the callback URI for getting notified about the NSSAI availability information, Network Slice Replacement or Network Slice Instance Replacement, the NSSF shall notify the NF Service Consumer whenever the NSSAI availability information, Network Slice Replacement or Network Slice Instance Replacement is updated.

##### 6.2.5.2.2 Notification Definition

Callback URI: {nfNssaiAvailabilityUri}

This callback URI is provided by the NF Service Consumer (e.g. AMF or V-NSSF) during subscription creation invoked by the NF Service Consumer.

Table 6.2.5.2.2-1: Resources and methods overview

|  |  |  |  |
| --- | --- | --- | --- |
| Resource name | Callback URI | HTTP method or custom operation | Description |
| NSSAI Availability Notification Callback | {nfNssaiAvailabilityUri} | POST | The NSSF uses this callback URI to Update the AMF with any S-NSSAIs restricted per TA in the serving PLMN of the UE or to notify the Network Slice Replacement or Network Slice Instance Replacement event. |

##### 6.2.5.2.3 Notification Standard Methods

6.2.5.2.3.1 POST

This method shall support the request data structures specified in table 6.2.5.2.3.1-1 and the response data structures and response codes specified in table 6.2.5.2.3.1-2.

Table 6.2.5.2.3.1-1: Data structures supported by the POST Request Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | P | Cardinality | Description |
| NssfEventNotification | M | 1 | Representation of the data to be sent to the NF service consumer (e.g. AMF or V-NSSF). |

Table 6.2.5.2.3.1-2: 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 a successful handling of notification in the NF service consumer (e.g. AMF or V-NSSF). |
| RedirectResponse | O | 0..1 | 307 Temporary Redirect | Temporary redirection. In the former case, the URI shall be an URI pointing to the endpoint of another NF service consumer to which the notification should be sent.  (NOTE 2) |
| RedirectResponse | O | 0..1 | 308 Permanent Redirect | Permanent redirection. In the former case, the URI shall be an URI pointing to the endpoint of another NF service consumer to which the notification should be sent.  (NOTE 2) |
| ProblemDetails | O | 0..1 | 400 Bad Request | The "cause" attribute may be used to indicate one of the following application errors:  - RESOURCE\_CONTEXT\_NOT\_FOUND  See table 6.2.7.3-1 for the description of this error. |
| ProblemDetails | O | 0..1 | 404 Not Found | The "cause" attribute may be used to indicate one of the following application errors:  - RESOURCE\_URI\_STRUCTURE\_NOT\_FOUND  See table 6.2.7.3-1 for the description of this error. |
| NOTE 1: The mandatory HTTP error status codes for the POST method listed in Table 5.2.7.1-1 of 3GPP TS 29.500 [4] other than those specified in the table above also apply, with a ProblemDetails data type (see clause 5.2.7 of 3GPP TS 29.500 [4]).  NOTE 2: RedirectResponse may be inserted by an SCP, see clause 6.10.9.1 of 3GPP TS 29.500 [4]. | | | | |

Table 6.2.5.2.3.1-3: Headers supported by the 307 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | A URI pointing to the endpoint of another NF service consumer to which the notification should be sent.  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 NF (service) instance ID towards which the request is redirected |

Table 6.2.5.2.3.1-4: Headers supported by the 308 Response Code on this resource

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Data type | P | Cardinality | Description |
| Location | string | M | 1 | A URI pointing to the endpoint of another NF service consumer to which the notification should be sent.  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 NF (service) instance ID towards which the request is redirected |

### 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 Nnssf\_NSSAIAvailability service based interface protocol.

Table 6.2.6.1-1: Nnssf\_NSSAIAvailability specific Data Types

|  |  |  |
| --- | --- | --- |
| Data type | Clause defined | Description |
| NssaiAvailabilityInfo | 6.2.6.2.2 | This contains the Nssai availability information requested by the AMF. |
| SupportedNssaiAvailabilityData | 6.2.6.2.3 | This contains the Nssai availability data information per TA supported by the AMF. |
| AuthorizedNssaiAvailabilityData | 6.2.6.2.4 | This contains the Nssai availability data information per TA authorized by the NSSF |
| RestrictedSnssai | 6.2.6.2.5 | This contains the restricted SNssai information per PLMN. |
| AuthorizedNssaiAvailabilityInfo | 6.2.6.2.6 | This contains the Nssai availability data information authorized by the NSSF |
| PatchDocument | 6.2.6.2.7 | This contains the JSON Patch instructions for updating the subscription at the NSSF. |
| NssfEventSubscriptionCreateData | 6.2.6.2.8 | This contains the information for event subscription. |
| NssfEventSubscriptionCreatedData | 6.2.6.2.9 | This contains the information for created event subscription. |
| NssfEventNotification | 6.2.6.2.10 | This contains the notification for created event subscription. |
| SnssaiReplacementSubscribeInfo | 6.2.6.2.11 | This contains the input requirements for Network Slice Replacement event subscription. |
| NsiUnavailabilitySubscribeInfo | 6.2.6.2.12 | This contains the input requirements for Network Slice Instance Replacement event subscription. |
| NssfEventType | 6.2.6.3.3 | This contains the event for the subscription. |

Table 6.2.6.1-2 specifies data types re-used by the Nnssf service based interface protocol from other specifications.

Table 6.2.6.1-2: Nnssf re-used Data Types

|  |  |  |
| --- | --- | --- |
| Data type | Reference | Comments |
| SupportedFeatures | 3GPP TS 29.571 [7] | Used to negotiate the applicability of the optional features defined in table 6.2.8-1. |
| Snssai | 3GPP TS 29.571 [7] |  |
| PatchItem | 3GPP TS 29.571 [7] | Identifies the JSON Patch instructions |
| DateTime | 3GPP TS 29.571 [7] |  |
| RedirectResponse | 3GPP TS 29.571 [7] |  |
| NfInstanceId | 3GPP TS 29.571 [7] |  |
| ExtSnssai | 3GPP TS 29.571 [7] |  |
| NsagId | 3GPP TS 29.571 [7] | Network Slice AS Group ID |
| SnssaiReplaceInfo | 3GPP TS 29.571 [7] | Alternative S-NSSAI information |
| PlmnId | 3GPP TS 29.571 [7] |  |
| TaiRange | 3GPP TS 29.510 [13] |  |
| NFType | 3GPP TS 29.510 [13] |  |
| NsagInfo | 3GPP TS 29.531 | See clause 6.1.6.2.14 |
| NsiId | 3GPP TS 29.531 | See clause 6.1.6.3.2 |

#### 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: NssaiAvailabilityInfo

Table 6.2.6.2.2-1: Definition of type NssaiAvailabilityInfo

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| supportedNssaiAvailabilityData | array(SupportedNssaiAvailabilityData) | M | 1..N | This IE shall contain the information regarding the S-NSSAIs the NF service consumer (e.g. AMF) and the 5G-AN supports per TA. |
| supportedFeatures | SupportedFeatures | C | 0..1 | This IE shall be present if at least one optional feature defined in clause 6.2.8 is supported |
| amfSetId | string | O | 0..1 | This IE may be included to indicate the AMF set identifier for the AMFs serving the TAIs where the NSSAI is available.  When present, this IE shall be constructed from PLMN-ID (i.e. three decimal digits MCC and two or three decimal digits MNC), AMF Region Id (8 bit), and AMF Set Id (10 bit).  Pattern: '^[0-9]{3}-[0-9]{2,3}-[A-Fa-f0-9]{2}-[0-3][A-Fa-f0-9]{2}$' |

##### 6.2.6.2.3 Type: SupportedNssaiAvailabilityData

Table 6.2.6.2.3-1: Definition of type SupportedNssaiAvailabilityData

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| tai | Tai | M | 1 | This IE shall contain the identifier of the Tracking Area |  |
| supportedSnssaiList | array(ExtSnssai) | M | 1..N | This IE shall contain the S-NSSAI(s) supported by the AMF for the TA. |  |
| taiList | array(Tai) | O | 1..N | When present, this IE shall contain additional TAIs with the same list of supported S-NSSAIs. (NOTE) | ONSSAI |
| taiRangeList | array(TaiRange) | O | 1..N | When present, this IE shall contain range(s) of TAIs with the same list of supported S-NSSAIs. (NOTE) | ONSSAI |
| nsagInfos | array(NsagInfo) | O | 1..N | When present, this IE shall contain the associations between NSAGs and S-NSSAIs. |  |
| NOTE: The taiList IE shall not include the TAI contained in the tai IE. The taiRangeList IE may encompass the TAI contained in the tai IE. | | | | | |

