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Foreword

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1 Scope

The present document specifies the media plane control protocols and interactions with the media needed to support Mission Critical Data (MCData) services, which are Short Data Service (SDS) and File Distribution (FD).

Mission critical communication services are services that require preferential handling compared to normal telecommunication services, e.g. in support of police or fire brigade.

The MCData service and its associated media plane control protocols can be used for public safety applications and also for general commercial applications (e.g., utility companies and railways).

The present document is applicable to User Equipment (UE) supporting MCData client functionality and to servers in the MCData system.

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 23.282: "Functional architecture and information flows to support Mission Critical Data (MCData) Stage-2".
- [3] 3GPP TS 23.280: "Common functional architecture to support mission critical services Stage-2".
- [4] 3GPP TS 24.481: "Mission Critical Services (MCS) group management; Protocol Specifications".
- [5] 3GPP TS 24.482: "Mission Critical Services (MCS) identity management; Protocol Specifications".
- [6] 3GPP TS 24.483: "Mission Critical Services (MCS) Management Object (MO)".
- [7] 3GPP TS 24.484: "Mission Critical Services (MCS) configuration management; Protocol Specifications".
- [8] 3GPP TS 24.282: "Mission Critical Services (MCS) signalling control; Protocol Specifications".
- [9] IETF RFC 2046 (November 1996): "Multipurpose Internet Mail Extensions (MIME) Part Two: Media Types".
- [10] IETF RFC 4122 (July 2005): "A Universally Unique Identifier (UUID) URN Namespace".
- [11] IETF RFC 4975 (September 2007): "The Message Session Relay Protocol (MSRP)".
- [12] IETF RFC 6135 (February 2011): "An Alternative Connection Model for the Message Session Relay Protocol (MSRP)".
- [13] IETF RFC 6714 (August 2012): "Connection Establishment for Media Anchoring (CEMA) for the Message Session Relay Protocol (MSRP)".
- [14] IETF RFC 4976 (September 2007): "Relay Extensions for the Message Session Relay Protocol (MSRP)".

[15] 3GPP TS 33.180: "Security of mission critical services".

3 Definitions 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].

example: text used to clarify abstract rules by applying them literally.

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].

CSK	Client-Server Key
CSK-ID	Client-Server Key Identifier
DPCK	MCDATA Payload Cipher Key
DPCK-ID	MCDATA Payload Cipher Key Identifier
DPKK	MCDATA Payload Protection Key
DPKK-ID	MCDATA Payload Protection Key Identifier
FD	File Distribution
GMK	Group Master Key
GMK-ID	Group Master Key Identifier
KMS	Key Management Server
KPAK	KMS Public Authentication Key
PCK	Private Call Key
PCK-ID	Private Call Key Identifier
PVT	Public Validation Token
SDS	Short Data Service
SPK	Signalling Protection Key
SPK-ID	Signalling Protection Key Identifier
SSK	Secret Signing Key

4 General

4.1 Overview

4.1.1 Short data service

The media plane control procedures, both for one-to-one and group short data services, take place for on-network only, when standalone short data is sent using media plane or when the short data is sent after an SDS session is established. In both cases the media plane is established as specified in 3GPP TS 24.282 [8].

The media plane uses the MSRP protocol as specified in RFC 4975 [11], RFC 4976 [14], RFC 6135 [12], and RFC 6714 [13].

In a standalone SDS using media plane, a single SDS message is sent by the originating MCDATA client as specified in this document. The procedure is terminated as specified in 3GPP TS 24.282 [8].

When an SDS session is established any MCDATA client with appropriate permissions, which participates this SDS session, can initiate the transmission of an SDS message until the termination of the SDS session. The termination of an SDS session is specified in 3GPP TS 24.282 [8].

An SDS message sent using media plane is carried in the body of an MSRP SEND request. The media control parameters and the data of an SDS message are carried in separate bodies in the same MSRP SEND request.

The Conversation ID, the Message ID, the optional InReplyTo message ID, the optional SDS disposition request type and the optional Application identifier are communicated by the MCDData client which sends the SDS message in the media control part of the body in the MSRP SEND request. The data is carried in a separate body of the MSRP SEND request.

For standalone SDS using media plane, the disposition notification is communicated as specified in 3GPP TS 24.282 [8].

For SDS during an SDS session the disposition notification is communicated using the procedures specified in the current document until the SDS session is terminated. After the termination of the SDS session the disposition notification, if any, is communicated as specified in 3GPP TS 24.282 [8].

4.1.2 File distribution

The media plane control procedures, both for one-to-one and group file distribution using media plane, take place for on-network only. The media plane for FD is established as specified in 3GPP TS 24.282 [8].

The media plane uses the MSRP protocol as specified in RFC 4975 [11], RFC 4976 [14], RFC 6135 [12], and RFC 6714 [13].

A file is sent using media plane by the originating MCDData client as specified in this document. The procedure is terminated as specified in 3GPP TS 24.282 [8].

The Conversation ID, the Message ID, the optional InReplyTo message ID, the optional FD disposition request type, the optional Application ID, the optional Mandatory download and the optional Metadata are communicated by the MCDData client which sends the file using the procedures specified in 3GPP TS 24.282 [8] while establishing the media plane.

The file is carried in the body of the MSRP SEND request as specified in this document.

The disposition notification is communicated as specified in 3GPP TS 24.282 [8].

4.1.3 Void

4.2 Other considerations

When an SDS message is sent using media plane, the body included in the MSRP SEND request, which carries media control information or which carries notification information, is protected between each entity separately if protection is applied. On the other hand the body included in the MSRP SEND request which carries the data is end to end protected. The procedures for the protection of the media control information or notification or of the data are specified in this document.

When a file is sent using media plane, the file or file portion, included in the body of the MSRP SEND request, is end to end protected. The procedure for the protection of the file is specified in this document.

5 Functional entities

5.1 General for MCDData functional entities

Media plane control is conducted between the MCDData server and MCDData UE. MCDData server has capability functions for SDS and FD. MCDData UE incorporates the MCDData client. MCDData user or MCDData user application may feed or consume data transmitted or received via the capability functions in the MCDData client. The capability function in the MCDData client provides SDS and FD services.

The capability functions of the MCDData server are specified for the controlling MCDData function and the participating MCDData function. The capability functions of the MCDData UE are specified for the MCDData client.

Data to be transmitted either by the MCDData user or by a MCDData user application using media plane shall be transmitted by the MCDData client to the participating MCDData function. The participating MCDData function shall forward the data to the controlling MCDData function. The controlling MCDData function shall distribute the data to the destination MCDData client for one-to-one MCDData service and to the MCDData clients of the affiliated group members for group MCDData service via the participating MCDData functions serving each destination MCDData client. A participating MCDData function may serve one or more MCDData clients. Based on deployment, controlling MCDData function may be in communication with zero, one or more participating MCDData functions. If a participating MCDData function is collocated with the controlling MCDData function, the controlling MCDData function may perform the functions of this co-located participating MCDData function. In this case the controlling MCDData function and this co-located participating MCDData function shall act as a single entity.

In the media plane the MCDData client and the controlling MCDData function shall act as MSRP clients. If and when a participating MCDData function is in the communication path as a separate entity between the controlling MCDData function and one or more MCDData clients, it shall act as an MSRP relay.

5.2 Functional entities for SDS

The capability function for SDS for media plane in the MCDData server is composed of SDS distribution function and the Transmission/Reception control. In the media plane the functions of SDS distribution and the Transmission/Reception control are specified for the controlling MCDData function and the participating MCDData function. The functions of the SDS are specified for the SDS function in MCDData client.

For SDS, data is composed of short data in the form of text, hypertext, binary string or location information. Short data generated in the MCDData client and sent using media plane follows the path for the originating MCDData client to the terminating MCDData clients as explained in subclause 5.1.

5.3 Functional entities for FD

The capability function for FD for media plane in the MCDData server is composed of FD function and the Transmission/Reception control. The file distribution over media plane functionalities in the MCDData server are specified for the controlling MCDData function and the participating MCDData function. The functions of the FD are specified for the FD function in the MCDData client.

