**SA WG2 Meeting #162S2-2404121**

**April 15th – 19th, 2024; Changsha, China**

**Source: Samsung, SK Telecom**

**Title: KI#2, New Sol: Subscription to new UPF upon UPF relocation in case of Direct Subscription**

**Document for: Approval**

**Agenda Item: 19.11**

**Work Item / Release:** **FS\_UPEAS\_Ph2 / Rel-19**

*Abstract of the contribution: This contribution proposes new solution for KI#2.*

1 Discussion

As per KI#2 description specified in TS 23.700-63 following aspects need to be studied:

- Identify the specific use case and scenarios that require optimizing the procedures related to UPF data collection with enhancements on UPF direct or indirect subscription;

- Whether and how the consumer NF can directly or indirectly contact the UPF for its subscription;

- How to authorize the consumer NF for directly subscribing to UPF event exposure service(s), and how to update/release the subscription;

- How to support the UPF relocation when some NFs have subscribed the direct or indirect subscription of UPF information;

- Which Event ID(s) can be subscribed/requested directly or indirectly to the UPF exposure service;

- Whether there are use cases that require other enhancements on UPF exposure services.

2 Proposal

It is proposed to adopt the following changes to TR 23.700-63.

**\*\*\* Start of the change\*\*\***

6.0 Mapping of Solutions to Key Issues

**Table 6.0-1: Mapping of Solutions to Key Issues**

|  |  |
| --- | --- |
|  | **Key Issues** |
| **Solutions** | **Key Issue #1** | **Key Issue #2** | **Key Issue #3** |
| **Solution #1: Provisioning of information for header handling** |  |  | x |
| **Solution #2: UPF provision and selection based on new UPF functionality #2** | x |  |  |
| **Solution #3: Selection on UPF with extended user plane capabilities** | x |  |  |
| **Solution #4: Selection of UPF providing specific user plane functionalities** | x |  |  |
| **Solution #5: Direct subscription of UPF event exposure service for TSC management** |  | x |  |
| **Solution #6: UPF selection based on the status of the supported functionalities** | x |  |  |
| **Solution #7: Translating SUPI/GPSI to NATed IP address** |  | x |  |
| **Solution #X** |  | X |  |

**\*\*\* Next change (all new text) \*\*\***

6.X Solution #X: Subscription to UPF Event Exposure Services in the event of UP Path change

6.X.1 Key Issue mapping

This solution addresses KI#2.

6.X.2 Description

This solution aims to provide a mechanism to support UPF relocation when a consumer NF has directly subscribed to UPF for Event exposure. As per Rel-18, in case the UPF relocation happens, the consumer NF (which is in operator’s Trusted Domain) needs to perform the discovery of the relevant UPF again in order to subscribe to the new UPF for Event Exposure

The proposed solution is as follows:

* While subscribing to UPF’s Event Exposure Service, consumer NF can indicate to the subscribed UPF (source UPF) to receive a notification of the information of new UPF in case of UPF relocation happens for the session for which Consumer NF had subscribed to the UPF.
* The Source UPF may indicate to SMF to provide information of target UPF in case N4 session between UPF and SMF is released.
* The SMF then informs the Target UPF instance ID and other relevant information to the Source UPF and Source UPF can notify that information to Consumer NF.
* Consumer NF can then subscribe to the new UPF for the relevant Events. Thus saving the Consumer NF the further procedure to find the Serving UPF.

6.X.3 Procedures



**Figure 6.X.3-1, Overview of procedure**

It is assumed that the Consumer NF is inside the operator’s trusted domain, i.e. it is either NWDAF, TSCTSF, Trusted AF or NEF (in case an external AF subscribes to UPF event exposure via NEF). So authorization of consumer NF for using Nupf\_EventExposre service can be done based on existing mechanisms.

A description of the procedure in Figure 6.X.3.1 is as follows:

1. The consumer NF subscribes to Source UPF for event exposure services. The discovery of the corresponding UPF which needs to be subscribed to is assumed to be already done by the consumer NF before this step. In the request it provides indication for Target UPF info in case of UPF relocation. The Reporting Frequency would be set to one (i.e. at the time of UPF relocation).
2. UPF (using N4 interface) requests SMF to provide information of target UPF in case of UPF relocation.
3. SMF decides for UPF relocation for the relevant PDU Session(s). This may be either due to UE mobility or if based on SMF internal policy (e.g. if it decides to transfer all PDU Sessions for a specific S-NSSAI/DNN to another UPF).
4. SMF notifies the Source UPF regarding UPF ID of target UPF, and optionally other relevant information related to Event Exposure service endpoint.

NOTE: In case of Event subscription of “Any UE” and when the SMF decides to release the whole UPF Association (that is all relevant N4 sessions are released), PFCP Association Release message may be used to carry the relevant information. In case Event subscription is for a specific UE, PFCP Session Release message may be used to carry the relevant target UPF information.

1. Based on the subscription request in Step. 1, Source UPF notifies the NF with the information received from the SMF. Source UPF is implicitly unsubscribed from event notification from UPF.

After receiving the information of the target UPF, if not already present, consumer NF may need to retrieve the NF profile for the target UPF, identified by the information received in Step 5, from NRF.

1. Consumer NF may subscribe to Target UPF for event exposure service for the supported Event ID(s) for the relevant PDU Session.
2. A subscribed event is detected in this new UPF.
3. Target UPF notifies to consumer NF regarding the subscribed events.

The enhancement from the existing procedure is that the Consumer NF, once it is unsubscribed from Source UPF after Step 5 and receives the information of the target UPF, does not need to perform the discovery of serving UPF again.

6.X.4 Impacts on services, entities and interfaces

N4 interface is extended to exchange information related to Target UPF information in case of N4 Session release

Nupf\_EventExposure service is extended to include indication to notify information related to target UPF in case of UPF relocation. Nupf\_EventExposure Notify can include the information of the target UPF in case the UPF which is subscribed to is relcated.

**\*\*\* End of the changes \*\*\***