**SA WG2 Meeting #160 S2-23xxxxx**

**November 13 – 17, 2023, Chicago, USA (Revision of S2-2311649)**

**Source: InterDigital Inc.**

**Title: New Study on Enhancement of Usage of User Identifiers in the 5G System**

**Document for: Approval**

**Agenda Item: 30.1**

3GPP™ Work Item Description

Information on Work Items can be found at <http://www.3gpp.org/Work-Items>
See also the [3GPP Working Procedures](http://www.3gpp.org/specifications-groups/working-procedures), article 39 and the TSG Working Methods in [3GPP TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm)

Title: Study on the Enhancement of Usage of User Identifiers in the 5G System

Acronym: FS\_eUUI5

Unique identifier:

Potential target Release: Rel-19

# 1 Impacts

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Affects: | UICC apps | ME | AN | CN | Others (specify) |
| Yes |  | x |  | x |  |
| No |  |  |  |  |  |
| Don't know | x |  | x |  | x |

# 2 Classification of the Work Item and linked work items

## 2.1 Primary classification

|  |  |
| --- | --- |
| x | Study  |
|  | Normative – Stage 1 |
|  | Normative – Stage 2 |
|  | Normative – Stage 3 |
|  | Normative – Other\* |

## 2.2 Parent Work Item

For a brand-new topic, use “N/A” in the table below. Otherwise indicate the parent Work Item.

|  |
| --- |
| Parent Work / Study Items  |
| Acronym | Working Group | Unique ID | Title (as in 3GPP Work Plan) |
|  |  |  | N/A |

### 2.3 Other related Work Items and dependencies

|  |
| --- |
| Other related Work /Study Items (if any) |
| Unique ID | Title | Nature of relationship |
| 780004 | Study on a Layer for User Centric Identifiers and Authentication | SA1 study on requirements for User Identifiers |
| 800012 | User Identities and Authentication | SA1 normative work on requirements for User Identifiers |
| 880041 | Study on Personal IoT Networks | SA1 study on Personal IoT Networks |
| 930029 | Personal IoT and Residential Networks | SA1 normative work on Personal IoT Networks; requirements for User Identifiers apply to Personal IoT Networks |
| 940065 | Study on Personal IoT Networks | SA2 study on Personal IoT Networks |
| 980011 | Personal IoT Networks | SA2 normative work on Personal IoT Networks |
| 950005 | Study on Localized Mobile Metaverse Services | SA1 study on metaverse services |
| 1000028 | Mobile Metaverse Services | SA1 normative work on metaverse services |

# 3 Justification

By enhancing the 5G System to allow for the creation and utilization of user-specific identities, operators will be able to provide enhanced user experience, optimized performance, and offer services to devices and users that are not part of the operator’s 3GPP network. For example, network settings can be adapted and services can be offered to users according to users’ needs, different from the subscription identifier that is used by the user to establish the connection.

In the context of this work, the user to be identified could be an individual human user using a UE with a certain subscription, an application running on or connecting via a UE, or a device (e.g., a PINE) behind a gateway UE (e.g., a PEGC).

Use cases are thoroughly discussed in TR 22.904 and include:

* One or more users (i.e., humans) sharing one UE,
* One or more users (i.e., devices) behind one gateway UE, and
* One or more users (i.e., gaming applications) running on the same UE and each is treated as a different user.

Support for the identification of non-3GPP devices that communicate via a gateway UE may also enable use cases such as the deployment of a 5G Mobile VPN that is managed by the network. A 5G Mobile VPN that can provide a secure and reliable connection between an enterprise’s equipment, which includes non-3GPP devices, and authorized UEs that are located off-premises.

Support for associating a user identifier with traffic of a UE may enable charging and service differentiation by an RG’s home network operator for users whose non-3GPP device(s) connect to the 5GC via the RG.

NOTE: Charging is in the remit of SA WG5.

This work is based on the SA1 FS\_LUCIA (SP-170995) study of the utility of user identities in the 3GPP System and the normative requirements for the support of user identities that were added to TS 22.101 and TS 22.115 as part of the UIA (SP-180328) work item.

# 4 Objective

The objectives of this SA2 study are to study how the 5G System can be enhanced to allow the operator to utilize user-specific identities in the 3GPP network. The reason for utilizing operator user-specific identities in the 3GPP network is to allow the operator to charge and provide service differentiation based on the user identity.

The focus is on two use cases. In both use cases one or more user identities may be associated with the subscription (i.e., identified by a SUPI) of a UE or RG and the users require different treatment (i.e., service differentiation).

The first use case is the scenario where the user identifier is used to identify the traffic that is sent to/from the UE. For example, this applies to the case where the user identifier identifies traffic to/from a UE application or all traffic to/from the UE (i.e., the human user case). The first use case is the focus of Work Tasks 1.x and Work Tasks 2.x. The first use case also includes exposure aspects. For example, operator can provide User Authentication Service and third parties can request operator for authentication/authorization for a particular user.

The second use case is the scenario where the user identifier identifies a non-3GPP device behind a UE or RG. The second use case is the focus of Work Tasks 4.x.

NOTE 1: User Identities are an optional feature.

NOTE 2: How a user identity and any associated credentials are provisioned in a non-3GPP device, UE, or application is not in scope of this study. Also, application layer interaction between application client of the UE and application server is out of scope.

The objectives of this study are not to move subscriber information into a user profile and information from the user profile should not be used to override information in a subscription. For example, the slices and DNNs that are available to the UE do not change based on the user of the UE.

