**3GPP TSG-CT WG4 Meeting #99eC4-204xxx**

**E-Meeting, 18th – 28th August 2020 *Revision of C4-204176***

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **29.531** | **CR** | **0078** | **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** |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
| ***Title:*** | Subscription modification | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei | | | | | | | | | |
| ***Source to TSG:*** | CT4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | TEI16 | | | | |  | ***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:*** | | AMF will subscribe to a notification of any changes in status of the NSSAI availability information upon this is updated by another AMF, the consumer AMF may need to update the subscription, e.g. the support TAIs are modified. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Support the modification of subscription | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | AMF is not able to update the support TAs in subscribe, which may cause extra signalling. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.3.2.3.1, 5.3.2.3.2(new), 6.2.3.1, 6.2.3.4.3.1, 6.2.3.4.3.2 (new), 6.2.6.2.7, 6.2.7.3, 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 the OpenAPI file for *Nnssf\_NSSAIAvailability* API.  taiRangeList IE described in clause 5.3.2.3.2 is defined in CR 0074. | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

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

#### 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) to subscribe to a notification 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 payload body of the POST request shall contain a representation of the individual event subscription resource to be created in the NssfEventSubscriptionCreateData. 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).

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

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

##### 5.3.2.3.2 Modification of a subscription

The Subscribe Operation is used by a NF Service Consumer (e.g. AMF) towards the NSSF, when it needs to modify an existing subscription previously created by itself at the AMF.

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) shall send a PATCH request to the resource URI identifying the individual subscription resource. The payload of the body 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 updating the taiList or taiRangeList IE, the NF Service Consumer shall update the same IE included in subscription creation, e.g. if the AMF provides taiList IE in subscription creation, the AMF shall update the taiList IE during subscription modification, instead of replacing taiList IE with taiRangeList IE.

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

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

#### 6.2.3.1 Overview



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. |
| Individual NSSAI Availability Notification Subscriptions | /nssai-availability/subscriptions/{subscriptionId} | DELETE | Unsubscribe to the notification of any changes to the NSSAI availability information. |
| PATCH | Modify a subscription. |

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

###### 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. |
| ProblemDetails | O | 0..1 | 404 Not Found | This represents the case when the subscription resource is unavailable. |
| NOTE: 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]). | | | | |

###### 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. |
| 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: 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]). | | | | |

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

##### 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]. |

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

#### 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 |
| 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. |

\* \* \* 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 | 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). |
| x | 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). |
| 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: '1.1.0'

title: 'NSSF NSSAI Availability'

description: |

NSSF NSSAI Availability Service.

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[…]

/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)

'400':

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

'401':

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

'404':

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

'429':

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

'500':

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

'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 7231

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 7231

schema:

type: string

'400':

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

'401':

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

'403':

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

'404':

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

'411':

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

'413':

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

'415':

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

'429':

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

'500':

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

'503':

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

default:

description: Unexpected error

[…]

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