For FD, data is composed of a file. A file provided at the MCDData client and sent using media plane follows the path from the originating MCDData client to the terminating MCDData clients as explained in subclause 5.1.

6 SDS media plane procedures

6.1 MCDData client procedures

6.1.1 Standalone SDS via media plane

6.1.1.1 General

In a standalone SDS via media plane, upon receiving an SDS request from the user or user application the originating MCDData client establishes the media plane as specified in 3GPP TS 24.282 [8]. When the media plane is established a conversation ID is associated with this SDS message.

For the procedures in subclause 6.1.1.2 it is assumed that it has been verified that:

1. if standalone one to one SDS using media plane is initiated:
 - a. the MCDData client is allowed to transmit data;
 - b. the size of the SDS message is less than or equal to maximum amount of data that the MCDData user can transmit in a single request during one-to-one communication; and

- c. the size of the SDS message is less than or equal to maximum data size for SDS;
2. if standalone group SDS using media plane is initiated:
 - a. the MCDData client is allowed to transmit data in this group;
 - b. the size of the SDS message is less than or equal to maximum amount of data that the MCDData user can transmit in a single request during group communication;and
 - c. the size of the SDS message is less than or equal to maximum data size for SDS; and3. the size of the short data including the media plane information elements is larger than the allowed limits over MCDData-SDS-1 interface using SIP reference points.

before the media plane establishment is initiated as specified in 3GPP TS 24.282[8];

The procedures in subclause 6.1.1.2 and subclause 6.1.1.3 are applicable for one-to-one and group standalone SDS using media plane.

6.1.1.2 Procedures for the originating MCDData client

6.1.1.2.1 Handling MSRP connection

Upon receiving an indication to establish MSRP connection for standalone SDS using media plane as the originating client, the MCDData client:

1. shall act as an MSRP client according to IETF RFC 6135 [12];
2. shall act according to IETF RFC 6135 [12], as:
 - a. an "active" endpoint, if a=setup attribute in the received SDP answer is set to "passive"; and
 - b. an "passive" endpoint, if a=setup attribute in the received SDP answer is set to "active";
3. shall establish the MSRP connection according to the MSRP connection parameters in the SDP answer received in the SIP 200 (OK) response according to IETF RFC 4975 [11]; and
4. if acting as an "active" endpoint, shall send an empty MSRP SEND request to bind the MSRP connection to the MSRP session from the perspective of the passive endpoint according to the rules and procedures of IETF RFC 4975 [11] and IETF RFC 6135 [12].

On receiving MSRP 200 (OK) response to the first MSRP SEND request, the MCDData client:

1. shall generate a SDS SIGNALLING PAYLOAD as specified in subclause 6.1.1.2.2;
2. shall generate a SDS DATA PAYLOAD as specified in subclause 6.1.1.2.3;
3. shall include the SDS SIGNALLING PAYLOAD and SDS DATA PAYLOAD in an MSRP SEND request as specified in subclause 6.1.1.2.4; and
4. shall send the MSRP SEND request on the established MSRP connection.

If MSRP chunking is not used then on receipt of a 200 (OK) response, the MCDData client shall terminate the SIP session as specified in 3GPP TS 24.282 [8].

If MSRP chunking is used, the MCDData client:

1. shall send further MSRP SEND requests as necessary;
2. shall wait for a 200 (OK) response to each MSRP SEND request sent; and
3. on receipt of the last 200 (OK) response shall terminate the SIP session as specified in 3GPP TS 24.282 [8].

On receiving a non-200 MSRP response to the MSRP SEND request the MCDData client shall handle the error as specified in IETF RFC 4975 [11]. To terminate the MSRP session, the MCDData client:

1. if there are further MSRP chunks to send, shall abort transmission of these further MSRP chunks;

2. shall indicate to MCDData user that the SDS message could not be sent; and
3. shall terminate the SIP session as specified in 3GPP TS 24.282 [8].

On receiving an indication to terminate the session from the signalling plane, the MCDData client:

1. if there are further MSRP chunks to send, shall abort transmission of these further MSRP chunks and may indicate to MCDData user that the SDS message could not be sent.

6.1.1.2.2 Generate signalling payload

In order to generate an SDS signalling payload, the MCDData client:

1. shall generate an SDS SIGNALLING PAYLOAD message as specified in 3GPP TS 24.282 [8]; and
2. shall include the SDS SIGNALLING PAYLOAD message in an application/vnd.3gpp.mcdata-signalling MIME body as specified in 3GPP TS 24.282 [8]; and

When generating an SDS SIGNALLING PAYLOAD message, the MCDData client:

1. shall generate a SDS SIGNALLING PAYLOAD message as defined in 3GPP TS 24.282 [8]. In the SDS SIGNALLING PAYLOAD message, the MCDData client:
 - a. may include and set the Disposition request type IE to:
 - i. "DELIVERY", if only delivery disposition is requested;
 - ii. "READ", if only read disposition is requested; or
 - iii. "DELIVERY AND READ", if both delivery and read dispositions are requested;
 - b. shall set Date and time IE to current UTC time;
 - c. shall set Conversation ID IE to a universally unique message ID generated as per IETF RFC 4122 [10];
 - d. shall set Message ID IE to a universally unique message ID generated as per IETF RFC 4122 [10];
 - e. if indicated that the SDS message is in reply to another SDS message then, shall include the Reply ID IE set to the message identifier of the indicated SDS message;
 - f. if indicated that the target recipient of the SDS message is an application then, shall set Application Identifier IE to the application identifier; and
 - g) shall set the Sender MCDData user ID to its own MCDData user ID as specified in subclause 15.2.15 of 3GPP TS 24.282 [8].

6.1.1.2.3 Generate data payload

In order to generate SDS data payload, the MCDData client:

1. shall generate a DATA PAYLOAD message as specified in 3GPP TS 24.282 [8]; and
2. shall include the DATA PAYLOAD message in an application/vnd.3gpp.mcdata-payload MIME body as specified in 3GPP TS 24.282 [8].

When generating a DATA PAYLOAD message, the MCDData client:

1. shall generate a SDS DATA PAYLOAD message as defined in 3GPP TS 24.282 [8]. In the SDS DATA PAYLOAD message, the MCDData client:
 - a. shall set Number of payloads IE to the total number of payloads being sent; and
 - b. for each payload, shall include Payload IE. In the Payload IE:
 - i. shall set Payload content type to "TEXT", or "BINARY", or "HYPERLINKS", or "LOCATION" according to the payload type; and

- ii. shall set Payload data IE to actual payload.

6.1.1.2.4 Generate MSRP SEND for SDS message

The MCDData client shall take the procedures in subclause 6.4.1 into consideration when generating MSRP SEND messages.

The MCDData client shall generate MSRP SEND for SDS message requests according to IETF RFC 4975 [11].

When generating an MSRP SEND for SDS message request containing an SDS SIGNALLING PAYLOAD message and an SDS DATA PAYLOAD message, the MCDData client

1. shall set To-Path header according to the MSRP URI(s) received in the answer SDP;
2. shall include two MIME bodies in accordance with subclause 6.4.1 where:
 - a. in the first body the Content-Type header field is set to "application/vnd.3gpp.mcddata-signalling" and the generated SDS SIGNALLING PAYLOAD message is included; and
 - b. in the second body the Content-Type header field is set to "application/vnd.3gpp.mcddata-payload" and the generated SDS DATA PAYLOAD message is included.

When generating an MSRP SEND for SDS message request containing only an SDS DATA PAYLOAD message, the MCDData client:

1. shall set To-Path header according to the MSRP URI(s) received in the answer SDP;
2. shall set the Content-Type as "application/vnd.3gpp.mcddata-payload"; and
3. shall set the body of the MSRP SEND request to the generated SDS DATA PAYLOAD message.

When generating an MSRP SEND for SDS message request containing only an SDS SIGNALLING PAYLOAD, the MCDData client:

1. shall set To-Path header according to the MSRP URI(s) received in the answer SDP;
2. shall set the Content-Type as "application/vnd.3gpp.mcddata-signalling"; and
3. shall set the body of the MSRP SEND request to the generated SDS SIGNALLING PAYLOAD message.

