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Contents

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

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1 Scope

The present document specifies the signalling control protocols needed to support Mission Critical Data (MCData) communications as specified by 3GPP TS 23.282 [2]. The present document specifies both on-network and off-network protocols.

The present document utilises the common functional architecture to support mission critical services as specified in 3GPP TS 23.280 [3], in support of MCData communications.

The MCData service 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 the MCData client functionality, and to application servers supporting the MCData server functionality.

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] IETF RFC 3261 (June 2002): "SIP: Session Initiation Protocol".

[5] 3GPP TS 24.229: "IP multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3".

[6] IETF RFC 3428 (December 2002): "Session Initiation Protocol (SIP) Extension for Instant Messaging".

[7] IETF RFC 6050 (November 2010): "A Session Initiation Protocol (SIP) Extension for the Identification of Services".

[8] IETF RFC 3841 (August 2004): "Caller Preferences for the Session Initiation Protocol (SIP)".

[9] IETF RFC 4826 (May 2007): "Extensible Markup Language (XML) Formats for Representing Resource Lists".

[10] 3GPP TS 24.379: "Mission Critical Push To Talk (MCPTT) call control Protocol specification".

[11] 3GPP TS 24.481: "Mission Critical Services (MCS) group management Protocol specification".

[12] 3GPP TS 24.484: "Mission Critical Services (MCS) configuration management Protocol specification".

[13] IETF RFC 4483 (May 2006): "A Mechanism for Content Indirection in Session Initiation Protocol (SIP) Messages.

[14] IETF RFC 4122 (July 2005): "A Universally Unique IDentifier (UUID) URN Namespace".

[15] 3GPP TS 24.582: "Mission Critical Data (MCData) media plane control Protocol specification";

[16] IETF RFC 3840 (August 2004): "Indicating User Agent Capabilities in the Session Initiation Protocol (SIP)".

[17] IETF RFC 4975 (September 2007): "The Message Session Relay Protocol (MSRP)".

[18] IETF RFC 5366 (October 2008): "Conference Establishment Using Request-Contained Lists in the Session Initiation Protocol (SIP)".

[19] IETF RFC 6135 (February 2011): "An Alternative Connection Model for the Message Session Relay Protocol (MSRP) ".

[20] IETF RFC 6714 (August 2012): "Connection Establishment for Media Anchoring (CEMA) for the Message Session Relay Protocol (MSRP)".

[21] IETF RFC 6086 (January 2011): "Session Initiation Protocol (SIP) INFO Method and Package Framework".

[22] IETF RFC 7230: "Hypertext Transfer Protocol (HTTP/1.1): Message Syntax and Routing".

[23] IETF RFC 7231: "Hypertext Transfer Protocol (HTTP/1.1): Semantics and Content".

[24] 3GPP TS 24.482: "Mission Critical Services (MCS) identity management Protocol specification.

[25] 3GPP TS 24.334: "Proximity-services (ProSe) User Equipment (UE) to Proximity-services (ProSe) Function Protocol aspects; Stage 3".

[26] 3GPP TS 33.180: "Security of the Mission Critical Service".

[27] IETF RFC 3856 (August 2004): "A Presence Event Package for the Session Initiation Protocol (SIP)".

[28] W3C: "XML Encryption Syntax and Processing Version 1.1", https://www.w3.org/TR/xmlenc-core1/.

[29] W3C: "XML Signature Syntax and Processing (Second Edition)", http://www.w3.org/TR/xmldsig-core/.

[30] IETF RFC 4648 (October 2006): "The Base16, Base32, and Base64 Data Encodings".

[31] 3GPP TS 23.003: "Numbering, addressing and identification".

[32] IETF RFC 2045 (November 1996): "Multipurpose Internet Mail Extensions (MIME) Part One: Format of Internet Message Bodies".

[33] IETF RFC 2392 (August 1998): "Content-ID and Message-ID Uniform Resource Locators".

[34] IETF RFC 3903 (October 2004): "Session Initiation Protocol (SIP) Extension for Event State Publication".

[35] IETF RFC 4354 (January 2006): "A Session Initiation Protocol (SIP) Event Package and Data Format for Various Settings in Support for the Push-to-Talk over Cellular (PoC) Service".

[36] IETF RFC 6665 (July 2012): "SIP-Specific Event Notification".

[37] 3GPP TS 29.283: "Diameter Data Management Applications".

[38] IETF RFC 4028 (April 2005): "Session Timers in the Session Initiation Protocol (SIP)".

[39] IETF RFC 3856 (August 2004): "A Presence Event Package for the Session Initiation Protocol (SIP)".

[40] IETF RFC 3863 (August 2004): "Presence Information Data Format (PIDF)".

[41] IETF RFC 4661 (September 2006): "An Extensible Markup Language (XML)-Based Format for Event Notification Filtering".

[42] 3GPP TS 24.483: "Mission Critical Services (MCS) Management Object (MO)".

[43] 3GPP TS 24.301: "Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3".

[44] IETF RFC 5627 (October 2009): "Obtaining and Using Globally Routable User Agent URIs (GRUUs) in the Session Initiation Protocol (SIP)".

[45] IETF RFC 4567 (July 2006): "Key Management Extensions for Session Description Protocol (SDP) and Real Time Streaming Protocol (RTSP)".

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].

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].

4 General

4.1 MCData overview

The MCData service supports communication between a pair of users (i.e. one-to-one communication) and several users (i.e. group communication), where each user has the ability to:

- share data using Short Data Service (SDS); and
- share files using File Distribution (FD) service.

SDS is provided in both, on-network and off-network while FD is provided only in on-network in this release of the present document.

The present document provides the signalling control protocol enhancements to support the MCData architectural procedures specified in 3GPP TS 23.282 [2].

For on-network communications, the present document makes use of the existing IMS procedures specified in 3GPP TS 24.229 [5].

The on-network procedures in this document allow an MCData user to:

- send a standalone SDS using signalling control plane;
- send a standalone SDS using media plane;
- initiate a SDS session;
- send a file using HTTP; and
- send a file using media plane.

For off-network, the present document utilises the procedures for ProSe direct discovery for Public Ssafety and the procedures for one-to-one ProSe direct communication for Public Safety and one-to-many ProSe direct communication for Public Safety, as specified in 3GPP TS 24.334 [25], and allows an MCData user to:

- send a standalone SDS using signalling control plane.

The MCData procedures provided by the present document refer to:

- the media plane procedures defined in 3GPP TS 24.582 [15];
- the group management procedures defined in 3GPP TS 24.481 [11];
- the identity management procedures defined in 3GPP TS 24.482 [24]; and
- the security procedures defined in 3GPP TS 33.180 [26].

The MCData procedures provided by the present document access the configuration parameters provided by 3GPP TS 24.483 [42] and 3GPP TS 24.484 [12].

The following procedures are provided within this document:

- common procedures are specified in clause 6;
- procedures for registration in the IM CN subsystem and service authorisation are specified in clause 7;
- procedures for affiliation are specified in clause 8;
- procedures for on-network and off-network SDS are specified in clause 9;
- procedures for on-network FD are specified in clause 10;
- procedures for transmission and reception control are specified in clause 11;
- procedures for dispositions and notifications are specified in clause 12; and
- procedures for communication release are specified in clause 13.

The MCData UE primarily obtains access to the MCData service via E-UTRAN, using the procedures defined in 3GPP TS 24.301 [43].

4.2 Identity, URI and address assignments

4.2.1 Public Service identities

In order to support MCData, the following URI and address assignments are assumed:

1) the participating MCData function is configured to be reachable using:
   a) the public service identity of the participating MCData function serving the MCData user.

4.2.2 MCData session identity

The MCData session identity is a SIP URI, which identifies the MCData session between:

- the MCData client and the participating MCData function; and
- the participating MCData function and the controlling MCData function.

The MCData session identity shall be a GRUU as defined in IETF RFC 5627 [44] assigned by the MCData server as per 3GPP TS 24.229 [5].

The MCData session identity identifies the MCData session in such a way that e.g.:

- the IM CN subsystem is able to route an initial SIP request to the controlling MCData function.

The controlling MCData function allocates a unique MCData session identity hosted at the controlling MCData function for the MCData session at the time of session establishment.

When protection of sensitive application data is required by the MCData operator, the MCData session identity cannot contain identity information that is classified as sensitive such as the MCData ID or the MCData Group ID, as specified in subclause 4.6.

The controlling MCData function sends the MCData session identity towards the MCData client during MCData session establishment by including it in the Contact header field of the final SIP response to a session initiation request.

The participating MCData function allocates a unique MCData session identity hosted at the participating MCData function for the MCData session when it receives a MCData session identity in the Contact header field of a SIP request or a SIP response from the controlling MCData function and includes it in the Contact header field of the SIP request or SIP response sent towards the MCData client. The participating MCData function maintains a mapping of the MCData session identities it sends to the MCData client to the corresponding MCData session identities received from the controlling MCData function.

The MCData client can cache the MCData session identity until a time when it is no longer needed.

4.2.3 MCData client ID

MCData client ID is described in subclause 4.8 of the present document.

4.3 Pre-established sessions

Pre-established sessions are not supported by the current release of this specification.

4.4 Emergency Alerts

Emergency Alerts are not supported by the current release of this specification.

4.5 MCData Protocol

Subclauses 15 describes the TLV based message formats used in MCData communications. Each message consist of a series of information elements. Annex I of 3GPP TS 24.379 [10] describes the standard format of the messages and the encoding rules for each type of information element.

4.6 Protection of sensitive XML application data

In certain deployments, for example, in the case that the MCData operator uses the underlying SIP core infrastructure from the carrier operator, the MCData operator can prevent certain sensitive application data from being visible in the clear to the SIP layer. The following data are classed as sensitive application data:

- MCData ID;
- MCData group ID;
- alert indicator;
- access token (containing the MCData ID); and
- MCData client ID.

The above data is transported as XML content in SIP messages. in XML elements or XML attributes.

Data is transported in attributes in the following circumstances in the procedures in the present document:

- an MCData ID, an MCData Group ID, and an MCData client ID in an XML document published in SIP PUBLISH request for affiliation according to IETF RFC 3856 [27];

- an MCData ID or an MCData Group ID in XML document notified in a SIP NOTIFY request for affiliation according to IETF RFC 3856 [27]; and

- an MCData ID in application/resource-lists+xml document included in a SIP MESSAGE or SIP INVITE request for one-to-one SDS or one-to-one FD, according to IETF RFC 5366 [18];

3GPP TS 33.180 [26] describes a method to provide confidentiality protection of sensitive application data in elements by using XML encryption (i.e. xmlenc) and in attributes by using an attribute confidentiality protection scheme described in subclause 6.6.2.3 of the present document. Integrity protection can also be provided by using XML signatures (i.e. xmlsig).

Protection of the data relies on a shared XML protection key (XPK) used to encrypt and sign data:

- between the MCData client and the MCData server, the XPK is a client-server key (CSK); and

- between MCData servers, the XPK is a signalling protection key (SPK).

The CSK (XPK) and a key-id CSK-ID (XPK-ID) are generated from keying material provided by the key management server. Identity based public key encryption based on MIKEY-SAKKE is used to transport the CSK between SIP end-points. The encrypted CSK is transported from the MCData client to the MCData server when the MCData client performs service authorisation as described in clause 7 and is also used during service authorisation to protect the access token.

The SPK (XPK) and a key-id SPK-ID (XPK-ID) are directly provisioned in the MCData servers.

Configuration in the MCData client and MCData server is used to determine whether one or both of confidentiality protection and integrity protection are required.

The following four examples give a brief overview of the how confidentiality and integrity protection is applied to application data in this specification.

