**3GPP TSG- Meeting #**

**, , -**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  |  | **CR** |  | **rev** |  | **Current version:** |  |  |
|  | | | | | | | | |
| *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 |  |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
| ***Title:*** |  | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** |  | | | | | | | | | |
| ***Source to TSG:*** |  | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** |  | | | | |  | ***Date:*** | | |  |
|  |  | | | |  | |  | | |  |
| ***Category:*** |  |  | | | | | ***Release:*** | | |  |
|  | *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-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | This paper provides the detailed functional model, as well as the SEAL API details for the introduced network slice capability management (NSCM) functionality at SEAL spec (in clause 16 of TS23.434). | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | In clause 16, we provided input to the 16.2 clause and sub-clauses which relate to the functional model for NSCM. Also, 16.4 was provided (which relates to the SEAL API for NSCM operation). Finally this contribution provides necessary updates in clause 16.3 and changes the name of slice enabler layer from NSE to NSCM. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The details on functional model and API description for NSCM feature will not be specified. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  |  | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  |  | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  |  | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

\* \* \* \* \* \* \* FIRST CHANGE \* \* \* \* \* \* \*

# 16 Network slice capability management

## 16.1 General

The network slice capability management is a SEAL service that offers network slice capability management capabilities, such as support for vertical application to slice re-mapping, to one or more vertical applications.

## 16.2 Functional model

### 16.2.1 General

The functional model for the network slice capability management is based on the generic functional model specified in clause 6.2. It is organized into functional entities to describe a functional architecture which addresses the support for network slice capability management aspects for vertical applications. Since the slicing is a feature which considers the Uu interfaces, only the on-network functional model is specified in this clause.

### 16.2.2 Functional model description

Figure 16.2.2-1 illustrates the generic functional model for network slice capability management.



Figure 16.2.2-1: Functional model for network slice capability management

The network slice capability management client communicates with the network slice capability management server over the NSCM-UU reference point. The network slice capability management client provides the support for network slice capability management functions to the VAL client(s) over NSCM‑C reference point. The VAL server(s) communicates with the network slice capability management server over the NSCM-S reference point. It is assumed that the network slice capability management server is deployed at the 5G system domain. The network slice capability management server, acting as AF, may communicate with the 5G Core Network functions via NEF (N33) or via N5 reference point (for interactions with PCF).

### 16.2.3 Functional entities description

#### 16.2.3.1 General

The functional entities for network slice capability management SEAL service are described in the following subclauses.

#### 16.2.3.2 Network slice capability management server

The network slice capability management server functional entity provides the enablement of the network slicing aspects to support the VAL applications. Such enablement supports the mapping or migration of one or more vertical applications to one or more network slices (from a set of network slices, as provided by the 3GPP network system) as described in procedure in clause 16.3.2.

The network slice capability management server is deployed at the 5G system domain and may interact with 5GC functions, acting as AF.

#### 16.2.3.3 Network slice capability management client

The network slice capability management client functional entity acts as the application client for the slice enablement. The network slice capability management client interacts with the network slice capability management server to receive a network slice configuration or re-mapping instruction,

The network slice capability management client, after receiving the network slice configuration or re-mapping instruction updates the connection capabilities (which are provided by the UE application as specified in Table 6.6.2.1-2 of TS 23.503) and triggers at the NAS layer the re-mapping of application traffic to new PDU session based on the updated URSP rules (based on UE re-evaluation as in 23.503).

### 16.2.4 Reference points description

#### 16.2.4.1 General

The reference points for the functional model for network slice capability management are described in the following subclauses.

#### 16.2.4.2 NSCM-UU

The interactions related to network slice capability management functions between the network slice capability management server and the network slice capability management client are supported by NSCM-UU reference point. This reference point utilizes Uu reference point as described in 3GPP TS 23.501 [10].

#### 16.2.4.3 NSCM-C

The interactions related to network slice capability management functions between the VAL client(s) and the network slice capability management client within a VAL UE are supported by the NSCM-C reference point.

Editor's Note: The functions enabled over NSCM-C reference point is FFS.

#### 16.2.4.4 NSCM-S

The interactions related to network slice capability management functions between the VAL server(s) and the network slice capability management server are supported by the NSCM-S reference point. This reference point is an instance of CAPIF-2 reference point as specified in 3GPP TS 23.222 [8].

#### 16.2.4.6 N5

The reference point N5 supports the interactions between the network slice capability management server and the PCF and is specified in 3GPP TS 23.501 [10].

Editor's Note: The functions enabled over N5 reference point is FFS.

#### 16.2.4.7 N33

The reference point N33 supports the interactions between the network slice capability management server and the NEF and is specified in 3GPP TS 23.501 [10].

Editor's Note: The functions enabled over N33 reference point is FFS.

## 16.3 Procedures and information flows for network slice capability management

### 16.3.1 General

### 16.3.2 Network slice adaptation for VAL application

#### 16.3.2.1 General

This subclause describes the procedure for network slice adaptation at the Network Slice Capability Management (NSCM) server, based on a request from a VAL server to adapt the network slice for the VAL application. This request is handled between the NSCM server and the NSCM client per each VAL UE of the VAL application.

