**3GPP TSG-SA WG6 Meeting #54-e S6-231371**

**17th – 26th April 2023 (revision of S6-230973)**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **23.434** | **CR** | **0173** | **rev** | **4** | **Current version:** | **18.4.1** |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network | **X** |

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|  | | | | | | | | | | |
| ***Title:*** | Support SEAL with multi-accesses | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Ericsson, FirstNet | | | | | | | | | |
| ***Source to TSG:*** | S6 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | SEAL\_Ph3, 5GFLS | | | | |  | ***Date:*** | | | 2023-04-07 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | B |  | | | | | ***Release:*** | | | Rel-18 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | UE using 3GPP and/or N3GPP accesses to core network (EPC/5GC) is possible for SEAL (e.g. SEAL LM can derive proper access type in clause 9.3.7). | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Add non-3GPP access connected to 3GPP core network in general description. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | No support for SEAL with N3GPP access connected to 3GPP core network. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 1, 2, 6.2, 6.5.2.2, 6.5.2.4, 9.2.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

\* \* \* First Change \* \* \* \*

# 1 Scope

The present document specifies the functional architecture for service enabler architecture layer (SEAL) and the procedures, information flows and APIs for each service within SEAL in order to support vertical applications over the 3GPP system. The present document is applicable to vertical applications using E-UTRAN or NR access based on the EPS or 5GS architecture defined in 3GPP TS 23.401 [9], 3GPP TS 23.246 [17], 3GPP TS 23.468 [16], 3GPP TS 23.501 [10] and 3GPP TS 23.247 [39] and non-3GPP access based on the EPS or 5GS architecture defined in 3GPP TS 23.402 [23402] and 3GPP TS 23.501 [10]. To ensure efficient use and deployment of vertical applications over 3GPP systems this specification for SEAL services includes the group management, configuration management, location management, identity management, key management and network resource management.

NOTE: In the present document, the multicast services offered by SEAL are only applicable for EPS.

\* \* \* Next Change \* \* \* \*

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 22.104: "Service requirements for cyber-physical control applications in vertical domains".

[3] 3GPP TS 23.379: "Functional architecture and information flows to support Mission Critical Push To Talk (MCPTT); Stage 2".

[4] 3GPP TS 23.280: "Common functional architecture to support mission critical services; Stage 2".

[5] 3GPP TS 23.281: "Functional architecture and information flows to support Mission Critical Video (MCVideo); Stage 2".

[6] 3GPP TS 23.282: "Functional architecture and information flows to support Mission Critical Data (MCData); Stage 2".

[7] 3GPP TS 23.286: "Application layer support for V2X services; Functional architecture and information flows".

[8] 3GPP TS 23.222: "Functional architecture and information flows to support Common API Framework for 3GPP Northbound APIs; Stage 2".

[9] 3GPP TS 23.401: "General Packet Radio Service (GPRS) enhancements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN) access".

[10] 3GPP TS 23.501: "System Architecture for the 5G System; Stage 2".

[11] 3GPP TS 23.502: "Procedures for the 5G System; Stage 2".

[12] 3GPP TS 23.303: "Proximity-based services (ProSe); Stage 2".

[13] 3GPP TS 23.682: "Architecture enhancements to facilitate communications with packet data networks and applications".

[14] 3GPP TS 23.002: "Network Architecture".

[15] 3GPP TS 23.228: "IP Multimedia Subsystem (IMS); Stage 2".

[16] 3GPP TS 23.468: "Group Communication System Enablers for LTE (GCSE\_LTE); Stage 2".

[17] 3GPP TS 23.246: "Multimedia Broadcast/Multicast Service (MBMS); Architecture and functional description".

[18] 3GPP TS 23.203: "Policy and charging control architecture".

[19] 3GPP TS 23.503: "Policy and Charging Control Framework for the 5G System; Stage 2".

[20] 3GPP TS 26.348: "Northbound Application Programming Interface (API) for Multimedia Broadcast/Multicast Service (MBMS) at the xMB reference point".

[21] 3GPP TS 29.214: "Policy and charging control over Rx reference point".

[22] 3GPP TS 29.468: "Group Communication System Enablers for LTE (GCSE\_LTE); MB2 Reference Point; Stage 3".

[23] 3GPP TS 36.300: "Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2".

[24] IETF RFC 6733 (October 2012): "Diameter Base Protocol".

[25] ETSI TS 102 894-2 (V1.2.1): "Intelligent Transport Systems (ITS); Users and applications requirements; Part 2: Applications and facilities layer common data dictionaryMultimedia Broadcast/Multicast Service (MBMS); Protocols and codecs".

[26] ETSI TS 102 965 (V1.4.1): "Intelligent Transport Systems (ITS); Application Object Identifier (ITS-AID); Registration".