##### 6.2.6.2.4 Type: AuthorizedNssaiAvailabilityData

Table 6.2.6.2.4-1: Definition of type AuthorizedNssaiAvailabilityData

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| tai | Tai | M | 1 | This IE shall contain the identifier of the Tracking Area. |  |
| supportedSnssaiList | array(ExtSnssai) | M | 1..N | This IE shall contain the S-NSSAI(s) supported by the AMF and 5G-AN and authorized by the NSSF for the TA. |  |
| restrictedSnssaiList | array(RestrictedSnssai) | O | 1..N | This IE may contain the restricted S-NSSAI(s) per PLMN for the TA. If the restricted S-NSSAI is not present, the S-NSSAIs indicated in supportedSnssaiList are not restricted in this TA for any PLMN. When present, this IE shall be included only by the NSSF. |  |
| taiList | array(Tai) | O | 1..N | When present, this IE shall contain additional TAIs with the same lists of supported and restricted S-NSSAIs. (NOTE) | ONSSAI |
| taiRangeList | array(TaiRange) | O | 1..N | When present, this IE shall contain range(s) of TAIs with the same lists of supported and restricted S-NSSAIs. (NOTE) | ONSSAI |
| nsagInfos | array(NsagInfo) | O | 1..N | When present, this IE shall contain the associations between NSAGs and S-NSSAIs. |  |
| NOTE: The taiList IE shall not include the TAI contained in the tai IE. The taiRangeList IE may encompass the TAI contained in the tai IE. | | | | | |

##### 6.2.6.2.5 Type: RestrictedSnssai

Table 6.2.6.2.5-1: Definition of type RestrictedSnssai

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| homePlmnId | PlmnId | M | 1 | This IE shall contain the home PLMN ID of the PLMN with which the serving network has roaming agreement.  This IE shall be ignored if the roamingRestriction is set to "true". |  |
| sNssaiList | array(ExtSnssai) | M | 1..N | This IE shall contain the array of restricted S-NSSAIs for the home PLMN Id. |  |
| homePlmnIdList | array(PlmnId) | O | 1..N | When present, this IE shall contain additional home PLMN IDs with which the serving network has roaming agreement and with the same list of restricted S-NSSAIs. | ONSSAI |
| roamingRestriction | boolean | O | 0..1 | When present, it shall be set as follows:  - true: the list of restricted S-NSSAIs are applicable to all of the home PLMN IDs with which the serving network has roaming agreement;  - false (default): the list of restricted S-NSSAIs are applicable to part of the home PLMN IDs with which the serving network has roaming agreement as included in the homePlmnId and homePlmnIdList IEs. | ONSSAI |

##### 6.2.6.2.6 Type: AuthorizedNssaiAvailabilityInfo

Table 6.2.6.2.6 -1: Definition of type AuthorizedNssaiAvailabilityInfo

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| authorizedNssaiAvailabilityData | array(AuthorizedNssaiAvailabilityData) | M | 1..N | Contains the authorized NSSAI availability information. |
| supportedFeatures | SupportedFeatures | C | 0..1 | This IE shall be present if at least one optional feature defined in clause 6.2.8 is supported |

##### 6.2.6.2.7 Type: PatchDocument

Table 6.2.6.2.7-1: Definition of type PatchDocument

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| N/A | array(PatchItem) | M | 1..N | An array of patch instructions to update the NSSAI availability information or the NssfEventSubscriptionCreateData at the NSSF. See 3GPP TS 29.571 [7]. |

##### 6.2.6.2.8 Type: NssfEventSubscriptionCreateData

Table 6.2.6.2.8-1: Definition of type NssfEventSubscriptionCreateData

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| nfNssaiAvailabilityUri | Uri | M | 1 | Identifies the recipient of notifications sent by the NF service consumer (e.g. AMF, V-NSSF) for this subscription |  |
| taiList | array(Tai) | C | 0..N | When present, this IE shall identify the TAIs supported by the NF service consumer (e.g. AMF).  This IE shall be present if the NF Service Consumer subscribes to the SNSSAI\_STATUS\_CHANGE\_REPORT event.  This IE may be absent if the NSSF supports the NSRP feature or the NSIUN feature and the NF service consumer does not subscribe to the SNSSAI\_STATUS\_CHANGE\_REPORT event.  (NOTE) |  |
| event | NssfEventType | M | 1 | Describes the event to be subscribed for this subscription. |  |
| additionalEvents | array(NssfEventType) | C | 1..N | This IE shall be present if the NSSF supports the NSRP feature or the NSIUN feature and the NF Service Consumer wishes to subscribe to more than one event type. When present, this IE shall indicate the additional event(s) requested to be subscribed. |  |
| expiry | DateTime | O | 0..1 | This IE may be included by the NF service consumer. When present, this IE shall represent the suggested UTC time after which the subscription becomes invalid. |  |
| amfSetId | string | O | 0..1 | This IE may be included for "SNSSAI\_STATUS\_CHANGE\_REPORT" event, to identify a specific AMF Set for which this subscription applies.  When present, this IE shall be constructed from PLMN-ID (i.e. three decimal digits MCC and two or three decimal digits MNC), AMF Region Id (8 bit), and AMF Set Id (10 bit).  Pattern: '^[0-9]{3}-[0-9]{2,3}-[A-Fa-f0-9]{2}-[0-3][A-Fa-f0-9]{2}$' |  |
| taiRangeList | array(TaiRange) | O | 1..N | Identifies a list of TAI ranges supported by the NF service consumer (e.g. AMF) to be applied for "SNSSAI\_STATUS\_CHANGE\_REPORT" event.  The NF service consumer shall only include this IE when it knows that the NSSF supports the "ONSSAI" feature.  (NOTE) | ONSSAI |
| amfId | NfInstanceId | O | 0..1 | This IE may be included to indicate the instance identity of the network function creating the subscription for "SNSSAI\_STATUS\_CHANGE\_REPORT" event. |  |
| supportedFeatures | SupportedFeatures | C | 0..1 | This IE shall be present if at least one optional feature defined in clause 6.2.8 is supported. |  |
| allAmfSetTaiInd | boolean | O | 0..1 | This IE may be present when amfSetId is present.  When present, this IE shall indicate whether the subscription is for all TAIs of the AMF set:  - ture: all TAIs of the AMF Set is subscribed.  - false (default): indicated TAIs (in the taiList IE and/or taiRangeList IE) are subscribed. | SATAS |
| nsrpSubscribeInfo | SnssaiReplacementSubscribeInfo | C | 0..1 | This IE shall be present when the NF Service Consumer subscribes to the Network Slice Replacement event. |  |
| nsiunSubscribeInfo | NsiUnavailabilitySubscribeInfo | C | 0..1 | This IE shall be present when the NF Service Consumer subscribes to the Network Slice Instance Replacement event. |  |
| NOTE: For event "SNSSAI\_STATUS\_CHANGE\_REPORT", the taiList attribute shall only be set to an empty array if the NSSF supports the "ONSSAI" feature and taiRangeList IE is present, or if the NSSF supports the "SATAS" feature and the allAmfSetTaiInd IE is present with value true. A NF service consumer (e.g. AMF) may provide both taiRangeList and taiList attributes, to carry individual TAI(s) in the taiList attribute and ranges of TAIs in the taiRangeList attribute. | | | | | |

##### 6.2.6.2.9 Type: NssfEventSubscriptionCreatedData

Table 6.2.6.2.9-1: Definition of type NssfEventSubscriptionCreatedData

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| subscriptionId | string | M | 1 | Identifies the subscription Id for the created subscription. |
| expiry | DateTime | C | 0..1 | This IE shall be included, if, based on operator policy and taking into account the expiry time included in the request, the NSSF needs to include an expiry time. When present, it represents the UTC time after which the subscribed event shall stop generating report and the subscription becomes invalid. Upon reaching this expiry time the NF service consumer shall delete the representation of the subscription it may have. |
| authorizedNssaiAvailabilityData | array(AuthorizedNssaiAvailabilityData) | O | 1..N | This IE may be included if the NF Service Consumer requested to subscribe to changes in the status of NSSAI availability information and if the authorized NSSAI availability (i.e. S-NSSAIs available per TA (unrestricted) and any S-NSSAIs restricted per PLMN in that TA in the serving PLMN of the UE) is available. |
| supportedFeatures | SupportedFeatures | C | 0..1 | This IE shall be present if at least one optional feature defined in clause 6.2.8 is supported. |