NOTE: This capability applies to deployments where the NSCM layer is deployed within the MNO domain

#### 16.3.2.2 Information flows

##### 16.3.2.2.1 Network slice adaptation request

Table 16.3.2.2.1-1 describes the information flow network slice adaptation request from the VAL server to the NSCM server.

Table 16.3.2.2.1-1: Network slice adaptation request

|  |  |  |
| --- | --- | --- |
| Information element | Status | Description |
| VAL service ID | M | The VAL service ID of the VAL application for which the network slice adaptation may corresponds to. |
| Network slice adaptation cause | O | The cause which necessitate the network slice change (e.g. VAL service profile change, VAL service operation, VAL UE / group mobility). |
| Requested S-NSSAI | O | Indication of the new S-NSSAI which is requested. |
| Requested DNN | O | Indication of the new DNN which is requested. |

Editor's note: The details of Network slice adaptation request is FFS

##### 16.3.2.2.2 Network slice adaptation response

Table 16.3.2.2.2-1 describes the information flow network slice adaptation response from the NSCM server to the VAL server.

Table 16.3.2.2.2-1: Network slice adaptation response

|  |  |  |
| --- | --- | --- |
| Information element | Status | Description |
| Result | M | Result includes success or failure of the network slice adaptation with the underlying network. |

##### 16.3.2.2.3 Network slice configuration request

Table 16.3.2.2.3-1 describes the information flow network slice configuration request from the NSCM server to the NSCM client.

Table 16.3.2.2.3-1: Network slice configuration request

|  |  |  |
| --- | --- | --- |
| Information element | Status | Description |
| NSCM server ID | M | The NSCM server ID which requests the network slice configuration |
| VAL service ID | M | The VAL service ID of the VAL application for which the network slice configuration may corresponds to. |
| Requested S-NSSAI | M | Indication of the new S-NSSAI which is requested. |
| Requested DNN | O | Indication of the new DNN which is requested. |

##### 16.3.2.2.4 Network slice configuration response

Table 16.3.2.2.4-1 describes the information flow network slice configuration response from the NSCM client to the NSCM server.

Table 16.3.2.2.4-1: Network slice configuration response

|  |  |  |
| --- | --- | --- |
| Information element | Status | Description |
| Result | M | Result includes success or failure of the network slice configuration with the underlying network. |

#### 16.3.2.3 Procedure for network slice adaptation for VAL application

Figure 16.3.2.3-1 illustrates the procedure where the NSCM server supports the network slice adaptation with the underlying 3GPP system for the VAL UEs of the VAL application.



Figure 16.3.2.3-1: Network slice adaptation for VAL application

1. The VAL server sends a network slice adaptation request to the NSCM server for the VAL application (and the VAL UEs within the VAL application). This request may be in the form of exact requested network slice (and optionally DNN) for all the VAL UEs of the VAL application; or indication that the VAL application needs to be remapped to a different network slice (and optionally DNN).

2. The NSCM server processes the request and triggers the network slice configuration per VAL UE within the VAL Application.

Editor's note: Further details for step 2 consider the request details in step 1 is FFS.

3. The NSCM server sends a network slice configuration request to the NSCM client, including the target S-NSSAI (and optionally DNN). This information will be used as part of the local URSP at the VAL UE side.

4. The NSCM client, based on the received network slice configuration request, updates the connection capabilities (as specified in Table 6.6.2.1-2 of TS 23.503) and triggers at the NAS layer the re-mapping of application traffic to new PDU session based on the updated URSP rules (based on UE re-evaluation as in 23.503). Then, NSCM client sends a network slice configuration response to the NSCM server to inform on the result.

5. The NSCM server provides a network slice adaptation response to the VAL server, providing information on the fulfilment of the network slice adaptation request per VAL application.

## 

## 16.4 SEAL APIs for network slice capability management

### 16.4.1 General

Table 16.4.1-1 illustrates the SEAL APIs for network slice capability management.

Table 16.4.1-1: List of SEAL APIs for network slice capability management

|  |  |  |  |
| --- | --- | --- | --- |
| API Name | API Operations | Known Consumer(s) | Communication Type |
| SS\_NetworkSliceAdaptation | Network\_slice\_adaptation | VAL server | Request /Response |

### 16.4.2 SS\_NetworkSliceAdaptation API

#### 16.4.2.1 General

**API description:** This API enables the VAL server to communicate with the network slice capability management server for network slice adaptation over NSCM-S.

#### 16.4.2.2 Network\_Slice\_Adaptation

**API operation name:** Network\_Slice\_Adaptation

**Description:** Requesting for network slice adaptation.

**Known Consumers:** VAL server.

**Inputs:** See subclause 16.3.2.2.1

**Outputs:** See subclause 16.3.2.2.2

See subclause 16.3.2.3 for the details of usage of this API operation.