6.1.1.3 Procedures for the terminating MCDData client

6.1.1.3.1 Handling MSRP connection

Upon receiving an indication to establish MSRP connection for standalone SDS using media plane as the terminating client, the MCDData client:

1. shall act as an MSRP client according to IETF RFC 6135 [12];
2. shall act either as an active endpoint or as a passive endpoint to open the transport connection, according to IETF RFC 6135 [12];
3. shall establish the MSRP connection according to the MSRP connection parameters in the SDP offer received in the SIP INVITE request according to IETF RFC 4975 [11];
4. if acting as an "active" endpoint, shall send an empty MSRP SEND request to bind the MSRP connection to the MSRP session from the perspective of the passive endpoint according to the rules and procedures of IETF RFC 4975 [11] and IETF RFC 6135 [12];

Once the MSRP connection is established, the MCDData client:

1. on receipt of an MSRP request in an MSRP session, shall follow the rules and procedures defined in IETF RFC 4975 [11] and in IETF RFC 6714 [13];

2. If an MSRP SEND request indicates the use of chunking, shall wait until all further MSRP SEND requests for the remaining chunks have been received and shall reassemble the entire set of MSRP requests into the MCDData standalone message before delivering the content to the application; and
3. shall handle the received content as described in subclause 6.1.1.3.2.

6.1.1.3.2 Handling received content and disposition requests

The MCDData client:

1. shall decode the contents of the application/vnd.3gpp.mcdata-signalling MIME body;
2. shall decode the contents of the application/vnd.3gpp.mcdata-payload MIME body;
3. if the SDS SIGNALLING PAYLOAD message contains a new Conversation ID, shall instantiate a new conversation with the Message ID in the SDS SIGNALLING PAYLOAD identifying the first message in the conversation thread;
4. if the SDS SIGNALLING PAYLOAD message contains an existing Conversation ID and:
 - a. if the SDS SIGNALLING PAYLOAD message does not contain an InReplyTo Message ID, shall use the Message ID in the SDS SIGNALLING PAYLOAD to identify a new message in the existing conversation thread; and
 - b. if the SDS SIGNALLING PAYLOAD message contains an InReplyTo Message ID, shall associate the message to an existing message in the conversation thread as identified by the InReplyTo Message ID in the SDS SIGNALLING PAYLOAD and use the Message ID in the SDS SIGNALLING PAYLOAD to identify the new message;
5. shall identify the number of Payload IEs in the DATA PAYLOAD message from the Number of Payloads IE in the DATA PAYLOAD message;
6. if the SDS SIGNALLING PAYLOAD message does not contain an Application identifier IE:
 - a. shall determine that the payload contained in the DATA PAYLOAD message is for user consumption;
 - b. may notify the MCDData user; and
 - c. shall render the contents of the Payload IE(s) to the MCDData user;
7. if the SDS SIGNALLING PAYLOAD message contains an Application identifier IE:
 - a. shall determine that the payload contained in the DATA PAYLOAD message is not for user consumption;
 - b. shall not notify the MCDData user;
 - c. if the Application identifier value is unknown, shall discard the SDS message; and
 - d. if the Application identifier value is known, shall deliver the contents of the Payload IE(s) to the identified application; and
8. if SDS Disposition request type IE is present in the SDS SIGNALLING PAYLOAD message received in subclause 6.1.1.3.1 then, shall send a disposition notification as described in 3GPP TS 24.282 [8] subclause 9.2.1.3.

6.1.2 Short data during an SDS session

6.1.2.1 General

In a SDS session, upon receiving an SDS request from the user or user application the originating MCDData client establishes the media plane as specified in 3GPP TS 24.282 [8].

The procedure in subclause 6.1.2.2 and subclause 6.1.2.3 are applicable for one-to-one and group SDS session.

Any MCDData user with appropriate permissions, originator of the SDS session or not, can send a SDS message during the SDS session.

A client which is not permitted to transmit data should not use the procedure in subclause 6.1.2.2 and subclause 6.1.2.3.

6.1.2.2 Procedures for the originating MCDData client

6.1.2.2.1 Handling MSRP connection

Upon receiving an indication to establish MSRP connection for SDS session as the originating MCDData client, the MCDData client:

1. shall act as an MSRP client according to IETF RFC 6135 [12];
2. shall act according to IETF RFC 6135 [12], as:
 - a. an "active" endpoint, if a=setup attribute in the received SDP answer is set to "passive"; and
 - b. an "passive" endpoint, if a=setup attribute in the received SDP answer is set to "active";
3. shall establish the MSRP connection according to the MSRP connection parameters in the SDP answer received in the SIP 200 (OK) response according to IETF RFC 4975 [11];
4. if acting as an "active" endpoint, shall send an empty MSRP SEND request to bind the MSRP connection to the MSRP session from the perspective of the passive endpoint according to the rules and procedures of IETF RFC 4975 [11] and IETF RFC 6135 [12];

Once the MSRP session is established, the MCDData client:

1. on receipt of an MSRP request in the MSRP session, shall follow the rules and procedures defined in IETF RFC 4975 [11] and in IETF RFC 6714 [13];
2. If an MSRP SEND request indicates the use of chunking, shall wait until all further MSRP SEND requests for the remaining chunks have been received and shall reassemble the entire set of MSRP requests into the MCDData SDS message before delivering the content to the application; and
3. shall handle the received content as described in subclause 6.1.2.6.

On receiving MSRP 200 (OK) response to the first MSRP SEND request, the MCDData client can generate and send an SDS message as specified in subclause 6.1.2.4, or can generate and send an SDS disposition notification for a received SDS message as specified in subclause 6.1.2.5, if requested.

Received content and disposition requests shall be handled as specified in subclause 6.1.2.6.

6.1.2.2.2 Void

6.1.2.2.3 Void

6.1.2.2.4 Void

6.1.2.3 Procedures for the terminating MCDData client

6.1.2.3.1 Handling MSRP connection

Upon receiving an indication to establish MSRP connection for SDS session as the terminating MCDData client, the MCDData client:

1. shall act as an MSRP client according to IETF RFC 6135 [12];
2. shall act either as an active endpoint or as an passive endpoint to open the transport connection, according to IETF RFC 6135 [12];

3. shall establish the MSRP connection according to the MSRP connection parameters in the SDP offer received in the SIP INVITE request according to IETF RFC 4975 [11];
4. if acting as an "active" endpoint, shall send an empty MSRP SEND request to bind the MSRP connection to the MSRP session from the perspective of the passive endpoint according to the rules and procedures of IETF RFC 4975 [11] and IETF RFC 6135 [12];

Once the MSRP session is established, the MCDData client:

1. on receipt of an MSRP request in the MSRP session, shall follow the rules and procedures defined in IETF RFC 4975 [11] and in IETF RFC 6714 [13];
2. If an MSRP SEND request indicates the use of chunking, shall wait until all further MSRP SEND requests for the remaining chunks have been received and shall reassemble the entire set of MSRP requests into the MCDData SDS message before delivering the content to the application; and
3. shall handle the received content as described in subclause 6.1.2.6.

On receiving MSRP 200 (OK) response to the first MSRP SEND request sent as "active" endpoint, or after sending MSRP 200 (OK) response to the first MSRP SEND request received as "passive" endpoint, the MCDData client can generate and send an SDS message as specified in subclause 6.1.2.4, or can generate and send an SDS disposition notification for a received SDS message as specified in subclause 6.1.2.5, if requested.

Received content and disposition requests shall be handled as specified in subclause 6.1.2.6.

6.1.2.3.2 Void

6.1.2.4 Sending SDS message

An MCDData client is allowed to send an one-to-one SDS message only if

1. the <allow-transmit-data> element of an <actions> element is present with a value "true" (see the MCDData user profile document in 3GPP TS 24.484 [7]);
2. the size of the SDS message is less than or equal to the value of the <max-data-size-sds-bytes> element in the MCDData service configuration document as specified in 3GPP TS 24.484 [7]; and
3. the size of the SDS message is less than or equal to the value of <MaxData1To1> element of the MCDData user profile document (see the MCDData user profile document in 3GPP TS 24.484 [7]).

