**SA WG2 Meeting #162S2-2405390**

**Changsha China, April 15th–April 19th, 2024 (revision of S2-2404548)**

**Source: Nokia, NEC?**

**Title: Solution for KI#2: Handling and notifying UE for Terminating Services.**

**Document for: Approval**

**Agenda Item: 19.8**

**Work Item / Release: FS\_UIA\_ARC / Rel-19**

*Abstract of the contribution: solution addressing KI#2*

# 1 Discussion

This document describes a solution addressing KI#2. If the User Identity (profile) is using the UE, the terminating services like SMS, NIDD, IMS terminating call attempting to deliver a message to the UE Subscription will fail because UE is not available at that moment for the UE Subscription but is used by the User Identity. While the UE is used by a User Identifier that is linked to the UE Subscription, there could be priority or important terminating messages which are attempted by the network and not delivered as the UE is being used by a User Identifier, hence it is required to at least alert with some indication, for the UE to take an action.

Below is the Scenario:

* UE subscription is owned by the father. (UE)
* User Profile is daughter. (User identifier)

For example, between time T0 to T100, the UE of the father is used by daughter, which means the UDM is aware that UE Subscription of father + User Profile of daughter is active, not just UE Subscription of father.

Now at T20, if the Bank/Priority services sends an SMS to the father (not the daughter), the UDM knows the UE is used by the UE Subscription of father + User Profile of daughter, an indication alert (without exposing what it is about) to the father, that some terminating service has been attempted by network.

User (daughter) is using the UE (of father), but the prime person or the subscription owner is the father, who is entitled for registering to be alerted when any specific service is marked as priority service.

Based on the indication received, the UE could take appropriate action.

# 2 Proposal

It is proposed to update TR 23.700-32 as follows.

\* \* \* \* First change \* \* \* \*

## 6.0 Mapping Solutions to Key Issues

Table 6.0-1: Mapping Solutions to Key Issues

|  |  |  |
| --- | --- | --- |
| Solutions |  |  |
|  | <Key Issue #1> | <Key Issue #2> | <Key Issue #3> | <Key Issue #4> |
| #1 | X | X | X |  |
| #2 | X |  |  |  |
| #3 | X | X |  |  |
| #4 | X |  |  |  |
| #5 | X | X |  |  |
| #6 | X |  |  |  |
| #7 | X |  |  |  |
| #8 |  | X |  |  |
| #9 |  | X |  |  |
| #10 |  | X | X |  |
| #11 |  | X | X |  |
| #12 |  | X | X |  |
| #13 |  | X |  |  |
| #14 |  | X |  |  |
| #15 |  |  | X |  |
| #16 |  |  | X |  |
| #X: |  | x |  |  |

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

## 6.X Solution #X: Handling and notifying the UE when the UE is used by User Identifier.

### 6.X.1 Introduction

This solution addresses KI#2 related to WT.

### 6.X.2 Functional Description

If the User Identity is using the UE, the terminating services like SMS attempting to deliver a message to the UE Subscription will fail because UE is not available at that moment for the UE Subscription but is used by the User Identity. However, UE is still used by other user profile. So, it is required that.

* The terminating service as in above shall not be delivered to the UE, as the UE is being used by the User identity (For e.g., a daughter (User Identity) is using the UE (of the father)).
* It is also required to indicate to the UE Subscription (of the father as in the above example) with an indication that some important services (SMSwhich may have been flagged as priority services) were attempted to be delivered.

**Brief of the solution:**

A prior, the UE could indicate support of receiving indication from the network when the UE is being used by User Identifier and there is an attempt from the network for terminating services to the UE.

The UE subscription either through OAM or AF provisioning, may configure or select the priority service (like SMS) that it would want to receive when a terminating service is attempted. i.e. service priority is configured in the UDM.

A NAS based indication can be added in the existing NAS message (configuration update procedure) or a new NAS message. The NAS indication is delivered to the UE over NAS layer.

When the UE that is being used by the User Identifier receives this indication, based on the value, it delivers the indication to the right application layer (SMS app).

Example: Application layer can display an indication to the user or add blink on the screen there is some delivery attempted by the network. The user may take some action (e.g., initiate log out so that UE can get logged in again to receive the message). However, this aspect is out of the scope of the 3GPP. Please note, this indication does not reveal any real message.

### 6.X.3 Procedures

#### 6.X.3.1 Illustration for SMS



Figure 6.X.3-1: Procedure for send indication to UE when the terminating service is SMS.

Step1: User Identifier 1 is registered with the UE and the UE may have indicated that is supports receiving an indication.

Step 2: UE gets deregistered. UDM is aware of this switch and hence shall mark.

Step 3: When SendRoutingInfoForSM reaches to the UDM for terminating SMSF address determination for the UE, and UE is deactivated state, the UDM returns error to the GMSC.

Step 4: UDM understands that there is a terminating service initiated for the UE. As UDM knows that UE is de-registered now and User Identity Profile 1 is registered/logged in, UDM sends indication towards UE via AMF (steps 5, 6).

Step 7: Application layer may display an indication to user or add blink on the screen indicating that an action is attempted by the network.

NOTE 1: Any privacy considerations if any shall be studies at SA3.

NOTE 2: This indication is for the terminating SMS service over NAS.

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

UE:

* UE supports indicating UE capability of supporting receiving indications from the network for the UE.
* UE implements receiving of the indication and flagging an alert.

UDM:

* Implements identification of terminating services to a UE and the state of the UE being in de-registered state.
* Carries out indication to the UE through NAS based on the local policies and the UE Subscription to receive such indication.

AMF:

* Receipt of indication from the UDM.
* Transferring of the indication to the UE over NAS.

\* \* \* \* End of Changes \* \* \* \*