##### 6.2.6.2.10 Type: NssfEventNotification

Table 6.2.6.2.10-1: Definition of type NssfEventNotification

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description | Applicability |
| subscriptionId | string | M | 1 | Indicates which subscription generated event notificaiton.  This parameter is generated by NSSF and returned in "Location" header in HTTP responses. This can be useful if a NF use a common call-back URI for multiple subscriptions. |  |
| authorizedNssaiAvailabilityData | array(AuthorizedNssaiAvailabilityData) | C | 0..N | This IE shall be present for a notification of changes in the status of the NSSAI availability information. When present, this IE shall contain the authorized NSSAI availability information for all TAs the AMF subscribed to. Each element shall contain the current status of the list of S-NSSAI available in a TA and the list of S-NSSAI restricted per PLMN in that TA.  The NF Service Consumer shall replace any authorizedNssaiAvailabilityData received earlier by the new authorizedNssaiAvailabilityData received in the notification.  When no supported S-NSSAIs authorized by the NSSF for all TAs, this IE shall contain an empty array indicating Authorized NSSAI Availability information is empty. When received this IE with empty array, the NF Service Consumer shall remove any locally stored authorizedNssaiAvailabilityData previously received from NSSF. (NOTE) |  |
| altNssai | array(SnssaiReplaceInfo) | C | 1..N | The IE shall be present for a notification of Network Slice Replacement. When present, this IE shall indicate the impacted S-NSSAIs if one or more of S-NSSAIs availability status changed from available to not available and vice versa, and the current status for each reported S-NSSAI.  This IE may contain the alternative S-NSSAI per impacted S-NSSAI for the S-NSSAIs that are reported as being not available.  See clause 5.15.19 in 3GPP TS 23.501 [2]. | NSRP |
| unavailableNsiList | array(NsiId) | C | 1..N | This IE shall be present for a of Network Slice Instance Replacement. When present, this IE shall indicate the NSI IDs for which the status has changed (e.g., that are congested or no longer available). | NSIUN |
| NOTE: For event "SNSSAI\_STATUS\_CHANGE\_REPORT", the NSSF shall only send notificaiton with empty array to NF Service Consumer previously indicated support of "EANAN" feature, when there is no supported S-NSSAIs authorized by the NSSF for all TAs. | | | | |  |

##### 6.2.6.2.11 Type: SnssaiReplacementSubscribeInfo

Table 6.2.6.2.11-1: Definition of type SnssaiReplacementSubscribeInfo

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| snssaiToSubscribe | array(Snssai) | M | 0..N | This IE shall indicate the S-NSSAIs for which notification is requested during Network Slice Replacement.  In the case of roaming it shall indicate:  - the VPLMN S-NSSAIs for which notification is requested in case of Network Slice Replacement; or  - the HPLMN S-NSSAIs for which notifcation is requested in case of Network Slice Replacement. (NOTE) |
| nfType | NFType | M | 1 | This IE shall contain the NF type of the NF service consumer. |
| nfId | NfInstanceId | M | 1 | This IE shall contain the NF identifier of the NF service consumer. |
| plmnId | PlmnId | C | 0..1 | This IE shall be present in roaming scenarios, if the indicated S-NSSAI is an HPLMN S-NSSAI. It may be present otherwise. When present, it shall indicate the PLMN ID of the S-NSSAI. |
| NOTE: The snnsaiToSubscribe attribute shall be set to an empty array for a Network Slice Replacement subscription applying to all S-NSSAIs. | | | | |

##### 6.2.6.2.12 Type: NsiUnavailabilitySubscribeInfo

Table 6.2.6.2.12-1: Definition of type NsiUnavailabilitySubscribeInfo

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Attribute name | Data type | P | Cardinality | Description |
| nsiToSubscribe | array(NsiId) | O | 0..N | When present, this IE shall indicate the identifier of the Network Slice Instance(s) for which notications are requested in case the status of the NSI changes (e.g., becomes congested or no longer available). (NOTE 1) (NOTE 3) |
| snssaiToSubscribe | array(Snssai) | O | 0..N | When present, this IE shall indicate the identifier of the S-NSSAI related to the NSI for which notications shall be invoked in case the NSI becomes congested or no longer available.(NOTE 2) (NOTE 3) |
| NOTE 1: The nsiToSubscribe attribute shall be set to an empty array for a Network Slice Instance Replacement subscription applying to all NSIs.  NOTE 2: The snnsaiToSubscribe attribute shall be set to an empty array for a Network Slice Instance Replacement subscription applying to all S-NSSAIs.  NOTE 3: At least one of the nsiToSubscribe IE or snssaiToSubscribe IE shall be present. | | | | |

#### 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 |
|  | <one simple data type, e.g. boolean, integer, null, number, string> |  |

##### 6.2.6.3.3 Enumeration: NssfEventType

Table 6.2.6.3.3-1: Enumeration NssfEventType

|  |  |
| --- | --- |
| Enumeration value | Description |
| "SNSSAI\_STATUS\_CHANGE\_REPORT" | A NF subscribes to this event to receive the status change about the current S-NSSAI available (i.e unrestricted) per TA and the status change about the list of restricted S-NSSAI per TA and per PLMN in the serving PLMN of the UE. |
| "SNSSAI\_REPLACEMENT\_REPORT" | A NF subscribes to this event to receive a replacement S-NSSAI for each impacted S-NSSAI. See clause 5.15.19 of 3GPP TS 23.501 [2]. |
| "NSI\_UNAVAILAIBILITY\_REPORT" | A NF subscribes to this event to receive the list of unavailable NSIs (e.g., due to overload). See clause 5.15.20 of 3GPP TS 23.501 [2]. |

#### 6.2.6.4 Binary data

There is no binary data used for the Nnssf\_NSSAIAvailability service in this version of the API.

### 6.2.7 Error Handling

#### 6.2.7.1 General

HTTP error handling shall be supported as specified in clause 5.2.4 of 3GPP TS 29.500 [4].

#### 6.2.7.2 Protocol Errors

Protocol Error Handling shall be supported as specified in clause 5.2.7.2 of 3GPP TS 29.500 [4].

#### 6.2.7.3 Application Errors

The common application errors defined in the Table 5.2.7.2-1 in 3GPP TS 29.500 [4] may also be used for the Nnssf\_NSSAIAvailability service. The following application errors listed in Table 6.1.7.3-1 are specific for the Nnssf\_NSSAIAvailability service.

Table 6.2.7.3-1: Application errors

|  |  |  |
| --- | --- | --- |
| Application Error | HTTP status code | Description |
| RESOURCE\_CONTEXT\_NOT\_FOUND | 400 Bad Request | Indicates that the NF Service Consumer (e.g. AMF) received a notification request from NSSF on an existing callback URI, but the corresponding context does not exist at the NF Service Consumer. |
| SNSSAI\_NOT\_SUPPORTED | 403 Forbidden | The request is rejected due to the SNSSAI provided in the request is not supported in the PLMN. |
| NOT\_AUTHORIZED | 403 Forbidden | The request is rejected due to the NF service consumer is not authorized to update the NSSAI availability information, or subscribe for the NSSAI availability information notification. |
| RESOURCE\_NOT\_FOUND | 404 Not Found | The request is rejected due to the NF service consumer is authorized, but the resource related to the NF Id for which the NSSAI availability information is updated or deleted is unavailable. |
| SUBSCRIPTION\_NOT\_FOUND | 404 Not Found | Indicates the modification of subscription has failed due to an application error when the subscription is not found in the NSSF. |
| RESOURCE\_URI\_STRUCTURE\_NOT\_FOUND | 404 Not Found | Indicates that the NF Service Consumer (e.g. AMF) received a notification request from NSSF on a callback URI that is not known to the NF Service Consumer. |

### 6.2.8 Feature negotiation

The feature negotiation mechanism specified in clause 6.6 of 3GPP TS 29.500 [4] shall be used to negotiate the optional features applicable between the NSSF and the NF Service Consumer, for the Nnssf\_NSSAIAvailability service, if any.

The NF Service Consumer shall indicate the optional features it supports for the Nnssf\_NSSAIAvailability service, if any, by including the supportedFeatures attribute in the HTTP PUT request when requesting the NSSF to update the NSSAI Availability information.

The NSSF shall determine the supported features for the updated NSSAI Availability information resource as specified in clause 6.6 of 3GPP TS 29.500 [4] and shall indicate the supported features by including the supportedFeatures attribute in the authorized NSSAI availability information it returns in the HTTP response.

The syntax of the supportedFeatures attribute is defined in clause 5.2.2 of 3GPP TS 29.571 [7].

The following features are defined for the Nnssf\_NSSAIAvailability service.