EXAMPLE 1: Pseudo code showing how confidentiality protection is represented in the procedures in the document for sensitive data sent by the originating client.

```
IF configuration is set for confidentiality protection of sensitive data
THEN
    Encrypt data element using the CSK (XPK;
    Include in an <EncryptedData> element of the XML MIME body:
      (1) the encryption method;
      (2) the key-id (XPK-ID);
      (3) the cipher data;
    Encrypt URIs in attribute using the CSK (XPK) by following subclause 6.6.2.3;
ELSE
    include application data into XML MIME body in clear text;
ENDIF;
```

EXAMPLE 2: Pseudo code showing how integrity protection is represented in the procedures in the present document for data sent by the originating client.

```
IF configuration is set for integrity protection of application data
THEN
    Use a method to hash the content;
    Generate a signature for the hashed content using the CSK (XPK;
    Include within a <Signature> XML element of the XML MIME body:
       (1) a cannonicalisation method to be applied to the signed information;
       (2) the signature method used for generating the signature;
       (3) a reference to the content to be signed;
       (4) the hashing method used;
       (5) the hashed content;
       (6) the key-id (XPK-ID);
       (7) the signature value;
ENDIF;
```

EXAMPLE 3: Pseudo code showing how confidentiality protection is represented in the procedures in the present document at the server side when receiving encrypted content.

```
IF configuration is set for confidentiality protection of sensitive data
THEN
    Check that the XML content contains the <EncryptedData> element;
```

```
       Check that the XML document contains a URI with the domain name for MC Services
confidentiality protection;
       Return an error if the <EncryptedData> element or domain name for MC Services confidentiality
protection are not found;
       Otherwise:
          (1) obtain the CSK (XPK) using the CSK-ID (XPK-ID) in the received XML body;
          (2) for encrypted data in elements, decrypt the data elements using the CSK;
          (3) for encrypted URIs in attributes, decrypt the URIs using the CSK;
   ENDIF;
```

EXAMPLE 4: Pseudo code showing how integrity protection is represented in the procedures in the present document at the server side when receiving signed content.

```
   IF configuration is set for integrity protection of application data
   THEN
      Check that the XML content contains the <Signature> element;
      Return an error if the <Signature> element is not found;
      Otherwise:
          (1) obtain the CSK (XPK) using the CSK-ID (XPK-ID) in the received XML body;
          (2) verify the signature of the content using the CSK;
      Return an error if the validation of the signature fails;
      IF validation of the signature passes
      THEN
         decrypt any data found in <EncryptedData> elements;
         decrypt any encrypted URIs found in attributes;
      ENDIF;
   ENDIF;
```

The content can be re-encrypted and signed again using the SPK between MCData servers.

The following examples show the difference between normal and encrypted data content. In this example consider the MCData client initiating a group standalone SDS message using the signalling control plane.

EXAMPLE 5: <mcdata-info> MIME body represented with data elements in the clear:

```
   Content-Type: application/vnd.3gpp.mcdata-info+xml
   <?xml version="1.0"?>
   <mcdata-info>
     <mcdata-Params>
       <request-type>group-sds</request-type>
       <mcdata-request-uri type="Normal">
         <mcdataURI>sip:group123@mcdataoperator1.com></mcdataURI>
       </mcdata-request-uri>
     </mcdata-Params>
   </mcdata-info>
```

EXAMPLE 6: <mcdata-info> MIME body represented with the <mcdata-request-uri> encrypted:

```
   Content-Type: application/vnd.3gpp.mcdata-info+xml
   <?xml version="1.0"?>
   <mcdata-info>
     <mcdata-Params>
       <request-type>group-sds</request-type>
       <mcdata-request-uri type="Encrypted">
         <EncryptedData xmlns='http://www.w3.org/2001/04/xmlenc#'
          Type='http://www.w3.org/2001/04/xmlenc#Content'>
           <EncryptionMethod Algorithm="http://www.w3.org/2009/xmlenc11#aes128-gcm"/>
           <ds:KeyInfo>
             <ds:KeyName>base64XpkId</KeyName>
           </ds:KeyInfo>
           <CipherData>
             <CipherValue>A23B45C5657689090</CipherValue>
           </CipherData>
         </EncryptedData>
       </mcdata-request-uri>
     </mcdata-Params>
   </mcdata-info>
```

EXAMPLE 7: pidf+xml MIME body represented with clear URIs in attributes:

```
Content-Type: application/pidf+xml
<?xml version="1.0" encoding="UTF-8"?>
<presence entity="sip:somebody@mcdata.org">
  <tuple id="acD4rhU87bK">
    <status>
```

```
      <affiliation group="sip:thegroup@mcdata.org"/>
    </status>
  </tuple>
</presence>
```

EXAMPLE 8: pidf+xml MIME body represented with encrypted URIs in attributes:

```
Content-Type: application/pidf+xml
<?xml version="1.0" encoding="UTF-8"?>
<presence entity="sip:c4Hrt45XG8IohRFT67vfdr3V;iv=45RtfVgHY23k8Ihy;xpk-id=b7UJv9;alg=128-aes-
gcm@mc1-encryption.3gppnetwork.org">
  <tuple id="acD4rhU87bK">
    <status>
      <affiliation group="sip:98yudFG45tx_89TYGedb4ujF ;iv=FGD567kjhfH7d4-D;key-id=eV9kl7;alg=128-
aes-gcm@mc1-encryption.3gppnetwork.org"/>
    </status>
  </tuple>
</presence>
```

4.7 Protection of TLV signalling and media content

The protection of TLV signalling and media content is based on 3GPP MCData security solution as defined in 3GPP TS 33.180 [26].

For different security requirements of different information elements of a MCData message, the information elements of MCData messages are bifurcated in the following components:

- **MCData Data signalling payload**: information elements necessary for identification and management of the MCData messages e.g. conversation identifiers, session identifiers, transaction identifiers, disposition requests, etc. This payload is confidentiality and integrity protected between the MCData Client and the MCData server.

- **MCData Data payload**: the actual user payload for MCData user or application consumption. This payload is end to end confidentiality and integrity protected.

An SDS message can be sent over both, signalling plane and media plane. When an SDS message is sent using signalling plane, the body included in the SIP MESSAGE request, which carries MCData Data signalling payload, is protected between each entity separately if protection is applied. On the other hand the body included in the SIP MESSAGE request which carries the MCData Data payload is end to end protected. The procedures for the protection of the SDS messages over the signalling plane are specified in this document. Protection of SDS message over media control plane is specified in 3GPP TS 24.582 [15].

For FD using HTTP and FD using media plane, the MCData Data signalling payload sent over the signalling plane is protected between each entity separately if protection is applied. The procedure for the protection of the file is specified in 3GPP TS 24.582 [15].

4.8 MCData client ID

The MCData client assigns the MCData client ID when the MCData client is used for the first time. The MCData client generates the MCData client ID as specified in subclause 4.2 of IETF RFC 4122 [25].

The MCData client preserves the MCData client ID:

- while the MCData client is SIP registered as specified in 3GPP TS 24.229 [5];

- while the MCData client is not SIP registered as specified in 3GPP TS 24.229 [5] and the UE serving the MCData client is switched on;

- while the UE serving the MCData client is switched off; and

- while the UE serving the MCData client is power-cycled.

NOTE: MCData client ID is not preserved when the UE is reset to factory settings.

4.9 Warning Header Field

4.9.1 General

The MCData server can include a free text string in a SIP response to a SIP request. When the MCData server includes a text string in a response to a SIP MESSAGE or SIP INVITE request the text string is included in a Warning header field as specified in IETF RFC 3261 [24]. The MCData server includes the Warning code set to 399 (miscellaneous warning) and includes the host name set to the host name of the MCData server.

EXAMPLE: Warning: 399 "200 user not authorised to transmit data "

4.9.2 Warning texts

The text string included in a Warning header field consists of an explanatory text preceded by a 3-digit text code, according to the following format in Table 4.4.2-1.

Table 4.9.2-1 ABNF for the Warning text

```
warn-text      =/  DQUOTE mcdata-warn-code SP mcdata-warn-text DQUOTE
mcdata-warn-code = DIGIT DIGIT DIGIT
mcdata-warn-text = *( qdtext | quoted-pair )
```

Table 4.4.2-2 defines the warning texts that are defined for the Warning header field when a Warning header field is included in a response to a SIP INVITE request as specified in subclause 4.4.1.

Table 4.9.2-2: Warning texts defined for the Warning header field

Code	Explanatory text	Description
101	service authorisation failed	The service authorisation of the MCData ID against the IMPU failed at the MCData server.
102	too many simultaneous affiliations	The MCData user already has N2 maximum number of simultaneous affiliations.
104	isfocus not assigned	A controlling MCData function has not been assigned to the MCData session.
113	group document does not exist	The group document requested from the group management server does not exist.
114	unable to retrieve group document	The group document exists on the group management server but the MCData server was unable to retrieve it.
115	group is disabled	The group has the <disabled> element set to "true" in the group management server.
116	user is not part of the MCData group	The group exists on the group management server but the requesting user is not part of this group.
120	user is not affiliated to this group	The MCData user is not affiliated to the group.
136	authentication of the MIKEY-SAKKE I_MESSAGE failed	Security context establishment failed.
139	integrity protection check failed	The integrity protection of an XML MIME body failed.
140	unable to decrypt XML content	The XML content cannot be decrypted.
141	user unknown to the participating function	The participating function is unable to associate the public user identity with an MCData ID.
142	unable to determine the controlling function	The participating function is unable to determine the controlling function for the group call or private call.
145	unable to determine called party	The participating function was unable to determine the called party from the information received in the SIP request.
198	no users are affiliated to this group	No users in the group are affiliated.
199	expected MIME bodies not in the request"	The expected MIME bodies were not received in the SIP request.
200	user not authorised to transmit data	The MCData user is not authorised to transmit data.
201	user not authorised to transmit data on this group identity	The MCData user is not authorised to transmit data on the group identity included in the request.
202	user not authorised for one-to-one MCData communications due to exceeding the maximum amount of data that can be sent in a single request	The MCData user is not authorised for one-to-one MCData communications due to exceeding the maximum amount of data that can be sent in a single request
203	message too large to send over signalling control plane	The MCData client sent data that is greater than the size that can be handled by the signalling control plane.
204	unable to determine targeted user for one-to-one SDS	The MCData server is unable to determine the targeted user for one-to-one SDS.
205	unable to determine targeted user for one-to-one FD	The MCData server is unable to determine the targeted user for one-to-one FD.
206	short data service not allowed for this group	SDS is not allowed on the group indicated in the SDS request.
207	SDS services not supported for this group	SDS services not supported for this group
208	user not authorised for MCData communications on this group identity due to exceeding the maximum amount of data that can be sent in a single request	The MCData user is not authorised for group MCData communications due to exceeding the maximum amount of data that can be sent in a single request.
209	one FD SIGNALLING PAYLOAD message only must be present in FD request	Only one FD SIGNALLING PAYLOAD message must be present in FD request
210	Only one File URL must be present in the FD request	Only one File URL must be present in the FD request.
211	payload for an FD request is not FILEURL	The payload in the FD request did not contain a FILEURL

212	file referenced by file URL does not exist	The MCData server was unable to locate the file referenced by the file URL.
213	file distribution not allowed for this group	FD is not allowed on the group indicated in the FD request.
214	FD services not supported for this group	FD services not supported for this group
215	request to transmit is queued by the server	The MCData request was queued by the server for later transmission.
216	unable to correlate the disposition notification	The MCData server was unable to correlate the disposition notification to a MCData message.
217	user not authorised for SDS communications on this group identity due to message size	The size of the message exceeded the maximum data allowed for SDS communications on this group identity
218	user not authorised for one-to-one SDS communications due to message size	The size of the message exceeded the maximum data allowed for one-to-one SDS communications.
219	user not authorised for FD communications on this group identity due to file size	The size of the file exceeded the maximum data allowed for FD communications on this group identity
220	user not authorised for FD communications due to file size	The size of the file exceeded the maximum data allowed for one-to-one FD communications.
221	user not authorised to initiate one-to-one SDS session	The MCData user is not authorised to initiate a one-to-one SDS session.
222	user not authorised to initiate group SDS session on this group identity	The MCData user is not authorised to initiate a SDS session on the group identity included in the request.

5 Functional entities

5.1 Introduction

This clause associates the functional entities with the MCData roles described in the stage 2 architecture document (see 3GPP TS 23.282 [2]).

5.2 MCData client

To be compliant with the procedures in the present document, an MCData client shall:

- act as the user agent for all MCData application transactions (e.g. initiation of a group standalone SDS message); and
- support handling of the MCData client ID as described in subclause 4.8.

To be compliant with the on-network procedures in the present document, an MCData client shall:

- support the MCData client on-network procedures defined in 3GPP TS 23.282 [2];
- support the on-network MCData message formats specified in clause 15 for the short data service (SDS) and the file distribution service (FD);
- act as a SIP UA as defined in 3GPP TS 24.229 [5];
- generate SDP offer and SDP answer in accordance with 3GPP TS 24.229 [5] and:
  a) subclause 9.2.3 and subclause 9.2.4 for short data service; and
  b) subclause 10.2.5 for file distribution.
- for registration and service authorisation, implement the procedures specified in subclause 7.2;

- for affiliation, implement the procedures specified in subclause 9.2;
- for short data service (SDS) functionality implement the MCData client procedures specified in:
  a) subclause 9.2; and
  b) clause 6 of 3GPP TS 24.582 [15];
- for file distribution (FD) functionality implement the MCData client procedures specified in:
  a) subclause 10.2; and
  b) clause 7 of 3GPP TS 24.582 [15];
- for transmission and reception control functionality implement the MCData client procedures specified in clause 11;
- for disposition notification functionality implement the MCData client procedures specified in clause 12.2; and
- for communication release functionality implement the MCData client procedures specified in clause 13.2;

To be compliant with the off-network procedures in the present document, an MCData client shall:

- support the off-network procedures defined in 3GPP TS 23.282 [2];
- support the off-network MCData message formats specified in clause 15;
- implement the procedures for ProSe direct discovery for public safety use as specified in 3GPP TS 24.334 [25];
- implement the procedures for one-to-one ProSe direct communication for Public Safety use as specified in 3GPP TS 24.334 [25]; and
- for short data service (SDS) functionality implement the MCData client procedures specified in subclause 9.3.

