**3GPP TSG- Meeting #S4-240282**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  |  | **CR** | **0001** | **rev** | **-** | **Current version:** |  |  |
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| *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)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

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| ***Title:*** | Addressing editor notes and missing details in TR 26.941 | | | | | | | | | |
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| ***Source to WG:*** | Samsung Electronics Co. Ltd. | | | | | | | | | |
| ***Source to TSG:*** | S4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | FS\_MS\_NS\_Ph2, TEI18 | | | | |  | ***Date:*** | | |  |
|  |  | | | |  | |  | | |  |
| ***Category:*** | F |  | | | | | ***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-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
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| ***Reason for change:*** | | Filling some missing details and addressing incomplete editor notes based on work done in other 3GPP groups | | | | | | | | |
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| ***Summary of change:*** | | Align network slice replacement procedure with latest SA2 specification, and network slice capability enablement with latest SA6 specification for completion | | | | | | | | |
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| ***Consequences if not approved:*** | | The specification will be left incomplete | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 4.2.2, 5.2.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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's revision history:*** | |  | | | | | | | | |

\* \* \* \* First change \* \* \* \*

### 4.2.2 Network slicing for specific applications

Before application services are allowed to access specific network slices, a third-party Application Service Provider can negotiate with the MNO and the MNO may create or allocate the network slices based on the service requirements. For example, a cloud gaming service provider may interact with the MNO to reserve specific network slices supporting low latency, and high computing resources.

Afterwards, the Application Function, on behalf of the Application Service Provider, informs the 5GC that the target application service can use the specific network slices, i.e., by providing application guidance for UE Route Selection Policy (URSP) determination as defined in clause 4.15.6.10 of TS 23.502 [15]. Depending on the nature of the application guidance, the operator may update the Network Slice Selection policies in the URSP accordingly. As a consequence, the application service may be migrated to the new network slice/DNN duple based on the updated URSP rule.

The URSP rules in the UE, which are used to associate applications with usage of particular network slices, may be pre-configured or provided by the PCF as defined in TS 23.503 [16]. Each URSP rule is expressed as a traffic descriptor for application detection, e.g. IP descriptors, application descriptors, domain descriptors.

NOTE: There is no restriction on which part of UE should (re-)evaluate the URSP rules. This may be done by either the Operating System or the modem layer.

Once an application is started or detected on the UE, the following procedure is followed:

1. The UE evaluates its URSP rules in the order of Rule Precedence and determines whether the application matches the Traffic descriptor of any URSP rule.

a. When a URSP rule is determined to be applicable for a given application, the UE derives the suitable network slices based on the applicable URSP rule.

b. If the UE determines that there is more than one existing PDU Session which matches a given URSP rule, it is up to UE implementation (Operating System or modem layer) to select one of them to use. Otherwise, the UE tries to establish a new PDU Session using the derived network slices.

2. If there is no matching URSP rule (except the “match all” rule), the UE uses its own local configuration (if any) to determine which PDU Session to use.

NOTE: The UE local configuration in this context is information about the associated application, such as application-specific parameters to set up a PDU Session or end user configuration for specific applications. This can be provisioned in the UE via the application layer, e.g. following interaction between the Edge Enabler Client (EEC) and the Edge Configuration Server (ECS), as defined in TS 23.558 [24].

3. When URSP rules are updated, or when a particular URSP rule’s validity changes, the association of existing applications to PDU Sessions may need to be re-evaluated.

4. Depending on UE implementation, the associations between applications and PDU Sessions may also be re-evaluated periodically, independent of any changes to URSP rules.

In the case where a network slice becomes unavailable (e.g. due to overload), the AMF is triggered, either by local configuration (e.g. trigger from OAM) or by a notification from the Access and Mobility Management PCF (AM PCF) or by the NSSF [26], to replace the current S‑NSSAI with a previously chosen Alternative S-NSSAI. Using a suitable NAS procedure (e.g. UE Configuration Update) the AMF informs the UE about the Alternative S-NSSAI as well as providing the mapping between S-NSSAI(s) and Alternative S-NSSAI(s) in the Allowed NSSAI and/or in the Configured NSSAI.