Table 6.2.8-1: Features of supportedFeatures attribute used by Nnssf\_NSSAIAvailability service

|  |  |  |  |
| --- | --- | --- | --- |
| Feature Number | Feature | M/O | Description |
| 1 | ONSSAI | O | Optimized NSSAI Availability Data encoding  When this feature is supported:  - NSSAI Availability data may be signalled per list or range(s) of TAIs (see clauses 6.2.6.2.3 and 6.2.6.2.4); and  - RestrictedSnssai may encode a list of Home PLMN IDs or may be applicable to all of the Home PLMN IDs (see clause 6.2.6.2.5).  - NSSF event subscription may encode a list of TAI ranges (see clause 6.2.6.2.8). |
| 2 | SUMOD | O | Subscription Modification in Subscribe Service Operation  When this feature is supported, the subscription of NSSAI availability information is supported to be modified (see clause 5.3.2.3.2). |
| 3 | EANAN | O | Empty Authorized NSSAI Availability Notification  A NSSF supporting this feature shall send a notification to NF consumer (as subscriber) with empty array of Authorized NSSAI Availability Data, when no supported NSSAI Authorized by the NSSF for all TAs after latest update and the NF consumer indicated support of this feature.  A NF Consumer support this feature shall accept empty array of Authorized NSSAI Availability Data in a notification from NSSF and delete locally stored Authorized NSSAI Availability Data previously received. |
| 4 | ES3XX | M | Extended Support of HTTP 307/308 redirection  An NF Service Consumer (e.g. AMF) that supports this feature shall support handling of HTTP 307/308 redirection for any service operation of the Nnssf\_NSSAIAvailability service. An NF Service Consumer that does not support this feature does only support HTTP redirection as specified for 3GPP Release 15. |
| 5 | SATAS | O | Subscribe ALL TAIs for AMF Set  A NSSF supporting this feature shall support the NF Consumer to subscribe to all TAI(s) for an AMF set. |
| 6 | NSIUN | O | Network Slice Instance Unavailability Notification  An NF Service Consumer (e.g., AMF, V-NSSF) and NSSF supporting this feature shall support notifications from the NSSF to the NF Service Consumer about the unavailability of Network Slice Instances, as specified in clause 5.15.5.3 of 3GPP TS 23.501 [2]. |
| 7 | NSRP | O | Network Slice Replacement  An NF service consumer (e.g., AMF, V-NSSF) that supports this feature shall support network slice replacement as specified in clause 5.15.19 of 3GPP TS 23.501 [2]. |
| Feature number: The order number of the feature within the supportedFeatures attribute (starting with 1).  Feature: A short name that can be used to refer to the bit and to the feature.  M/O: Defines if the implementation of the feature is mandatory ("M") or optional ("O").  Description: A clear textual description of the feature. | | | |

### 6.2.9 Security

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

The Nnssf\_NSSAIAvailability API does not define any scopes for OAuth2 authorization.

### 6.2.10 HTTP redirection

An HTTP request may be redirected to a different NSSF service instance, within the same NSSF or a different NSSF of an NSSF set, e.g. when an NSSF service instance is part of an NSSF (service) set or when using indirect communications (see 3GPP TS 29.500 [4]). See the ES3XX feature in clause 6.2.8.

An SCP that reselects a different NSSF producer instance will return the NF Instance ID of the new NSSF 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 NSSF within an NSSF set redirects a service request to a different NSSF of the set using a 307 Temporary Redirect or 308 Permanent Redirect status code, the identity of the new NSSF 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 Nnssf\_NSSelection service. 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: The semantics and procedures, as well as conditions, e.g. for the applicability and allowed combinations of attributes or values, not expressed in the OpenAPI definitions but defined in other parts of the specification also apply.

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

# A.2 Nnssf\_NSSelection API

openapi: 3.0.0

info:

version: '2.3.0-alpha.2'

title: 'NSSF NS Selection'

description: |

NSSF Network Slice Selection Service.

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security:

- {}

- oAuth2ClientCredentials:

- nnssf-nsselection

servers:

- url: '{apiRoot}/nnssf-nsselection/v2'

variables:

apiRoot:

default: https://example.com

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

externalDocs:

description: 3GPP TS 29.531 V18.2.0; 5G System; Network Slice Selection Services; Stage 3

url: https://www.3gpp.org/ftp/Specs/archive/29\_series/29.531/

paths:

/network-slice-information:

get:

summary: Retrieve the Network Slice Selection Information

tags:

- Network Slice Information (Document)

operationId: NSSelectionGet

parameters:

- name: nf-type

in: query

description: NF type of the NF service consumer

required: true

schema:

$ref: 'TS29510\_Nnrf\_NFManagement.yaml#/components/schemas/NFType'

- name: nf-id

in: query

description: NF Instance ID of the NF service consumer

required: true

schema:

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

- name: slice-info-request-for-registration

in: query

description: Requested network slice information during Registration procedure

content:

application/json:

schema:

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

- name: slice-info-request-for-pdu-session

in: query

description: Requested network slice information during PDU session establishment procedure

content:

application/json:

schema:

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

- name: slice-info-request-for-ue-cu

in: query

description: Requested network slice information during UE confuguration update procedure

content:

application/json:

schema:

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

- name: home-plmn-id

in: query

description: PLMN ID of the HPLMN

content:

application/json:

schema:

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

- name: tai

in: query

description: TAI of the UE

content:

application/json:

schema:

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

- name: supported-features

in: query

description: Features required to be supported by the NFs in the target slice instance

schema:

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

responses:

'200':

description: OK (Successful Network Slice Selection)

content:

application/json:

schema:

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

'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'

'406':

$ref: 'TS29571\_CommonData.yaml#/components/responses/406'

'414':

$ref: 'TS29571\_CommonData.yaml#/components/responses/414'

'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:

nnssf-nsselection: Access to the Nnssf\_NSSelection API

schemas:

AuthorizedNetworkSliceInfo:

description: Contains the authorized network slice information

type: object

properties:

allowedNssaiList:

type: array

items:

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

minItems: 1

configuredNssai:

type: array

items:

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

minItems: 1

targetAmfSet:

type: string

pattern: '^[0-9]{3}-[0-9]{2,3}-[A-Fa-f0-9]{2}-[0-3][A-Fa-f0-9]{2}$'

candidateAmfList:

type: array

items:

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

minItems: 1

rejectedNssaiInPlmn:

type: array

items:

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

minItems: 1

rejectedNssaiInTa:

type: array

items:

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

minItems: 1

nsiInformation:

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

supportedFeatures:

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

nrfAmfSet:

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

nrfAmfSetNfMgtUri:

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

nrfAmfSetAccessTokenUri:

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

nrfOauth2Required:

type: object

description: >

Map indicating whether the NRF requires Oauth2-based authorization for accessing

its services. The key of the map shall be the name of an NRF service,

e.g. "nnrf-nfm" or "nnrf-disc"

additionalProperties:

type: boolean

minProperties: 1

targetAmfServiceSet:

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

targetNssai:

type: array

items:

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

minItems: 1

nsagInfos:

type: array

items:

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

minItems: 1

SubscribedSnssai:

description: Contains the subscribed S-NSSAI

type: object

required:

- subscribedSnssai

properties:

subscribedSnssai:

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

defaultIndication:

type: boolean

subscribedNsSrgList:

type: array

items:

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

minItems: 1

AllowedSnssai:

description: >

Contains the authorized S-NSSAI and optional mapped home S-NSSAI and

network slice instance information

type: object

required:

- allowedSnssai

properties:

allowedSnssai:

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

nsiInformationList:

type: array

items:

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

minItems: 1

mappedHomeSnssai:

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

AllowedNssai:

description: >

Contains an array of allowed S-NSSAI that constitute the allowed NSSAI information

for the authorized network slice information

type: object

required:

- allowedSnssaiList

- accessType

properties:

allowedSnssaiList:

type: array

items:

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

minItems: 1

accessType:

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

NsiInformation:

description: >

Contains the API URIs of NRF services to be used to discover NFs/services,

subscribe to NF status changes and/or request access tokens within the selected

Network Slice instance and optional the Identifier of the selected Network Slice instance

type: object

required:

- nrfId

properties:

nrfId:

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

nsiId:

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

nrfNfMgtUri:

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

nrfAccessTokenUri:

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

nrfOauth2Required:

type: object

description: >

Map indicating whether the NRF requires Oauth2-based authorization for accessing

its services. The key of the map shall be the name of an NRF service,

e.g. "nnrf-nfm" or "nnrf-disc"

additionalProperties:

type: boolean

minProperties: 1

MappingOfSnssai:

description: Contains the mapping of S-NSSAI in the serving network and the value of the home network

type: object

required:

- servingSnssai

- homeSnssai

properties:

servingSnssai:

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

homeSnssai:

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

SliceInfoForRegistration:

description: Contains the slice information requested during a Registration procedure

type: object

properties:

subscribedNssai:

type: array

items:

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

minItems: 1

allowedNssaiCurrentAccess:

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

allowedNssaiOtherAccess:

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

sNssaiForMapping:

type: array

items:

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

minItems: 1

requestedNssai:

type: array

items:

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

minItems: 1

defaultConfiguredSnssaiInd:

type: boolean

default: false

mappingOfNssai:

type: array

items:

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

minItems: 1

requestMapping:

type: boolean

ueSupNssrgInd:

type: boolean

suppressNssrgInd:

type: boolean

nsagSupported:

type: boolean

default: false

SliceInfoForPDUSession:

description: Contains the slice information requested during PDU Session establishment procedure

type: object

required:

- sNssai

- roamingIndication

properties:

sNssai:

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

roamingIndication:

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

homeSnssai:

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

SliceInfoForUEConfigurationUpdate:

description: Contains the slice information requested during UE configuration update procedure

type: object

properties:

subscribedNssai:

type: array

items:

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

minItems: 1

allowedNssaiCurrentAccess:

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

allowedNssaiOtherAccess:

