**3GPP TSG- Meeting #**

**, , -**

|  |
| --- |
| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  |  | **CR** |  | **rev** | **1** | **Current version:** |  |  |
|  |
| *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)*.* |
|  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

|  |
| --- |
|  |
| ***Title:***  | PoI in NWDAF |
|  |  |
| ***Source to WG:*** | SA3LI(Ministère Economie et Finances) |
| ***Source to TSG:*** | SA3 |
|  |  |
| ***Work item code:*** |  |  | ***Date:*** |  |
|  |  |  |  |  |
| ***Category:*** |  |  | ***Release:*** |  |
|  | *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 canbe 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:*** | Introduce an IRI-POI in the NWDAF to provide analytics data which relate to a target UE (statistics and/or predictions). |
|  |  |
| ***Summary of change:*** |  Definition of IRIs related to data analytics of a target UE generated by the IRI-POI in the NWDAF  |
|  |  |
| ***Consequences if not approved:*** | The above information will still be missing |
|  |  |
| ***Clauses affected:*** | 2; 3.3; 6.2; 7.X; Annex A |
|  |  |
|  | **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:*** | s3i240020 |

**\*\*\* Start of First 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 23.501: "System Architecture for the 5G System".

[3] 3GPP TS 33.126: "Lawful interception requirements".

[4] 3GPP TS 23.502: "Procedures for the 5G System; Stage 2".

[5] 3GPP TS 23.271: "Functional stage 2 description of Location Services (LCS)".

[6] OMA-TS-MLP-V3\_5-20181211-C: "Open Mobile Alliance; Mobile Location Protocol, Candidate Version 3.5", <https://www.openmobilealliance.org/release/MLS/V1_4-20181211-C/OMA-TS-MLP-V3_5-20181211-C.pdf>".

[7] ETSI TS 103 120: "Lawful Interception (LI); Interface for warrant information".

[8] ETSI TS 103 221-1: "Lawful Interception (LI); Internal Network Interfaces; Part 1: X1 ".

[9] 3GPP TS 33.501: "Security Architecture and Procedures for the 5G System".

[10] ETSI GR NFV-SEC 011: "Network Functions Virtualisation (NFV); Security; Report on NFV LI Architecture".

[11] 3GPP TS 33.107: "3G Security; Lawful interception architecture and functions".

[12] 3GPP TS 23.214: "Architecture enhancements for control and user plane separation of EPC nodes; Stage 2".

[13] 3GPP TS 23.228: "IP Multimedia Subsystem (IMS); Stage 2".

[14] 3GPP TS 38.413: "NG-RAN; NG Application Protocol (NGAP)".

[15] 3GPP TS 33.128: "Protocol and Procedures for Lawful Interception; Stage 3".

[16] ETSI TS 103 221-2: " Lawful Interception (LI); Internal Network Interfaces; Part 2: X2/X3".

[17] MMS Architecture OMA-AD-MMS-V1\_3-20110913-A.

[18] Multimedia Messaging Service Encapsulation Protocol OMA-TS-MMS\_ENC-V1\_3-20110913-A.

[19] 3GPP TS 22.140: "Multimedia Messaging Service (MMS); Stage 1".

[20] ETSI GS NFV-IFA 026: "Network Functions Virtualisation (NFV) Release 3; Management and Orchestration; Architecture enhancement for Security Management Specification".

[21] 3GPP TS 33.108: "Handover Interface for Lawful Interception (LI)".

[22] 3GPP TS 23.401: "General Packet Radio Service (GPRS) enhancements for
Evolved Universal Terrestrial Radio Access Network (E-UTRAN) access".

[23] 3GPP TS 23.402: "Architecture enhancements for non-3GPP accesses".

[24] 3GPP TS 23.280: "Common functional architecture to support mission critical services; Stage 2".

[25] OMA-AD-PoC-V2\_1-20110802-A: "Push to talk over Cellular (PoC) Architecture".

[26] GSMA IR.92: "IMS Profile for Voice and SMS".

