**3GPP TSG-SA WG6 Meeting #62 S6-243437**

**Maastricht, Netherlands, 19th – 23rd August 2024 (revision of S6-243219)**

**Source: Huawei**

**Title: New study for SEAL enhancements**

**Document for: Approval**

**Agenda Item: 10**

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: SID for SEAL enhancements

Acronym: FS\_enhSEAL

Unique identifier:

{A number to be provided by MCC at the plenary}

Potential target Release: Rel-19

# 1 Impacts

{For Normative work, identify the anticipated impacts. For a Study, identify the scope of the study}

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

# 2 Classification of the Work Item and linked work items

## 2.1 Primary classification

### This work item is a …

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

**\* Other = e.g. testing**

## 2.2 Parent Work Item

|  |
| --- |
| Parent Work / Study Items  |
| Acronym | Working Group | Unique ID | Title (as in 3GPP Work Plan) |
| SEAL\_Ph3 | SA6 | 980131 | Service enabler architecture layer for vertical phase 3 |

###  2.3 Other related Work Items and dependencies

|  |
| --- |
| Other related Work /Study Items (if any) |
| Unique ID | Title | Nature of relationship |
| 1010006 | SEAL DD (Data Delivery) Phase 2 | Rel-19 SEALDD work |

**Dependency on non-3GPP (draft) specification:**

{This section is to be typically used to identify the IETF dependencies. Delete the header "Dependency on non-3GPP (draft) specification:" if no such dependency}

# 3 Justification

Network capabilities exposure is one of important topics of 3GPP. Lots of network APIs were defined by SA2, SA4, and SA5 from 4G phase and beyond. In the specifications defined by these WGs, those APIs can be categorized into two types: one is the NF APIs exposed by Network functions like PCF, AMF, and MB-SMF…., and the other is the SCEF/NEF APIs exposed by network exposure function (See figure1). The NF APIs are defined in a network centric way i.e., one API can serve many use cases to simplify the implementation and save cost of Network Function. Most of the NEF APIs follow the same pattern of NF APIs, i.e., the inputs and outputs are the same as the NF APIs).

Network Function (e.g 5GC NFs)

Trusted AF

Untrusted AF

NEF/SCEF/EGMF

NEF APIs

NF APIs

NF APIs

Figure 1 SA2 defined Network exposure architecture

SEAL server

*Provided by 3rd party*

Network Function（e.g NFs）

SEAL server

*Provided by MNO*

Trusted domain+NEF

NEF/SCEF/EGMF

Untrusted AF

SEAL service APIs

NEF APIs

NF APIs

NF APIs

Trusted AF

SEAL service APIs

5GC

Figure 2 Core Network APIs abstraction by SEAL

Since Rel16, SA6 has started the works on SEAL to ease the usage of 5G system capabilities by APP developers. As figure 2 shows, how SEAL provides service Layer services aimed at providing developer-friendly APIs for APP domain to use the services exposed by network layer entities like SCEF/NEF or by PCF, AMF, MB-SMF and other Network entities (to authorized AFs). These service Layer services provide value-add functionality including abstraction, optimization, aggregation, etc. for both MNOs and 3rd parties.

The service API exposed by SEAL can be based on MNO Network capabilities/resource (e.g., Reserve\_Network\_Resource API exposed by NRM use only 5G QoS capability). There are also SEAL services which combine terminal capabilities/resource and MNO network capabilities/resource (e.g Subscribe\_Location\_Info API exposed by LMS is the combination of Core network location capabilities and Location Management client reported Location information).

Industry promotion organizations (e.g., CAMARA/GSMA Open Gateway) start to investigate how to simplify network APIs and transform them to be more consumable by the APP developers. In addition, it is also an important topic in 5GACIA about how vertical applications can well use network layer exposed capabilities. However, considering gaps wrt industry requirements there are some aspects that needs to be enhanced from SA6 perspective.