An MCDData client is allowed to send a group SDS message only if

1. the <mcddata-allow-transmit-data-in-this-group> element of an <action> element is present with a value "true" as defined in the MCDData group document for this MCDData group as specified in 3GPP TS 24.481 [4];
2. the size of the SDS message is less than or equal to the value contained in the <mcddata-on-network-max-data-size-for-sds> as defined in the MCDData group document for this MCDData group as specified in 3GPP TS 24.481 [4]; and
3. the size of the SDS message is less than or equal to the value contained in the <mcddata-max-data-in-single-request> element of the <entry> element of the MCDData group document for this MCDData group as specified in 3GPP TS 24.481 [11].

If the above mentioned conditions satisfy, the MCDData client:

1. shall generate a SDS SIGNALLING PAYLOAD as specified in subclause 6.1.1.2.2;
2. shall generate a SDS DATA PAYLOAD as specified in subclause 6.1.1.2.3;
3. shall include the SDS SIGNALLING PAYLOAD and SDS DATA PAYLOAD in an MSRP SEND request as specified in subclause 6.1.1.2.4, with the following clarification;
 - a. shall set To-Path header according to the MSRP URI in the received SDP; and
4. shall send the MSRP SEND request on the established MSRP connection.

6.1.2.5 SDS Notification

6.1.2.5.1 Sending SDS Notification

To send an SDS disposition notification, the MCDData client:

1. shall generate a SDS NOTIFICATION as specified in subclause 6.1.2.5.2;
2. shall include the SDS NOTIFICATION in an MSRP SEND request as specified in subclause 6.1.2.5.3, with the following clarification;
 - a. shall set To-Path header according to the MSRP URI in the received SDP; and
3. shall send the MSRP SEND request on the established MSRP connection.

If MSRP chunking is used, the MCDData client:

1. shall send further MSRP SEND requests as necessary.

On receiving a non-200 MSRP response to the MSRP SEND request the MCDData client shall handle the error as specified in IETF RFC 4975 [11]. To terminate the MSRP session, the MCDData client:

1. if there are further MSRP chunks to send, shall abort transmission of these further MSRP chunks; and
2. shall indicate to MCDData user that the SDS message or the SDS disposition notification could not be sent.

6.1.2.5.2 Generate SDS NOTIFICATION

In order to generate an SDS notification, the MCDData client:

1. shall generate an SDS NOTIFICATION message as specified in 3GPP TS 24.282 [8]; and
2. shall include the SDS NOTIFICATION message in an application/vnd.3gpp.mcdata-signalling MIME body as specified in 3GPP TS 24.282 [8].

When generating an SDS NOTIFICATION message, the MCDData client:

1. if sending a delivered notification, shall set the SDS disposition notification type IE as "DELIVERED";
2. if sending a read notification, shall set the SDS disposition notification type IE as "READ";
3. if sending a delivered and read notification, shall set the SDS disposition notification type IE as "DELIVERED AND READ";
4. if the SDS message could not be delivered to the user or application (e.g. due to lack of storage), shall set the SDS disposition notification type IE as "UNDELIVERED";
5. shall set the Date and time IE to the current time;
6. shall set the Conversation ID to the value of the Conversation ID that was received in the SDS message;
7. shall set the Message ID to the value of the Message ID that was received in the SDS message;
8. if the SDS message was destined for the user, shall not include an Application ID IE;
9. if the SDS message was destined for an application, shall include an Application ID IE set to the value of the Application ID that was included in the SDS message; and
10. shall set the Sender MCDData user ID to its own MCDData user ID as specified in subclause 15.2.15 of 3GPP TS 24.282 [8].

6.1.2.5.3 Generate MSRP SEND for SDS disposition notification

The MCDData client shall generate MSRP SEND requests for SDS disposition notification according to IETF RFC 4975 [11].

When generating an MSRP SEND request for SDS disposition notification containing an SDS NOTIFICATION message, the MCDData client

1. shall set To-Path header according to the MSRP URI(s) received in the answer SDP;
2. shall set the content type as Content-Type = "application/vnd.3gpp.mcdata-signalling"; and
3. shall set the body of the MSRP SEND request to the generated SDS NOTIFICATION message.

6.1.2.6 Handling received content and disposition requests

Upon receiving an SDS message, the MCDData client:

1. shall follow the procedure defined in subclause 6.1.1.3.2, with the following clarification:
 - a. if SDS Disposition request type IE is present in the received SDS SIGNALLING PAYLOAD message then, shall send an SDS disposition notification as described in subclause 6.1.2.5.

Upon receiving an SDS disposition notification, the MCDData client:

1. shall decode the contents of the application/vnd.3gpp.mcdata-signalling MIME body; and
2. shall deliver the notification to the user or application.

6.2 Participating MCDData function procedures

6.2.1 Standalone SDS via media plane

6.2.1.1 General

For a standalone SDS via media plane, the media plane is established between the originating MCDData client and the originating participating MCDData function, the originating participating MCDData function and the controlling MCDData function, the controlling MCDData function and the terminating participating MCDData function(s) and each terminating participating MCDData function and the terminating MCDData client(s) as specified in 3GPP TS 24.282 [8].

The procedures in subclause 6.2.1.4 and subclause 6.2.1.5 are applicable for one-to-one and group standalone SDS using media plane.

6.2.1.2 Establishing MSRP session to receive standalone SDS message

To receive a SDS message over MSRP, the participating MCDData function:

1. shall act according to IETF RFC 6135 [12], as:
 - a. an "passive" endpoint, if a=setup attribute in the sent SDP answer was set to "passive"; and
 - b. an "active" endpoint, if a=setup attribute in the sent SDP answer was set to "active"; and
2. shall establish an MSRP connection according to the MSRP connection parameters in the sent SDP answer response as described in IETF RFC 4976 [14].

6.2.1.3 Establish MSRP session to send standalone SDS message

To send a SDS message over MSRP, the participating MCDData function:

1. shall act according to IETF RFC 6135 [12], as:
 - a. an "active" endpoint, if a=setup attribute in the received SDP answer is set to "passive"; and
 - b. an "passive" endpoint, if a=setup attribute in the received SDP answer is set to "active"; and

2. shall establish the MSRP connection according to the MSRP connection parameters in the received SDP answer response as described in IETF RFC 4976 [14].

6.2.1.4 Procedures for the originating participating MCDData function

6.2.1.4.1 Establish MSRP session with the originating MCDData client

The originating participating MCDData function should establish the MSRP session with the originating MCDData client as specified in subclause 6.2.1.2.

6.2.1.4.2 Establish MSRP session with the controlling MCDData function

The originating participating MCDData function should establish the MSRP session with the controlling MCDData function as specified in subclause 6.2.1.3.

6.2.1.4.3 Handling of received MSRP messages

Upon receiving an MSRP SEND request from the originating MCDData client, the originating participating MCDData function:

1. if in a standalone one-to-one SDS using media plane, shall verify the SDS message size is less than or equal to <MacData1To1> element of the MCDData user profile document for the originating MCDData client (see the MCDData user profile document in 3GPP TS 24.484 [7]);
2. if the verifications in 1 above fails, shall send the MSRP response with the error code 403 to the originating MCDData client and shall not continue with the rest of the procedure;
3. if an MSRP connection is not established with the controlling MCDData function then, shall establish the MSRP connection as specified in subclause 6.2.1.4.2. Otherwise, shall use the existing MSRP connection; and
4. shall forward the received MSRP SEND request to the controlling MCDData function according to the rules and procedures of IETF RFC 4975 [11].

Upon receiving an MSRP 200 (OK) response from the controlling MCDData function, the participating MCDData function shall forward the MSRP 200 (OK) response to the originating MCDData client according to the rules and procedures of IETF RFC 4975 [11].

Upon receiving an error MSRP response from the controlling MCDData function, the participating MCDData function shall forward the error MSRP response to the originating MCDData client according to the rules and procedures of IETF RFC 4975 [11].