To be compliant with the on-network and off-network procedures in the present document requiring end-to-end security key distribution, an MCData client shall support the procedures specified in 3GPP TS 33.180 [26].

To be compliant with the procedures for confidentiality protection of XML elements in the present document, the MCData client shall implement the procedures specified in subclause 6.5.2.

To be compliant with the procedures for integrity protection of XML MIME bodies in the present document, the MCData client shall implement the procedures specified in subclause 6.5.3.

5.3 MCData server

An MCData server can perform the controlling role for short data service and file distribution as defined in 3GPP TS 23.282 [2].

An MCData server can perform the participating role for short data service and file distribution as defined in 3GPP TS 23.282 [2].

An MCData server performing the participating role can serve an originating MCData user.

An MCData server performing the participating role can serve a terminating MCData user.

The same MCData server can perform the participating role and controlling role for the same group short data service transaction or group file distribution transaction.

When referring to the procedures in the present document for the MCData server acting in a participating role for the served user, the term, "participating MCData function" is used.

When referring to the procedures in the present document for the MCData server acting in a controlling role for the served user, the term "controlling MCData function" is used.

To be compliant with the procedures in the present document, an MCData server shall:

- support the MCData server procedures defined in 3GPP TS 23.282 [2];
- implement the role of an AS performing 3rd party call control acting as a routing B2BUA as defined in 3GPP TS 24.229 [5];
- generate SDP offer and SDP answer in accordance with 3GPP TS 24.229 [5] and:
  a) subclause 9.2.3 and subclause 9.2.4 for short data service; and
  b) subclause 10.2.5 for file distribution.
- for registration and service authorisation, implement the procedures specified in subclause 7.3;
- for affiliation, implement the procedures specified in subclause 9.2.2;
- for short data service (SDS) functionality implement the MCData server procedures specified in:
  a) subclause 9.2; and
  b) clause 6 of 3GPP TS 24.582 [15];
- for file distribution (FD) functionality implement the MCData server procedures specified in:
  a) subclause 10.2; and
  b) clause 7 of 3GPP TS 24.582 [15];
- for transmission and reception control functionality implement the MCData server procedures specified in clause 11;
- for disposition notification functionality implement the MCData server procedures specified in clause 12.2; and
- for communication release functionality implement the MCData server procedures specified in clause 13.2.

To be compliant with the procedures in the present document requiring the distribution of keying material between MCData clients as specified in 3GPP TS 33.180 [26], an MCData server shall ensure that the keying material is copied from the incoming MCData messages into the outgoing MCData messages.

To be compliant with the procedures for confidentiality protection of XML elements in the present document, the MCData server shall implement the procedures specified in subclause 6.5.2.

To be compliant with the procedures for integrity protection of XML MIME bodies in the present document, the MCData server shall implement the procedures specified in subclause 6.5.3.

6 Common procedures

6.1 Introduction

This clause describes the common procedures for each functional entity.

6.2 MCData client procedures

6.2.1 Distinction of requests at the MCData client

6.2.1.1 SIP MESSAGE request

The MCData client needs to distinguish between the following SIP MESSAGE request for originations and terminations:

- SIP MESSAGE request routed to the MCData client with an Accept-Contact header field with the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds", and an ICSI value

"urn:urn-7:3gpp-service.ims.icsi.mcdata.sds" in a P-Asserted-Service header field. Such requests are known as "SIP MESSAGE request for standalone SDS for terminating MCData client";

- SIP MESSAGE request routed to the MCData client with an Accept-Contact header field with the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd", and an ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd" in a P-Asserted-Service header field. Such requests are known as "SIP MESSAGE request for FD using HTTP for terminating MCData client";

- SIP MESSAGE request routed to the MCData client with an Accept-Contact header field with the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds", and an ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds" in a P-Asserted-Service header field, and with an application/vnd.3gpp.mcdata-signalling MIME body containing an SDS NOTIFICATION message Such requests are known as "SIP MESSAGE request for SDS disposition notification for terminating MCData client"; and

- SIP MESSAGE request routed to the MCData client with an Accept-Contact header field with the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd", and an ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd" in a P-Asserted-Service header field, and with an application/vnd.3gpp.mcdata-signalling MIME body containing an FD NOTIFICATION message Such requests are known as "SIP MESSAGE request for FD disposition notification for terminating MCData client"; and

- SIP MESSAGE request routed to the MCData client with an Accept-Contact header field with the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd", and an ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd" in a P-Asserted-Service header field, and with an application/vnd.3gpp.mcdata-info+xml MIME body containing a <request-type> element in of the SIP MESSAGE request contains the value "msf-disc-res". Such requests are known as "SIP MESSAGE request for absolute URI discovery response".

6.2.2 MCData conversation items

6.2.2.1 Generating an SDS Message

In order to generate an SDS message, the MCData client:

1) shall generate an SDS SIGNALLING PAYLOAD message as specified in subclause 15.1.2;

2) shall generate a DATA PAYLOAD message as specified in subclause 15.1.4;

3) shall include in the SIP request, the SDS SIGNALLING PAYLOAD message in an application/vnd.3gpp.mcdata-signalling MIME body as specified in subclause E.1; and

4) shall include in the SIP request, the DATA PAYLOAD message in an application/vnd.3gpp.mcdata-payload MIME body as specified in subclause E.2.

When generating an SDS SIGNALLING PAYLOAD message as specified in subclause 15.1.2, the MCData client:

1) shall set the Date and time IE to the current time as specified in subclause 15.2.8;

2) if the SDS message starts a new conversation, shall set the Conversation ID IE to a newly generated Conversation ID value as specified in subclause 15.2.9;

3) if the SDS message continues an existing unfinished conversation, shall set the Conversation ID IE to the Conversation ID value of the existing conversation as specified in subclause 15.2.9;

4) shall set the Message ID IE to a newly generated Message ID value as specified in subclause 15.2.10;

5) if the SDS message is in reply to a previously received SDS message, shall include the InReplyTo message ID IE with the Message ID value in the previously received SDS message;

6) if the SDS message is for user consumption, shall not include an Application ID IE as specified in subclause 15.2.7;

7) if the SDS message is intended for an application on the terminating MCData client, shall include an Application ID IE with a Application ID value representing the intended application as specified in subclause 15.2.7;

NOTE: The value chosen for the Application ID value is decided by the mission critical organisation.

8) if only a delivery disposition notification is required shall include a SDS disposition request type IE set to "DELIVERY" as specified in subclause 15.2.3;

9) if only a read disposition notification is required shall include a SDS disposition request type IE set to "READ" as specified in subclause 15.2.3; and

10) if both a delivery and read disposition notification is required shall include a SDS disposition request type IE set to "DELIVERY AND READ" as specified in subclause 15.2.3.

When generating an DATA PAYLOAD message for SDS as specified in subclause 15.1.4, the MCData client:

1) shall set the Number of payloads IE to the number of Payload IEs that needs to be encoded, as specified in subclause 15.2.12;

2) if end-to-end security is required for a one-to-one communication, shall include the Security parameters and Payload IE with security parameters as described in 3GPP TS 33.180 [26]. Otherwise, if end-to-end security is not required for a one-to-one communication, shall include the Payload IE as specified in subclause 15.1.4; and

3) for each Payload IE included:

   a) if the payload is text, shall set the Payload content type as "TEXT" as specified in subclause 15.2.13;

   b) if the payload is binary data, shall set the Payload content type as "BINARY" as specified in subclause 15.2.13;

   c) if the payload is hyperlinks, shall set the Payload content type as "HYPERLINKS" as specified in subclause 15.2.13;

   d) if the payload is location, shall set the Payload content type as "LOCATION" as specified in subclause 15.2.13; and

   e) shall include the data to be sent in the Payload data.

6.2.2.2 Generating an FD Message for FD using HTTP

In order to generate an FD message, the MCData client:

1) shall generate an FD SIGNALLING PAYLOAD message as specified in subclause 15.1.3; and

2) shall include in the SIP request, the FD SIGNALLING PAYLOAD message in an application/vnd.3gpp.mcdata-signalling MIME body as specified in subclause E.1.

When generating an FD SIGNALLING PAYLOAD message as specified in subclause 15.1.3, the MCData client:

1) shall set the Date and time IE to the current time as specified in subclause 15.2.8;

2) if the FD message starts a new conversation, shall set the Conversation ID IE to a newly generated Conversation ID value as specified in subclause 15.2.9;

3) if the FD message continues an existing unfinished conversation, shall set the Conversation ID IE to the Conversation ID value of the existing conversation as specified in subclause 15.2.9;

4) shall set the Message ID IE to a newly generated Message ID value as specified in subclause 15.2.10;

5) if the FD message is in reply to a previously received MCData message, shall include the InReplyTo message ID IE with the Message ID value in the previously received MCData message;

6) if the FD message is for user consumption, shall not include an Application ID IE as specified in subclause 15.2.7;

7) if the FD message is intended for an application on the terminating MCData client, shall include an Application ID IE with a Application ID value representing the intended application as specified in subclause 15.2.7;

NOTE: The value chosen for the Application ID value is decided by the mission critical organisation.

8) may include an FD disposition request type IE set to "FILE DOWNLOAD COMPLETE UPDATE" as specified in subclause 15.2.4;

9) if requiring mandatory download at the recipient side, shall include a Mandatory download IE as specified in subclause 15.2.16 set to the value of "MANDATORY DOWNLOAD";

10) shall include a Payload IE with:

   a) the Payload content type set to "FILEURL" as specified in subclause 15.2.13; and

   b) the URL of the file in the Payload data as as specified in subclause 15.2.13; and

11) may include a Metadata IE with the required file description information and file availability information, as specified in subclause 15.2.17.

6.2.2.3 Generating an FD Message for FD using media plane

In order to generate an FD message, the MCData client:

1) shall generate an FD SIGNALLING PAYLOAD message as specified in subclause 15.1.3; and

2) shall include in the SIP request, the FD SIGNALLING PAYLOAD message in an application/vnd.3gpp.mcdata-signalling MIME body as specified in subclause E.1.

When generating an FD SIGNALLING PAYLOAD message as specified in subclause 15.1.3, the MCData client:

1) shall set the Date and time IE to the current time as specified in subclause 15.2.8;

2) if the filestarts a new conversation, shall set the Conversation ID IE to a newly generated Conversation ID value as specified in subclause 15.2.9;

3) if the filecontinues an existing conversation, shall set the Conversation ID IE to the Conversation ID value of the existing conversation as specified in subclause 15.2.9;

4) shall set the Message ID IE to a newly generated Message ID value as specified in subclause 15.2.10;

5) if the fileis in reply to a previously received SDS message or file, shall include the InReplyTo message ID IE with the Message ID value in the previously received SDS message or file;

6) if the file is for user consumption, shall not include an Application ID IE as specified in subclause 15.2.7;

7) if the file is intended for an application on the terminating MCData client, shall include an Application ID IE with a Application ID value representing the intended application as specified in subclause 15.2.7;

NOTE: The value chosen for the Application ID value is decided by the mission critical organisation.

8) if a file download complete notification is required shall include a FD disposition request type IE set to "FILE DOWNLOAD COMPLETED UPDATE" as specified in subclause 15.2.4; and

9) shall include and set the Mandatory download IE to "MANDATORY DOWNLOAD" as described in subclause 15.2.16.

6.2.3 Disposition Notifications

6.2.3.1 Generating an SDS Notification

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

1) shall generate an SDS NOTIFICATION message as specified in subclause 15.1.5; and

2) shall include in the SIP request, the SDS NOTIFICATION message in an application/vnd.3gpp.mcdata-signalling MIME body as specified in subclause E.1.

When generating an SDS NOTIFICATION message as specified in subclause 15.1.5, the MCData client:

1) if sending a delivered notification, shall set the SDS disposition notification type IE as "DELIVERED" as specified in subclause 15.2.5;

2) if sending a read notification, shall set the SDS disposition notification type IE as "READ" as specified in subclause 15.2.5;

3) if sending a delivered and read notification, shall set the SDS disposition notification type IE as "DELIVERED AND READ" as specified in subclause 15.2.5;

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" as specified in subclause 15.2.5;

5) shall set the Date and time IE to the current time to as specified in subclause 15.2.8;

6) shall set the Conversation ID to the value of the Conversation ID that was received in the SDS message as specified in subclause 15.2.9;

7) shall set the Message ID to the value of the Message ID that was received in the SDS message as specified in subclause 15.2.10;

8) if the SDS message was destined for the user, shall not include an Application ID IE as specified in subclause 15.2.7; and

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 as specified in subclause 15.2.3.