1. Lack of insufficient description explaining the relationship of different SEALs services, lack of Usage [instructions](https://context.reverso.net/%E7%BF%BB%E8%AF%91/%E8%8B%B1%E8%AF%AD-%E4%B8%AD%E6%96%87/instructions%2Bfor%2Buse) for each APIs (e.g. Valued use case and value added, Parameters mapping between 3GPP parameter and APP domain‘s parameters, APP impacted).
2. Some SEAL services, may be further improved by absorbing other network services to provide a larger granularity services aligning to industry requirements. For example, Location retrieval API from CAMARA specifies that the identifier of the target UE could be IPV4 address or IPV6 address or phone number or network access identifier (GPSI). Location retrieval API defined by SA6 accepts the identifier of the target UE as VAL UE ID or VAL user ID which could be GPSI. Other input formats required by the CAMARA Location retrieval API is not supported. Similar is the case for the Location verification API also. Another example is, Quality on Demand (QoD) API from CAMARA provides the customer with the ability to set quality for a flow within an access network connections and to get the notifications if the network cannot fulfill. Resource request and Resource Modification request APIs as part of Network Resource Management SEAL service offers the same service required by CAMARA API but it is lacking the functionality of identifying a particular application session to be guaranteed with a requested QoS attributes.
3. The content related to the option that the SEAL service server are deployed by operators.( e.g. SEAL service is owned by the MNO and deployed in the same trust domain of 5G network system) is not well reflected and exists un-consistent description in the TS. When SEAL service servers are deployed by MNO, they can invoke NF API from network functions without NEF, but this option is not well captured for several services (e.g., Location management, NRM, ADAES, NSCALE etc.). This may lead to the misunderstanding of the different business deployment options available for SEAL services and the potential value-add they offer.
4. SEAL is a layer which is expected to be deployed by either the MNO or an edge/cloud provider as a set of aPaaS capabilities in the cloud platform. In such deployments, there is a need to support cloud native applications as possible consumers of SEAL services, and this may require the enhancement or “upgrade” of existing SEAL architecture as well as nomenclature to be in-line with the new requirement. When interacting with ASPs/ IT domain, the evolution of SEAL architecture towards micro-service based architecture (MSA) or even server-less architecture is necessary in order to support cloud native deployments. For supporting such evolution, the proper definition of SEAL services as well as new challenges arising based on different service-based deployment considerations (e.g. service bus vs mesh, gRPC vs REST API design considerations, use of sidecars/proxies etc) need to be investigated thoroughly.

Below are some of the APIs defined in GSMA/CAMARA that could adopt SEAL services for the **realization reference.**

* Quality on Demand (QoD) (boost)
* Geofencing
* Location retrieval
* Device Location verification

# 4 Objective

Objectives of this WID include the following：

1. Investigate how to enhance the content of all technical specifications related to SEAL services.
2. Review each SEAL services procedures and clarify the interaction with the core network considering the deployment option where SEAL service server is deployed by PLMN operator if it is missing.
3. Review the current adoption of the 3GPP APIs by other SDOs to understand the transformation being made and make the SEAL services APIs consumable directly without the need of transformation.
4. Review the lasted version of 5G network capabilities related with Smart factory, XR applications in TS 23.501, TS 23.502, TS23.503, 23.288 (e.g. TSC/TSN), update SEAL services accordingly.
5. Investigate possible enhancements to SEAL architecture towards MSA and server-less deployments to support cloud native applications.

NOTE: Enhancement for XR APP will only focus on the issues and requirements which are not covered by XR-APP SID.

# Expected Output and Time scale

***{If this WID covers both stage 2 and stage 3, clearly indicate the different completion dates.}***

|  |
| --- |
| New specifications {One line per specification. Create/delete lines as needed} |
| Type  | TS/TR number | Title | For info at TSG#  | For approval at TSG# | Rapporteur |
| New | TR 23.XXX | *SEAL enhancements* | TSG#106 | TSG#107 | Yang, Yanmei |
|  |  |  |  |  |  |

|  |
| --- |
| Impacted existing TS/TR {One line per specification. Create/delete lines as needed} |
| TS/TR No. | Description of change  | Target completion plenary# | Remarks |
|  |  |  |  |
| None |  |  |  |

# 6 Work item Rapporteur(s)

Yang, Yanmei, Huawei Technologies Co.,Ltd.

# 7 Work item leadership

SA6

# 8 Aspects that involve other WGs

CT3 for stage3 implementation

# 9 Supporting Individual Members

{At least 4 supporting Individual Members are needed. There is an expectation that these companies will provide resources to progress the work. Note that having 4 supporting companies is a necessary but not sufficient condition: the usual TSG approval process by consensus is needed for the WID approval}

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| --- |
| Supporting IM name |
| Huawei Technologies Co Ltd |
| Hisilicon  |
| Samsung |
| CMCC |
| CATT |
| China Telecom |
| Convida Wireless  |
| Apple? |
| Lenovo |
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