6.2.1.5 Procedures for the terminating participating MCDData function

6.2.1.5.1 Establish MSRP session with the controlling MCDData function

The terminating participating MCDData function should establish the MSRP session with the controlling MCDData function as specified in subclause 6.2.1.2.

6.2.1.5.2 Establish MSRP session with the terminating MCDData client

The terminating participating MCDData function should establish MSRP session to terminating MCDData client as specified in subclause 6.2.1.3.

6.2.1.5.3 Handling of received MSRP messages

Upon receiving an MSRP SEND request from the controlling MCDData function, the terminating participating MCDData function:

1. shall generate and send a MSRP 200 (OK) response for the received MSRP SEND request to the controlling MCDData function, according to the rules and procedures of IETF RFC 4975 [11]; and

2. shall forward the received MSRP SEND request to the terminating MCDData client according to the rules and procedures of IETF RFC 4975 [11].

Upon receiving an error MSRP response from the terminating MCDData client, the participating MCDData function shall forward the error MSRP response to the originating MCDData client according to the rules and procedures of IETF RFC 4975 [11].

6.2.2 Short data during an SDS session

6.2.2.1 General

For a one-to-one or group SDS session, the media plane is established between the originating MCDData client and the originating participating MCDData function, the originating participating MCDData function and the controlling MCDData function, the controlling MCDData function and the terminating participating MCDData function(s) and each terminating participating MCDData function and the terminating MCDData client(s) as specified in 3GPP TS 24.282 [8]. The procedures in subclause 6.2.2.4 and subclause 6.2.2.5 are applicable for one-to-one and group SDS session.

6.2.2.2 Establishing MSRP session to receive SDS message

To receive a SDS message over MSRP, the participating MCDData function:

1. shall act according to IETF RFC 6135 [12], as:
 - a. an "passive" endpoint, if a=setup attribute in the sent SDP answer was set to "passive"; and
 - b. an "active" endpoint, if a=setup attribute in the sent SDP answer was set to "active"; and
2. shall establish an MSRP connection according to the MSRP connection parameters in the sent SDP answer response as described in IETF RFC 4976 [14].

6.2.2.3 Establish MSRP session to send SDS message

To send a SDS message over MSRP, the participating MCDData function:

1. shall act according to IETF RFC 6135 [12], as:
 - a. an "active" endpoint, if a=setup attribute in the received SDP answer is set to "passive"; and
 - b. an "passive" endpoint, if a=setup attribute in the received SDP answer is set to "active"; and
2. shall establish the MSRP connection according to the MSRP connection parameters in the received SDP answer response as described in IETF RFC 4976 [14].

6.2.2.4 Procedures for the originating participating MCDData function

6.2.2.4.1 Establish MSRP session with the originating MCDData client

The originating participating MCDData function should establish the MSRP session with the originating MCDData client as specified in subclause 6.2.2.2.

6.2.2.4.2 Establish MSRP session with the controlling MCDData function

The originating participating MCDData function should establish the MSRP session with the controlling MCDData function as specified in subclause 6.2.2.3.

6.2.2.4.3 Handling of received MSRP messages

Upon receiving an MSRP SEND request from the originating MCDData client, the originating participating MCDData function:

1. if an MSRP connection is not established with the controlling MCDData function then, shall establish the MSRP connection as specified in subclause 6.2.2.4.2. Otherwise, shall use the existing MSRP connection; and
2. shall forward the received MSRP SEND request to the controlling MCDData function according to the rules and procedures of IETF RFC 4975 [11].

Upon receiving an MSRP 200 (OK) response from the controlling MCDData function, the participating MCDData function shall forward the MSRP 200 (OK) response to the originating MCDData client according to the rules and procedures of IETF RFC 4975 [11].

Upon receiving an error MSRP response from the controlling MCDData function, the participating MCDData function shall forward the error MSRP response to the originating MCDData client according to the rules and procedures of IETF RFC 4975 [11].

6.2.2.5 Procedures for the terminating participating MCDData function

6.2.2.5.1 Establish MSRP session with the controlling MCDData function

The terminating participating MCDData function should establish the MSRP session with the controlling MCDData function as specified in subclause 6.2.2.2.

6.2.2.5.2 Establish MSRP session with the terminating MCDData client

The terminating participating MCDData function should establish MSRP session to terminating MCDData client as specified in subclause 6.2.2.3.

6.2.2.5.3 Handling of received MSRP messages

Upon receiving an MSRP SEND request from the controlling MCDData function, the terminating participating MCDData function:

1. shall generate and send a MSRP 200 (OK) response for the received MSRP SEND request to the controlling MCDData function, according to the rules and procedures of IETF RFC 4975 [11]; and
2. shall forward the received MSRP SEND request to the terminating MCDData client according to the rules and procedures of IETF RFC 4975 [11].

Upon receiving an error MSRP response from the terminating MCDData client, the participating MCDData function shall forward the error MSRP response to the originating MCDData client according to the rules and procedures of IETF RFC 4975 [11].

6.3 Controlling MCDData function procedures

6.3.1 Standalone SDS via media plane

6.3.1.1 General

The controlling MCDData function plays a key role in anchoring the media between the originating MCDData client and the terminating MCDData client. Hence controlling MCDData function maintains a MSRP session with all the active MCDData clients.

The procedures in subclause 6.3.1.2 and subclause 6.3.1.3 are applicable for both, one-to-one and group standalone SDS using media plane.

6.3.1.2 Establishing MSRP session

6.3.1.2.1 MSRP session establishment with originating MCDData client

To establish the MSRP connection with the originating MCDData client, the controlling MCDData function performs below procedures:

1. shall act as an MSRP client and establish TLS connection with the originating participating MCDData function, if exists, otherwise the originating MCDData client, according to the rules and procedures as described in IETF RFC 4975 [11];
2. shall act as an MSRP client to send MSRP SEND requests according to the rules and procedures described in IETF RFC 6135 [12];
3. shall act as an "passive" endpoint according to the rules and procedures described in IETF RFC 6135 [12];
4. shall establish the MSRP connection with originating MCDData client, according to the rules and procedures described in IETF RFC 6135 [12]; and
5. as a passive endpoint, shall wait for MSRP SEND request on established MSRP connection, to bind the MSRP connection to the MSRP session according to the rules and procedures of IETF RFC 4975 [11] and IETF RFC 6135 [12].

6.3.1.2.2 MSRP session establishment with terminating MCDData client

To establish the MSRP connection with the terminating MCDData client, the controlling MCDData function performs below procedures:

1. shall act as an MSRP client and establish TLS connection with the terminating participating MCDData function, if exists, otherwise the terminating MCDData client, according to the rules and procedures as described in IETF RFC 4975 [11];
2. shall act as an MSRP client to send MSRP SEND requests according to the rules and procedures described in IETF RFC 6135 [12];
3. shall act according to IETF RFC 6135 [12], as:
 - a. an "active" endpoint, if a=setup attribute in the received SDP answer is set to "passive"; and
 - b. an "passive" endpoint, if a=setup attribute in the received SDP answer is set to "active";
4. shall establish the MSRP connection with each terminating MCDData client identified in the 3GPP TS 24.282 [8], according to the rules and procedures described in IETF RFC 6135 [12]; and
5. if acting as an "active" endpoint, shall send an empty MSRP SEND request on each established MSRP connection, to bind the MSRP connection to the MSRP session according to the rules and procedures of IETF RFC 4975 [11] and IETF RFC 6135 [12].

