**3GPP TSG-CT WG4 Meeting #99eC4-204269**

**E-Meeting, 18th – 28th August 2020**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **29.531** | **CR** | **0080** | **rev** | **1** | **Current version:** | **16.3.0** |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
|  | | | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
| ***Title:*** | Notify Empty Authorized NSSAI Availability | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Ericsson, Huawei | | | | | | | | | |
| ***Source to TSG:*** | CT4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | TEI16, 5GS\_Ph1-CT | | | | |  | ***Date:*** | | | 2020-08-24 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-16 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) Rel-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | 3GPP 29.531 specified that NSSF sends notification to NF consumer (e.g. AMF) when Authorized NSSAI Availability information is changed in a NssfEventNotifiation data object. If no supported SNSSAIs authorized by the NSSF for all the TAs, the NSSF should indicate notify AMF that Authorized SNSSAI Availability is empty. This is not supported in current API as NssfEventNotification must include at least 1 AuthorizedNssaiAvailabilityData attribute in API definition:  Table 6.2.6.2.10-1: Definition of type NssfEventNotification   |  |  |  |  | | --- | --- | --- | --- | | Attribute name | Data type | P | Cardinality | | subscriptionId | string | M | 1 | | authorizedNssaiAvailabilityData | array(AuthorizedNssaiAvailabilityData) | M | 1..N |   The CR proposes to allow NSSF to send empty array in notification to indicate the scenario.  An optional feature is introduced to allow NSSF to omit sending empty array to legacy NF consumer thus to avoid negative responses. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | 1/ Change cardinality of authorizedNssaiAvailabilityData to "0..N"  2/ Add new optional feature "EANAN" to support handling empty array  3/ Add supportedFeatures IE for subscription creation  4/ Add description and table note for NSSF omitting empty array to legacy NF consumer  5/ Update OpenAPI accordingly  6/ Correct name to Callback URIs | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Empty Authorized NSSAI Availability Information cannot be notified to AMF which leads to potential misuse of unauthorized NSSAIs. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.3.2.5.1, 6.2.5.1, 6.2.5.2.2, 6.2.6.2.8, 6.2.6.2.9, 6.2.6.2.10, 6.2.8, A.3 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **x** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | | This CR introduces backward compatible corrections to OpenAPI file of Nssf\_NSSAIAvailability API.  NOTE: Even though it is not backward compatible according to OpenAPI specification, the proposed change can be qualified as BC change, as it will not impact any existing features on legacy NF consumer. | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | Rev1:  1/ Change baseline to Rel-16  2/ Add Huawei as co-source  3/ Editorial corrections.  4/ Merge changes for callback URI clarification from CR0076 | | | | | | | | |

\* \* \* First Change \* \* \* \*

##### 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.



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). The payload body of the POST request shall contain the one representation of the individual NssfEventNotification resource. 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.

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

\* \* \* Next Change \* \* \* \*

#### 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 |  |

\* \* \* Next Change \* \* \* \*

##### 6.2.5.2.2 Notification Definition

Callback URI: {nfNssaiAvailabilityUri}

This callback URI is provided by the NF Service Consumer (e.g. AMF) during NSSAI Availability Information update 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. |

\* \* \* Next Change \* \* \* \*

##### 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 |
| nfNssaiAvailabilityUri | Uri | M | 1 | Identifies the recipient of notifications sent by the NF service consumer (e.g. AMF) for this subscription |
| taiList | array(Tai) | M | 1..N | Identifies the TAIs supported by the NF service consumer (e.g. AMF). |
| event | NssfEventType | M | 1 | Describes the event to be subscribed for this subscription. |
| expiry | DateTime | O | 0..1 | This IE may be included by the NF service consumer. When present, this IE shall represent the suggested time after which the subscription becomes invalid. |
| amfSetId | string | O | 0..1 | This IE may be included 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}$' |
| supportedFeatures | SupportedFeatures | C | 0..1 | This IE shall be present if at least one optional feature defined in clause 6.2.8 is supported. |

\* \* \* Next Change \* \* \* \*

##### 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 AMF needs to include an expiry time. When present, it represents the 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 | 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, the NSSF may include this IE. |
| supportedFeatures | SupportedFeatures | C | 0..1 | This IE shall be present if at least one optional feature defined in clause 6.2.8 is supported. |

\* \* \* Next Change \* \* \* \*

##### 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 |
| 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) | M | 0..N | 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) |
| NOTE: 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, | | | | |

\* \* \* Next Change \* \* \* \*

### 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 | 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. |
| 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. | | | |

\* \* \* Next Change \* \* \* \*

## A.3 Nnssf\_NSSAIAvailability API

openapi: 3.0.0

info:

version: '1.0.2'

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 V15.3.0; 5G System; Network Slice Selection Services; Stage 3

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

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Text Skipped for Clarify \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

NssfEventNotification:

type: object

required:

- subscriptionId

- authorizedNssaiAvailabilityData

properties:

subscriptionId:

type: string

authorizedNssaiAvailabilityData:

type: array

items:

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

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Text Skipped for Clarify \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

\* \* \* End of Changes \* \* \* \*