6.2.3.2 Generating an FD Notification

In order to generate an FD notification, the MCData client:

1) shall generate an FD NOTIFICATION message as specified in subclause 15.1.6; and

2) shall include in the SIP request, the FD NOTIFICATION message in an application/vnd.3gpp.mcdata-signalling MIME body as specified in subclause E.1.

When generating an FD NOTIFICATION message as specified in subclause 15.1.6, the MCData client:

1) if sending a file download accept notification, shall set the FD disposition notification type IE as "FILE DOWNLOAD REQUEST ACCEPTED" as specified in subclause 15.2.6;

2) if sending a file download reject notification, shall set the FD disposition notification type IE as "FILE DOWNLOAD REQUEST REJECTED" as specified in subclause 15.2.6;

3) if sending a file download deferred notification, shall set the FD disposition notification type IE as "FILE DOWNLOAD REQUEST DEFERRED" as specified in subclause 15.2.6;

4) shall set the Conversation ID to the value of the Conversation ID that was received in the FD message as specified in subclause 15.2.9;

5) shall set the Date and time IE to the current time as specified in subclause 15.2.8; and

6) if sending a file download completed notification:

   a) shall set the FD disposition notification type IE as "FILE DOWNLOAD COMPLETED" as specified in subclause 15.2.6;

   b) shall set the Message ID to the value of the Message ID that was received in the FD message as specified in subclause 15.2.10;

   c) if the FD message was destined for the user, shall not include an Application ID IE as specified in subclause 15.2.7; and

   d) if the FD 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 FD message as specified in subclause 15.2.3.

6.2.4 Sending SIP requests and receiving SIP responses

6.2.4.1 Generating a SIP MESSAGE request towards the originating participating MCData function

This subclause is referenced from other procedures.

In a SIP MESSAGE request, the MCData client:

1) when sending SDS messages or SDS disposition notifications:

   a) shall include an Accept-Contact header field containing the g.3gpp.mcdata.sds media feature tag along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [8];

   b) shall include an Accept-Contact header field with the media feature tag g.3gpp.icsi-ref containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds" along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [8]; and

   c) shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds" (coded as specified in 3GPP TS 24.229 [5]), in a P-Preferred-Service header field according to IETF RFC 6050 [7] in the SIP MESSAGE request;

2) when sending FD messages, FD disposition notifications or FD media storage function discovery messages:

   a) shall include an Accept-Contact header field containing the g.3gpp.mcdata.fd media feature tag along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [8];

   b) shall include an Accept-Contact header field with the media feature tag g.3gpp.icsi-ref containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd" along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [8]; and

   c) shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd" (coded as specified in 3GPP TS 24.229 [5]), in a P-Preferred-Service header field according to IETF RFC 6050 [7] in the SIP MESSAGE request;

3) may include a P-Preferred-Identity header field in the SIP MESSAGE request containing a public user identity as specified in 3GPP TS 24.229 [5]; and

4) shall set the Request-URI to the public service identity identifying the participating MCData function serving the MCData user.

6.3 MCData server procedures

6.3.1 Distinction of requests at the MCData server

6.3.1.1 SIP MESSAGE request

The MCData server needs to distinguish between the following SIP MESSAGE request for originations and terminations:

- SIP MESSAGE request routed to the originating participating MCData function with an Accept-Contact header field with the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds", and an ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds" in a P-Asserted-Service header field. Such requests are known as "SIP MESSAGE request for standalone SDS for originating participating MCData function";

- SIP MESSAGE request routed to the originating participating MCData function with an Accept-Contact header field with the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd", and an ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd" in a P-Asserted-Service header field, and with an application/vnd.3gpp.mcdata-info+xml MIME body containing a <request-

type> element containing the value "msf-disc-req". Such requests are known as "SIP MESSAGE request for absolute URI discovery request for participating MCData function";

- SIP MESSAGE request routed to the terminating participating MCData function with an Accept-Contact header field with the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd", and an ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd" in a P-Asserted-Service header field, and with an application/vnd.3gpp.mcdata-info+xml MIME body containing a <request-type> element containing the value "msf-disc-res". Such requests are known as "SIP MESSAGE request for absolute URI discovery response for participating MCData function";

- SIP MESSAGE request routed to the controlling MCData function with an Accept-Contact header field with the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd", and an ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd" in a P-Asserted-Service header field, and with an application/vnd.3gpp.mcdata-info+xml MIME body containing a <request-type> element containing the value "msf-disc-req". Such requests are known as "SIP MESSAGE request for absolute URI discovery request for controlling MCData function";

- SIP MESSAGE request routed to the originating participating MCData function with an Accept-Contact header field with the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd", and an ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd" in a P-Asserted-Service header field. Such requests are known as "SIP MESSAGE request for FD using HTTP for originating participating MCData function";

- SIP MESSAGE request routed to the terminating participating MCData function with an Accept-Contact header field with the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds", and an ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds" in a P-Asserted-Service header field. Such requests are known as "SIP MESSAGE request for standalone SDS for terminating participating MCData function";

- SIP MESSAGE request routed to the terminating participating MCData function with an Accept-Contact header field with the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd", and an ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd" in a P-Asserted-Service header field. Such requests are known as "SIP MESSAGE request for FD using HTTP for terminating participating MCData function";

- SIP MESSAGE request routed to an MCData server with an Accept-Contact header field with the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds", an ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds" in a P-Asserted-Service header field, and with an application/vnd.3gpp.mcdata-signalling MIME body containing an SDS NOTIFICATION message Such requests are known as "SIP MESSAGE request for SDS disposition notification for MCData server";

- SIP MESSAGE request routed to an MCData server with an Accept-Contact header field with the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd", an ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd" in a P-Asserted-Service header field, and with an application/vnd.3gpp.mcdata-signalling MIME body containing an FD NOTIFICATION message. Such requests are known as "SIP MESSAGE request for FD disposition notification for MCData server";

- SIP MESSAGE request routed to the controlling MCData function with an Accept-Contact header field with the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds", and an ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds" in a P-Asserted-Service header field. Such requests are known as "SIP MESSAGE request for standalone SDS for controlling MCData function"; and

- SIP MESSAGE request routed to the controlling MCData function with an Accept-Contact header field with the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd", and an ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd" in a P-Asserted-Service header field. Such requests are known as "SIP MESSAGE request for FD using HTTP for controlling MCData function".

If a SIP MESSAGE request is received at an MCData server that is not in accordance with the SIP MESSAGE requests listed above, then the MCData server shall reject the SIP MESSAGE request with a SIP 403 (Forbidden) response.

6.3.1.2 SIP INVITE request

The MCData server needs to distinguish between the following SIP INVITE requests for originations and terminations:

- SIP INVITE request routed to the originating participating MCData function with an Accept-Contact header field with the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds", and an ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds" in a P-Asserted-Service header field and a <request-type> element set to "one-to-one-sds" or "group-sds" contained in an application/vnd.3gpp.mcdata-info+xml MIME body. Such requests are known as "SIP INVITE request for standalone SDS over media plane for originating participating MCData function";

- SIP INVITE request routed to the terminating participating MCData function with an Accept-Contact header field with the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds", and an ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds" in a P-Asserted-Service header field and a <request-type> element set to "one-to-one-sds" or "group-sds" contained in an application/vnd.3gpp.mcdata-info+xml MIME body. Such requests are known as "SIP INVITE request for standalone SDS over media plane for terminating participating MCData function";

- SIP INVITE request routed to the controlling MCData function with an Accept-Contact header field with the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds", and an ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds" in a P-Asserted-Service header field and a <request-type> element set to "one-to-one-sds" or "group-sds" contained in an application/vnd.3gpp.mcdata-info+xml MIME body. Such requests are known as "SIP INVITE request for controlling MCData function for standalone SDS over media plane";

- SIP INVITE request routed to the originating participating MCData function with an Accept-Contact header field with the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds", and an ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds" in a P-Asserted-Service header field and a <request-type> element set to "one-to-one-sds-session" or "group-sds-session" contained in an application/vnd.3gpp.mcdata-info+xml MIME body. Such requests are known as "SIP INVITE request for SDS session for originating participating MCData function";

- SIP INVITE request routed to the terminating participating MCData function with an Accept-Contact header field with the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds", and an ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds" in a P-Asserted-Service header field and a <request-type> element set to "one-to-one-sds-session" or "group-sds-session" contained in an application/vnd.3gpp.mcdata-info+xml MIME body. Such requests are known as "SIP INVITE request for SDS session for terminating participating MCData function";

- SIP INVITE request routed to the controlling MCData function with an Accept-Contact header field with the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds", and an ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds" in a P-Asserted-Service header field and a <request-type> element set to "one-to-one-sds-session" or "group-sds-session" contained in an application/vnd.3gpp.mcdata-info+xml MIME body. Such requests are known as "SIP INVITE request for controlling MCData function for SDS session";

- SIP INVITE request routed to the originating participating MCData function with an Accept-Contact header field with the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd", and an ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd" in a P-Asserted-Service header field and a <request-type> element set to "one-to-one-fd" or "group-fd" contained in an application/vnd.3gpp.mcdata-info+xml MIME body. Such requests are known as "SIP INVITE request for file distribution for originating participating MCData function";

- SIP INVITE request routed to the terminating participating MCData function with an Accept-Contact header field with the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd", and an ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd" in a P-Asserted-Service header field and a <request-type> element set to "one-to-one-fd" or "group-fd" contained in an application/vnd.3gpp.mcdata-info+xml MIME body. Such requests are known as "SIP INVITE request for file distribution for terminating participating MCData function"; and

- SIP INVITE request routed to the controlling MCData function with an Accept-Contact header field with the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd", and an ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd" in a P-Asserted-Service header field and a <request-type> element set to "one-to-one-fd" or "group-fd" contained in an application/vnd.3gpp.mcdata-info+xml MIME body. Such requests are known as "SIP INVITE request for controlling MCData function for file distribution".

6.3.2 Sending SIP requests and receiving SIP responses

6.3.2.1 Generating a SIP MESSAGE request towards the terminating MCData client

This subclause is referenced from other procedures.

The participating MCData function shall generate a SIP MESSAGE request in accordance with 3GPP TS 24.229 [5] and IETF RFC 3428 [6] and:

1) shall include in the SIP MESSAGE request all Accept-Contact header fields and all Reject-Contact header fields, with their feature tags and their corresponding values along with parameters according to rules and procedures of IETF RFC 3841 [8] that were received (if any) in the incoming SIP MESSAGE request;

2) shall set the Request-URI of the outgoing SIP MESSAGE request to the public user identity associated to the MCData ID of the terminating MCData user;

3) shall populate the outgoing SIP MESSAGE request MIME bodies as specified in subclause 6.4 and

4) shall copy the contents of the P-Asserted-Identity header field of the incoming SIP MESSAGE request to the P-Asserted-Identity header field of the outgoing SIP MESSAGE request.

6.3.3 Retrieving a group document

This subclause describes how an MCData server accesses a group document from a group management server.

Upon receipt of a SIP request:

1) if the MCData server is not yet subscribed to the group document for the group identity in the <mcdata-request-uri> element of the application/vnd.3gpp.mcdata-info+xml MIME body of the SIP request, the MCData server shall subscribe to the "xcap-diff" event-package for the group document of this group identity as specified in 3GPP TS 24.481 [11];

NOTE: As a group document can potentially have a large content, the MCData server can subscribe to the group document indicating support of content-indirection as defined in IETF RFC 4483 [13], by following the procedures in 3GPP TS 24.481 [11].

2) upon receipt of a SIP 404 (Not Found) response as a result of attempting to subscribe to the "xcap-diff" event-package for the group document of the group identity in the <mcdata-request-uri> element of the application/vnd.3gpp.mcdata-info+xml MIME body of the SIP request as specified in 3GPP TS 24.481 [11], the MCData server shall send the SIP 404 (Not Found) response with the warning text set to "113 group document does not exist" in a Warning header field as specified in subclause 4.9. Otherwise, continue with the rest of the steps; and

3) upon receipt of any other SIP 4xx, SIP 5xx or SIP 6xx response as a result of attempting to subscribe to the "xcap-diff" event-package for the group document of the group identity in the <mcdata-request-uri> element of the application/vnd.3gpp.mcdata-info+xml MIME body of the SIP INVITE request as specified in 3GPP TS 24.481 [11], the MCData server shall send the SIP final response with the warning text set to "114 unable to retrieve group document" in a Warning header field as specified in subclause 4.4 and shall not continue with the rest of the steps;

6.3.4 Determining targeted group members for MCData communications

The MCData server shall only send MCData messages to affiliated group members.

