



**TETRA and Critical Communications Evolution (TCCE);
Critical Communications Architecture;
Part 2: Critical Communications application
mobile to network interface architecture**

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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee TETRA and Critical Communications Evolution (TCCE).

The present document is part 2 of a multi-part deliverable covering TETRA and Critical Communications Evolution (TCCE); Critical Communications Architecture, as identified below:

ETSI TR 103 269-1: "Critical Communications Architecture Reference Model";

ETSI TS 103 269-2: "Critical Communications application mobile to network interface architecture";

ETSI TS 103 269-3: "Critical Communications application mobile to network interface specification".

Modal verbs terminology

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1 Scope

The present document presents an overview of the architecture for a generic mission critical service for use by a Critical Communications Application in network and terminal over a broadband IP bearer, with specific focus for LTE. The architecture is part of the overall Critical Communications Architecture Reference Model, described in ETSI TR 103 269-1 [i.11]. The overall architecture and services are described and the implementation of services equivalent to the existing narrowband technologies, for example those in TETRA and Tetrapol systems. Off network services are for future study and so are outside the scope of the present document.

2 References

2.1 Normative references

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The following referenced documents are necessary for the application of the present document.

- [1] Void.
- [2] IETF RFC 3261: "SIP: Session Initiation Protocol".
- [3] IETF RFC 5389: "Session Traversal Utilities for NAT (STUN)".
- [4] IETF RFC 6665: "SIP-Specific Event Notification".
- [5] IETF RFC 3428: "Session Initiation Protocol (SIP) Extension for Instant Messaging".
- [6] IETF RFC 3903: "Session Initiation Protocol (SIP) Extension for Event State Publication".
- [7] IETF RFC 4566: "SDP: Session Description Protocol".
- [8] Void.
- [9] IETF RFC 791: "Internet Protocol (v4)".
- [10] IETF RFC 2460: "Internet Protocol, Version 6 (IPv6) Specification".
- [11] IETF RFC 793: "Transmission Control Protocol".
- [12] IETF RFC 4960: "Stream Control Transmission Protocol".
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- [15] IETF RFC 768: "User Datagram Protocol".
- [16] IETF RFC 3550: "RTP: A Transport Protocol for Real-Time Applications".
- [17] IETF RFC 3711: "The Secure Real-time Transport Protocol (SRTP)".
- [18] IETF RFC 5245 (04-2010): "Interactive Connectivity Establishment (ICE): A Protocol for Network Address Translator (NAT) Traversal for Offer/Answer Protocols".

- [19] IETF RFC 5766: "Traversal Using Relays around NAT (TURN): Relay Extensions to Session Traversal Utilities for NAT (STUN)".
- [20] ETSI TS 100 900 (V7.2.0): "Digital cellular telecommunications system (Phase 2+) (GSM); Alphabets and language-specific information (GSM 03.38 version 7.2.0 Release 1998)".
- [21] IETF RFC 3629 (11-2003): "UTF-8, a transformation format of ISO 10646".
- [22] IETF RFC 7230 (06-2014): "Hypertext Transfer Protocol (HTTP/1.1): Message Syntax and Routing".
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- [31] OpenID Connect 1.0: "OpenID Connect Core 1.0 incorporating errata set 1".
- NOTE: Available at http://openid.net/specs/openid-connect-core-1_0.html.
- [32] IETF RFC 3680 (03-2004): "A Session Initiation Protocol (SIP) Event Package for Registrations".
- [33] ETSI TS 124 229: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); LTE; IP multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3 (3GPP TS 24.229)".
- [34] OMA (03-05-2016): "XML Document Management (XDM) Specification", Approved Version 2.2.

2.2 Informative references

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NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

- [i.1] ETSI TR 102 022-2: "User Requirements Specification Mission Critical Broadband Communications; Part 2: Critical Communications Application".

[i.2] TETRA and Critical Communications Association; List of TIP features.

NOTE: Available at https://tandcca.com/fm_file/listoftipfeaturesv2-0-pdf/.

[i.3] ETSI EN 300 392-12: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 12: Supplementary services stage 3".

[i.4] ETSI TS 122 179: "Universal Mobile Telecommunications System (UMTS); LTE; Mission Critical Push to Talk (MCPTT) over LTE; Stage 1 (3GPP TS 22.179)".

[i.5] IEEE 802.11™: "IEEE Standard for Information technology - Telecommunications and information exchange between systems local and metropolitan area networks - Specific requirements - Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications".

[i.6] IEEE 802.16™: "IEEE Standard for Air Interface for Broadband Wireless Access Systems".

[i.7] IETF RFC 5359: "Session Initiation Protocol Service Examples".

[i.8] ETSI TS 123 003: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); Numbering, addressing and identification (3GPP TS 23.003)".

[i.9] ETSI TS 136 300: "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2 (3GPP TS 36.300)".

[i.10] IETF RFC 959 (10-1985): "File Transfer Protocol (FTP)".

[i.11] ETSI TR 103 269-1: "TETRA and Critical Communications Evolution (TCCE); Critical Communications Architecture; Part 1: Critical Communications Architecture Reference Model".

[i.12] ETSI TS 122 278: "LTE; Service requirements for the Evolved Packet System (EPS) (3GPP TS 22.278)".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

5-tuple: set of five values required to specify a TCP or UDP connection, comprising a protocol identifier (TCP or UDP), a source IP address, a source port number, a destination IP address and a destination port number

Access Point Name (APN): reference to a GGSN comprising an external network identifier and an optional PLMN operator identifier

NOTE: To support inter-PLMN roaming, the internal GPRS DNS functionality is used to translate the APN into the IP address of the GGSN (ETSI TS 123 003 [i.8]).

affiliation: process of negotiating access to communications with a group

NOTE 1: The TETRA term for affiliation is "Group Attachment".