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

defaultConfiguredSnssaiInd:

type: boolean

requestedNssai:

type: array

items:

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

minItems: 1

mappingOfNssai:

type: array

items:

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

minItems: 1

ueSupNssrgInd:

type: boolean

suppressNssrgInd:

type: boolean

rejectedNssaiRa:

type: array

items:

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

minItems: 1

nsagSupported:

type: boolean

default: false

ConfiguredSnssai:

description: Contains the configured S-NSSAI(s) authorized by the NSSF in the serving PLMN and optional mapped home S-NSSAI

type: object

required:

- configuredSnssai

properties:

configuredSnssai:

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

mappedHomeSnssai:

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

NsagInfo:

description: Contains the association of NSAGs and S-NSSAI(s) along with the TA(s) within which the association is valid.

type: object

required:

- nsagIds

- snssaiList

properties:

nsagIds:

type: array

items:

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

minItems: 1

snssaiList:

type: array

items:

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

minItems: 1

taiList:

type: array

items:

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

minItems: 1

taiRangeList:

type: array

items:

$ref: 'TS29510\_Nnrf\_NFManagement.yaml#/components/schemas/TaiRange'

minItems: 1

RoamingIndication:

description: Contains the indication on roaming

anyOf:

- type: string

enum:

- NON\_ROAMING

- LOCAL\_BREAKOUT

- HOME\_ROUTED\_ROAMING

- type: string

NsiId:

description: Contains the Identifier of the selected Network Slice instance

type: string

# A.3 Nnssf\_NSSAIAvailability API

openapi: 3.0.0

info:

version: '1.3.0-alpha.5'

title: 'NSSF NSSAI Availability'

description: |

NSSF NSSAI Availability Service.

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security:

- {}

- oAuth2ClientCredentials:

- nnssf-nssaiavailability

servers:

- url: '{apiRoot}/nnssf-nssaiavailability/v1'

variables:

apiRoot:

default: https://example.com

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

externalDocs:

description: 3GPP TS 29.531 V18.5.0; 5G System; Network Slice Selection Services; Stage 3

url: https://www.3gpp.org/ftp/Specs/archive/29\_series/29.531/

paths:

/nssai-availability/{nfId}:

put:

summary: Updates/replaces the NSSF with the S-NSSAIs the NF service consumer (e.g AMF)supports per TA

tags:

- NF Instance ID (Document)

operationId: NSSAIAvailabilityPut

parameters:

- name: nfId

in: path

description: Identifier of the NF service consumer instance

required: true

schema:

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

- name: Content-Encoding

in: header

description: Content-Encoding, described in IETF RFC 9110

schema:

type: string

- name: Accept-Encoding

in: header

description: Accept-Encoding, described in IETF RFC 9110

schema:

type: string

requestBody:

description: Parameters to update/replace at the NSSF, the S-NSSAIs supported per TA

required: true

content:

application/json:

schema:

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

responses:

'200':

description: OK (Successful update of SNSSAI information per TA)

content:

application/json:

schema:

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

headers:

Accept-Encoding:

description: Accept-Encoding, described in IETF RFC 9110

schema:

type: string

Content-Encoding:

description: Content-Encoding, described in IETF RFC 9110

schema:

type: string

'204':

description: No Content (No supported slices after Successful update)

'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

patch:

summary: Updates an already existing S-NSSAIs per TA provided by the NF service consumer (e.g AMF)

tags:

- NF Instance ID (Document)

operationId: NSSAIAvailabilityPatch

parameters:

- name: nfId

in: path

description: Identifier of the NF service consumer instance

required: true

schema:

type: string

- name: Content-Encoding

in: header

description: Content-Encoding, described in IETF RFC 9110

schema:

type: string

- name: Accept-Encoding

in: header

description: Accept-Encoding, described in IETF RFC 9110

schema:

type: string

requestBody:

description: JSON Patch instructions to update at the NSSF, the S-NSSAIs supported per TA

required: true

content:

application/json-patch+json::

schema:

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

responses:

'200':

description: OK (Successful update of SNSSAI information per TA)

content:

application/json:

schema:

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

headers:

Accept-Encoding:

description: Accept-Encoding, described in IETF RFC 9110

schema:

type: string

Content-Encoding:

description: Content-Encoding, described in IETF RFC 9110

schema:

type: string

'204':

description: No Content (No supported slices after Successful update)

'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

delete:

summary: Deletes an already existing S-NSSAIs per TA provided by the NF service consumer (e.g AMF)

tags:

- NF Instance ID (Document)

operationId: NSSAIAvailabilityDelete

parameters:

- name: nfId

in: path

description: Identifier of the NF service consumer instance

required: true

schema:

type: string

responses:

'204':

description: No Content (Successful deletion of SNSSAI information per TA)

'307':

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

'308':

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

'400':

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

'401':

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

'403':

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

'404':

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

'429':

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

'500':

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

'502':

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

'503':

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

default:

description: Unexpected error

/nssai-availability/subscriptions:

post:

summary: Creates subscriptions for notification about updates to NSSAI availability information

tags:

- Subscriptions (Collection)

operationId: NSSAIAvailabilityPost

parameters:

- name: Content-Encoding

in: header

description: Content-Encoding, described in IETF RFC 9110

schema:

type: string

requestBody:

description: Subscription for notification about updates to NSSAI availability information

required: true

content:

application/json:

schema:

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

callbacks:

nssaiAvailabilityNotification:

'{request.body#/nfNssaiAvailabilityUri}':

post:

parameters:

- name: Content-Encoding

in: header

description: Content-Encoding, described in IETF RFC 9110

schema:

type: string

requestBody: # contents of the callback message

required: true

content:

application/json:

schema:

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

responses:

'204':

description: No Content (successful notification)

headers:

Accept-Encoding:

description: Accept-Encoding, described in IETF RFC 9110

schema:

type: string

'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

responses:

'201':

description: Created (Successful creation of subscription for notification)

content:

application/json:

schema:

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

headers:

Location:

description: >

Contains the URI of the newly created resource, according to the structure:

{apiRoot}/nnssf-nssaiavailability/<apiVersion>/nssai-availability/subscriptions/{subscriptionId}

required: true

schema:

type: string

Content-Encoding:

description: Content-Encoding, described in IETF RFC 9110

schema:

type: string

'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

/nssai-availability/subscriptions/{subscriptionId}:

delete:

summary: Deletes an already existing NSSAI availability notification subscription

tags:

- Subscription ID (Document)

operationId: NSSAIAvailabilityUnsubscribe

parameters:

- name: subscriptionId

in: path

description: Identifier of the subscription for notification

required: true

schema:

type: string

responses:

'204':

description: No Content (Successful deletion of subscription for NSSAI Availability notification)

'307':

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

'308':

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

'400':

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

'401':

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

'403':

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

'404':

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

'429':

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

'500':

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

'502':

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

'503':

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

default:

description: Unexpected error

patch:

summary: updates an already existing NSSAI availability notification subscription

tags:

- Subscription ID (Document)

operationId: NSSAIAvailabilitySubModifyPatch

parameters:

- name: subscriptionId

in: path

description: Identifier of the subscription for notification

required: true

schema:

type: string

- name: Content-Encoding

in: header

description: Content-Encoding, described in IETF RFC 9110

schema:

type: string

requestBody:

description: JSON Patch instructions to update at the NSSF, the NSSAI availability notification subscription

required: true

content:

application/json-patch+json::

schema:

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

responses:

'200':

description: OK (Successful update of NSSAI availability notification subscription)

content:

application/json:

schema:

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

headers:

Content-Encoding:

description: Content-Encoding, described in IETF RFC 9110

schema:

type: string

'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

/nssai-availability:

options:

summary: Discover communication options supported by NSSF for NSSAI Availability

operationId: NSSAIAvailabilityOptions

tags:

- NSSAI Availability Store

responses:

'200':

description: OK

headers:

Accept-Encoding:

description: Accept-Encoding, described in IETF RFC 9110

schema:

type: string

'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'

'405':

$ref: 'TS29571\_CommonData.yaml#/components/responses/405'

'429':

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

'500':

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

'501':

$ref: 'TS29571\_CommonData.yaml#/components/responses/501'

'502':

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

'503':

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

default:

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

components:

securitySchemes:

oAuth2ClientCredentials:

type: oauth2

flows:

clientCredentials:

tokenUrl: '{nrfApiRoot}/oauth2/token'

scopes:

nnssf-nssaiavailability: Access to the Nnssf\_NSSAIAvailability API

schemas:

NssaiAvailabilityInfo:

description: This contains the Nssai availability information requested by the AMF

type: object

required:

- supportedNssaiAvailabilityData

properties:

supportedNssaiAvailabilityData:

type: array

items:

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

minItems: 1

supportedFeatures:

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

amfSetId:

type: string

pattern: '^[0-9]{3}-[0-9]{2,3}-[A-Fa-f0-9]{2}-[0-3][A-Fa-f0-9]{2}$'