[27] GSMA NG.114: "IMS Profile for Voice, Video and Messaging over 5GS".

[28] 3GPP TS 24.147: "Conferencing using the IP Multimedia (IM) Core Network (CN) subsystem; Stage 3".

[29] ETSI GS NFV-SEC 012: "Network Functions Virtualisation (NFV) Release 3; Security; System architecture specification for execution of sensitive NFV components".

[30] 3GPP TS 23.273: "5G System (5GS) Location Services (LCS); Stage 2".

[31] 3GPP TS 29.522: "5G System; Network Exposure Function Northbound APIs; Stage3".

[32] 3GPP TS 29.122: "T8 reference point for Northbound APIs".

[33] 3GPP TS 23.682: "Architecture enhancements to facilitate communications with packet data networks and applications".

[34] OMA-AD-CPM-V2\_2-20170926-C: "Open Mobile Alliance, OMA Converged IP Messaging System Description", <http://www.openmobilealliance.org/release/CPM/V2_2-20200907-C/OMA-AD-CPM-V2_2-20170926-C.pdf>.

[35] GSMA RCC.07: "Rich Communication Suite – Advanced Communications Services and Client Specification".

[36] IETF RFC 4975: "The Message Session Relay Protocol (MSRP)".

[37] IETF RFC 6714: "Connection Establishment for Media Anchoring (CEMA) for the Message Session Relay Protocol (MSRP)".

[38] IETF RFC 3862: "Common Presence and Instant Messaging (CPIM): Message Format".

[39] 3GPP TS 24.229: "IP Multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3".

[40] IETF RFC 8224: "Authenticated Identity Management in the Session Initiation Protocol (SIP)".

[41] IETF RFC 8946: "Personal Assertion Token (PASSporT) Extension for Diverted Calls".

[42] IETF draft-ietf-stir-passport-rcd-26, "PASSporT Extension for Rich Call Data".

NOTE: The above document cannot be formally referenced until it is published as an RFC.

[43] IETF RFC 7095: "jCard: The JSON Format for vCard".

[44] 3GPP TS 24.196: "Enhanced Calling Name (eCNAM)".

[45] IETF RFC 8816: "Secure Telephone Identity Revisited (STIR) Out-of-Band Architecture and Use Cases".

[46] IETF draft-ietf-stir-messaging-08, "Messaging Use Cases and Extensions for STIR".

NOTE: The above document cannot be formally referenced until it is published as an RFC.

[47] 3GPP TS 33.535: "Authentication and Key Management for Applications (AKMA) based on 3GPP credentials in the 5G System (5GS)".

[48] 3GPP TS 33.220: "Generic Authentication Architecture (GAA); Generic Bootstrapping Architecture (GBA)".

[49] 3GPP TS 33.222: "Generic Authentication Architecture (GAA); Access to network application functions using Hypertext Transfer Protocol over Transport Layer Security (HTTPS)".

[50] 3GPP TS 23.040: "Technical realization of the Short Message Service (SMS)".

[51] 3GPP TS 23.558: "Architecture for enabling Edge Applications".

[52] 3GPP TS 29.518: "5G System; Access and Mobility Management Services; Stage 3".

[53] 3GPP TS 26.501: "5G Media Streaming (5GMS); General description and architecture".

[54] 3GPP TS 29.272: "Evolved Packet System (EPS); Mobility Management Entity (MME) and Serving GPRS Support Node (SGSN) related interfaces based on Diameter protocol".

[55] 3GPP TS 23.288: "Architecture enhancements for 5G System (5GS) to support network data analytics services".