NOTE 2: ETSI TS 122 179 [i.4] uses the term "Affiliation".

call: set of one or more transmissions of media between two or more parties

call hang time: period within a call during which no communications are sent or received, and following expiry of which, the call will be cleared

CCA client: entity that provides the CCA application functionality within an access network client terminal

NOTE: A CCA client may create multiple instances of its application functionality within a single access network client terminal.

CCA client identity: URI that identifies the CCA client in a specific device

CCA functional identity: SIP URI used when identifying and routing call related and call unrelated signalling sent to and from a CCA client application that has been associated with a user role

CCA group identity (CCA group ID): SIP URI used when identifying and routing call related and call unrelated signalling sent to a CCA group

CCA group reference: short reference to a CCA group identity that is used in media control protocol messages

CCA individual identity: SIP URI used when identifying and routing call related and call unrelated signalling sent to and from a CCA client instance that has been associated with a user

CCA server identity: name used to uniquely identify a critical communications application server

CCA user identity: name utilized for authentication of the user as an enabling step to gain access to CCA services

critical communications application: infrastructure based application which provides critical communications services to its CCA clients

full-duplex: method of communication in which participants can send and receive information at the same time

Fully Qualified Domain Name (FQDN): host name (including all subnames) and domain name, including the top level domain

NOTE: An FQDN is not the same as a URL (universal resource locator), but rather it is a part of it. This is because an FQDN lacks the TCP/IP protocol name (e.g. HTTP [23] or FTP [i.10]) that is always used at the start of a URL. Moreover, a URL may also include a directory path, a file name and a TCP port number.

Gateway GPRS Support Node (GGSN): component responsible for connecting a GPRS network or a GSM-based 3GPP network to an external packet switched network such as the Internet or an X.25 network

NOTE: A P-Gateway is the equivalent of the GGSN in the evolved packet core.

Globally Routable User agent URI (GRUU): SIP URI that routes to a specific UA instance and can be successfully used by any UA in the Internet, not just UAs in the same domain or IP network as the UA instance to which the URI points

half-duplex: method of communication in which only one participant can send information at one time

NOTE: In a half-duplex call, the call consists of a sequence of unidirectional transactions.

local breakout: optimized routing for a user with mobility within and across one operator-defined network region such that user plane traffic does not need to leave the current region

NOTE: An operator may define network regions e.g. according to administrative domains. Local breakout is applicable for user-to-user traffic and for 3GPP-operator provided services (including Internet access) [i.12]. The routing is per APN.

MBMS Service Area: area within which data of a specific MBMS session are sent

NOTE: Each individual MBMS session of an MBMS Bearer Service may be sent to a different MBMS Service Area.

MBSFN Area: group of cells within an MBSFN Synchronization Area of a network which are co-ordinated to achieve an MBSFN transmission

MBSFN Synchronization Area: area of the network where all eNodeBs can be synchronized and perform MBSFN transmissions

NOTE: MBSFN Synchronization Areas are capable of supporting one or more MBSFN Areas. MBSFN Synchronization Areas are independent from the definition of MBMS Service Areas.

media path transport parameters: set of parameters including at least a 5-tuple, direction (send-only, receive-only or send and receive), codec type and bandwidth

migration: obtaining Critical Communications service from a CCAS other than the home CCAS

Mobile Unit (MU): combination of access network client terminal and client application for critical communications which provides critical communications services to its user

participant type: functional category of a CCA user (e.g. first responder, second responder, dispatch, dispatch supervisor) typically defined by individuals authorized to control CCA service parameters and user profiles, etc.

registration: process of negotiating service from a CCAS

roaming: obtaining an IP connection to the home CCAS from a broadband IP network other than the home broadband IP network

NOTE: If a 3GPP LTE PLMN provides home service to a user, obtaining service from a different PLMN is an example of roaming.

session: period within a period of affiliation to a group within which transmissions may be sent and received to and from that group by using media control signalling only

session hang time: period following a call during which the CCAS may maintain a session before clearing it

Universal Resource Identifier (URI): compact sequence of characters that identifies an abstract or physical resource

Universal Resource Locator (URL): type of URI that identifies a resource via a representation of its primary access mechanism (e.g. its network "location"), rather than by some other attributes it may have

Universally Unique Identifier (UUID): 128-bit identifier that is effectively unique across space and time

User Agent (UA): software that acts on behalf of a user

user instance: unique combination of a CCA individual identity, a user profile and a CCA client instance

XML Configuration Access Protocol (XCAP): set of conventions for mapping XML documents and document components into HTTP URIs, rules for how the modification of one resource affects another, data validation constraints and authorization policies associated with access to those resources

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

3GPP	3 rd Generation Partnership Project
AGNSS	Assisted Global Navigation Satellite System
AL	Ambience Listening
APN	Access Point Name
ASCII	American Standard Code for Information Interchange
ASSI	Alias Short Subscriber Identity
AVL	Automatic Vehicle Location
BIC	Barring of Incoming Calls
BOC	Barring of Outgoing Calls
BS	Base Station
CAD	Call Authorized by Dispatcher
CCA	Critical Communications Application
CCAS	Critical Communications Application Server
CCS	Critical Communications System
CF	Call Forwarding