The MCData server determines whether a user is affiliated to a group by following the procedures in subclause 6.3.5.

The MCData server performs the affiliation check in subclause 6.3.5 on each entry contained in the <list> element of the group document.

6.3.5 Affiliation check

The MCData server shall determine that the MCData user, with MCData User ID, is affiliated to the MCData group, with MCData Group ID, at the MCData client, with MCData client ID, if the elements, as described in subclause 8.3.3.2, exist with their expected values, as below:

1. an MCData group information entry with MCData group ID same as the MCData group ID under consideration;
2. in the MCData group information entry found in 1, an MCData user information entry with the MCData ID same as the MCData ID under consideration;
3. in the MCData user information entry found in 2, an MCData client information entry with MCData Client ID same as the MCData client ID under consideration; and
4. in the MCData user information entry found in 2, an expiration time, which has not expired.

6.4 Handling of MIME bodies in a SIP message

The MCData client and the MCData server shall support several MIME bodies in SIP requests and SIP responses.

When the MCData client or the MCData server sends a SIP message and the SIP message contains more than one MIME body, the MCData client or the MCData server:

1) shall, as specified in IETF RFC 2046 [21], 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;
3) shall insert a final boundary delimiter; and
4) if an SDP offer or an SDP answer is one of the MIME bodies, shall insert the application/sdp MIME body as the first MIME body.

NOTE: The reason for inserting the application/sdp MIME body as the first body is that if a functional entity in the underlying SIP core does not understand multiple MIME bodies, the functional entity will ignore all MIME bodies with the exception of the first MIME body. The order of multiple MCData application MIME bodies in a SIP message is irrelevant.

When the MCData client or the MCData server sends a SIP message and the SIP message contains only one MIME body, the MCData client or the MCData 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.

6.5 Confidentiality and Integrity Protection of sensitive XML content

6.5.1 General

6.5.1.1 Applicability and exclusions

The procedures in subclauses 6.5 apply in general to all procedures described in clause 9, clause 10, clause 12 and clause 13 with the exception that the confidentiality and integrity protection procedures for the registration and service authorisation procedures are described in clause 7.

6.5.1.2 Performing XML content encryption

Whenever the MCData UE includes XML elements or attributes pertaining to the data specified in subclause 4.6 in SIP requests or SIP responses, the MCData UE shall perform the procedures in subclause 6.5.2.3.1.

Whenever the MCData server includes XML elements or attributes pertaining to the data specified in subclause 4.6 in SIP requests or SIP responses, the MCData server shall perform the procedures in subclause 6.5.2.3.2, with the exception that when the MCData server receives a SIP request with XML elements or attributes in an MIME body that need to be copied from the incoming SIP request to an outgoing SIP request without modification, the MCData server shall perform the procedures specified in subclause 6.5.2.5.

NOTE: The procedures in subclause 6.5.2.3.1 and subclause 6.5.2.3.2 first determine (by referring to configuration) if confidentiality protection is enabled and then call the necessary procedures to encrypt the contents of the XML elements if confidentiality protection is enabled.

6.5.1.3 Performing integrity protection on an XML body

The functional entity shall perform the procedures in this subclause just prior to sending a SIP request or SIP response.

1) The MCData UE shall perform the procedures in subclause 6.5.3.3.1; and

2) The MCData server shall perform the procedures in subclause 6.5.3.3.2.

NOTE: The procedures in subclause 6.5.3.3.1 and subclause 6.5.3.3.2 first determine if integrity protection of XML MIME bodies is required and then calls the necessary procedures to integrity protect each XML MIME body if integrity protection is required. Each XML MIME body has its own signature.

6.5.1.4 Verifying integrity of an XML body and decrypting XML elements

Whenever the functional entity (i.e. MCData UE or MCData server) receives a SIP request or a SIP response, the functional entity shall perform the following procedures before performing any other procedures.

1) The functional entity shall determine if integrity protection has been applied to an XML MIME body by following the procedures in subclause 6.5.3.4.1 and if integrity protection has been applied:

   a) shall use the keying information described in subclause 6.5.3.2 and the procedures described in subclause 6.5.3.4.2 to verify the integrity of the XML MIME body; and

   b) if the integrity protection checks fail shall not perform any further procedures in this clause;

2) The functional entity shall determine whether confidentiality protection has been applied to XML elements in XML MIME bodies in a SIP request or SIP response, pertaining to the data specified in subclause 4.6, by following the procedures in subclause 6.5.2.4.1, and if confidentiality protection has been applied:

   a) shall use the keying information described in subclause 6.5.2.2 along with the procedures described in subclause 6.5.2.4.2 to decrypt the received values; and

   b) if any decryption procedures fail, shall not perform any further procedures in this clause.

6.5.2 Confidentiality Protection

6.5.2.1 General

In general, confidentiality protection is applied to specific XML elements and attributes in XML MIME bodies in SIP requests and responses as specified in subclause 4.6.

Configuration for applying confidentiality protection is not selective to a specific XML element or attribute of the data described in subclause 4.6. If configuration for confidentiality protection is turned on, then all XML elements and attributes described in subclause 4.6 are confidentiality protected. If configuration for confidentiality protection is turned off, then no XML content in SIP requests and SIP responses are confidentiality protected.

6.5.2.2 Keys used in confidentiality protection procedures

Confidentiality protection uses an XPK to encrypt the data which (depending on who is the sender and who is the receiver of the encrypted information) can be a CSK or an SPK as specified in subclause 4.6. An XPK-ID (CSK-ID/SPK-ID) is used to key the XPK (CSK/SPK). It is assumed that before the procedures in this subclause are called, the CSK/CSK-ID and/or SPK/SPK-ID are available on the sender and recipient of the encrypted content as described in subclause 4.6.

The procedures in subclause 6.5.2.3 and subclause 6.5.2.4 are used with a XPK equal to the CSK and a XPK-ID equal to the CSK-ID in the following circumstances as described in 3GPP TS 33.180 [26]:

1) MCData client sends confidentiality protected content to an MCData server; and

2) MCData server sends confidentiality protected content to an MCData client.

The procedure in subclause 6.5.2.3 and subclause 6.5.2.4 are used with a XPK equal to the SPK and a XPK-ID equal to the SPK-ID when the MCData server sends confidentiality protected content to an MCData server.

6.5.2.3 Procedures for sending confidentiality protected content

6.5.2.3.1 MCData client

If the <confidentiality-protection> element in the MCData Service Configuration document as specified in 3GPP TS 24.484 [12] is set to "true" or no <confidentiality-protection> element is present in the MCData Service Configuration document, then sending confidentiality protected content from the MCData client to the MCData server is enabled, and the MCData client:

1) shall use the appropriate keying information specified in subclause 6.5.2.2;

2) shall perform the procedures in subclause 6.5.2.3.3 to confidentiality protect XML elements containing the content described in subclause 4.6; and

3) shall perform the procedures in subclause 6.5.2.3.4 to confidentiality protect URIs in XML attributes for URIs described in subclause 4.6.

If the <confidentiality-protection> element in the MCData Service Configuration document as specified in 3GPP TS 24.484 [12] is set to "false", then sending confidentiality protected content from the MCData client to the MCData server is disabled, and content is included in XML elements and attributes without encryption.

6.5.2.3.2 MCData server

If the <confidentiality-protection> element in the MCData Service Configuration document as specified in 3GPP TS 24.484 [12] is set to "true" or no <confidentiality-protection> element is present in the MCData Service Configuration document, then sending confidentiality protected content from the MCData server to the MCData client is enabled. If the <allow-signalling-protection> element of the <protection-between-mcdata-servers> element is set to "true" in the MCData Service Configuration document as specified in 3GPP TS 24.484 [12] or no <allow-signalling-protection> element is present in the MCData Service Configuration document, then sending confidentiality protected content between MCData servers is enabled.

When sending confidentiality protected content, the MCData server:

1) shall use the appropriate keying information specified in subclause 6.5.2.2;

2) shall perform the procedures in subclause 6.5.2.3.3 to confidentiality protect XML elements containing the content described in subclause 4.6, and

3) shall perform the procedures in subclause 6.5.2.3.4 to confidentiality protect URIs in XML attributes for URIs described in subclause 4.6.

If the <confidentiality-protection> element in the MCData Service Configuration document as specified in 3GPP TS 24.484 [12] is set to "false", then sending confidentiality protected content from the MCData server to the MCData client is disabled, and then content is included in XML elements and attributes without encryption.

If the <allow-signalling-protection> element of the <protection-between-mcdata-servers> element in the MCData Service Configuration document as specified in 3GPP TS 24.484 [12] is set to "false", then sending confidentiality protected content between MCData servers is disabled, and content is included in XML elements and attributes without encryption.

6.5.2.3.3 Content Encryption in XML elements

The following procedures shall be performed by an MCData client or an MCData server:

1) perform encryption as specified in W3C: "XML Encryption Syntax and Processing Version 1.1", https://www.w3.org/TR/xmlenc-core1/ [28] subclause 4.3, using the "AES-128-GCM algorithm HMAC" as the encryption algorithm and the XPK as the key; and

2) follow the semantic for the element of the MIME body as described in Annex F of the present document, to include the encrypted content in the MIME body ensuring that the necessary XML elements required for confidentiality protection are included as specified in 3GPP TS 33.180 [26].

6.5.2.3.4 Attribute URI Encryption

The following procedures shall be performed by an MCData client or an MCData server:

1) perform encryption as specified in [aes-gcm], using the "AES-128-GCM algorithm HMAC" as the encryption algorithm and the XPK as the key, with a 96 bit randomly selected IV; and

2) replace the URI to be protected in the attribute by a URI constructed as follows:

   a) the URI schema is "sip:";

   b) the first part of the userinfo part is the base64 encoded result of the encryption of the original attribute value;

   c) the string ";iv=" is appended to the result of step b);

   d) the base64 encoding of the IV (section 5 of IETF RFC 4648 [30]) is appended to the result of step c);

   e) the string ";key-id=" is appended to the result of step d);

   f) the base64 encoding of the XPK-ID according to 3GPP 33.180 [26] is appended to the result of step e);

   g) the string ";alg=128-aes-gcm" is appended to the result of step f); and

   h) the string "@" followed by the domain name for MC Services confidentiality protection as specified in 3GPP TS 23.003 [31] is appended to the result of step g).

6.5.2.4 Procedures for receiving confidentiality protected content

6.5.2.4.1 Determination of confidentiality protected content

The following procedure is used by the MCData client or MCData server to determine if an XML element is confidentiality protected.

1) if an XML element contains the <EncryptedData> XML element, then the content of the XML element is confidentiality protected; and

2) if an XML element does not contain the <EncryptedData> XML element, then the content of the XML element is.not confidentiality protected.

The following procedure is used by the MCData client or MCData server to determine if a URI in the XML attribute is confidentiality protected.

1) if an XML attribute is a URI with the domain name for MC Services confidentiality protection as specified in the 3GPP TS 23.003 [31], then the URI is confidentiality protected; and

2) if an XML attribute is a URI without the domain name for MC Services confidentiality protection as specified in the 3GPP TS 23.003 [31], then the URI is not confidentiality protected.

6.5.2.4.2 Decrypting confidentiality protected content in XML elements

The following procedure shall be performed by an MCData client or an MCData server to decrypt an individual XML element that has a type of "encrypted" within an XML MIME body:

1) if the <EncryptedData> XML element or any of its sub-elements as described in 3GPP TS 33.180 [26] are not present in the MIME body then send a SIP 403 (Forbidden) response with the warning text set to "140 unable to decrypt XML content" in a Warning header field as specified in subclause 4.4, and exit this procedure. Otherwise continue with the rest of the steps;

2) perform decryption on the <EncryptedData> element as specified in W3C: "XML Encryption Syntax and Processing Version 1.1", https://www.w3.org/TR/xmlenc-core1/ [28] subclause 4.4 to decrypt the contents of the <CipherValue> element contained within the <CipherData> element;

3) if the decryption procedure fails, then send a SIP 403 (Forbidden) response with the warning text set to "140 unable to decrypt XML content" in a Warning header field as specified in subclause 4.4. Otherwise continue with the rest of the steps; and

4) return success of this procedure together with the decrypted XML element.

6.5.2.4.3 Decrypting confidentiality protected URIs in XML attributes

The following procedure shall be performed by an MCData client or an MCData server to decrypt a URI in an attribute in a XML document:

1) the value between ";iv=" and the next ";" provides the base64 encoded value of the 96 bit IV and the value between ";=key-id" and the next ";" defines the key which has been used for encryption, i.e. "CSK" or "SPK"; and

2) the original URI is obtained by decrypting the base64 encoded string between the "sip:" URI prefix and the next ";" using the "AES-128-GCM algorithm HMAC" as the decryption algorithm with IV and key as determined in step 1). This value replaces the encrypted URI as the value of the XML attribute.