**\*\*\* End of First Change \*\*\***

**\*\*\* Start of Second Change \*\*\***

## 3.3 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

5GC 5G Core Network

5GMS 5G Media Streaming

5GS 5G System

AAnF AKMA Anchor Function

AC Application Client

ACR Application Context Relocation

ADMF LI Administration Function

AF Application Function

AF\_ID Application Function Identity

AKA Authentication and Key Agreement

A-KID AKMA Key IDentifier

AKMA Authentication and Key Management for Applications

AMF Access and Mobility Management Function

AS Application Server

AUSF Authentication Server Function

BBIFF Bearer Binding Intercept and Forward Function

BSS Business Support System

CAG Closed Access Group

CC Content of Communication

CP Control Plane

CPIM Common Presence and Instant Messaging

CPS Call Placement Service

CSI Cell Supplemental Information

CSP Communication Service Provider

CSR Cell Site Report

CUPS Control and User Plane Separation

DN Data Network

DNAI Data Network Access Identifier

DoNAS Data over NAS

EAP Extensible Authentication Protocol

EAS Edge Application Server

ECGI E-UTRAN Cell Global Identifier

eCNAM Enhanced Calling Name

ECSP Edge Computing Service Provider

E-CSCF Emergency – Call Session Control Function

EDN Edge Data Network

EEC Edge Enabler Client

EECID Edge Enabler Client IDentifier

EES Edge Enabler Server

GPSI Generic Public Subscription Identifier

HMEE Hardware Mediated Execution Enclave

HR Home Routed

IBCF Interconnection Border Control Functions

ICF Identity Caching Function

IEF Identity Event Function

IMS-AGW IMS Access Gateway

IM-MGW IM Media Gateway

IP Interception Product

IQF Identity Query Function

IRI Intercept Related Information

KAF AKMA Application Key

KAKMA AKMA Anchor Key

KID Key IDentifier

KLI Decryption key(s) for services encrypted by CSP-provided keys

KSF Key Server Function

LAF Location Acquisition Function

LALS Lawful Access Location Services

LARF Location Acquisition Requesting Function

LBO Local Break Out

LEA Law Enforcement Agency

LEMF Law Enforcement Monitoring Facility

LI Lawful Interception

LI CA Lawful Interception Certificate Authority

LICF Lawful Interception Control Function

LI\_HI1 Lawful Interception Handover Interface 1

LI\_HI2 Lawful Interception Handover Interface 2

LI\_HI3 Lawful Interception Handover Interface 3

LI\_HI4 Lawful Interception Handover Interface 4

LI\_HILA Lawful Interception Handover Interface Location Acquisition

LI\_HIQR Lawful Interception Handover Interface Query Response

LIID Lawful Interception Identifier

LIPF Lawful Interception Provisioning Function

LIR Location Immediate Request

LI\_SI Lawful Interception System Information Interface

LISSF Lawful Interception State Storage Function

LI\_ST Lawful Interception State Transfer Interface

LI\_T1 Lawful Interception Internal Triggering Interface 1

LI\_T2 Lawful Interception Internal Triggering Interface 2

LI\_T3 Lawful Interception Internal Triggering Interface 3

LI\_X0 Lawful Interception Internal Interface 0

LI\_X1 Lawful Interception Internal Interface 1

LI\_X2 Lawful Interception Internal Interface 2

LI\_X2\_LA Lawful Interception Internal Interface 2 Location Acquisition

LI\_X3 Lawful Interception Internal Interface 3

LI\_X3A Lawful Interception Internal Interface 3 Aggregator

LI\_XEM1 Lawful Interception Internal Interface Event Management Interface 1

LI\_XER Lawful Interception Internal Interface Event Record

LI\_XLA Lawful Interception Internal Interface Location Acquisition

LI\_XQR Lawful Interception Internal Interface Query Response

LMF Location Management Function

LMISF LI Mirror IMS State Function

LMISF-CC LMISF for the handling of CC

LMISF-IRI LMISF for the handling of IRI

LTF Location Triggering Function

MA Multi-Access

MANO Management and Orchestration

MDF Mediation and Delivery Function

MDF2 Mediation and Delivery Function 2