Work Tasks 1.x focuses on supporting the use case where the user identifier is associated with traffic that is to/from the UE:

* WT#1.1: Define the architectural assumptions that are necessary to support identifying the user identity that is associated with a UE’s traffic. .
* WT#1.2: What information is stored as part of the user identity profile (e.g., a user identity, associated security credentials, associated devices, user identity specific settings, charging details and parameters). Including how user identity profiles are acquired, stored, and updated in the 5GC.

* WT#1.3: Whether and how user identifiers are linked and unlinked (i.e., associated) with 3GPP subscriptions in an operator-controlled manner.
* WT#1.4: Whether and what user identity-specific settings and parameters (e.g., QoS) need to be taken into account by the 3GPP system in order to provide service differentiation.

Work Tasks 2.x builds on Work Tasks 1.x. The focus of this work task is on how users authenticated and authorized, how user identity related functionality and information is exposed, and how the network restricts user identifiers.

* WT#2.1: How are users authenticated and authorized and what user profile information and functionality is exposed to 3rd parties (e.g., exposure of the content of the user profile, exposure of authorization/authentication results, authenticating users, and linking a user identity with a subscription).

NOTE 4: Privacy protections (e.g., privacy of information in the user profile) may be considered by SA WG3.

NOTE 5: The purpose of this work task is not to standardize the format or type of digital assets that are stored in a user profile.

NOTE 6: Aspects of this work task will depend on interaction with SA WG3. For example, authentication and Authorization methods are in the remit of SA WG3. Also, privacy questions related to exposure of user profile information need to be coordinated with SA WG3.

NOTE 7: As much as possible, solutions should be based on existing procedures.

* WT#2.2: How the network restricts the usage of user identifiers, including in roaming scenarios (e.g., how the operator restricts the number of simultaneously active user identifiers per SUPI (i.e., per subscription), restricts the usage of a user identifier in roaming scenarios, and suspends usage of the user identifier based on operator policy or location).

Work Tasks 3.x are void.

Work Tasks 4.x builds on Work Tasks 1.x and 2.x and focuses on the case where the user identifier identifies a non-3GPP device behind a UE or RG. The focus of this work task is how the user identifier is used by the network to control and identify the traffic to/from the non-device behind the UE or RG.

* WT#4.1: When non-devices communicate via a UE or RG, whether and how the network is aware of the non-3GPP devices connecting to the UE and controls the traffic to/from the non-3GPP devices (e.g., control of IP Address allocation for the non-3GPP devices behind the UE or RG).
* WT#4.2: Void.
* WT#4.3: How to provide 5GC identification (e.g., user identity) and policy control of individual non-3GPP devices connecting behind a UE or RG. Including how to trigger policy control for the individual non-3GPP devices via PCF and NEF APIs.

NOTE 8: Changes to the layer 1 or layer 2 protocols of non-3GPP devices are not in scope of this study. It is assumed that the non-3GPP device can communicate with an Authentication Server via a protocol (e.g., EAP) whose payload can be transparently passed by the UE.

NOTE 9: Conclusions related to an RG should be shared with the Broadband Forum (BBF) and CableLabs.

Work Tasks 5.x are void.

## TU estimates and dependencies

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Work Task ID** | **TU Estimate****(Study)** | **TU Estimate****(Normative)** | **RAN Dependency****(Yes/No/Maybe)**  | **Inter Work Tasks Dependency**  |
| WT#1 |  |  |  | WT#1 is Self-Contained |
| WT#1.1 | 0.75 | 0.75 | No |  |
| WT#1.2 | 0.5 | 0.5 | No |  |
| WT#1.3 | 0.5 | 0.5 | No |  |
| WT#1.4 | 0.75 | 0.75 | Maybe |  |
| WT#2 |  |  |  | Depends on WT#1 |
| WT#2.1 | 0.75 | 0.75 | No | Depends on WT#1.2 (i.e., what is in the user identity profile) |
| WT#2.2 | 0.25 | 0.25 | No |  |
| WT#3.x | Void | Void | N/A |  |
| WT#4 |  |  |  | Depends on WT#1 and WT#2 |
| WT#4.1 | 0.75 | 0.75 | No |  |
| WT#4.2 | Void | Void | N/A |  |
| WT#4.3 | 0.75 | 0.75 | No |  |
| WT#5 | Void | Void | N/A |  |

**Total TU estimates for the study phase: 5.00**

**Total TU estimates for the normative phase: 5.00**

**Total TU estimates: 5.00 + 5.00 = 10**

# 5 Expected Output and Time scale

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Type  | TS/TR number | Title | For info at TSG#  | For approval at TSG# | Rapporteur |
| Internal TR | 23.7xy | Study on the Enhancement of Usage of User Identifiers in the 5G System | SA#103(March 2024) | SA#104 (June 2024) |  |

# 6 Work item Rapporteur(s)

# 7 Work item leadership

SA2

# 8 Aspects that involve other WGs

Security aspects will be covered by SA3.

# 9 Supporting Individual Members

|  |
| --- |
| Supporting IM name |
| InterDigital Inc. |
| Deutsche Telekom |
| Futurewei |
| NEC |
| Huawei |
| HiSilicon |
| AT&T |
| KPN |
| Philips International B.V. |
| Comcast |
| CableLabs |
| Dish Network |
| Charter Communications, Inc. |
| Samsung |
| Xiaomi |
| Broadcom |
| Vodafone |
| China Mobile |
| China Unicom |
| Telecom Italia |