**3GPP TSG-SA WG4 Meeting #126 S4-231789**

**Meeting, 13 – 17 November 2023**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **26.941** | **pCR** |  | **rev** | **03** | **Current version:** | **1.0.0** |  |
|  | | | | | | | | |
| *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 | **x** | Radio Access Network |  | Core Network | **x** |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
| ***Title:*** | [FS\_MS\_NS\_Ph2]KI#2: Realising dynamic policies using different slices | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Nokia | | | | | | | | | |
| ***Source to TSG:*** | S4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | FS\_MS\_NS\_Ph2 | | | | |  | ***Date:*** | | | 04-11-2023 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | B |  | | | | | ***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)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Clause 6.2 containing the KI#2 of the latest version of TR 26.941 v 1.0.0 is left incomplete. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | This CR proposes candidate solution to the Key Issue #2 on realising dynamic policies using different slices. The description is added under clause 6.2.1.1 and the proposed new solution is added under clause 6.2.2.1. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | TR 26.941 will remain incomplete. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 6.2.1 (new), 6. 2.1.1 (new), 6.2.2 (new) and 6.2.2.1 (new) | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | |  | | | | | | | | |

|  |
| --- |
| 1st Change |

## 6.2 Key Issue #2: Realising dynamic policies using different slices

### 6.2.1 Description

#### 6.2.1.1 Slice selection for M5 dynamic policy requests

Editor’s Note: Key issue to cover study objective of identifying the appropriate network slice for outbound M5 dynamic policy requests from UE to AF.

Per clause 5 of TS 26.512 [4], uplink media streaming functional entities in the 5GMS System include the 5GMSu Application Provider, 5GMSu AF, 5GMSu AS. To make use of these entities, the UE includes a 5GMSu-Aware Application that is provided by the 5GMSu Application Provider and a 5GMSu Client comprising the Media Session Handler and the Media Streamer.

The architecture below is from TS 26.501 [3]. Figure 6.2.1.1‑1 represents the media architecture connecting UE internal functions and related network functions for uplink media streaming.



Figure 6.2.1.1‑1: Media architecture for unicast uplink media streaming (source: TS 26.501 [3])

The baseline procedure for uplink media streaming sessions is defined in clause 6.1 of TS 26.501 [3]. The steps pertinent to this Key Issue are:

- The dynamic policy invocation configuration information is first fetched by the Media Session Handler from the 5GMSu AF using the M5u Service Access Information API specified in clause 11.2 of TS 26.512 [4].

- When the UE wants a different network QoS policy for 5G Media Streaming, the Media Session Handler in the 5GMSu Client makes a Dynamic Policy creation request to the 5GMSu AF.

- Clause 7.9 of TS 26.512 [4] specifies the procedures for Policy Templates provisioning, using which an 5GMSu Application Provider configures a set of Policy Templates within the scope of the Provisioning Session that can be subsequently applied to downlink or uplink media streaming sessions.

- Clause 11.5 of TS 26.512 [4] specifies the M5u Dynamic Policies API that allows the Media Session Handler to request a specific policy and charging treatment to be applied to a particular application data flow of a downlink or uplink media streaming session. The Dynamic Policies API defines a set of data models, resources, and related procedures for the creation and management of the Dynamic Policy resource. The QoS parameters requested by the 5GMS Client are required to fall within the limits of the Policy Template indicated in the request.

Example use case: A camera is contributing a video stream to a centralised 5GMS AS via a 5G access network in a production environment. The camera is generating 720p video and is allocated a particular network slice by the MNO for its uplink media session. The camera is then reconfigured to produce 4K video and requires a slice with a different network QoS that supports the higher bit rate required. In this case, the UE sends out an M5u outbound Dynamic Policy request to the 5GMSu AF.

**Open question:** How does the Media Session Handler establish an uplink media streaming session with the 5GMSu AF via the M5u interface based on the configuration information received over the M5u interface and a request from the Media Streamer received over the M6u interface. The objective is to select a proper DNN/Slice to carry the uplink M5u dynamic policy request. The dynamic policy invocation can be carried over the existing (first) slice or a new slice (if the first slice is not available) for this higher bit rate.

### 6.2.2 Candidate solutions

#### 6.2.2.1 Candidate solution #1 Dynamic Policy based on Network Slicing for Uplink Media Streaming

Assumptions:

1. Before application services are allowed to access specific Network Slices, a third-party Application Service Provider (in this case, a 5GMSu Application Provider) negotiates with the MNO (in this case a 5GMS System operator) to create or allocate Network Slices based on the service requirements.

2. Afterwards, the Application Function (in this case a 5GMSu AF), on behalf of the Application Service Provider, informs the 5GC that the target application service can use the negotiated 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 [1]. Depending on the nature of the application guidance, the MNO (5GMS System 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.

3. All M4u and M5u interactions occur through a PDU Session established within the provisioned Network Slice.

This candidate solution is summarised as follows:

- The 5GMSu Application Provider requests from the MNO (5GMS System operator) the assignment of more than one Network Slice for the distribution of the service. The 5GMSu Application Provider indicates the desired Network Slice features that correspond to the Service Access Information. Upon successful assignment of the Network Slices for the service the MNO responds with the list of allowed S-NSSAIs to the 5GMSu Application Provider.

- The 5GMSu AF supports the Dynamic Policies API at reference point M5u. The Dynamic Policy API allows the Media Session Handler to request a specific QoS and charging policy to be applied to the data flows of an uplink or downlink media streaming session.

Figure 6.2.2.1-1 is the sequence diagram for the candidate solution.