MDF3 Mediation and Delivery Function 3

MRFP Multimedia Resource Function Processor

MSRP Message Session Relay Protocol

N3A Non-3GPP Access

N3IWF Non 3GPP Inter Working Function

N9HR N9 Home Routed

NAS Non-Access Stratum

NCGI NR Cell Global Identity

NEF Network Exposure Function

NFV Network Function Virtualisation

NFVI Network Function Virtualisation Infrastructure

NFVO Network Function Virtualisation Orchestrator

NIDD Non-IP Data Delivery

NPLI Network Provided Location Information

NR New Radio

NRF Network Repository Function

NSSF Network Slice Selection Function

NWDAF Network Data Analytics Function

OSS Operations Support System

PAG POI Aggregator

PCF Policy Control Function

P-CSCF Proxy - Call Session Control Function

PEI Permanent Equipment Identifier

PGW PDN Gateway

PGW-C PDN Gateway Control Plane

PGW-U PDN Gateway User Plane

POI Point Of Interception

PLMN Public Land Mobile Network

PTC Push to Talk over Cellular

RCD Rich Call Data

RCS Rich Communication Suite

S8HR S8 Home Routed

SCEF Service Capability Exposure Function

SCS Service Capability Server

SGW Serving Gateway

SGW-C Serving Gateway Control Plane

SGW-U Serving Gateway User Plane

SHAKEN Signature-based Handling of Asserted information using toKENs

SIRF System Information Retrieval Function

S-CSCF Serving - Call Session Control Function

SIP Session Initiation Protocol

SMF Session Management Function

SMSF SMS-Function

STF Security Terminating Function

STIR Secure Telephony Identity Revisited

SUCI Subscriber Concealed Identifier

SUPI Subscriber Permanent Identifier

TAI Tracking Area Identity

TF Triggering Function

TLS Transport Layer Security

TNGF Trusted Non-3GPP Gateway Function

TrGW Transit Gateway

TWIF Trusted WLAN Interworking Function

UDM Unified Data Management

UDR Unified Data Repository

UDSF Unstructured Data Storage Function

UPF User Plane Function

VNF Virtual Network Function

VNFC Virtual Network Function Component

W-AFG Wireline Access Gateway Function

xCC LI\_X3 Content of Communication

xIRI LI\_X2 Intercept Related Information

**\*\*\*End of Second Change \*\*\***

**\*\*\* Start of Third Change \*\*\***

## 6.2 5G

### 6.2.1 General

Figure 6.2-1 depicts the 5G EPC-anchored LI architecture. The network functions are depicted in grey, while the LI elements are depicted in blue.



Figure 6.2-1: 5G EPC-anchored LI architecture

Figure 6.2-2 depicts the 5G core-anchored LI architecture. The network functions are depicted in grey, while the LI elements are depicted in blue.



Figure 6.2-2: 5G core-anchored LI architecture

NOTE: A CC-POI may also be present in the SMF for roaming NIDD interception, which is not shown in figure 6.2-2.

**\*\*\* End of third Change \*\*\***

**\*\*\* Start of Fourth Change \*\*\***

## 7.X LI at NWDAF

### 7.X.1 Background

Network Data Analytics Function (NWDAF) is a 5G network function which analyses data collected from network functions, OAM and UEs via AF in the 5G System, and publishes the analytics results to subscribing data analytics consumers. The results could be a summary of statistical/historical data, or an attempt to predict future data values related to UEs which user consent is granted.

NWDAF covers the following data analytics services related to a UE:

- Observed service experience as defined in TS 23.288 [55] clause 6.4.

- UE mobility as defined in TS 23.288 [55] clause 6.7.2.

- UE communication as defined in TS 23.288 [55] clause 6.7.3.

- Abnormal behaviour as defined in TS 23.288 [55] clause 6.7.5.

- Data volume dispersion as defined in TS 23.288 [55] clause 6.10.

- Relative proximity as defined in in TS 23.288 [55] clause 6.19.

- PDU session traffic as defined in TS 23.288 [55] clause 6.20.

NWDAF covers additional services which are not UE related, and additional services which are UE related but not of interest from LI perspective. LI for these services is not defined in the present document.

