**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 canbe 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**

### 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 pair of network slice/DNN 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 to replace an S‑NSSAI with an alternative S-NSSAI either based on local configuration (e.g. based on trigger from OAM) or based on a notification from the Access Management PCF (AM PCF) or NSSF. 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.

During the new PDU Session establishment procedure towards to a unavailable S-NSSAI which would be replaced by an Alternative S-NSSAI, 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.

For existing PDU Session associated with an S-NSSAI that is replaced with the Alternative S-NSSAI, the AMF informs the SMF responsible for the PDU Session that the PDU Session is to be transferred to Alternative S-NSSAI, and SMF further updates the network slices in the UE/RAN/UPF via PDU Session Modification procedure or triggers the re-establishment of the PDU Session with the Alternative S-NSSAI.

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