6.5.2.5 MCData server copying received XML content

The following procedure is executed when an MCData server receives a SIP request containing XML MIME bodies, where the content needs to be copied from the incoming SIP request to the outgoing SIP request.

The MCData server:

1) shall copy the XML elements from the XML MIME body of the incoming SIP request that do not contain a <EncryptedData> XML element, to the same XML body in the outgoing SIP request;

2) for each encrypted XML element in the XML MIME body of the incoming SIP request as determined by subclause 6.5.2.4.1:

   a) shall use the keying information described in subclause 6.5.2.2 to decrypt the content within the XML element by following the procedures specified in subclause 6.5.2.4.2, and shall continue with the steps below if the encrypted XML element was successfully decrypted;

   b) if confidentiality protection is enabled as specified in subclause 6.5.2.3.2, then for each decrypted XML element:

      i) shall re-encrypt the content within the XML element using the keying information described in subclause 6.5.2.2 and by following the procedures specified in subclause 6.5.2.3.3; and

      ii) shall include the re-encrypted content into the same XML MIME body of the outgoing SIP request; and

   c) if confidentiality protection is disabled as specified in subclause 6.5.2.3.2, shall include the decrypted content in the same XML MIME body of the outgoing SIP request.

3) for each encrypted XML URI attribute in the XML MIME body of the incoming SIP request as determined by subclause 6.5.2.4.1:

a) shall use the keying information described in subclause 6.5.2.2 to decrypt the URI value of the XML attribute by following the procedures specified in subclause 6.5.2.4.3, and shall continue with the steps below if the encrypted XML attribute value was successfully decrypted;

b) if confidentiality protection is enabled as specified in subclause 6.5.2.3.2, then for each decrypted XML element:

   i) shall re-encrypt the URI value of the XML attribute using the keying information described in subclause 6.5.2.2 and by following the procedures specified in subclause 6.5.2.3.4; and

   ii) shall include the re-encrypted attribute value into the same XML MIME body of the outgoing SIP request; and

c) if confidentiality protection is disabled as specified in subclause 6.5.2.3.2, shall include the decrypted value in the same XML MIME body of the outgoing SIP request.

6.5.3 Integrity Protection of XML documents

6.5.3.1 General

Integrity protection can be applied to a whole XML MIME body. When integrity protection is enabled, all XML MIME bodies transported in SIP requests and responses are integrity protected. The following XML MIME bodies used in the present specification in SIP signalling can be integrity protected:

- application/vnd.3gpp.mcdata-info+xml;
- application/poc-settings+xml;
- application/resources-list+xml;
- application/vnd.3gpp.mcdata-affiliation-command+xml;

If integrity protection is enabled, and one or more of the XML MIME bodies complying to the types listed above are included in a SIP request or SIP response, then a MIME body of type application/vnd.3gpp.mcptt-signed+xml specified in 3GPP TS 24.379 [10] is included in the SIP request or SIP response containing one or more signatures pointing to those XML MIME bodies as illustrated in Figure 6.5.3.3-1.

In order to integrity protect the XML MIME bodies listed above in this subclause in SIP requests and SIP responses, the MCData client and MCData server shall for each MIME body, include the Content-ID header field as specified in IETF RFC 2045 [32] containing a Content-ID ("cid") Uniform Resource Locator (URL) as specified in IETF RFC 2392 [33].

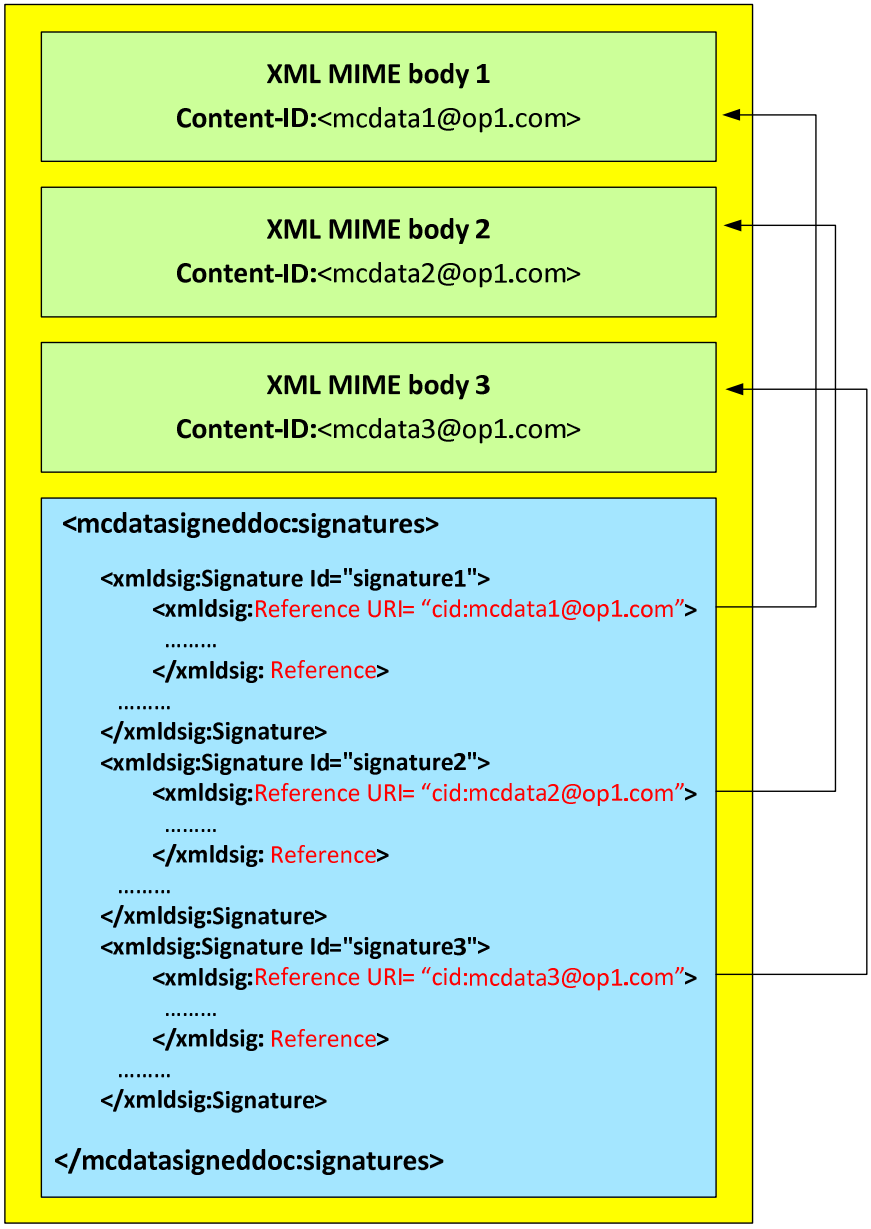

Figure 6.5.3.1-1: Integrity Protection of XML MIME bodies in SIP requests and SIP responses

Each MIME body that is integrity protected is assigned a unique signature.

Configuration for applying integrity protection is not selective to a specific MIME body. If configuration for integrity protection is turned on, then all XML MIME bodies in SIP requests and responses are integrity protected. If configuration for integrity protection is turned off, then no XML MIME bodies in SIP requests and SIP responses are integrity protected.

6.5.3.2 Keys used in integrity protection procedures

Integrity protection uses an XPK to sign the data which (depending on who is the sender and who is the receiver of the signed information) can be a CSK or an SPK as specified in subclause 4.6. An XPK-ID (CSK-ID/SPK-ID) is used to key the XPK (CSK/SPK). It is assumed that before the procedures in subclause 6.5.3.3 and subclause 6.5.3.4 are called, the CSK/CSK-ID and/or SPK/SPK-ID are available on the sender and recipient of the integrity protected content, as described in subclause 4.6.

The procedures in subclause 6.5.3.3 and subclause 6.5.3.4 shall be used with a XPK equal to the CSK and a XPK-ID equal to the CSK-ID in the following circumstances as described in 3GPP TS 33.180 [26]:

1) MCData client sends integrity protected content to an MCData server; and

2) MCData server sends integrity protected content to an MCData client.

The procedure in subclause 6.5.3.3 and subclause 6.5.3.4 shall be used with a XPK equal to the SPK and a XPK-ID equal to the SPK-ID when the MCData server sends integrity protected content to an MCData server

6.5.3.3 Sending integrity protected content

6.5.3.3.1 MCData client

If the <integrity-protection> element in the MCData Service Configuration document as specified in 3GPP TS 24.484 [12] is set to "true" or no <integrity-protection> element is present in the MCData Service Configuration document, then sending integrity protected content from the MCData client to the MCData server is enabled, and the MCData client shall use the appropriate keying information specified in subclause 6.5.3.2 and shall perform the procedures in subclause 6.5.3.3.3 to integrity protect XML MIME bodies.

NOTE: Each XML MIME body is integrity protected separately.

If the <integrity-protection> element in the MCData Service Configuration document as specified in 3GPP TS 24.484 [12] is set to "false", then sending integrity protected content from the MCData client to the MCData server is disabled, and all XML MIME bodies are sent without integrity protection.

6.5.3.3.2 MCData server

If the <integrity-protection> element in the MCData Service Configuration document as specified in 3GPP TS 24.484 [12] is set to "true", or no <integrity-protection> element is present in the MCData Service Configuration document, then sending integrity protected content from the MCData server to the MCData client is enabled. If the <allow-signalling-protection> element of the <protection-between-mcdata-servers> element is set to "true" in the MCData Service Configuration document as specified in 3GPP TS 24.484 [12] or no <allow-signalling-protection> element is present in the MCData Service Configuration document, then sending integrity protected content between MCData servers is enabled.

When sending integrity protected content, the MCData server shall use the appropriate keying information specified in subclause 6.5.3.2 and shall perform the procedures in subclause 6.5.3.3.3 to integrity protect XML MIME bodies.

NOTE: Each XML MIME body is integrity protected separately.

If the <integrity-protection> element in the MCData Service Configuration document as specified in 3GPP TS 24.484 [12] is set to "false", then sending integrity protected content from the MCData server to the MCData client is disabled, and all XML MIME bodies are sent without integrity protection.

If the <allow-signalling-protection> element of the <protection-between-mcdata-servers> element in the MCData Service Configuration document as specified in 3GPP TS 24.484 [12] is set to "false", then sending integrity protected content between MCData servers is disabled, and content is included in XML elements without encryption.

6.5.3.3.3 Integrity protection procedure

The following procedure shall be performed by the MCData client and MCData server to integrity protect the XML bodies defined by the MIME types listed in subclause 6.5.3.1:

1) include a Content-Type header field set to "application/vnd.3gpp.mcptt-signed+xml" defined in 3GPP TS 24.379 [10];

2) for each of the MIME types defined in subclause 6.5.3.1 where the content defined by these MIME types is to be integrity protected:

   a) perform reference generation as specified in W3C: "XML Signature Syntax and Processing (Second Edition)", http://www.w3.org/TR/xmldsig-core [29] subclause 3.1.1 using the SHA256 algorithm to produce a hash of the MIME body and continue with the procedures below if reference generation is successful;

   b) perform signature generation as specified in W3C: "XML Signature Syntax and Processing (Second Edition)", http://www.w3.org/TR/xmldsig-core [29] subclause 3.1.2 using the HMAC-SHA256 signature method and the XPK as the key and continue with the procedures below if signature generation is successful; and

3) follow the schema defined in Annex F.6.2 and the semantic described in Annex F.6.3 to create the application/vnd.3gpp.mcptt-signed+xml MIME body, defined in 3GPP TS 24.379 [10], containing signatures referring to the XML MIME bodies included in the SIP request or SIP response.

6.5.3.4 Receiving integrity protected content

6.5.3.4.1 Determination of integrity protected content

The following procedure is used by the MCData client or MCData server to determine if an XML MIME body is integrity protected.

1) if the <Signature> XML element is not present in the XML MIME body, then the content is not integrity protected; and

2) if the <Signature> XML element is present in the XML MIME body, then the content is integrity protected.