6.3.1.3 Handling of received MSRP messages

Upon receiving a MSRP SEND request from the originating participating MCDData function, the controlling MCDData function:

1. if in a standalone one-to-one SDS using media plane, shall verify the SDS message size is less than or equal to <max-data-size-sds-bytes> element in the MCDData service configuration document as specified in 3GPP TS 24.484 [7];
2. if in a standalone group SDS using media plane shall verify:
 - a. the SDS message size is less than or equal to <mcdData-max-data-in-single-request> element of the MCDData group document for the (see the MCDData group document in 3GPP TS 24.481 [4]); and
 - b. the SDS message size is less than or equal to <mcdData-on-network-max-data-size-for-SDS> element of the MCDData group document (see the MCDData group document in 3GPP TS 24.481 [4]);

3. if the verifications in either 1 or 2 a or 2 b above fails, shall send the MSRP response with the error code 403 to the MCDData client which sent the SDS message and shall not continue with the rest of the procedure;
4. shall generate and send a MSRP 200 (OK) response for the received MSRP SEND requests to the originating participating MCDData function, according to the rules and procedures of IETF RFC 4975 [11]; and
5. shall forward the received MSRP SEND requests to each terminating MCDData client with which a successful MSRP connection was established, according to the rules and procedures of IETF RFC 4975 [11]. Following clarifications apply to the generated MSRP SEND request:
 - a. shall modify the To-Path header according to the MSRP URI received in the answer SDP from the MCDData client in accordance with rules and procedures of IETF RFC 4975 [11]; and
 - b. shall modify the From-Path header to the controlling MCDData function's own MSRP URI, according to the rules and procedures of IETF RFC 4975 [11].

6.3.2 Short data during SDS session

6.3.2.1 General

6.3.2.2 Establishing MSRP session

6.3.2.2.1 MSRP session establishment with originating MCDData client

To establish the MSRP connection with the originating MCDData client, the controlling MCDData function performs below procedures:

1. shall act as an MSRP client and establish TLS connection with the originating participating MCDData function, if exists, otherwise the originating MCDData client, according to the rules and procedures as described in IETF RFC 4975 [11];
2. shall act as an MSRP client to send MSRP SEND requests according to the rules and procedures described in IETF RFC 6135 [12];
3. shall act as an "passive" endpoint according to the rules and procedures described in IETF RFC 6135 [12];
4. shall establish the MSRP connection with originating MCDData client, according to the rules and procedures described in IETF RFC 6135 [12]; and
5. acting as a "passive" endpoint, shall wait for MSRP SEND request on established MSRP connection, to bind the MSRP connection to the MSRP session according to the rules and procedures of IETF RFC 4975 [11] and IETF RFC 6135 [12].

6.3.2.2.2 MSRP session establishment with terminating MCDData client

To establish the MSRP connection with the terminating MCDData client, the controlling MCDData function performs below procedures:

1. shall act as an MSRP client and establish TLS connection with the terminating participating MCDData function, if exists, otherwise the terminating MCDData client, according to the rules and procedures as described in IETF RFC 4975 [11];
2. shall act as an MSRP client to send MSRP SEND requests according to the rules and procedures described in IETF RFC 6135 [12];
3. shall act according to IETF RFC 6135 [12], as:
 - a. an "active" endpoint, if a=setup attribute in the received SDP answer is set to "passive"; and
 - b. an "passive" endpoint, if a=setup attribute in the received SDP answer is set to "active";
4. shall establish the MSRP connection with each terminating MCDData client identified in the 3GPP TS 24.282 [8], according to the rules and procedures described in IETF RFC 6135 [12]; and

5. if acting as an "active" endpoint, shall send an empty MSRP SEND request on each established MSRP connection, to bind the MSRP connection to the MSRP session according to the rules and procedures of IETF RFC 4975 [11] and IETF RFC 6135 [12].

6.3.2.3 Handling of received MSRP messages

Upon receiving a MSRP SEND request from the originating participating MCDData function, the controlling MCDData function:

1. shall generate and send a MSRP 200 (OK) response for the received MSRP SEND requests to the originating participating MCDData function, according to the rules and procedures of IETF RFC 4975 [11]; and
2. shall forward the received MSRP SEND requests to each terminating MCDData client with which a successful MSRP connection was established, according to the rules and procedures of IETF RFC 4975 [11]. Following clarifications apply to the generated MSRP SEND request:
 - a. shall modify the To-Path header according to the MSRP URI received in the answer SDP from the MCDData client in accordance with rules and procedures of IETF RFC 4975 [11]; and
 - b. shall modify the From-Path header to the controlling MCDData function's own MSRP URI, according to the rules and procedures of IETF RFC 4975 [11].

6.4 General

6.4.1 Handling of MIME bodies in MSRP SEND messages

The MCDData client and MCDData server shall support several MIME bodies in MSRP SEND requests as specified in IETF RFC 4975 [11].

When the MCDData client or the MCDData server sends a MSRP SEND that contains more than one MIME body, the MCDData client or the MCDData server:

- 1) shall, as specified in IETF RFC 2046 [9], include one Content-Type header field with the value set to multipart/mixed and with a boundary delimiter parameter set to any chosen value;
- 2) for each MIME body:
 - a) shall insert the boundary delimiter;
 - b) shall insert the Content-Type header field with the MIME type of the MIME body; and
 - c) shall insert the content of the MIME body; and
- 3) shall insert a final boundary delimiter.

When the MCDData client or the MCDData server sends an MSRP SEND containing only one MIME body, the MCDData client or the MCDData server:

- 1) shall include a Content-Type header field set to the MIME type of the MIME body; and
- 2) shall insert the content of the MIME body.

7 FD media plane procedures

7.1 MCDATA client procedures

7.1.1 General

For file distribution, upon receiving a request from the user or user application the originating client establishes the media plane as specified in 3GPP TS 24.282 [8].

The procedures in subclause 7.1.2 and subclause 7.1.3 are applicable for one-to-one and group file distribution.

A MCDATA client which is not permitted to transmit data should not use the procedure in subclause 7.1.2.

7.1.2 Originating MCDATA client procedures

7.1.2.1 Handling MSRP connection

Upon receiving an indication to establish MSRP connection for file distribution as the originating client, the MCDATA client:

1. shall act as an MSRP client according to IETF RFC 6135 [12];
2. shall act according to IETF RFC 6135 [12], as:
 - a. an "active" endpoint, if a=setup attribute in the received SDP answer is set to "passive"; and
 - b. an "passive" endpoint, if a=setup attribute in the received SDP answer is set to "active";
3. shall establish the MSRP connection according to the MSRP connection parameters in the SDP answer received in the SIP 200 (OK) response according to IETF RFC 4975 [11]; and
4. if acting as an "active" endpoint, shall send an empty MSRP SEND request to bind the MSRP connection to the MSRP session from the perspective of the passive endpoint according to the rules and procedures of IETF RFC 4975 [11] and IETF RFC 6135 [12].

On receiving MSRP 200 (OK) response to the first MSRP SEND request, the MCDATA client can send the file. To send the file, the MCDATA client:

1. shall generate MSRP SEND for file distribution request according to IETF RFC 4975 [11]. When generating an MSRP SEND, the MCDATA client:
 - a. shall set To-Path header according to the MSRP URI(s) received in the answer SDP;
 - b. shall set the first content type as Content-Type = "application/vnd.3gpp.mcddata-file"; and
 - c. shall set the body of the MSRP SEND request with MSRP payload. MSRP payload is set to the file or part of the file.
2. shall send the MSRP SEND request(s) on the established MSRP connection.

If MSRP chunking is used, the MCDATA client:

1. shall send further MSRP SEND requests containing the file as necessary;
2. shall wait for a 200 (OK) response to each MSRP SEND request sent; and
3. on receipt of the last 200 (OK) response shall terminate the SIP session as specified in 3GPP TS 24.282 [8].

On receiving a non-200 MSRP response to the MSRP SEND request the MCDATA client shall handle the error as specified in IETF RFC 4975 [11]. To terminate the MSRP session, the MCDATA client:

1. if there are further MSRP chunks to send, shall abort transmission of these further MSRP chunks;

2. shall indicate to MCDData user that the file could not be distributed; and
3. shall terminate the SIP session as specified in 3GPP TS 24.282 [8].

