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Stage 2
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1 Scope

This document specifies the functional architecture, procedures and information flows needed to support the Mission Critical Data (MCData) services. MCData is a suite of services which utilizes the common functional architecture defined in 3GPP TS 23.280 [5] to support MC services over LTE including the common services core.

MCData services suite consists of the following sub-services:

- short data service (SDS);
- file distribution (FD.

MCData features include:

- conversation management;
- transmission and reception control;
- communication release; and
- enhanced status.

The corresponding service requirements are defined in 3GPP TS 22.282 [3] and 3GPP TS 22.280 [2].

The present document is applicable primarily to MCData service using E-UTRAN access based on the EPC architecture defined in 3GPP TS 23.401 [4]. Certain application functions of the MCData service could also be supported via non-3GPP access networks but no additional functionality is specified to support non-3GPP access.

The MCData service can be used for public safety applications and also for general commercial applications e.g. utility companies and railways.

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2 References

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- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
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[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 22.280: "Mission Critical Common Requirements (MCCoRe); Stage 1".

[3] 3GPP TS 22.282: "Mission Critical Data services over LTE".

[4] 3GPP TS 23.401: "General Packet Radio Service (GPRS) enhancements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN) access".

[5] 3GPP TS 23.280: "Common functional architecture and information flows to support mission critical communication services; Stage 2".

[6] 3GPP TS 23.228: "IP Multimedia Subsystem (IMS); Stage 2".

[7] 3GPP TS 23.303: "Proximity-based services (ProSe); Stage 2".

[8] 3GPP TS 23.468: "Group Communication System Enablers for LTE (GCSE_LTE); Stage 2".

[9] 3GPP TS 23.237: "IP Multimedia Subsystem (IMS) Service Continuity; Stage 2".

[10] 3GPP TS 23.002: "Network Architecture".

[11] 3GPP TS 23.379: "Functional architecture and information flows to support Mission Critical Push To Talk (MCPTT); stage 2".

[12] 3GPP TS 29.283: "Diameter data management applications".

[13] 3GPP TS 33.180: "Security of the Mission Critical Service".

[14] 3GPP TS 23.203: "Policy and charging control architecture".

[15] 3GPP TS 36.331: "Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification".

[16] 3GPP TS 29.468: "Group Communication System Enablers for LTE (GCSE_LTE); MB2 reference point; Stage 3".

3 Definitions, symbols and abbreviations

3.1 Definitions

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

Auto-receive: A mechanism where data smaller than a configured size threshold are delivered to the receiving MCData client(s) from the MCData server i.e. without waiting for the receiving user to indicate a present need for the data.

Conversation identifier: A universally unique identifier that identifies a series of related MCData transactions.

Data stream: A sequence of data that is agnostic to any underlying media (e.g. audio, video, telemetry data), on which processing of data (e.g. semantic, syntactic, save or filter operation) can begin before all the content is received.

FD disposition: is one of "not downloaded" and "download completed".

MCData client: An instance of an MC service client that provides the client application function for the MCData service.

MCData group: An MC service group configured for MCData service.

MCData group affiliation: An MC service group affiliation for MCData.

MCData group communication: A one-to-many communication using an MCData service.

MCData group de-affiliation: An MC service group de-affiliation for MCData.

MCData ID: An instance of an MC service ID within the MCData service.

MCData server: An instance of an MC service server that provides the server application function for the MCData service.

MCData service: A data communication service comprising at least one underlying generic capability (e.g. SDS, file distribution, data streaming) with strong security, high availability, reliability and priority handling to support applications for mission critical organizations and mission critical applications for other businesses and organizations (e.g. utilities, railways).

MCData UE: An MC service UE that can be used to participate in MCData services.

MCData user: An MC service user who is authorized for MCData services suite via an MCData UE.

Reception control: A mechanism that allows the MCData service to regulate data reception to the receiving MCData clients.

Reply identifier: A reference to the original MCData transaction to which the current transaction is a reply.

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SDS data: A payload with limited size and variable content type used in SDS transactions.

SDS disposition: is one of "undelivered", "delivered" and "read".

Standalone communication: A unidirectional one-to-one or group data communication completed after one transaction.

Transaction identifier: A unique identifier that identifies a MCData transaction within a conversation.