6.5.3.4.2 Verification of integrity protected content

The following procedure is used by the MCData client or MCData server to verify the integrity of an XML MIME body:

1) if the required sub-elements of the <Signature> as described in 3GPP TS 33.180 [26] are not present in the MIME body and if not present, are not known to the sender and recipient by other means, then the integrity protection procedure fails and exit this procedure. Otherwise continue with the rest of the steps;

2) perform reference validation on the <Reference> element as specified in W3C: "XML Signature Syntax and Processing (Second Edition)", http://www.w3.org/TR/xmldsig-core [29] subclause 3.2.1;

3) if reference validation fails, then send a SIP 403 (Forbidden) response towards the functional entity with the warning text set to: "139 integrity protection check failed" in a Warning header field as specified in subclause 4.4, and do not continue with the rest of the steps in this subclause;

4) obtain the XPK using the XPK-ID in the received XML body and use it to perform signature validation of the value of the <SignatureValue> element as specified in W3C: "XML Signature Syntax and Processing (Second Edition)", http://www.w3.org/TR/xmldsig-core [29] subclause 3.2.2;

5) if signature validation fails, then send a SIP 403 (Forbidden) response towards the functional entity with the warning text set to: "139 integrity protection check failed" in a Warning header field as specified in subclause 4.4, and do not continue with the rest of the steps in this subclause; and

6) return success of the integrity protection of the XML document passes the integrity protection procedure.

6.6 Confidentiality and Integrity Protection of TLV messages

6.6.1 General

Signalling plane provides confidentiality and integrity protection for the MCData Data signalling and MCData Data messages sent over the signalling plane. Signalling plane security also provides the authentication of MCData Data messages.

The signalling plane security is based on 3GPP MCData security solution including key management and end-to-end protection as defined in 3GPP TS 33.180 [26].

Various keys and associated key identifiers protect the MCData Data signalling and MCData Data messages carried on the signalling plane.

The MCData Data signalling messages may be:

1. SDS SIGNALLING PAYLOAD;

2. FD SIGNALLING PAYLOAD;

3. SDS NOTIFICATION;
4. FD NOTIFICATION;
5. FD NETWORK NOTIFICATION;
6. COMMUNICATION RELEASE;
7. SDS OFF-NETWORK MESSAGE; or
8. SDS OFF-NETWORK NOTIFICATION.

The MCData Data messages may be:

1. DATA PAYLOAD.

In an on-network MCData communication for an MCData group, if protection of MCData Data messages is negotiated, the GMK and the GMK-ID of the MCData group protect the MCData Data messages sent and received by MCData clients:

In an on-network one-to-one MCData communications, if protection of MCData Data messages is negotiated, the PCK and the PCK-ID protect the MCData Data messages sent and received by MCData clients;

If protection of MCData Data signalling messages sent using unicast between the MCData client and the participating MCData function serving the the MCData client is negotiated, the CSK and the CSK-ID protect the MCData Data signalling messages sent and received using unicast by the MCData client and by a participating MCData function;

If protection of MCData Data signalling messages between the participating MCData function and the controlling MCData function is configured, the SPK and the SPK-ID protect the MCData Data signalling messages sent and received between the participating MCData function and the controlling MCData function;

The GMK and the GMK-ID are distributed to the MCData clients using the group document subscription and notification procedure specified in 3GPP TS 24.481 [11].

The PCK and the PCK-ID are generated by the MCData client initiating the standalone SDS using signalling control plane or 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 MCData client receiving the SIP signalling.

The CSK and the CSK-ID are generated by the MCData client and provided to the participating MCData function serving the MCData client using SIP signalling.

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

The key material for creating and verifying the authentication signature (SSK, PVT and KPAK) is provisioned to the MCData clients by the KMS as specified in 3GPP TS 33.180 [26].

6.6.2 Derivation of master keys for media and media control

Each MCData 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 6.6.1 are used to derive a MCData Payload Cipher Key (DPCK) and its associated DPCK-ID as specified in 3GPP TS 33.180 [26].

DPCK and DPCK-ID are used in the protection of MCData Data signalling and MCData Data messages as specified in 3GPP TS 33.180 [26].

6.6.3 Protection of MCData Data signalling and MCData Data messages

6.6.3.1 General

The MCData Data messages may be encrypted and integrity protected. When encryption is applied the media shall be encrypted as specified in subclause 8.5.4 in 3GPP TS 33.180 [26].

The MCData Data signalling messages may be protected by encryption. When encryption is applied the MCData Data signalling shall be encrypted as specified in subclause 8.5.4 in 3GPP TS 33.180 [26].

The MCData Data messages and the protected MCData Data messages may also be end-to-end authenticated as specified in subclause 8.5.5 in 3GPP TS 33.180 [15].

6.6.3.2 The MCData client

A MCData client transmitting MCData Data messages shall protect the MCData Data messages using the related DPPK and DPPK-ID according to the negotiatd protection method. For one-to-one communications PCK and PCK-ID shall be used as DPPK and DPPK-ID. For group communications GMK and GMK-ID shall be used as DPPK and DPPK-ID.

A MCData client transmitting MCData Data messages shall use the key material provisioned by the KMS when generating the authentication signature.

A MCData client which receives protected MCData Data messages shall decrypt and authenticate the protected MCData Data messages using the related DPPK and DPPK-ID according to the negotiated protection method.

A MCData client which receives signed MCData Data messages shall verify the signature using the signature, the identity of the originating MCData client and the KPAK provisioned by the KMS.

A MCData client transmitting MCData Data signalling messages shall encrypt the MCData Data signalling messages using CPK and CPK-ID if MCData Data signalling messages protection is negotiated.

A MCData client which receives encrypted MCData Data signalling messages shall decrypt the media control using CPK and CPK-ID.

6.6.3.3 The participating MCData function

A participating MCData function which receives protected MCData Data messages shall forward it to the next entity without any additional action related to the security framework.

A participating MCData function, when receiving an encrypted MCData Data signalling messages from a MCData client shall decrypt the encrypted MCData Data signalling messages using the CSK and CSK-ID negotiated with the MCData client which has sent the MCData Data signalling message. Then, the participating MCData function shall forward the MCData Data signalling messages to the controlling MCData function by encrypting the MCData Data signalling messages using SPK and SPK-ID, if protection is configured between the participating MCData function and the controlling MCData function.

A participating MCData function, when receiving an encrypted MCData Data signalling messages from the controlling MCData function shall decrypt the encrypted MCData Data signalling messages using the SPK and SPK-ID configured between the participating MCData function and the controlling MCData function. Then, the participating MCData function shall forward the MCData Data signalling messages to the destination MCData client using the CSK and CSK-ID if protection is negotiated between the participating MCData function and the MCData client.

6.6.3.4 The controlling MCData function

A controlling MCData function which receives protected MCData Data messages shall forward it to the next entity without any additional action related to the security framework.

A controlling MCData function, when receiving an encrypted MCData Data signalling messages from a participating MCData function shall decrypt the encrypted MCData Data signalling messages using the SPK and SPK-ID configured between the participating MCData function and the controlling MCData function. Then, the controlling MCData function shall forward the MCData Data signalling messages to the participating MCData function serving the destination MCData client by encrypting the MCData Data signalling messages using SPK and SPK-ID, if protection is configured between the participating MCData function and the controlling MCData function.

7 Registration and service authorisation

7.1 General

This clause describes the procedures for SIP registration and MCData service authorization for the MCData client and the MCData service. The MCData UE can use SIP REGISTER or SIP PUBLISH for MCData service settings to

perform service authorization for MCData. The decision which method to use is based on implementation and on availability of an access-token received as outcome of the user authentication procedure as described in 3GPP TS 24.482 [24].

If another MC service client (e.g. MCPTT, MCVideo) is operating at the same time on the same MC UE as the MCData client, then the MCData client shares the same SIP registration as the other MC service clients. The SIP REGISTER procedures in this clause are combined with the SIP REGISTER procedures for the other operating MC service clients to create a single SIP REGISTER request. If other MC service clients are already operating when the MCData client registers then a re-registration is performed containing the parameters for the other operating MC services.

Although the access-token can be the same for the MCData service as for other MC services when performing service authorization for MCData along with other MC services using SIP REGISTER multipart MIME bodies for each MC service are included in the SIP REGISTER request. The MCData server can therefore receive multipart MIME bodies in the SIP REGISTER request. Multiple contact addresses (one per MC service client) can be included in a SIP REGISTER request provided they all contain the same IP address and port number (see 3GPP TS 24.229 [5] for further details of including multiple contact addresses in a single SIP REGISTER request).

If the MCData client logs off from the MCData service but other MC service clients are to remain registered the MC UE performs a re-registration as specified in 3GPP TS 24.229 [5] without the supported g.3gpp.mcdata media feature tags and the g.3gpp.icsi-ref media feature tags containing the values of the supported MCData service ICSIs in the Contact header field of the SIP REGISTER request but with the parameters for the remaining operating MC service clients.

7.2 MCData client procedures

7.2.1 SIP REGISTER request for service authorisation

When the MCData client performs SIP registration for service authorisation the MCData client shall perform the registration procedures as specified in 3GPP TS 24.229 [5].

The MCData client shall include the following media feature tags in the Contact header field of the SIP REGISTER request:

1) the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata";

2) if SDS is supported then:

   a) the g.3gpp.mcdata.sds media feature tag; and

   b) the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds"; and

3) if FD service is supported then:

   a) the g.3gpp.mcdata.fd media feature tag; and

   b) the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd".

NOTE 1: If the MCData client logs off from the MCData service but the MCData UE remains registered the MCData UE performs a re-registration as specified in 3GPP TS 24.229 [5] without the supported g.3gpp.mcdata media feature tags and the g.3gpp.icsi-ref media feature tag containing the supported MCData service ICSIs in the Contact header field of the SIP REGISTER request.

If the MCData client, upon performing SIP registration:

1) has successfully finished the user authentication procedure as described in 3GPP TS 24.482 [24];

2) has available an access-token;

3) based on implementation decides to use SIP REGISTER for service authorization;

4) confidentiality protection is disabled as specified in subclause 6.5.2.3.1; and

5) integrity protection is disabled as specified in subclause 6.5.3.3.1;

then the MCData client shall include an application/vnd.3gpp.mcdata-info+xml MIME body as defined in Annex F.1 with the <mcdata-access-token> element set to the value of the access token received during the user authentication procedures, in the SIP REGISTER request.

NOTE 2: the access-token contains the MCData ID of the user.

If the MCData client, upon performing SIP registration:

1) has successfully finished the user authentication procedure as described in 3GPP TS 24.482 [24];

2) has an available access-token;

3) based on implementation decides to use SIP REGISTER for service authorization; and

4) either confidentiality protection is enabled as specified in subclause 6.5.2.3.1 or integrity protection is enabled as specified in subclause 6.5.3.3.1;

then the MCData client:

1) shall include an application/mikey MIME body with the CSK as MIKEY-SAKKE I_MESSAGE as specified in 3GPP TS 33.180 [26] in the body of the SIP REGISTER request;

2) if confidentiality protection is enabled as specified in subclause 6.5.2.3.1, shall encrypt the received access-token using the CSK and shall include in the body of the SIP REGISTER request, an application/vnd.3gpp.mcdata-info+xml MIME body with the <mcdata-access-token> element set to the encrypted access-token, as specified in subclause 6.5.3.3.1;

3) if confidentiality protection is disabled as specified in subclause 6.5.2.3.1, shall include an application/vnd.3gpp.mcdata-info+xml MIME body as defined in Annex F.1 with the <mcdata-access-token> element set to the value of the access token received during the user authentication procedures; and

4) if integrity protection is enabled as specified in subclause 6.5.3.3.1, shall use the CSK to integrity protect the application/vnd.3gpp.mcdata-info+xml MIME body by following the procedures in subclause 6.6.3.3.3.

7.2.1AA SIP REGISTER request without service authorisation

When the MCData client performs SIP registration without service authorisation the MCData client shall perform the registration procedures as specified in 3GPP TS 24.229 [4].

The MCData client shall include the following media feature tags in the Contact header field of the SIP REGISTER request:

1) the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata";

2) if SDS is supported then:

   a) the g.3gpp.mcdata.sds media feature tag; and

   b) the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds"; and

3) if FD service is supported then:

   a) the g.3gpp.mcdata.fd media feature tag; and

   b) the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd".

NOTE: If the MCData client logs off from the MCData service but the MCData UE remains registered the MCData UE performs a re-registration as specified in 3GPP TS 24.229 [5] without the supported g.3gpp.mcdata media feature tags and the g.3gpp.icsi-ref media feature tag containing the supported MCData service ICSIs in the Contact header field of the SIP REGISTER request.

7.2.1A Common SIP PUBLISH procedure

This procedure is only referenced from other procedures.

When populating the SIP PUBLISH request, the MCData client shall:

1) shall set the Request-URI to the public service identity identifying the participating MCData function serving the MCData user;

2) shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata" (coded as specified in 3GPP TS 24.229 [5]), in a P-Preferred-Service header field according to IETF RFC 6050 [7];

3) shall set the Event header field to the "poc-settings" value; and

4) shall set the Expires header field according to IETF RFC 3903 [34], to 4294967295, if the MCData user is not removing the MCData service settings, otherwise to remove the MCData service settings the MCData client shall set the Expires header field to zero.

