**SA WG2 Meeting #162 S2-2405414**

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

**Source: Lenovo**

**Title: New Solution: User Profile Creation and linking to 3GPP subscription**

**Document for: Approval**

**Agenda Item: 19.8**

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

*Abstract of the contribution:*

# 1 Discussion

The procedure to create a User Profile associated with a 3GPP (mobile) subscription is as follows. It is based by introducing a new function in a 5G Core (5GC) network, called User Identity Management Function (UIMF). The UIMF is accessible by a device either via the 5GC network or via the Internet, i.e. by using any access network other than 5G such as a public WiFi network, wireline residential access, etc. All communication between a device and UIMF takes place in the application layer, e.g. by using an MNO Application that can be downloaded in the device. After downloading the MNO Application, the user creates an account with the UIMF (and confirms his mobile number. At this point, the created account is associated with his/her mobile subscription.

The user can utilize any device to access UIMF, as long as the device has the MNO Application and the user can login to UIMF using the credentials of his/her UIMF account. A device is not required to have a USIM for accessing the UIMF.

The figure below shows how the user can utilize the MNO Application and interact with UIMF for creating a new User Profile that is linked with his/her mobile subscription. The device shown in the figure could be a typical smartphone equipped with a USIM module, or any USIM-less device, such as tablet, laptop, PC, etc.



Figure 1 - User profile configuration

The UIMF configures user profile data (called Device User Profile Data, DUPD) to the UE. The DUPD contain may contain one (or more user identifiers) associated with the user. The configuration may be carried out via app layer procedure or via CP procedures.

The UIMF provides via NEF services user profile information to the 5G core network. The user profile information can be stored in the UDR.

The User Profile includes one or more of the following:

- A User Profile Reference ID that uniquely identifies the User Profile among all User Profiles in the same mobile subscription;

- One of more User Identifiers (e.g. user@example.com);

- Authentication information, such as credentials (e.g. a password, digital certificated, etc.) and authentication types;

- A Generic Public Subscription Identifier (GPSI) that identifies the mobile subscription linked with the User Profile;

- One or more devices that can use this User Profile;

- One or more applications associated with this User Profile;

- The QoS settings that should be applied to the traffic associated with this User Profile and;

- The list of services available for this User Profile;

Figure 2 describes the procedure for creating a user profile, association with a subscription and configuration in the 5GC via the NEF.



**Figure 2: Procedure to create a User Profile**

Further details for the solution are provided below:

# 2 Proposal

The following key issue is proposed.

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

# 6 Solutions

## 6.0 Mapping of Solutions to Key Issues

Table 6.0-1: Mapping of Solutions to Key Issues

|  |  |  |
| --- | --- | --- |
| Solutions |  |  |
|  | <Key Issue #1> | <Key Issue #2> | <Key Issue #3> | <Key Issue #4> |
| #X | X | X | X |  |
| #2 |  |  |  |  |

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

## 6.X Solution #X: User Profile creation within an operator's realm

### 6.X.1 Key Issue mapping

Editor's note: This clause lists the key issue(s) addressed by this solution.

The solution addresses Key Issue 1 aspects of Key Issue 2 and 3.

### 6.X.2 Description

Editor's note: This clause will describe the solution principles and architecture assumptions for corresponding key issue(s). Sub-clause(s) may be added to capture details.

The procedure to create a User Profile associated with a 3GPP (mobile) subscription is as follows. It is based by introducing a new function in a 5G Core (5GC) network, called User Identity Management Function (UIMF). The UIMF is accessible by a device either via the 5GC network or via the Internet, i.e. by using any access network other than 5G such as a public WiFi network, wireline residential access, etc. All communication between a device and UIMF takes place in the application layer, e.g. by using an MNO Application that can be downloaded in the device. After downloading the MNO Application, the user creates an account with the UIMF (and confirms his mobile number. At this point, the created account is associated with his/her mobile subscription.

The user can utilize any device to access UIMF, as long as the device has the MNO Application and the user can login to UIMF using the credentials of his/her UIMF account. A device is not required to have a USIM for accessing the UIMF.

The figure below shows how the user can utilize the MNO Application and interact with UIMF for creating a new User Profile that is linked with his/her mobile subscription. The device shown in the figure could be a typical smartphone equipped with a USIM module, or any USIM-less device, such as tablet, laptop, PC, etc.



Figure 6.x.2-1 - User profile configuration

The UIMF configures user profile data (called Device User Profile Data, DUPD) to the UE. The DUPD contain may contain one (or more user identifiers) associated with the user. The configuration may be carried out via app layer procedure or via CP procedures.

The UIMF ensures that the user identity used is unique for the PLMN that the user profile is created.

The UIMF provides via NEF services user profile information to the 5G core network. The user profile information can be stored in the UDR.

The User Profile includes one or more of the following:

- A User Profile Reference ID that uniquely identifies the User Profile among all User Profiles in the same mobile subscription;

- One of more User Identifiers (e.g. user@example.com);

- Authentication information, such as credentials (e.g. a password, digital certificated, etc.) and authentication types;

- A Generic Public Subscription Identifier (GPSI) that identifies the mobile subscription linked with the User Profile;

- One or more devices that can use this User Profile;

- One or more applications associated with this User Profile;

- The QoS settings that should be applied to the traffic associated with this User Profile and;

- The list of services available for this User Profile;

### 6.X.3 Procedures

Editor's note: This clause describes high-level procedures and information flows for the solution.