SupportedNssaiAvailabilityData:

description: This contains the Nssai availability data information per TA supported by the AMF

type: object

required:

- tai

- supportedSnssaiList

properties:

tai:

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

supportedSnssaiList:

type: array

items:

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

minItems: 1

taiList:

type: array

items:

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

minItems: 1

taiRangeList:

type: array

items:

$ref: 'TS29510\_Nnrf\_NFManagement.yaml#/components/schemas/TaiRange'

minItems: 1

nsagInfos:

type: array

items:

$ref: 'TS29531\_Nnssf\_NSSelection.yaml#/components/schemas/NsagInfo'

minItems: 1

AuthorizedNssaiAvailabilityData:

description: This contains the Nssai availability data information per TA authorized by the NSSF

type: object

required:

- tai

- supportedSnssaiList

properties:

tai:

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

supportedSnssaiList:

type: array

items:

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

minItems: 1

restrictedSnssaiList:

type: array

items:

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

minItems: 1

taiList:

type: array

items:

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

minItems: 1

taiRangeList:

type: array

items:

$ref: 'TS29510\_Nnrf\_NFManagement.yaml#/components/schemas/TaiRange'

minItems: 1

nsagInfos:

type: array

items:

$ref: 'TS29531\_Nnssf\_NSSelection.yaml#/components/schemas/NsagInfo'

minItems: 1

RestrictedSnssai:

description: This contains the restricted SNssai information per PLMN

type: object

required:

- homePlmnId

- sNssaiList

properties:

homePlmnId:

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

sNssaiList:

type: array

items:

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

minItems: 1

homePlmnIdList:

type: array

items:

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

minItems: 1

roamingRestriction:

type: boolean

default: false

AuthorizedNssaiAvailabilityInfo:

description: This contains the Nssai availability data information authorized by the NSSF

type: object

required:

- authorizedNssaiAvailabilityData

properties:

authorizedNssaiAvailabilityData:

type: array

items:

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

minItems: 1

supportedFeatures:

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

NssfEventSubscriptionCreateData:

description: This contains the information for event subscription

type: object

required:

- nfNssaiAvailabilityUri

- event

properties:

nfNssaiAvailabilityUri:

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

taiList:

type: array

items:

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

event:

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

additionalEvents:

type: array

items:

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

minItems: 1

expiry:

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

amfSetId:

type: string

pattern: '^[0-9]{3}-[0-9]{2,3}-[A-Fa-f0-9]{2}-[0-3][A-Fa-f0-9]{2}$'

taiRangeList:

type: array

items:

$ref: 'TS29510\_Nnrf\_NFManagement.yaml#/components/schemas/TaiRange'

minItems: 1

amfId:

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

supportedFeatures:

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

allAmfSetTaiInd:

type: boolean

default: false

nsrpSubscribeInfo:

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

nsiunSubscribeInfo:

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

NssfEventSubscriptionCreatedData:

description: This contains the information for created event subscription

type: object

required:

- subscriptionId

properties:

subscriptionId:

type: string

expiry:

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

authorizedNssaiAvailabilityData:

type: array

items:

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

minItems: 1

supportedFeatures:

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

NssfEventNotification:

description: This contains the notification for created event subscription

type: object

required:

- subscriptionId

properties:

subscriptionId:

type: string

authorizedNssaiAvailabilityData:

type: array

items:

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

altNssai:

type: array

items:

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

minItems: 1

description: >

Indicate the impacted S-NSSAIs, the current status for each reported S-NSSAI, and

if available the alternative S-NSSAI per impacted S-NSSAI for the S-NSSAIs that are

reported as being not available.

unavailableNsiList:

type: array

items:

$ref: 'TS29531\_Nnssf\_NSSelection.yaml#/components/schemas/NsiId'

minItems: 1

SnssaiReplacementSubscribeInfo:

description: Present if the NF service consumer subscribes to events related to Network Slice Replacement.

type: object

properties:

snssaiToSubscribe:

type: array

items:

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

nfType:

$ref: 'TS29510\_Nnrf\_NFManagement.yaml#/components/schemas/NFType'

nfId:

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

plmnId:

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

required:

- snssaiToSubscribe

- nfType

- nfId

NsiUnavailabilitySubscribeInfo:

description: Present if the NF service consumer subscribes to events related to Network Slice Instance Replacement.

type: object

properties:

nsiToSubscribe:

type: array

items:

$ref: 'TS29531\_Nnssf\_NSSelection.yaml#/components/schemas/NsiId'

snssaiToSubscribe:

type: array

items:

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

NssfEventType:

description: This contains the event for the subscription

anyOf:

- type: string

enum:

- SNSSAI\_STATUS\_CHANGE\_REPORT

- SNSSAI\_REPLACEMENT\_REPORT

- NSI\_UNAVAILABILITY\_REPORT

- type: string

PatchDocument:

description: This contains the JSON Patch instructions for updating the Nssai availability data information at the NSSF

type: array

items:

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

minItems: 1

Annex B (informative):  
Change history

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Change history** | | | | | | | |
| **Date** | **Meeting** | **TDoc** | **CR** | **Rev** | **Cat** | **Subject/Comment** | **New version** |
| 2017-10 | CT4#80 | C4-175279 |  |  |  | Initial Draft. | 0.1.0 |
| 2017-10 | CT4#81 | C4-175398 |  |  |  | Implementation of C4-175280 | 0.2.0 |
| 2018-01 | CT4#82 | C4-181394 |  |  |  | Implementation of C4-181240、C4-181242、C4-181244、C4-181355、C4-181356、C4-181357 | 0.3.0 |
| 2018-03 | CT4#83 | C4-182438 |  |  |  | Implementation of C4-182087、C4-182294、C4-182295、C4-182296、C4-182297、C4-182298、C4-182299 | 0.4.0 |
| 2018-03 | CT#79 | CP-180035 |  |  |  | Presented for information | 1.0.0 |
| 2018-04 | CT4#84 | C4-183519 |  |  |  | Implementation of C4-183068、C4-183071、C4-183431、C4-183432、C4-183433 | 1.1.0 |
| 2018-05 | CT4#85 | C4-184631 |  |  |  | Implementation of C4-184602, C4-184023, C4-184024, C4-184025, C4-184026, C4-184603, C4-184527, C4-184528, C4-184604, C4-184632 | 1.2.0 |
| 2018-06 | CT#80 | CP-181108 |  |  |  | Presented for approval | 2.0.0 |
| 2018-06 | CT#80 |  |  |  |  | Approved in CT#80. | 15.0.0 |
| 2018-09 | CT#81 | CP-182160 | 0001 | 5 | F | Alignment of Nnssf\_NSSelection\_Get service operation with stage 2 | 15.1.0 |
| 2018-09 | CT#81 | CP-182014 | 0002 | 2 | F | Adding NRF corresponding to an AMF set | 15.1.0 |
| 2018-09 | CT#81 | CP-182167 | 0003 | 4 | F | Corrections to NSSF Data Types | 15.1.0 |
| 2018-09 | CT#81 | CP-182063 | 0004 |  | F | Corrections to NSSAIAvailability Service Operations | 15.1.0 |
| 2018-09 | CT#81 | CP-182063 | 0005 | 1 | F | Configured NSSAI for HPLMN - Alignment with Stage 2 | 15.1.0 |
| 2018-09 | CT#81 | CP-182063 | 0006 |  | F | Correction to NRF Id in NSIInformation | 15.1.0 |
| 2018-09 | CT#81 | CP-182063 | 0007 |  | F | Description of Structured data types | 15.1.0 |
| 2018-09 | CT#81 | CP-182063 | 0008 |  | F | API version number update | 15.1.0 |
| 2018-12 | CT#82 | CP-183022 | 0009 |  | F | Type Definition of AllowedNssai | 15.2.0 |
| 2018-12 | CT#82 | CP-183022 | 0010 | 1 | F | Correction to Slice Information For Registration | 15.2.0 |
| 2018-12 | CT#82 | CP-183022 | 0011 |  | F | API Root | 15.2.0 |
| 2018-12 | CT#82 | CP-183022 | 0012 | 3 | F | Common Error Status Codes | 15.2.0 |
| 2018-12 | CT#82 | CP-183148 | 0013 | 2 | F | Array Range Correction | 15.2.0 |
| 2018-12 | CT#82 | CP-183022 | 0016 | 1 | F | OpenAPI Corrections | 15.2.0 |
| 2018-12 | CT#82 | CP-183022 | 0017 | 2 | F | Subscription Lifetime for NSSAI Availability Event Subscription | 15.2.0 |
| 2018-12 | CT#82 | CP-183022 | 0018 |  | F | Correction of Resource URI structure | 15.2.0 |
| 2018-12 | CT#82 | CP-183022 | 0019 |  | F | Add Delete Service Operation in Nnssf\_NSSAIAvailability Service | 15.2.0 |
| 2018-12 | CT#82 | CP-183022 | 0020 | 2 | F | Add the Default Configured NSSAI Indication in Nnssf\_NSSelection Service | 15.2.0 |
| 2018-12 | CT#82 | CP-183022 | 0021 |  | F | CR 0021 29.531 Rel-15 Resource Uri Correction | 15.2.0 |
| 2018-12 | CT#82 | CP-183022 | 0022 |  | F | Correction to NssaiAvailabilityInfo | 15.2.0 |
| 2018-12 | CT#82 | CP-183022 | 0023 | 2 | F | Make OAuth2.0 Optional to Use | 15.2.0 |
| 2018-12 | CT#82 | CP-183022 | 0024 |  | F | ExternalDocs | 15.2.0 |
| 2018-12 | CT#82 | CP-183022 | 0025 |  | F | API Version | 15.2.0 |
| 2019-03 | CT#83 | CP-190027 | 0026 | 1 | F | Definition of TargetAmfSet | 15.3.0 |
| 2019-03 | CT#83 | CP-190027 | 0027 | 1 | F | OpenAPI Corrections | 15.3.0 |
| 2019-03 | CT#83 | CP-190027 | 0029 |  | F | Add missing NFType reference in reused data types | 15.3.0 |
| 2019-03 | CT#83 | CP-190027 | 0030 | 2 | F | Clarify the conditions of returning Configured NSSAI. | 15.3.0 |
| 2019-03 | CT#83 | CP-190027 | 0031 | 1 | F | Service operation of Nnssf\_NSSelection service during UE configuration update procedure | 15.3.0 |
| 2019-03 | CT#83 | CP-190171 | 0032 | 1 | F | API version update | 15.3.0 |
| 2019-06 | CT#84 | CP-191039 | 0033 | 1 | F | Content encodings supported in HTTP requests | 15.4.0 |
| 2019-06 | CT#84 | CP-191039 | 0034 | 4 | F | Add AMFset in NssaiAvailabilityInfo | 15.4.0 |
| 2019-06 | CT#84 | CP-191039 | 0036 | 2 | F | Storage of OpenAPI specification files | 15.4.0 |
| 2019-06 | CT#84 | CP-191039 | 0039 | 1 | F | API URIs of the NRF | 15.4.0 |
| 2019-06 | CT#84 | CP-191039 | 0040 | 1 | F | Subscription to and notification of NSSF events | 15.4.0 |
| 2019-06 | CT#84 | CP-191039 | 0041 | 2 | F | Essential Correction on Application Error returned by NSSF | 15.4.0 |
| 2019-06 | CT#84 | CP-191039 | 0042 | 1 | F | Copyright Note in YAML file | 15.4.0 |
| 2019-06 | CT#84 | CP-191039 | 0043 |  | F | 3GPP TS 29.531 API version update | 15.4.0 |
| 2019-09 | CT#85 | CP-192111 | 0045 |  | F | Essential Correction on AllowedNssai | 15.5.0 |
| 2019-09 | CT#85 | CP-192131 | 0044 | 1 | B | Slice selection during handover from 4G to 5G | 16.0.0 |
| 2019-12 | CT#86 | CP-193048 | 0047 | 1 | B | Subscribed NSSAI from the UDM | 16.1.0 |
| 2019-12 | CT#86 | CP-193044 | 0049 |  | F | 3GPP TS 29.531 API version update | 16.1.0 |
| 2020-03 | CT#87 | CP-200039 | 0050 | 2 | F | Add Corresponding API descriptions in clause 5.1 | 16.2.0 |
| 2020-03 | CT#87 | CP-200020 | 0051 | 2 | B | Optimized NSSAI Availability Data encoding | 16.2.0 |
| 2020-03 | CT#87 | CP-200020 | 0052 | 3 | B | AMF Service Set ID in Nnssf\_NSSelection response | 16.2.0 |
| 2020-03 | CT#87 | CP-200039 | 0053 | 2 | D | Editorial corrections | 16.2.0 |
| 2020-03 | CT#87 | CP-200039 | 0054 | 1 | F | Correction - formatting consistency | 16.2.0 |
| 2020-03 | CT#87 | CP-200020 | 0055 | 2 | B | 29531 CR optionality of ProblemDetails | 16.2.0 |
| 2020-03 | CT#87 | CP-200020 | 0056 | 1 | F | Modifications in the API of Nnssf\_NSSAIAvailability service for the support of compression | 16.2.0 |
| 2020-03 | CT#87 | CP-200020 | 0057 | 2 | F | Corrections in the NSSF specification | 16.2.0 |
| 2020-03 | CT#87 | CP-200052 | 0058 |  | F | 3GPP TS 29.531 Rel16 API External doc update | 16.2.0 |
| 2020-07 | CT#88 | CP-201058 | 0059 |  | F | Storage of YAML files in ETSI Forge | 16.3.0 |
| 2020-07 | CT#88 | CP-201058 | 0060 | 3 | F | Supported Headers Tables for Request and Response codes | 16.3.0 |
| 2020-07 | CT#88 | CP-201058 | 0061 | 1 | F | Add a new Notifications Overview Table | 16.3.0 |
| 2020-07 | CT#88 | CP-201034 | 0062 | 1 | F | Remaining modifications in the API of Nnssf\_NSSAIAvailability service for the support of compression | 16.3.0 |
| 2020-07 | CT#88 | CP-201034 | 0063 |  | F | Slice Differentiator Ranges and Wildcard | 16.3.0 |
| 2020-07 | CT#88 | CP-201058 | 0064 | 1 | B | Restricted Snssai for roaming users | 16.3.0 |
| 2020-07 | CT#88 | CP-201034 | 0065 |  | F | PATCH Response | 16.3.0 |
| 2020-07 | CT#88 | CP-201058 | 0066 | 1 | F | Data type column in Resource URI variables Table | 16.3.0 |
| 2020-07 | CT#88 | CP-201058 | 0067 |  | F | mappingOfNssai IE in SliceInfoForRegistration | 16.3.0 |
| 2020-07 | CT#88 | CP-201058 | 0068 | 1 | F | URI of the Nnssf\_NSSelection and Nnssf\_NSSAIAvailability Services | 16.3.0 |
| 2020-07 | CT#88 | CP-201058 | 0069 | 1 | F | Error code corrections | 16.3.0 |
| 2020-07 | CT#88 | CP-201326 | 0071 | 1 | F | 29.531 Rel-16 API version and External doc update | 16.3.0 |
| 2020-09 | CT#89 | CP-202090 | 0072 |  | F | Essential correction to event SNSSAI\_STATUS\_CHANGE\_REPORT | 16.4.0 |
| 2020-09 | CT#89 | CP-202090 | 0073 | 1 | F | Slice selection based on Load Analytics Information from NWDAF | 16.4.0 |
| 2020-09 | CT#89 | CP-202090 | 0074 | 3 | F | TAI Range List Served by an AMF | 16.4.0 |