1. In the case where there is no existing PDU Session in the unavailable slice and the UE is trying to establish a new one to support a 5G Media Streaming session, the UE may provide both the Alternative S-NSSAI and the current S-NSSAI in the PDU Session Establishment message, in which case the AMF provides both S-NSSAI values to the SMF for the PDU Session establishment. The SMF proceeds with the PDU Session Establishment using the Alternative S-NSSAI. As a result, the new PDU Session is established over the Alternative S-NSSAI with a new IP address.

2. In the case where an ongoing 5G Media Streaming session is already being carried over the PDU Session associated with the unavailable slice, the AMF informs the SMF responsible for the PDU Session that it is to be transferred to the Alternative S-NSSAI. Then, depending on the Session and Service Continuity (SSC) mode of the existing PDU Session, either:

- *SSC mode 1*: The SMF further updates the network slices in the UE/RAN/UPF via the PDU Session Modification procedure. In this case, the IP address of the PDU Session remains the same.

- *SSC mode 2 or 3*: The SMF triggers the modification/release of the PDU Session and re-establishment of the PDU Session in the Alternative S-NSSAI. In this case, a new IP address is allocated during the PDU Session re-establishment procedure and the ongoing 5G Media Streaming session at reference point M4 and M5 needs to be migrated to the new PDU Session.

When the AMF is notified that the replaced network slice has become available again (e.g., congestion has been mitigated), the AMF reconfigures the UE (e.g., by using the UE Configuration Update procedure or else as a matter of course when the UE next registers with the network) to use the replaced S-NSSAI if it has already configured the UE to use the Alternative S-NSSAI when the S-NSSAI became unavailable. Furthermore, if a PDU Session was established in the Alternative S-NSSAI when the replaced S-NSSAI became unavailable, the AMF triggers transfer of that PDU Session to the replaced S-NSSAI when the S-NSSAI becomes available again by updating the SMF(s) of the PDU Session using the Nsmf\_PDUSession\_UpdateSMContext service operation described in clause 5.2.8.2.6 of TS 26.502 [15].

\* \* \* \* Second change \* \* \* \*

### 5.2.2 Scenario 2: Third-party-managed network slicing

In this scenario, a third party requests that the operator provisions a network slice based on certain requirements. The operator provisions a network slice and hands it over to the third party. This mode of operation is specified in TS 28.530 [3] and is referred to as Network Slice-as-a-Service (NSaaS). Once the slice is handed over, the third party may enhance the network slice e.g., by adding custom network functions, modifying slice configuration, etc.

A method for negotiating requirements for NSaaS service is the use of GST attributes specified by the GSM Association in GSMA NG.116 [5]. In addition to the performance-related characteristics, a number of scalability-related attributes may be used to describe the requirements of the slice to be provisioned in the 5G System.

The third party then provides the network slice resources to its customers. As described in the previous scenario, customers of the third party may then negotiate with the third party to set up communication services in that network slice. The users of these customers will then be able to access the customer’s service using the provisioned network slice.

An Application Service Provider may function as the third party in this scenario in which case it receives a provisioned network slice as a service from the Mobile Network Operator. In this case, in addition to the capabilities described in TS 26.501 [20] and TS 26.512 [21] a 5GMS Application Provider in the role of Application Service Provider may have additional facilities to control and manage the resources of the network slice.