The figure below shows how the user can utilize the MNO Application and interact with UIMF for creating a new User Profile that is linked with his/her mobile subscription. The device shown in the figure could be a typical smartphone equipped with a USIM module, or any USIM-less device, such as tablet, laptop, PC, etc.



Figure 6.x.3-1: Procedure to create a User Profile

1a. After the MNO Application is launched, a secure connection is established with the UIMF. The IP address of UIMF can be pre-configured in the MNO Application, or could be discovered with DNS.

1b. The user logs in to UIMF using the credentials of his/her UIMF account.

1c. Using the UI of the MNO Application, the user requests to create a new User Profile. The type of the User Profile could be selected from a list of pre-defined profiles (e.g. "safe browsing", "social media", "video streaming", etc.), or could be specified by selecting the individually services of the User Profile. The user may provide a new set of credentials for this User Profile, e.g. a User Identity and a Password. Alternatively, the user may select to link this User Profile with an existing third-party account. In this case, the user does not need to provide a set of credentials for the User Profile, since the existing credentials of the third-party account are reused.

1d. In case the user decides to link the User Profile with a third-party account, the UIMF triggers the known OAuth 2.0 procedure (as defined in RFC 6749) towards a third-party Application Service Provider (ASP) to obtain access to the user’s third-party account. Authentication messages may be sent to UE via app layer.

1e. During the OAuth 2.0 procedure, the UIMF receives an access token from the third-party application server (AS) and then employs the access token to retrieve user information from the third-party ASP, including a User Identity, preferences, possibly a subscription status (i.e. if the user maintains a gold or silver subscription with the third-party service provider), etc.

1f. The UIMF creates the new User Profile. In case the User Profile was linked with a third-party account (with steps 1d and 1e), the UIMF may create the new User Profile by considering the user information received from the third-party ASP in step 1e and also the SLA that has been setup between the mobile operator and the third-party service provider.

 The User Profile created by the UIMF is automatically linked with the user’s mobile subscription. The User Profile includes one or more of the following:

- A User Profile Reference ID that uniquely identifies the User Profile among all User Profiles in the same mobile subscription;

- One of more User Identifiers (e.g. user@example.com);

- Authentication information, such as credentials (e.g. a password, digital certificated, etc.) and authentication types;

- A Generic Public Subscription Identifier (GPSI) that identifies the mobile subscription linked with the User Profile;

- One or more devices that can use this User Profile;

NOTE: It is assumed that UIMF can obtain device information (UE ID) from the client - One or more applications associated with this User Profile;

- The QoS settings that should be applied to the traffic associated with this User Profile;

- The list of services available for this User Profile;

1g. The UIMF sends to the MNO Application the data (called Device User Profile Data; DUPD) that should be stored in the UE about this User Profile.

1h. The UIMF sends the DUPD not only to the device that initiated the User Profile creation but also to all other devices connected to UIMF using the same UIMF account, which are allowed to use the User Profile. For example, if a user has a smartphone, a tablet and a PC, all running the MNO Application and being logged in to UIMF with the same UIMF account, then all three devices will receive the DUPD for the new User Profile, assuming all of them are allowed to use this User Profile. This is an important step as it synchronizes all the User Profiles of a mobile subscriber across all devices of the mobile subscriber.

2. After the User Profile is created, the UIMF sends a Create User Profile request to a network function in the 5GC, e.g. to the Network Exposure Function (NEF) in order to store the created User Profile in the associated mobile subscription data. The Create User Profile request contains the GPSI of the linked mobile subscription and information about the User Profile itself (User Profile Info).

3. The NEF determines the SUPI of the associated mobile subscription, which is needed before storing the User Profile in UDR.

4. The NEF derives, from the received User Profile, updated data for the user profile info in the UDR.

5. Finally, the NEF responds to UIMF and completes the creation of the new User Profile.

As described in Solution 1, based on the user profile information separate User Profiles may be created in AM, SM and referenced in PDU Session related control data:

- A User Profile Reference ID that uniquely identifies the User Profile among all User Profiles in the same mobile subscription;

- One of more User Identifiers (e.g. user@example.com);

- In AM subscription data:

- One or more devices (i.e. PEIs) that can use this User Profile;-

NOTE: This is required in case a device accesses 3GPP network via 5G-RG as per Key Issue 4

- In SM subscription data:

- Authentication information, such as credentials (e.g. a password, digital certificated, etc.) and authentication types;

- In PDU session related control data, :

- One or more applications associated with this User Profile;

- The QoS settings that should be applied to the traffic associated with this User Profile; and

- The list of services available for this User Profile.

- A User Profile reference ID can be added as a Data Sub-Key within PDU session for PDU session policy control related data.

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

Editor's note: This clause captures impacts on existing 3GPP nodes and functional elements.

- New function to create user profiles and associate profile to a 3GPP subcruption

- Potentially new NEF service to receive information about user profiles

- UDR: Storing user profile information

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* End of change \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*