| 2020-09 | CT#89 | CP-202090 | 0077 | 1 | F | Request mapping of S-NSSAI | 16.4.0 |
| 2020-09 | CT#89 | CP-202090 | 0078 | 2 | F | Subscription modification | 16.4.0 |
| 2020-09 | CT#89 | CP-202035 | 0080 | 2 | F | Notify Empty Authorized NSSAI Availability | 16.4.0 |
| 2020-09 | CT#89 | CP-202096 | 0081 |  | F | 29.531 Rel-16 API version and External doc update | 16.4.0 |
| 2020-12 | CT#90-e | CP-203162 | 0082 | 1 | F | HTTP 3xx redirection | 16.5.0 |
| 2020-12 | CT#90-e | CP-203040 | 0083 | 1 | F | Mapping of S-NSSAIs in HPLMN and VPLMN | 16.5.0 |
| 2020-12 | CT#90-e | CP-203040 | 0084 | 1 | F | Number of allowed S-NSSAIs | 16.5.0 |
| 2020-12 | CT#90-e | CP-203035 | 0085 |  | F | Storage of YAML files in 3GPP Forge | 16.5.0 |
| 2020-12 | CT#90-e | CP-203036 | 0086 |  | F | API version and External doc update | 16.5.0 |
| 2021-03 | CT#91-e | CP-210043 | 0090 |  | F | OpenAPI syntax error | 16.6.0 |
| 2021-03 | CT#91-e | CP-210054 | 0091 |  | F | 29.531 Rel-16 API version and External doc update | 16.6.0 |
| 2021-03 | CT#91-e | CP-210034 | 0088 | 1 | F | OpenAPI Reference | 17.0.0 |
| 2021-03 | CT#91-e | CP-210025 | 0089 | 1 | F | N31 interface between NSSFs | 17.0.0 |
| 2021-06 | CT#92-e | CP-211083 | 0094 |  | A | Essential correction on Nssai Availability Document Update | 17.1.0 |
| 2021-06 | CT#92-e | CP-211028 | 0095 |  | F | Data Types Descriptions | 17.1.0 |
| 2021-06 | CT#92-e | CP-211059 | 0097 | 1 | F | Redirect Responses | 17.1.0 |
| 2021-06 | CT#92-e | CP-211046 | 0098 |  | F | Miscellaneous corrections | 17.1.0 |
| 2021-06 | CT#92-e | CP-211050 | 0100 |  | F | 29.531 Rel-17 API version and External doc update | 17.1.0 |
| 2021-09 | CT#93-e | CP-212075 | 0106 |  | A | Incorrect references | 17.2.0 |
| 2021-09 | CT#93-e | CP-212052 | 0101 |  | F | SNSSAI\_NOT\_SUPPORTED | 17.2.0 |
| 2021-09 | CT#93-e | CP-212030 | 0102 | 3 | B | NSSRG value | 17.2.0 |
| 2021-09 | CT#93-e | CP-212030 | 0103 | 3 | B | Missing indication of UE support of NSSRG functionality in NSSF service | 17.2.0 |
| 2021-09 | CT#93-e | CP-212030 | 0104 | 2 | B | Target NSSAI | 17.2.0 |
| 2021-09 | CT#93-e | CP-212045 | 0107 | 1 | F | NSSAIAvailability Notify | 17.2.0 |
| 2021-09 | CT#93-e | CP-212059 | 0108 |  | F | 29.531 Rel-17 API version and External doc update | 17.2.0 |
| 2021-12 | CT#94-e | CP-213085 | 0111 |  | B | Indicating possible use of OAuth2 authorization in NSSF response | 17.3.0 |
| 2021-12 | CT#94-e | CP-213085 | 0114 |  | F | Corrections to the API URI | 17.3.0 |
| 2021-12 | CT#94-e | CP-213086 | 0112 | 1 | F | Correction on requestedNssai | 17.3.0 |
| 2021-12 | CT#94-e | CP-213086 | 0115 |  | F | Notification Errors | 17.3.0 |
| 2021-12 | CT#94-e | CP-213092 | 0110 | 1 | B | UDM indication to provide full set of subscribed S-NSSAIs | 17.3.0 |
| 2021-12 | CT#94-e | CP-213092 | 0113 | 1 | B | Rejected S-NSSAIs for RA in NS Selection | 17.3.0 |
| 2021-12 | CT#94-e | CP-213092 | 0119 | 1 | B | Target NSSAI correction | 17.3.0 |
| 2021-12 | CT#94-e | CP-213092 | 0116 |  | F | Configured NSSAI can include S-NSSAIs with different NSSRG values | 17.3.0 |
| 2021-12 | CT#94-e | CP-213113 | 0117 | 1 | F | Configured NSSAI shall be returned by NSSF to AMF during UCU procedure | 17.3.0 |
| 2021-12 | CT#94-e | CP-213113 | 0118 | 1 | F | Clarification on the condition when AMF can retrieve slice mapping information | 17.3.0 |
| 2021-12 | CT#94-e | CP-213121 | 0120 |  | F | 29.531 Rel-17 API version and External doc update | 17.3.0 |
| 2022-03 | CT#95-e | CP-220024 | 0126 |  | F | Formatting of Description Fields | 17.4.0 |
| 2022-03 | CT#95-e | CP-220087 | 0122 |  | F | Correction on ExtSnssai | 17.4.0 |
| 2022-03 | CT#95-e | CP-220087 | 0123 |  | F | Adding use case for sending Allowed NSSAI aligned with stage 2 | 17.4.0 |
| 2022-03 | CT#95-e | CP-220092 | 0124 | 1 | D | Capitalize allowed NSSAI and target NSSAI | 17.4.0 |
| 2022-03 | CT#95-e | CP-220066 | 0127 |  | F | 29.531 Rel-17 API version and External doc update | 17.4.0 |
| 2022-06 | CT#96 | CP-221033 | 0129 | 1 | F | Redirect or handover the UE to a cell of another TA | 17.5.0 |
| 2022-06 | CT#96 | CP-221029 | 0130 | 2 | F | Clarification on targetAmfSet in AuthorizedNetworkSliceInfo | 17.5.0 |
| 2022-06 | CT#96 | CP-221055 | 0131 | 4 | F | Nnssf\_NSSelection service update to support NSAG | 17.5.0 |
| 2022-06 | CT#96 | CP-221055 | 0132 | 3 | F | Nnssf\_NSSAIAvailability service update to support NSAG | 17.5.0 |
| 2022-06 | CT#96 | CP-221033 | 0135 | 1 | F | Correction on OpenAPI | 17.5.0 |
| 2022-06 | CT#96 | CP-221051 | 0136 |  | F | 29.531 Rel-17 API version and External doc update | 17.5.0 |
| 2022-09 | CT#97e | CP-222055 | 0140 | 1 | F | Cleanup of the service operation description | 17.6.0 |
| 2022-09 | CT#97e | CP-222021 | 0137 | 1 | B | Subscribe to All TAIs for AMF Set | 18.0.0 |
| 2022-09 | CT#97e | CP-222025 | 0142 |  | F | 29.531 Rel-18 API version and External doc update | 18.0.0 |
| 2022-12 | CT#98e | CP-223028 | 0143 | 1 | F | Missing mandatory status codes in OpenAPI | 18.1.0 |
| 2022-12 | CT#98e | CP-223033 | 0144 | - | F | 29.531 Rel-18 API version and External doc update | 18.1.0 |
| 2023-03 | CT#99 | CP-230072 | 0146 | 1 | A | Essential correction of MNC encoding targetAmfSet | 18.2.0 |
| 2023-03 | CT#99 | CP-230071 | 0148 | - | F | 29.531 Rel-18 API version and External doc update | 18.2.0 |
| 2023-06 | CT#100 | CP-231028 | 0147 | 3 | F | Location header description | 18.3.0 |
| 2023-06 | CT#100 | CP-231027 | 0151 | 1 | F | Clarify the inclusion of targetAmfSet IE and candidateAmfList IE | 18.3.0 |
| 2023-06 | CT#100 | CP-231025 | 0152 | - | F | Clarify the inclusion of ueSupNssrgInd IE | 18.3.0 |
| 2023-06 | CT#100 | CP-231027 | 0153 | 1 | F | Clarify the content of mappingOfNssai IE | 18.3.0 |
| 2023-06 | CT#100 | CP-231025 | 0154 | - | F | Update data types re-used by Nnssf\_NSSelection service | 18.3.0 |
| 2023-06 | CT#100 | CP-231048 | 0155 | 1 | B | Discontinuity of NSI for PDU sessions | 18.3.0 |
| 2023-06 | CT#100 | CP-231048 | 0156 | 5 | B | Support of Alternative S-NSSAI | 18.3.0 |
| 2023-06 | CT#100 | CP-231069 | 0159 | 1 | F | Editorial corrections | 18.3.0 |
| 2023-06 | CT#100 | CP-231028 | 0160 | - | F | Removal of apiVersion from resource URI variables tables | 18.3.0 |
| 2023-06 | CT#100 | CP-231070 | 0161 | - | F | 29.531 Rel-18 API version and External doc update | 18.3.0 |
| 2023-09 | CT#101 | CP-232069 | 0163 | 3 | B | Updates on Subscription, Unsubscription and Notification of NSSF for Network Slice and Network Slice Instance replacement | 18.4.0 |
| 2023-09 | CT#101 | CP-232043 | 0164 | 1 | B | Nnssf\_NSSAIAvailability Service updata for Network Slice Replacement | 18.4.0 |
| 2023-09 | CT#101 | CP-232043 | 0165 | 1 | B | Remove the Editor's NOTE on Network Slice instance Replacement | 18.4.0 |
| 2023-09 | CT#101 | CP-232058 | 0166 | 1 | F | Major API version | 18.4.0 |
| 2023-09 | CT#101 | CP-232060 | 0167 | - | F | 29.531 Rel-18 API version and External doc update | 18.4.0 |
| 2023-12 | CT#102 | CP-233027 | 0168 | - | F | HTTP RFCs obsoleted by IETF RFC 9110 and 9113 | 18.5.0 |
| 2023-12 | CT#102 | CP-233044 | 0169 | - | F | Correction on the description of DateTime | 18.5.0 |
| 2023-12 | CT#102 | CP-233071 | 0172 | 2 | A | Update of subscribed NSSAI when UE is not registered in network | 18.5.0 |
| 2023-12 | CT#102 | CP-233058 | 0175 | 3 | A | Correction of API TS29531\_Nnssf\_NSSAIAvailability.yaml, error in amfSetId pattern | 18.5.0 |
| 2023-12 | CT#102 | CP-233030 | 0176 | - | F | ProblemDetails RFC 7807 obsoleted by 9457 | 18.5.0 |
| 2023-12 | CT#102 | CP-233060 | 0180 | - | F | 29.531 Rel-18 API version and External doc update | 18.5.0 |