A 5GMS Application Provider with the additional role of Network Slice Capability Exposure (NSCE) service provider may provide Network Slice Capability Exposure services to its users for Application Layer Enablement using the procedures and information flows specified in TS 23.435 [9]. Following are some of the network slice capability enablement features, a 5GMS Application Provider may benefit from:

1. Receive application layer network slice life-cycle management information based on network slice status collected from the 5G System (clause 9.4 of [9]). The 5GMS Application Provider may use this information to potentially activate feature such as metrics reporting (clause 7.8 of TS 26.512 [21]) and consumption reporting (clause 7.7 of TS 26.512 [21]), and update Policy Templates using Policy Template Provisioning API (clause 7.9 of TS 26.512 [21])

2. Network slice optimization based on customer application policy (clause 9.5 of [9]). The 5GMS Application Provider may use the policy information to potentially update Policy Templates for 5G Media Streaming using Policy Template Provisioning API (clause 7.9 of TS 26.512 [21])

3. For a given slice, discovery of management service capabilities and related permissions, and exposure of new or modified management service capabilities based on changes at OAM (clause 9.6 of [9]). The 5GMS Application Provider may use this information to potentially activate edge resource provisioning for 5G Media Streaming (clause 7.10 of TS 26.512 [21])

4. End-to-end network slice performance and analytics monitoring information based on data collected by the NSCE server from OAM, 5G Network etc. (clause 9.7 of [9]). The 5GMS Application Provider may use this information to potentially activate feature such as metrics reporting (clause 7.8 of TS 26.512 [21]) and consumption reporting (clause 7.7 of TS 26.512), and update Policy Templates using Policy Template Provisioning API (clause 7.9 of TS 26.512 [21])

5. Coordinated resource optimization across multiple slices to realize optimized and efficient resource usage among multiple slices sharing common network resources (clause 9.10 of [9]). The 5GMS Application Provider may potentially update Policy Templates for one or more network slices using Policy Template Provisioning API (clause 7.9 of TS 26.512 [21])

6. Network slice adaptation for customer application (clause 9.11 of [9]). Using this capability, the 5GMS Application Provider may potentially activate feature such as metrics reporting (clause 7.8 of TS 26.512 [21]) and consumption reporting (clause 7.7 of TS 26.512), and update Policy Templates using Policy Template Provisioning API (clause 7.9 of TS 26.512 [21])

7. Communication service life-cycle management to realize allocation of proper network slice resources to support customer application requirements (clause 9.12 of [9]). The 5GMS Application Provider may use this information to potentially negotiate requirements with the MNO as described in clause 4.3 of present document.

8. Receive network slice diagnostics information about specific event(s) related to service experience (clause 9.14 of [9]). The 5GMS Application Provider may use this information to potentially activate feature such as metrics reporting (clause 7.8 of TS 26.512 [21]) and consumption reporting (clause 7.7 of TS 26.512), and update Policy Templates using Policy Template Provisioning API (clause 7.9 of TS 26.512 [21])

9. Receive fault management information gathered from different data sources to identify problems relating to network connectivity and network performance (clause 9.15 of [9]). The 5GMS Application Provider may use this information to potentially activate feature such as metrics reporting (clause 7.8 of TS 26.512 [21]) and consumption reporting (clause 7.7 of TS 26.512), and update Policy Templates using Policy Template Provisioning API (clause 7.9 of TS 26.512 [21])

10. Verification of slice requirements and alignment capability based on QoS achievement status together with OAM QoS data versus the real customer QoS data collected from end users of customers (clause 9.16 of [9]). The 5GMS Application Provider may use this information to potentially activate feature such as metrics reporting (clause 7.8 of TS 26.512 [21]) and consumption reporting (clause 7.7 of TS 26.512), and update Policy Templates using Policy Template Provisioning API (clause 7.9 of TS 26.512 [21])

11. Receive network slice information e.g., retrieval and conversion of Network Slice Service Profile in 5GS as specified in TS 28.532 [12] (clause 9.17 of [9]). The 5GMS Application Provider may use this information to potentially negotiate requirements with the MNO as described in clause 4.3 of present document.

12. Perform network slice allocation if it cannot access 5G management system directly (clause 9.18 of [9]). The 5GMS Application Provider may use this information to potentially negotiate requirements with the MNO as described in clause 4.3 of present document.

\* \* \* \* End changes \* \* \* \*