### 7.X.2 Architecture

The NWDAF shall provide the IRI-POI function. Figure 7.X.2-1 gives a reference point representation of the LI architecture with NWDAF as a CP NF providing the IRI-POI function. NWDAF provides a set of data analytics in the form of statistics and predictions to authorized NF consumers. This LI architecture is valid in non-roaming and roaming situations.

In roaming situation, data analytics may be exchanged between the visited network and home network via NWDAFs with roaming exchange capability.

- For an outbound roaming UE, the NF consumer in the home network can retrieve analytics from the NWDAF present in the visited network.

- For an inbound roaming UE, the NF consumer in the visited network can retrieve analytics from the NWDAF present in the home network.

NOTE: The NWDAF in the visited network is also referred to as V-RE-NWDAF and the NWDAF in the HPLMN is also referred to as H-RE-NWDAF.



Figure 7.X.2-1: LI architecture for 5G data analytics showing LI at NWDAF

NOTE: For roaming case, the NWDAF in the visited network is also referred to as V-RE-NWDAF and the NWDAF in the home network is also referred to as H-RE-NWDAF.

### 7.X.3 Target identities

The LIPF present in the ADMF provisions the intercept information associated with the following target identities to the IRI-POI present in the NWDAF:

- SUPI.

### 7.X.4 IRI events

The IRI-POI in the NWDAF shall generate xIRI when it detects the following specific events or information:

- Events subscription (see clauses 7.2.2 and 7.2.3 of TS 22.288 [55]).

- Events notification (see clause 7.2.4 of TS 23.288 [55]).

- Analytics info query (see clause 7.3.2 of TS 23.288 [55]).

- Roaming analytics subscription (see clauses 7.7.2 and 7.7.3 of TS 23.288 [55]).

- Roaming analytics notification (see clause 7.7.4 of TS 23.288 [55]).

The POI in the NWDAF shall report analytics only when the target SUPI is the single SUPI for which the analytics is run.

The events subscription xIRI is generated when the IRI-POI present in the NWDAF detects that a request to subscribe/update subscription/delete subscription for UE related analytics events for a target UE has been received from a consumer NF. The UE related analytics events are listed in clause 7.X.1.

The events notification xIRI is generated when the IRI-POI present in the NWDAF detects that the NWDAF notifies a NF consumer about analytics events related to a target UE.

The analytics info query xIRI is generated when the IRI-POI present in the NWDAF detects that the NWDAF has received a query for an analytics event related to a target UE.

The roaming analytics subscription xIRI is generated when the IRI-POI present in the RE-NWDAF detects that a request to subscribe/update subscription/delete subscription for analytics events for a target inbound roaming or outbound roaming UE has been received from a consumer NWDAF.

The roaming analytics notification xIRI is generated when the IRI-POI present in the RE-NWDAF detects that the RE-NWDAF notifies a NWDAF consumer about analytics events related to a target UE.

**\*\*\* End of Fourth Change \*\*\***

**\*\*\* Start of Fifth Change \*\*\***

Annex A (informative):
5G LI network topology views

# A.1 Non-roaming scenario

## A.1.1 General

In a non-roaming scenario, the POIs present in the following NFs provide the LI functions:

- AMF.

- UDM.

- SMF.

- UPF.

- SMSF.

- NEF.

- NWDAF.

For the interception of PDU sessions, the EPC CUPS LI model is not extended to 5G where SMF and UPF are involved in delivering the xIRI and xCC associated with the PDU sessions.

NOTE: The above list of NFs that provide the POI functions may have to be expanded once a deployment scenario for such a case is defined in the normative part of the present document.

## A.1.2 Service-based representation with point-to-point LI system

The overall network configuration for 5G in a non-roaming scenario with the LI aspects is shown in figure A.1-1 using the service-based representation (as shown in TS 23.501 [2]) with the use of point-to-point LI system.



Figure A.1-1: Network topology showing LI for 5G (service-based representation) with point-to-point LI system

**\*\*\* End of Fifth Change \*\*\***

**\*\*\* End of Last Change \*\*\***