Figure 6.2.2.1-1: Dynamic Policy invocation for uplink media streaming based on Network Slicing

Pre-requisites:

1. The 5GMSu AF is provisioned by the Application Provider.

2. The 5GMSu AS instance(s) receiving the content for the particular uplink media streaming session shall be accessible through the DNN(s) associated with the Network Slice(s) provisioned for the contribution of that content.

The steps are as follows:

1. The 5GMSu-Aware Application triggers an uplink media streaming session by invoking the Media Streamer with a Media Streamer Entry for the selected content.

2. The Media Streamer requests the Media Streamer Entry from the 5GMSu AS to initiate an uplink streaming session.

3. The Media Streamer notifies the Media Session Handler about the upcoming media session and may request specific 5GMSu AF-based Network Assistance for that session, if not already established.

4. The Media Session Handler retrieves Service Access Information for the Provisioning Session of interest from the 5GMSu AF to assist with the route selection for the session. This may include information about the network slices, the DNNs, any pre-authorized QoS guarantees for that Provisioning Session.

5. The Media Session Handler and the UE Policy Management in the UE perform the route selection procedure using information such as the Media Streamer Entries, the traffic descriptors. The UE Policy Management will use the matching filter to retrieve the Route Selection descriptor, which provides the DNN, and the S-NSSAI(s), identifying the network slice(s) to be used for this Provisioning Session.

NOTE 1: The PCF updates the URSP rules with the Alternative S‑NSSAI information. TS 23.503 [2] clause 6.6.2.2 describes the procedure used by the PCF to provision the UE with URSP. TS 23.503 [2] clause 6.6.2.3 and clause 4.2.2 of the present document describe the UE procedure for associating applications with PDU Sessions based on the URSP rules. This step may involve creation of a new PDU Session or modification of an existing PDU Session as specified in clause 4.2.2 of the present document so that the Media Session Handler and the Media Stream Handler are able to communicate with the 5GMSu AF and 5GMSu AS instances via reference points M5u and M4u respectively.

6. The UE reuses an existing PDU Session with the selected S-NSSAI and DNN as per NOTE 1 above or requests the establishment of a new PDU Session with the identified parameters, if one doesn't exist already.

7. The 5GMS-Aware Application requests the Media Session Handler to launch media streamer.

The details of the M5u Dynamic Policy procedure are defined by 3GPP TS 26.501 [3] in step 7 of clause 5.1 for downlink media streaming and step 7 of clause 6.1 for uplink media streaming. Given a set of applicable Policy Templates listed in the Service Access information acquired in step 4 (i.e., those that realise the desired Service Operation Points) whose Application Session Context information matches that of the current application flow (i.e. matching S-NSSAI and DNN values), steps 8–11 are repeated until either the 5GMSu AF accepts application of a Policy Template or until all the applicable Policy Templates are exhausted, as follows:

8. The Media Session Handler picks an applicable Policy Template for the Dynamic Policy operation.

NOTE 2: The MSH picks an applicable policy template based on the URSP rules communicated by the UE to the MSH. How does it map a URSP rule to a Policy Template ID is FFS.

9. The Media Session Handler requests the 5GMSu AF to apply the network QoS described by the Policy Template to the application flow in the current slice by sending the policyTemplateId and M5QoSSpecification as described in clause 11.5 of 3GPP TS 26.512 [4].

NOTE 3: How the 5GMSu AF determines the current slice and Data Network for the incoming request is for future study.

10. In the first alternative, the 5GMSu AF concludes that the network QoS described by the requested Policy Template can be applied in the current slice. The 5GMSu AF applies the requested QoS and provides the Media Session Handler with a success response.

NOTE4:The Media Session Handler may intend to activate the Dynamic Policy for the application flow in the PDU Session of the Alternative S-NSSAI. However, the Media Session Handler may not have appropriate Policy Templates to request activation because the 5GMS Application Provider has not configured applicable Policy Templates for Alternative S-NSSAI.

11. In another alternative, the 5GMS AF may conclude that the network QoS described by the requested Policy Template cannot be satisfied in the current slice. The 5GMSu AF denies application of requested QoS and provides the Media Session Handler with a denied response. When the Media Session Handler receives this response, steps 8–11 are repeated with the next applicable Policy Template.

12. The streaming of the media content at the target Service Operation Point starts as defined by 3GPP TS 26.501 [3] in step 8 of clause 5.1 for downlink media streaming and step 8 of clause 6.1 for uplink media streaming. Uplink media streaming continues in the current slice with possible performance degradation if all applicable Policy Templates were exhausted without success.

|  |
| --- |
| 2nd Change |

# 2 References

[1] 3GPP [TS 23.502](https://portal.3gpp.org/desktopmodules/Specifications/SpecificationDetails.aspx?specificationId=3145): "Procedures for 5G System; Stage 2".

[2] 3GPP [TS 23.503](https://portal.3gpp.org/desktopmodules/Specifications/SpecificationDetails.aspx?specificationId=3334): "Policy and Charging Control Framework for the 5G System; Stage 2".

[3] 3GPP [TS 26.501](https://www.etsi.org/deliver/etsi_ts/126500_126599/126501/16.05.00_60/ts_126501v160500p.pdf): “5G Media Streaming (5GMS); General description and architecture”.

[4] 3GPP [TS 26.512](https://portal.3gpp.org/desktopmodules/Specifications/SpecificationDetails.aspx?specificationId=3647): “ 5G Media Streaming (5GMS); Protocols”.

|  |
| --- |
| End of change |