Transmission control: A mechanism that allows the MCData service to regulate data transmission requests from the sending MCData users, either prior to or after active sending from the MCData UE.

For the purposes of the present document, the following terms and definitions given in 3GPP TS 22.280 [2] apply:

Mission Critical
Mission Critical Applications
Mission Critical Service
Mission Critical Organization

For the purposes of the present document, the following terms and definitions given in 3GPP TS 22.282 [3] apply:

MCData system

For the purposes of the present document, the following terms and definitions given in 3GPP TS 23.280 [5] apply:

MC service client
MC service group
MC service group affiliation
MC service group de-affiliation
MC service ID
MC service server

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For the purposes of the present document, the following terms and definitions given in 3GPP TS 23.203 [14] apply:

Dynamic PCC rule

3.2 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].

DS	Data Streaming
FD	File Distribution
MC	Mission Critical
MCData ID	MCData user identity
PCC	Policy and Charging Control
PCRF	Policy and Charging Rules Function
QCI	QoS Class Identifier
SDS	Short Data Service
UM	Unacknowledged Mode

4 Introduction

The MCData service suite provides a set of generic capabilities and specific services to enable one-to-one and group data communications between MCData users.

The MCData architecture utilises the common functional architecture to support mission critical services over LTE defined in 3GPP TS 23.280 [5] and aspects of the IMS architecture defined in 3GPP TS 23.228 [6], the Proximity-based Services (ProSe) architecture defined in 3GPP TS 23.303 [7], the Group Communication System Enablers for LTE

(GCSE_LTE) architecture defined in 3GPP TS 23.468 [8], the Security of the Mission Critical Service in 3GPP TS 33.180 [13] and the PS-PS access transfer procedures defined in 3GPP TS 23.237 [9] to enable support of the MCData service.

The MCData UE primarily obtains access to the MCData service via E-UTRAN, using the EPS architecture defined in 3GPP TS 23.401 [4]. Certain application functions of MCData service can be accessed using MCData UEs via non-3GPP access networks.

5 Architectural requirements

5.1 Transmission control

The MCData service supports the ability to transmit SDS messages automatically towards the selected recipient user (private communication) or affiliated members of the selected MCData group. The MCData server may still reject the sent message (e.g. if there is no authority to send).

For MCData types other than SDS, the MCData service invokes a transmission request grant approach before data is permitted to be transmitted. The MCData service provides a configurable limit for the maximum amount of data for FD or time for streamed data that an MCData user can transmit in a single request, which may be configured by the MCData administrator.

Editor's note: Additional criteria such as frequency of transmission, category/type of data, etc., for transmission control arbitration is FFS.

For congestion control, related to transmission requests, the MCData service may perform the following:

- reject the data transmission requests and then shall notify the MCData user of the rejection;
- queue the data transmission requests; or
- at anytime, withhold the permission to transmit data automatically.

The MCData service shall notify the transmitting MCData group member if there are no other MCData group members affiliated to the MCData group.

5.2 Reception control

The MCData service shall support the ability to receive small amounts of data automatically. The MCData service may store data waiting for delivery in a temporary store, and notify availability to the receiving MCData users. The data which is temporarily stored may be configured with "time to live" value, and subsequently, the data may be purged from the temporary store upon expiry of "time to live".

The recipient individual user (private communication) or affiliated members of the MCData group(s) shall be notified of the list of available data either on request or periodically.

The MCData service shall provide a mechanism for the MCData user to select data to be downloaded from the list corresponding to the temporary store, subject to limitations such as expiry time and size.

The MCData service shall support the ability to automatically deliver files with a size less than a configured threshold value (i.e. auto-receive). The data size for auto-receive shall be configured by the MCData administrator.

5.3 Short Data Service capability

The MCData service shall support SDS capability for one-to-one and group communications.

The SDS capability shall support messages with a maximum payload of at least 1000 bytes. The supported message types shall include text, binary, or hyperlinks. Multiple message types may be interleaved within in a single message payload. The payload shall support indication of location information of the sending MCData user.

The MCData service shall support messages to be sent over the signalling plane or the media plane.

The SDS capability shall allow for multiple related messages to be correlated and sequenced within the MCData service.

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