7.1.3 Terminating MCDData client procedures

7.1.3.1 Handling MSRP connection

Upon receiving an indication to establish MSRP connection for file distribution as the terminating client, the MCDData client:

1. shall act as an MSRP client according to IETF RFC 6135 [12];
2. shall act either as an active endpoint or as a passive endpoint to open the transport connection, according to IETF RFC 6135 [12];
3. shall establish the MSRP connection according to the MSRP connection parameters in the SDP offer received in the SIP INVITE request according to IETF RFC 4975 [11];
4. if acting as an "active" endpoint, shall send an empty MSRP SEND request to bind the MSRP connection to the MSRP session from the perspective of the passive endpoint according to the rules and procedures of IETF RFC 4975 [11] and IETF RFC 6135 [12];

Once the MSRP session is established, the MCDData client:

1. on receipt of an MSRP request in the MSRP session, shall follow the rules and procedures defined in IETF RFC 4975 [11] and in IETF RFC 6714 [13];
2. If an MSRP SEND request indicates the use of chunking, shall wait until all further MSRP SEND requests for the remaining chunks have been received and shall reassemble the entire set of MSRP requests into the file before delivering the content to the application; and
3. shall handle the received content as described in subclause 7.1.3.2.

7.1.3.2 Handling received content and disposition requests

Upon receiving a file, the MCDData client:

1. shall decode the contents of the application/vnd.3gpp.mcdata-file MIME body; and
2. once all the chunks of the file are successfully received, shall indicate to the signalling plane that the file download is completed.

7.2 Participating MCDData function procedures

7.2.1 General

For a one-to-one or group file distribution, the media plane is established between the originating MCDData client and the originating participating MCDData function, the originating participating MCDData function and the controlling MCDData function, the controlling MCDData function and the terminating participating MCDData function(s) and each terminating participating MCDData function and the terminating MCDData client(s) as specified in 3GPP TS 24.282 [8]. The procedures in subclause 7.2.1.2 and subclause 7.2.1.3 are applicable for one-to-one and group file distribution.

7.2.2 Establishing MSRP session to receive the file

To receive a file over MSRP, the participating MCDData function:

1. shall act according to IETF RFC 6135 [12], as:
 - a. an "passive" endpoint, if a=setup attribute in the sent SDP answer was set to "passive"; and

- b. an "active" endpoint, if a=setup attribute in the sent SDP answer was set to "active"; and
2. shall establish an MSRP connection according to the MSRP connection parameters in the sent SDP answer response as described in IETF RFC 4976 [14].

7.2.3 Establish MSRP session to send the file

To send a file over MSRP, the participating MCDATA function:

1. shall act according to IETF RFC 6135 [12], as:
 - a. an "active" endpoint, if a=setup attribute in the received SDP answer is set to "passive"; and
 - b. an "passive" endpoint, if a=setup attribute in the received SDP answer is set to "active"; and
2. shall establish the MSRP connection according to the MSRP connection parameters in the received SDP answer response as described in IETF RFC 4976 [14].

7.2.4 Originating participating MCDATA function procedures

7.2.4.1 Establish MSRP session with the originating MCDATA client

The originating participating MCDATA function should establish the MSRP session with the originating MCDATA client as specified in subclause 7.2.2.

7.2.4.2 Establish MSRP session with the controlling MCDATA function

The originating participating MCDATA function should establish the MSRP session with the controlling MCDATA function as specified in subclause 7.2.3.

7.2.4.3 Handling of received MSRP messages

Upon receiving an MSRP SEND request from the originating MCDATA client, the originating participating MCDATA function:

1. if an MSRP connection is not established with the controlling MCDATA function then, shall establish the MSRP connection as specified in subclause 7.2.4.2. Otherwise, shall use the existing MSRP connection; and
2. shall forward the received MSRP SEND request to the controlling MCDATA function according to the rules and procedures of IETF RFC 4975 [11].

Upon receiving an MSRP 200 (OK) response from the controlling MCDATA function, the participating MCDATA function shall forward the MSRP 200 (OK) response to the originating MCDATA client according to the rules and procedures of IETF RFC 4975 [11].

Upon receiving an error MSRP response from the controlling MCDATA function, the participating MCDATA function shall forward the error MSRP response to the originating MCDATA client according to the rules and procedures of IETF RFC 4975 [11].

7.2.5 Terminating participating MCDATA function procedures

7.2.5.1 Establish MSRP session with the controlling MCDATA function

The terminating participating MCDATA function should establish the MSRP session with the controlling MCDATA function as specified in subclause 7.2.2.

7.2.5.2 Establish MSRP session with the terminating MCDATA client

The terminating participating MCDATA function should establish MSRP session to terminating MCDATA client as specified in subclause 7.2.3.

7.2.5.3 Handling of received MSRP messages

Upon receiving an MSRP SEND request from the controlling MCDData function, the terminating participating MCDData function:

1. shall generate and send a MSRP 200 (OK) response for the received MSRP SEND request to the controlling MCDData function, according to the rules and procedures of IETF RFC 4975 [11]; and
2. shall forward the received MSRP SEND request to the terminating MCDData client according to the rules and procedures of IETF RFC 4975 [11].

Upon receiving an error MSRP response from the terminating MCDData client, the participating MCDData function shall forward the error MSRP response to the originating MCDData client according to the rules and procedures of IETF RFC 4975 [11].

7.3 Controlling MCDData function procedures

7.3.1 General

7.3.2 Establishing MSRP session

7.3.2.1 MSRP session establishment with originating MCDData client

To establish the MSRP connection with the originating MCDData client, the controlling MCDData function performs below procedures:

1. shall act as an MSRP client and establish TLS connection with the originating participating MCDData function, if exists, otherwise the originating MCDData client, according to the rules and procedures as described in IETF RFC 4975 [11];
2. shall act as an MSRP client to send MSRP SEND requests according to the rules and procedures described in IETF RFC 6135 [12];
3. shall act as an "passive" endpoint according to the rules and procedures described in IETF RFC 6135 [12];
4. shall establish the MSRP connection with originating MCDData client, according to the rules and procedures described in IETF RFC 6135 [12]; and
5. acting as a "passive" endpoint, shall wait for MSRP SEND request on established MSRP connection, to bind the MSRP connection to the MSRP session according to the rules and procedures of IETF RFC 4975 [11] and IETF RFC 6135 [12].

7.3.2.2 MSRP session establishment with terminating MCDData client

To establish the MSRP connection with the terminating MCDData client, the controlling MCDData function performs below procedures:

1. shall act as an MSRP client and establish TLS connection with the terminating participating MCDData function, if exists, otherwise the terminating MCDData client, according to the rules and procedures as described in IETF RFC 4975 [11];
2. shall act as an MSRP client to send MSRP SEND requests according to the rules and procedures described in IETF RFC 6135 [12];
3. shall act according to IETF RFC 6135 [12], as:
 - a. an "active" endpoint, if a=setup attribute in the received SDP answer is set to "passive"; and
 - b. an "passive" endpoint, if a=setup attribute in the received SDP answer is set to "active";
4. shall establish the MSRP connection with each terminating MCDData client identified in the 3GPP TS 24.282 [8], according to the rules and procedures described in IETF RFC 6135 [12]; and

5. if acting as an "active" endpoint, shall send an empty MSRP SEND request on each established MSRP connection, to bind the MSRP connection to the MSRP session according to the rules and procedures of IETF RFC 4975 [11] and IETF RFC 6135 [12].

7.3.3 Handling of received MSRP messages

Upon receiving a MSRP SEND request from the originating participating MCDData function, the Controlling function:

1. shall generate and send a MSRP 200 (OK) response for the received MSRP SEND requests to the originating participating MCDData function, according to the rules and procedures of IETF RFC 4975 [11]; and
2. shall forward the received MSRP SEND requests to each terminating MCDData client with which a successful MSRP connection was established, according to the rules and procedures of IETF RFC 4975 [11]. Following clarifications apply to the generated MSRP SEND request:
 - a. shall modify the To-Path header according to the MSRP URI received in the answer SDP from the MCDData client in accordance with rules and procedures of IETF RFC 4975 [11]; and
 - b. shall modify the From-Path header to the controlling MCDData function's own MSRP URI, according to the rules and procedures of IETF RFC 4975 [11].

8 Communication release media plane procedures

When communication is released by the MCDData client or by the MCDData server, as specified in 3GPP TS 24.282 [8], for an SDS or FD session which uses the media plane, the related MSRP session and the TCP or TLS connections used for this MSRP session shall also be released.

9 Coding

9.1 General

SDS and FD over media plane messages are coded according to MSRP as specified in RFC 4975 [11] both for short data and disposition notification. The body of an MSRP message includes SDS specific messages of a file.

