**TSG SA Meeting #SP-101 SP-231119r05**

**11 - 15 September 2023, Bangalore, India (Revision of S2-2309924)**

**Source: InterDigital Inc.**

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

**Document for: Approval**

**Agenda Item: 6.4.2**

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 |

# 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) or a WLAN AP.

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 UE(s), 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 UE(s) or 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.

5G System enhancements for the utilization of user-specific identities could also be used to provide the network operator with greater control over the UE’s non-3GPP access connection to the 5GC. For example, when a UE is registered over 3GPP access, it may also be connected to a residential AP using pre-shared key (PSK) or using EAP authentication method and the UE might not be registered to the 5GC via the residential AP. In such a scenario, it would be beneficial if the network was able to detect that the UE is connected to a residential AP, use a user-specific identity to authenticate and authorize the UE’s connection to the residential AP, and prompt the user to register with the 5G System via the residential AP’s non-3GPP access.

# 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. Work Tasks 1.x, 2.x, and 4.x focus on the case where the user is a human user of a UE, an application running on a UE, or a device behind a gateway UE/RG. Work Task 5.x focuses on providing the network operator with greater control over the UE’s non-3GPP access connection to the 5GC.

The following aspects will be studied:

Work Tasks 1.x are necessary to support identifying the user of a subscription (i.e., identifying a specific user obtaining connectivity via the 5G Core Network).

* WT#1.1: Define the architectural assumptions that enable the support of user identities and the related involvement of the mobile operator network.

NOTE x: Scenarios include cases where the user identity provider is either a 3rd party identity provider or an operator.

* WT#1.2: What information is stored as part of the user identity profile (e.g., a user identity, associated devices, user identity specific settings, charging details and parameters, user digital assets (e.g., avatar)). Including how user identity profiles are acquired, stored, and updated in the 5GC.

NOTE 1: The intention of this work task is 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.

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

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

* 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 when delivering a service.

Work Tasks 2.x build on the same use cases as Work Tasks 1.x and relate to authorizing users and what profile information, if any, should be exposed to 3rd party application providers. The Authentication and Authorization aspects of these work tasks will depend on interaction with SA WG3.

* WT#2.1: Whether and how information from the user identity profile is used to authenticate and authorize accessing information from the user profile and to authenticate and authorize users. Including:
	+ API Exposure of user identity functionality (e.g. exposure of the content of the user profile, exposure of authorization/authentication results, and linking a user identity with a subscription)

NOTE 2: Authentication and Authorization methods are in the remit of SA WG3.

NOTE 3: 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 relate to scenarios where a device (i.e., a UE or a non-3GPP device) connects to the 5G System via a UE/RG and how the user identity from Work Task 1.x is used by the network to control the traffic from the UE or non-3GPP device.

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

NOTE a: Changes to the layer 1 or layer 2 protocols of non-3GPP devices are not in scope of this study.

NOTE b: Conclusions related to this work task should be shared with the Broadband Forum (BBF) and CableLabs.

Work Tasks 5.x relate to scenarios where N3GPP access is available for the UE to connect to the 5G System.

* WT#5.1: How to provide the operator with greater control over the UE’s non-3GPP access connection to the 5GC.
	+ How to identify whether the UE is connected to the residential AP using PSK (pre-shared key) and managed by the operator or a residential AP that is not managed by the operator.
	+ Whether and how to enable reporting of the UE’s N3GPP access related information about the UE (e.g., continued or new association with WLAN AP, BSSID, ESSID, UE local IP address, etc.). Whether and how to enhance the 5GC API framework to enable exposure of the UE’s N3GPP access related information to an operator managed AF.

NOTE m: Some UE’s N3GPP access related information is already reported by the UE and, as much as possible, existing UE reporting mechanisms should be re-used.

NOTE p: Privacy protections related to exposure of the UE’s N3GPP access related information should be considered and coordinated with SA WG3.

* + Whether and how to enhance the 5G System to allow the network to prompt the UE to register with the 5GC via the UE’s connection to the residential AP.
	+ Whether and how user identities can be used to authenticate and authorize the UE’s connection to the residential AP.

## 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 |  |  |  | May depend 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 |  |  |  | May depend on WT#1 and WT#2 |
| WT#5.1 | 1.0 | 1.0 | No |  |

**Total TU estimates for the study phase: 6.00**

**Total TU estimates for the normative phase: 6.00**

**Total TU estimates: 6.00 + 6.00 = 12**

# 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 |