**3GPP TSG-WG SA4 Meeting #122 *S4-230167***

**Athens, Greece, February 20-24, 2023**

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| *CR-Form-v12.2* | | | | | | | | |
| **PSEUDO CHANGE REQUEST** | | | | | | | | |
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|  | **.941** | **CR** | **pseudo** | **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)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

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| ***Title:*** | Clarification on traffic migration to different network slices. | | | | | | | | | |
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| ***Source to WG:*** | Huawei, HiSilicon | | | | | | | | | |
| ***Source to TSG:*** | SA4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | **FS\_MS\_NS\_Ph2** | | | | |  | ***Date:*** | | | 2023-02-09 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | F |  | | | | | ***Release:*** | | | Rel-18 |
|  | *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:*** | | Further clarify the existing mechanism and also the latest SA2 progress on the migration of application service to different network slices, including the URSP rule update based on the AF guidance or the network slice replacement in case of slice unavailability (e.g. due to overload) (see S2-2301602 approved in SA2#154AH). | | | | | | | | |
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| ***Summary of change:*** | | Clariify migration of application service to different network slices. | | | | | | | | |
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| ***Consequences if not approved:*** | | Existing mechanisms for application service migration to different network slices are missing as the baseline. | | | | | | | | |
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| ***Clauses affected:*** | | 4.2.2 | | | | | | | | |
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|  | | **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**

# 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 TR 26.804: "Study on 5G media streaming extensions".

[3] 3GPP TS 28.530: "Management and orchestration; Concepts, use cases and requirements".

[4] 3GPP TS 28.531: "Management and orchestration; Provisioning".

[5] GSM Association NG.116, “Generic Network Slice Template”,  
<https://www.gsma.com/newsroom/wp-content/uploads//NG.116-v6.0.pdf>

[6] 3GPP TR 23.700-40: “Study on enhancement of network slicing; Phase 2”

[7] 3GPP TS 23.501: "System architecture for the 5G System (5GS)".

[8] 3GPP TS 23.700‑99: "Study in Network slice capability exposure for application layer enablement (NSCALE)".

[9] 3GPP TS 23.435: "Procedures for Network Slice Capability Exposure for Application Layer Enablement Service".

[10] 3GPP TS 28.541: "Management and orchestration; 5G Network Resource Model (NRM); Stage 2 and stage 3".

[11] 3GPP TS 28.542: "Management and orchestration of networks and network slicing; 5G Core Network (5GC) Network Resource Model (NRM); Stage 1".

[12] 3GPP TS 28.532: "Management and orchestration; Generic management services".

[13] 3GPP TS 28.545: "Management and orchestration; Fault Supervision (FS)".

[14] 3GPP TS 28.546: "Management and orchestration of networks and network slicing; Fault Supervision (FS); Stage 2 and stage 3".

[15] 3GPP TS 23.502: "Procedures for the 5G System (5GS)".

[16] 3GPP TS 23.503: "Policy and charging control framework for the 5G System (5GS); Stage 2".

[17] 3GPP TS 23.434: "Service Enabler Architecture Layer for Verticals (SEAL); Functional architecture and information flows ".

[18] 3GPP TS 27.007: "AT command set for User Equipment (UE)".

[19] 3GPP TS 29.520: "5G System; Network Data Analytics Services; Stage 3".

[20] 3GPP TS 26501: "5G Media Streaming (5GMS); General description and architecture".

[21] 3GPP TS 26512: "5G Media Streaming (5GMS); Protocols".

[22] 3GPP TS 28.552: "Management and orchestration; 5G performance measurements".

[23] 3GPP TS 28.554: "Management and orchestration; 5G end to end Key Performance Indicators (KPI)".

[24] 3GPP TS 23.558: "Architecture for enabling Edge Applications".

[X] 3GPP TR 23.700-41: " Study on enhancement of network slicing; Phase 3".

## **Next 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 [X], to replace the current S‑NSSAI with a previously chosen Alternative S-NSSAI. The AMF provides the Alternative S-NSSAI to the UE as well as 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:

a) SSC is true and 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.

b) SSC is false and the SMF triggers the 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.

Editor’s note: the above descriptions of Network Slice Replacement will be updated to aligned with SA2’s conclusion.