9.2 SDS specific messages

SDS specific messages used for on-network SDS using media plane are SDS SIGNALLING PAYLOAD message, DATA PAYLOAD message and SDS NOTIFICATION message. The message structures and the format of the information elements are specified in clause 15 of 3GPP TS 24.282 [8]

10 Media plane security aspects

10.1 General

Media plane security provides integrity and confidentiality protection for the MCDData media information and media plane control information transmitted using media plane. Media plane security also provides the authentication of MCDData media information.

The media plane security is based on 3GPP MCDData security solution including key management as defined in 3GPP TS 33.180 [15].

NOTE: In 3GPP TS 33.180 [15] media information is denoted as MCDData Data Payload and media plane control information is denoted as MCDData Data signalling Payload.

Various keys and associated key identifiers protect the media information and media plane control information carried in the body of an MSRP SEND message.

The media plane control information may be:

1. SDS SIGNALLING PAYLOAD; or
2. SDS NOTIFICATION.

The media information may be:

1. DATA PAYLOAD; or
2. File or file portion.

In an on-network MCDData communication for an MCDData group, if protection of media is negotiated, the GMK and the GMK-ID of the MCDData group shall be used for protecting the media sent and received by MCDData clients.

In an on-network one-to-one MCDData communication, if protection of media is negotiated, the PCK and the PCK-ID shall be used for protecting the media sent and received by MCDData clients.

If protection of media control information sent using unicast between the MCDData client and the participating MCDData function serving the the MCDData client is negotiated, the CSK and the CSK-ID shall be used for protecting the media control information sent and received using unicast by the MCDData client and by a participating MCDData function.

If protection of media control information between the participating MCDData function and the controlling MCDData function is configured, the SPK and the SPK-ID shall be used for protecting the media control information sent and received between the participating MCDData function and the controlling MCDData function.

The GMK and the GMK-ID are distributed to the MCDData clients using the group document subscription and notification procedure specified in 3GPP TS 24.481 [4].

The PCK and the PCK-ID are generated by the MCDData client initiating the standalone one-to-one SDS using media plane or one-to-one SDS session or one-to-one FD using media plane and provided to the MCDData client receiving the SIP signalling according to 3GPP TS 24.282 [8].

The CSK and the CSK-ID are generated by the MCDData client and provided to the participating MCDData function serving the MCDData client using SIP signalling according to 3GPP TS 24.282 [8].

The SPK and the SPK-ID are configured in the participating MCDData function and the controlling MCDData function.

The key material for creating and verifying the authentication signature (SSK, PVT and KPAK) is provisioned to the MCDData clients by the KMS as specified in 3GPP TS 33.180 [15].

10.2 Derivation of master keys for media and media control

Each MCDData Payload Protection Key (DPPK) (i.e. GMK, PCK, CSK, SPK) and its associated key identifier DPPK-ID (i.e. GMK-ID, PCK-ID, CSK-ID, SPK -ID) described in subclause 10.1 shall be used to derive a MCDData Payload Cipher Key (DPCK) and its associated DPCK-ID as specified in 3GPP TS 33.180 [15].

DPCK and DPCK-ID shall be used in the protection of media or media plane control information as specified in 3GPP TS 33.180 [15].

10.3 Protection of media and media control and authentication of media

10.3.1 General

The media information may be protected. Protection shall be applied as specified in subclause 8.5.4 in 3GPP TS 33.180 [15].

The media control information may be protected. Protection shall be applied as specified in subclause 8.5.4 in 3GPP TS 33.180 [15].

MCDData media information or protected MCDData media information may also be authenticated as specified in subclause 8.5.5 in 3GPP TS 33.180 [15].

10.3.2 The MCDData client

A MCDData client transmitting media information shall protect the media information using the related DPPK and DPPK-ID according to the negotiated protection method. For one-to-one communication PCK and PCK-ID shall be used as DPPK and DPPK-ID. For group communication GMK and GMK-ID shall be used as DPPK and DPPK-ID.

A MCDData client transmitting media information or protected media information shall use the key material provisioned by the KMS when generating the authentication signature.

A MCDData client which receives protected media information shall decrypt and check the integrity of the protected media using the related DPPK and DPPK-ID according to the negotiated protection method.

A MCDData client which receives signed media information or signed and protected media information shall verify the signature by using the signature, the identity of the originating MCDData client and the KPAK provisioned by the KMS.

A MCDData client transmitting media control information shall protect the media control information using CPK and CPK-ID if media control information protection is negotiated.

A MCDData client which receives protected media control information shall decrypt and check the integrity of the protected media control information using CPK and CPK-ID.

10.3.3 The participating MCDData function

A participating MCDData function which receives protected media information shall forward it to the next entity without any additional action related to the security framework.

A participating MCDData function, when receiving a protected media control information from a MCDData client shall decrypt and integrity check the protected media control using the CSK and CSK-ID negotiated with the MCDData client which has sent the media control. Then, the participating MCDData function shall forward the media control information to the controlling MCDData function by protecting the media control information using SPK and SPK-ID, if protection is configured between the participating MCDData function and the controlling MCDData function.

A participating MCDData function, when receiving a protected media control information from the controlling MCDData function shall decrypt and integrity check the protected media control information using the SPK and SPK-ID configured between the participating MCDData function and the controlling MCDData function. Then, the participating MCDData function shall forward the media control information to the destination MCDData client by protecting the media control information using the CSK and CSK-ID if protection is negotiated between the participating MCDData function and the MCDData client.

10.3.4 The controlling MCDData function

A controlling MCDData function which receives protected media information shall forward it to the next entity without any additional action related to the security framework.

A controlling MCDData function, when receiving a protected media control information from a participating MCDData function shall decrypt and integrity check the protected media control information using the SPK and SPK-ID configured between the participating MCDData function and the controlling MCDData function. Then, the controlling MCDData function shall forward the media control information to the participating MCDData function serving the destination MCDData client by protecting the media control information using SPK and SPK-ID, if protection is configured between the participating MCDData function and the controlling MCDData function.

Annex A (informative): Change history

Change history							
Date	Meeting	TDoc	CR	Rev	Cat	Subject/Comment	New version
2017-01						Initial version	0.0.0
2017-01						Implementing P-CR C1-170436 from CT1#101-bis	0.1.0
2017-03						Implementing P-CR C1-171055 and C1-171056 from CT1#102	0.2.0
2017-04						Implementing P-CR C1-171746, C1-171747, C1-171749 and C1-171818 from CT1#103	0.3.0
2017-06						Implementing P-CRs from CT1#104: C1-172229, C1-172539, C1-172540, C1-172543, C1-172550, C1-172740, and C1-172741	0.4.0
2017-06	CT-76					Version 1.0.0 created for presentation for information at CT76	1.0.0
2017-06	CT-76					Version 14.0.0 created after approval at CT76	14.0.0
2017-09	CT-77	CP-172102	0001		F	Corrections for the Overview clause	14.1.0
2017-09	CT-77	CP-172102	0002		F	Removal of Editor's Note for clause 6	14.1.0
2017-09	CT-77	CP-172102	0003	1	F	Protection of information in the media plane	14.1.0
2017-09	CT-77	CP-172102	0005	1	F	Standalone SDS via media plane, verification of configuration data in the media plane	14.1.0
2017-09	CT-77	CP-172102	0006		F	Location Information	14.1.0
2017-09	CT-77	CP-172102	0007	2	F	Restructuring SDS session and authorization checks	14.1.0
2017-12	CT-78	CP-173064	0008	1	F	Authentication of Data Payload	14.2.0
2018-06	SA-80	-	-	-	-	Update to Rel-15 version (MCC)	15.0.0
2020-06	CT-88e	CP-201088	0013	1	A	Adding mcdata id in signalling payload for sender of the data in MCDData media plane (Session) communication.	15.1.0
2020-12	CT-90e	CP-203196	0020		A	Correction of Content-Type description.	15.2.0

History

Document history		
V15.0.0	June 2018	Publication
V15.1.0	July 2020	Publication
V15.2.0	January 2021	Publication