[27] ISO TS 17419: "Intelligent Transport Systems - Cooperative systems - Classification and management of ITS applications in a global context".

[28] 3GPP TS 26.346: "Multimedia Broadcast/Multicast Service (MBMS); Protocols and codecs".

[29] 3GPP TS 33.434: "Service Enabler Architecture Layer (SEAL); Security aspects for Verticals".

[30] 3GPP TS 29.549: "Service Enabler Architecture Layer for Verticals (SEAL); Application Programming Interface (API) specification; Stage3".

[31] 3GPP TS 23.285: "Architecture enhancements for V2X services".

[32] IETF RFC 7252: "The Constrained Application Protocol (CoAP)".

[33] IETF RFC 8323: "CoAP (Constrained Application Protocol) over TCP, TLS, and WebSockets".

[34] 3GPP TS 23.288: "Architecture enhancements for 5G System (5GS) to support network data analytics services".

[35] IEEE Std 802.1Qcc-2018: "Standard for Local and metropolitan area networks - Bridges and Bridged Networks - Amendment: Stream Reservation Protocol (SRP) Enhancements and Performance Improvements".

[36] IEEE 802.1Q-2018: "IEEE Standard for Local and Metropolitan Area Networks—Bridges and Bridged Networks".

[37] IEEE Std 802.1CB-2017: "Frame Replication and Elimination for Reliability".

[38] 3GPP TS 23.003: "Numbering, Addressing and Identification".

[39] 3GPP TS 23.247: "Architectural enhancements for 5G multicast-broadcast services; Stage 2".

[40] 3GPP TS 23.435: "Procedures for Network Slice Capability Exposure for Application Layer Enablement Service".

[41] 3GPP TS 28.531: "Management and orchestration; Provisioning".

[42] 3GPP TS 28.533: "Management and orchestration; Architecture framework".

[43] 3GPP TS 28.530: "Management and orchestration; Concepts, use cases and requirements".

[44] 3GPP TS 28.532: "Management and orchestration; Generic management services".

[45] 3GPP TS 28.552: "Management and orchestration; 5G performance measurements".

[46] 3GPP TS 28.554: "Management and orchestration; 5G end to end Key Performance Indicators (KPI)".

[47] 3GPP TS 28.104: "Management and orchestration; Management Data Analytics".

[48] 3GPP TS 23.433: "Service Enabler Architecture Layer for Verticals (SEAL); Data Delivery enabler for vertical applications".

[49] 3GPP TS 23.436: "Procedures for Application Data Analytics Enablement Service".

[23402] 3GPP TS 23.402: "Architecture enhancements for non-3GPP accesses".

\* \* \* Next Change \* \* \* \*

## 6.2 On-network functional model description

Figure 6.2-1 illustrates the generic on-network functional model for SEAL.



Figure 6.2-1: Generic on-network functional model

In the vertical application layer, the VAL client communicates with the VAL server over VAL-UU reference point. VAL-UU supports both unicast and multicast delivery modes.

NOTE 1: The VAL-UU reference point is out of scope of the present document.

The SEAL functional entities on the UE and the server are grouped into SEAL client(s) and SEAL server(s) respectively. The SEAL consists of a common set of services (e.g. group management, location management) and reference points. The SEAL offers its services to the vertical application layer (VAL).

NOTE 2: The functionalities and reference points of the vertical application layer are out of scope of the present document.

NOTE 3: The vertical application layer may further consist of vertical application enabler layer functionalities (specified by 3GPP) and application specific functionalities, which is out of scope of the present document.

The SEAL client(s) communicates with the SEAL server(s) over the SEAL-UU reference points. SEAL-UU supports both unicast and multicast delivery modes. The SEAL client(s) provides the service enabler layer support functions to the VAL client(s) over SEAL-C reference points. The VAL server(s) communicate with the SEAL server(s) over the SEAL-S reference points. The SEAL server(s) may communicate with the underlying 3GPP network systems using the respective 3GPP interfaces specified by the 3GPP network system.

Editor's Note: SEAL-UU support for multicast delivery is FFS.

The specific SEAL client(s) and the SEAL server(s) along with their specific SEAL-UU reference points and the specific network interfaces of 3GPP network system used are described in the respective on-network functional model for each SEAL service.

Figure 6.2-1 illustrates SEAL-UU and VAL-UU utilizing 3GPP network systems (e.g. EPS or 5GS) as transport layer.

NOTE 4: SEAL-UU and VAL-UU can utilize non-3GPP systems as transport layer (e.g. WLAN offloading), which is out of scope of the present specification.

Figure 6.2-2 illustrates the functional model for interconnection between SEAL servers.



