**3GPP TSG-S4 Meeting #120e *S4-221007***

 **E-meeting, 17th – 26th Aug 2022**

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| *CR-Form-v12.0* |
| **Pseudo CHANGE REQUEST** |
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|  | **26.941** | **CR** | **<CR#>** | **rev** | **<Rev#>** | **Current version:** | **<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 |  |

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| ***Title:***  | Network Slicing in SA2 |
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| ***Source to WG:*** | Huawei, HiSilicon |
| ***Source to TSG:*** | S4 |
|  |  |
| ***Work item code:*** | FS\_MS\_NS\_Ph2 |  | ***Date:*** | 2022-08-10 |
|  |  |  |  |  |
| ***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-12 (Release 12)**Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)* |
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| ***Reason for change:*** | In the SA#96e, the study of network slicing for 5G Media Streaming is approved. As the mentioned in the objectives, the potential issue/impact/gap needs further study. Therefore, it’s quite essential to firstly understand the current work in other WGs. This paper intends to give an introduction of network slicing work in SA2, especially the logic for the usage of network slicing for specific applications.  |
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| ***Summary of change:*** | An introduction of network slicing work in SA2, especially the logic for the usage of network slicing for specific applications.  |
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| ***Consequences if not approved:*** | The current status is not clear before starting the study item. |
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| ***Clauses affected:*** | 2, 4 |
|  |  |
|  | **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 \* \* \* \*

# 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*.

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

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

[Z] 3GPP TS 23.203: "Policies and Charging control architecture; Stage 2".

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

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

## 4.X Network slicing in SA2

### 4.X.1 General.

A Network Slice is a logical network with specific capabilities and characteristics as defined in clause 3.1 of [X]. According to the supported features, functionalities and different groups of UEs, the multiple Network Slices can be deployed by the operator. More specifically, the network slice can support different functionality (e.g., priority, policy control), different performance requirements (e.g., latency, data rates), or different targeted users (e.g., MPS users, Public Safety users, corporate customers, roamers, or MVNO hosting users). For example, based on the operator’s needs, there can be one network slice for MIoT services, one for supporting eMBB UEs and another one for V2X services.

A Network Slice instance is a set of Network Function instances and the required resources (e.g. compute, storage and networking resources) which form a deployed Network Slice. A slice instance includes both core network control plane and user plane network functions as defined in clause 4.15.1 of [X].

A UE can access multiple Network Slices simultaneously. The occurrence of PDU Session Establishment in a Network Slice instance to a DN allows data transmission in that Network Slice instance. The Network Slice Selection policies in the UE are used to associate an application with a specific network slice during PDU Session Establishment. A PDU Session belongs to one and only one specific Network Slice instance per PLMN. Therefore, different Network Slice instances do not share a PDU Session. But multiple PDU Sessions in a given Network Slice instance may be associated with the same DNN.

In addition, enhancements to interworking between the EPC and the 5GC have been made to the 5G System, and network slice-specific authentication and authorization are also supported. For each network slice that is subject to Network Slice Admission Control, the monitoring and control of the number of registered UEs, the number of PDU Sessions and the slice-maximum bit rate are defined in order to ensure that the maximum resource of the network slice is not exceeded.

### 4.X.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 [Y]. Depending on the nature of the application guidance, the operator may update the Network Slice Selection policies in the URSP accordingly.

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 [Z]. 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.

4. If there is no matching URSP rule (except the “match all” rule), the UE shall use the 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 [XX].

5. 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.

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