Figure 6.2-2: Interconnection between SEAL servers

To support distributed SEAL server deployments, the SEAL server interacts with another SEAL server for the same SEAL service over SEAL-E reference point.

Figure 6.2-3 illustrates the functional model for inter-service communication between SEAL servers.



Figure 6.2-3: Inter-service communication between SEAL servers

The SEAL server interacts with another SEAL server for inter-service communication over SEAL-X reference point.

Figure 6.2-4 illustrates the functional model for communication between SEAL server and VAL user database.



Figure 6.2-4: Communication between SEAL server and VAL user database

The SEAL server interacts with the VAL user database for storing and retrieving user profile over VAL-UDB reference point.

Figure 6.2-5 shows the functional model for the signalling control plane.



Figure 6.2-5: Functional model for signalling control plane

NOTE 5: The Light-weight Protocol (LWP) functional entities and reference points are a generic representation of protocol entities and reference points for use in constrained environments. Realizations of LWP by means of a particular transport protocol are defined in the annex of this specification. Realizations of LWP by means of transport protocols is not limited to those defined in the annex of this specification.

\* \* \* Next Change \* \* \* \*

#### 6.5.2.2 VAL-UU

The interactions related to vertical application layer support functions between VAL client and VAL server are supported by VAL-UU reference point. This reference point is an instance of Uu reference point as described in 3GPP TS 23.401 [9] and 3GPP TS 23.501 [10] or an instance of non-3GPP access reference point based on 3GPP system as described in 3GPP TS 23.402 [23402] and 3GPP TS 23.501 [10].

NOTE 1: The details of VAL-UU reference point is out of scope of the present document.

NOTE 2: This reference point can be an instance of non-3GPP access in non-3GPP system, which is out of scope of the present document.

\* \* \* Next Change \* \* \* \*

#### 6.5.2.4 SEAL-UU

The interactions between a SEAL client and the corresponding SEAL server are generically referred to as SEAL-UU reference point. The specific SEAL service reference point corresponding to SEAL-UU is specified in the specific SEAL service functional model. This reference point is an instance of Uu reference point as described in 3GPP TS 23.401 [9] and 3GPP TS 23.501 [10] or an instance of non-3GPP access reference point based on 3GPP system as described in 3GPP TS 23.402 [23402] and 3GPP TS 23.501 [10].

NOTE: This reference point can be an instance of non-3GPP access in non-3GPP system, which is out of scope of the present document.

\* \* \* Next Change \* \* \* \*

### 9.2.2 On-network functional model description

Figure 9.2.2-1 illustrates the generic on-network functional model for location management.



Figure 9.2.2-1: On-network functional model for location management

The location management client communicates with the location management server over the LM-UU reference point. The location management client provides the support for location management functions to the VAL client(s) over LM‑C reference point. The VAL server(s) communicate with the location management server over the LM-S reference point. The VAL client communicates with the VAL server over the VAL-UU reference point which is outside the scope of this document.

The location management server communicates with the SCEF via T8 reference point to obtain location information from the underlying 3GPP network system. The location management server obtains location information from the NEF via N33 reference point by mechanism defined in clause 5.2.6.2 of 3GPP TS 23.502 [11]. The location management server may obtain location information from the GMLC via Le reference point defined in clause 4.4.1 of 3GPP TS 23.273 [50]. The location management server may optionally obtains location information from the 3rd party location server via LM-3P reference point.

When the fused location function is present, the location management server, may use the location information from multiple sources to determine a more accurate UE location. The fused location function may select one or more location sources and for LM-UU location source derive location access type and positioning methods based on the requested location QoS obtained from the location management server.

NOTE: Location information from LCS of 4G system is not exposed by SCEF.

Figure 9.2.2-2 exhibits the service-based interfaces for providing and consuming location management services. The location management server could provide service to VAL server and location management client through interface Slm.



Figure 9.2.2-2: Architecture for location management – Service based representation

Figure 9.2.2-3 illustrates the service-based representation for utilization of the 5GS network services based on the 5GS SBA specified in 3GPP TS 23.501 [10].



Figure 9.2.2-3: Architecture for location management utilizing the 5GS network services based on the 5GS SBA – Service based representation

Figure 9.2.2-4 illustrates the service-based representation for utilization of the Core Network (5GC, EPC) northbound APIs via CAPIF.



Figure 9.2.2-4: Utilization of Core Network Northbound APIs via CAPIF – service based representation

The Location management server acts as authorized API invoker to consume services from the Core Network (5GC, EPC) northbound API entities like SCEF, NEF, SCEF+NEF which act as API Exposing Function as specified in 3GPP TS 23.222 [6].

\* \* \* END of Change \* \* \* \*