NOTE 1: 4294967295, which is equal to 2^{32}-1, is the highest value defined for Expires header field in IETF RFC 3261 [4].

NOTE 2: The expiration timer of the MCData client service settings is only applicable for the MCData client service settings from the MCData client that matches the Instance Identifier URN. The expiration timer of MCData user service settings is also updated in the MCData server if expiration timer of MCData client service settings is updated in the MCData server.

NOTE 3: Removing the MCData service settings by setting the Expires header field to zero, logs off the MCData client from the MCData service.

7.2.2 SIP PUBLISH request for service authorisation and MCData service settings

If based on implementation the MCData client decides to use SIP PUBLISH for MCData server settings to also perform service authorization and

1) has successfully finished the user authentication procedure as described in 3GPP TS 24.482 [24]; and

2) has available an access-token;

then the MCData client:

1) shall perform the procedures in subclause 7.2.1A;

2) if confidentiality protection is disabled as specified in subclause 6.5.2.3.1 and integrity protection is disabled, shall include in the body of the SIP PUBLISH request, an application/vnd.3gpp.mcdata-info+xml MIME body as specified in Annex F.1 with the <mcdata-access-token> element set to the value of the access token received during the user authentication procedures;

3) if either confidentiality protection is enabled as specified in subclause 6.5.2.3.1 or integrity protection is enabled as specified in subclause 6.5.3.3.1 shall include an application/mikey MIME body with the CSK as MIKEY-SAKKE I_MESSAGE as specified in 3GPP TS 33.180 [26] in the body of the SIP PUBLISH request;

4) if confidentiality protection is enabled as specified in subclause 6.5.2.3.1, shall include in the body of the SIP PUBLISH request an application/vnd.3gpp.mcdata-info+xml MIME body with:

   a) the <mcdata-access-token> element set to the received access-token encrypted using the CSK, as specified in subclause 6.5.2.3.3; and

   b) the <mcdata-client-id> element set to the encrypted MCData client ID of the originating MCData client, as specified in subclause 6.5.2.3.3;

5) if confidentiality protection is disabled as specified in subclause 6.5.2.3.1, shall include in the body of the SIP PUBLISH request, an application/vnd.3gpp.mcdata-info+xml MIME body as specified in Annex F.1 with:

   a) the <mcdata-access-token> element set to the value of the access token received during the user authentication procedures in the body of the SIP PUBLISH request; and

   b) the <mcdata-client-id> element set to the value of the MCData client ID of the originating MCData client;

6) shall include an application/poc-settings+xml MIME body as defined in 3GPP TS 24.379 [10] containing:

   a) the <selected-user-profile-index> element set to the value contained in the "user-profile-index" attribute of the selected MCData user profile as defined in 3GPP TS 24.484 [12]; and

7) if integrity protection is enabled as specified in subclause 6.5.3.3.1, shall use the CSK to integrity protect the application/vnd.3gpp.mcdata-info+xml MIME body and application/poc-settings+xml MIME body by following the procedures in subclause 6.5.3.3.3.

The MCData client shall send the SIP PUBLISH request according to 3GPP TS 24.229 [5].

7.2.3 Sending SIP PUBLISH for MCData service settings only

To set, update, remove or refresh the MCData service settings, the MCData client shall generate a SIP PUBLISH request according 3GPP TS 24.229 [5], IETF RFC 3903 [34] and IETF RFC 4354 [35]. In the SIP PUBLISH request, the MCData client:

1) shall perform the procedures in subclause 7.2.1A;

2) if confidentiality protection is enabled as specified in subclause 6.5.2.3.1, shall include in the body of the SIP PUBLISH request, an application/vnd.3gpp.mcdata-info+xml MIME body with:

   a) the <mcdata-request-uri> element set to the targeted MCData ID encrypted using the CSK, as specified in subclause 6.5.2.3.3; and

   b) the <mcdata-client-id> element set to the encrypted MCData client ID of the originating MCData client, as specified in subclause 6.5.2.3.3;

3) if confidentiality protection is disabled as specified in subclause 6.5.2.3.1, shall include an application/vnd.3gpp.mcdata-info+xml MIME body as specified in Annex F.1 with:

   a) the <mcdata-request-uri> set to the cleartext targeted MCData ID; and

   b) the <mcdata-client-id> element set to the value of the MCData client ID of the originating MCData client;

4) shall include an application/poc-settings+xml MIME body as defined in 3GPP TS 24.379 [10] containing:

   a) the <selected-user-profile-index> element set to the value contained in the "user-profile-index" attribute of the selected MCData user profile as defined in 3GPP TS 24.484 [12]; and

5) if integrity protection is enabled as specified in subclause 6.5.3.3.1, shall use the CSK to integrity protect the application/vnd.3gpp.mcdata-info+xml MIME body and application/poc-settings+xml MIME body by following the procedures in subclause 6.5.3.3.3.

The MCData client shall send the SIP PUBLISH request according to 3GPP TS 24.229 [5].

On receiving the SIP 200 (OK) response to the SIP PUBLISH request the MCData client may indicate to the MCData User the successful communication of the MCData service settings to the MCData server.

7.2.4 Determination of MCData service settings

In order to discover MCData service settings of another MCData client of the same MCData user or to verify the currently active MCData service settings of this MCData client, the MCData client shall generate an initial SIP SUBSCRIBE request according to 3GPP TS 24.229 [5], IETF RFC 6665 [36], and IETF RFC 4354 [35].

In the SIP SUBSCRIBE request, the MCData client:

1) shall set the Request-URI to the public service identity identifying the originating participating MCData function serving the MCData user;

2) shall include an application/vnd.3gpp.mcdata-info+xml MIME body. In the application/vnd.3gpp.mcdata-info+xml MIME body, the MCData client shall include the <mcdata-request-uri> element set to the MCData ID of the MCData user;

3) shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata" (coded as specified in 3GPP TS 24.229 [5]), in a P-Preferred-Service header field according to IETF RFC 6050 [7];

4) shall set the Event header field to the 'poc-settings' value;

5) shall include an Accept header field containing the "application/poc-settings+xml" MIME type;

6) if the MCData client wants to receive the current status and later notification, shall set the Expires header field according to IETF RFC 6665 [36], to 4294967295; and

NOTE 1: 4294967295, which is equal to 2^{32}-1, is the highest value defined for Expires header field in IETF RFC 3261 [4].

7) if the MCData client wants to fetch the current state only, shall set the Expires header field according to IETF RFC 6665 [36], to zero.

In order to re-subscribe or de-subscribe, the MCData client shall generate an in-dialog SIP SUBSCRIBE request according to 3GPP TS 24.229 [5], IETF RFC 6665 [36], IETF RFC 4354 [35]. In the SIP SUBSCRIBE request, the MCData client:

1) shall set the Event header field to the 'poc-settings' value;

2) shall include an Accept header field containing the "application/poc-settings+xml" MIME type;

3) if the MCData client wants to receive the current status and later notification, shall set the Expires header field according to IETF RFC 6665 [36], to 4294967295; and

NOTE 2: 4294967295, which is equal to 2^{32}-1, is the highest value defined for Expires header field in IETF RFC 3261 [4].

4) if the MCData client wants to de-subscribe, shall set the Expires header field according to IETF RFC 6665 [36], to zero.

Upon receiving a SIP NOTIFY request according to 3GPP TS 24.229 [5], IETF RFC 6665 [36] and IETF RFC 4354 [35], that contains an application/poc-settings+xml MIME body the MCData client shall cache:

1) the <am-settings> element of the poc-settings+xml MIME body for each MCData client identified by the "id" attribute according to IETF RFC 4354 [35] as the current Answer-mode indication of that MPCTT client; and

2) the <selected-user-profile-index> element of the poc-settings+xml MIME body for each MCData client identified by the "id" attribute according to IETF RFC 4354 [35] as the active MCData user profile of that MCData client.

7.3 MCData server procedures

7.3.1 General

The MCData server obtains information that it needs to implement service authorization specific requirements from:

a) any received third-party SIP REGISTER request (e.g. including information contained in the body of the third-party SIP REGISTER request) as specified in 3GPP TS 24.229 [5]. The body will carry the SIP REGISTER request as sent by the MCData client and may contain information needed for service authorization; or

b) any received SIP PUBLISH request for MCData server settings containing the g.3gpp.mcdata.sds media feature tag along with the "require" and "explicit" header field parameters. The body of the SIP PUBLISH request will contain information needed for service authorization.

7.3.1A Confidentiality and Integrity Protection

When the MCData server receives a SIP REGISTER request sent from the MCData client contained within a message/sip MIME body of a received third-party SIP REGISTER request or a SIP PUBLISH request, it first determines whether XML MIME bodies included in the request are integrity protected. If XML MIME bodies are integrity protected the MCData server validates the signature of each of the XML MIME bodies. If the integrity

protection check(s) pass or the XML MIME bodies are not integrity protected, the MCData server then determines whether the content in specific XML elements is confidentiality protected. If XML content is confidentiality protected, the MCData server decrypts the protected content.

Upon receiving:

- a SIP REGISTER request containing an application/vnd.3gpp.mcdata-info+xml MIME body within a message/sip MIME body of the SIP REGISTER request sent from the MCData client; or

- a SIP PUBLISH request containing an application/vnd.3gpp.mcdata-info+xml MIME body and an application/poc-settings+xml MIME body;

the MCData server:

1) shall determine if integrity protection has been applied to XML MIME bodies in the SIP request by following the procedures in subclause 6.5.3.4.1 for each XML MIME body;

2) if integrity protection has been applied, shall use the keying data described in subclause 6.5.3.2 and the procedures described in subclause 6.5.3.4.2 to verify the integrity of each of the XML MIME bodies; and

3) if all integrity protection checks succeed, shall continue with the remaining steps of this subclause.

Upon receiving:

- a SIP REGISTER request containing an application/vnd.3gpp.mcdata-info+xml MIME body with an <mcdata-access-token> element and an <mcdata-client-id> element within a message/sip MIME body of the SIP REGISTER request sent from the MCData client; or

- a SIP PUBLISH request containing an application/vnd.3gpp.mcdata-info+xml MIME body with an <mcdata-access-token> element and an <mcdata-client-id> element, and an application/poc-settings+xml MIME body;

the MCData server:

1) shall determine if confidentiality protection has been applied to the <mcdata-access-token> element and the <mcdata-client-id> element in the application/vnd.3gpp.mcdata-info+xml MIME body, by following the procedures in subclause 6.5.2.4.1;

2) if confidentiality protection has been applied to the <mcdata-access-token> element and <mcdata-client-id> element:

   a) shall use the keying information received in the MIKEY-SAKKE I_MESSAGE as specified in 3GPP TS 33.180 [26], along with the procedures described in subclause 6.5.2.4.2 to:

      i) decrypt the received access token in the <mcdata-access-token> element in the application/vnd.3gpp.mcdata-info+xml MIME body; and

      ii) decrypt the received MCData client ID in the <mcdata-client-id> element in the application/vnd.3gpp.mcdata-info+xml MIME body;

   b) if the decryption procedure succeeds, shall identify the MCData ID and the MCData client ID from the decrypted values; and

   c) if the decryption procedure fails, shall determine that confidentiality protection has not been successful;

3) if confidentiality protection has been applied to only one of the <mcdata-access-token> element or the <mcdata-client-id> element:

   a) shall determine that confidentiality protection has not been successful;

4) if confidentiality protection has not been applied:

   a) shall identify the MCData ID from <mcdata-access-token> element received in the application/vnd.3gpp.mcdata-info+xml MIME body; and

   b) shall identify the MCData client ID from the <mcdata-client-id> element received in the application/vnd.3gpp.mcdata-info+xml MIME body.

Upon receiving a SIP PUBLISH request containing an application/vnd.3gpp.mcdata-info+xml MIME body with an <mcdata-request-uri> element, an <mcdata-client-id> element, and an application/poc-settings+xml MIME body, the MCData server:

1) shall determine if confidentiality protection has been applied to the <mcdata-request-uri> element and the <mcdata-client-id> element in the application/vnd.3gpp.mcdata-info+xml MIME body by following the procedures in subclause 6.5.2.4.1;

2) if confidentiality protection has been applied to the <mcdata-request-uri> element and the <mcdata-client-id> element:

   a) shall use the keying information described in subclause 6.5.2.2 along with the procedures described in subclause 6.5.2.4.2 to:

      i) decrypt the received encrypted MCData ID in the <mcdata-request-uri> element in the application/vnd.3gpp.mcdata-info+xml MIME body; and

      ii) decrypt the received encrypted MCData client ID in the <mcdata-client-id> element in the application/vnd.3gpp.mcdata-info+xml MIME body;

   b) if all decryption procedures succeed, shall identify the MCData ID and MCData client ID from the decrypted values; and

   c) if the decryption procedure fails, shall determine that confidentiality protection has not been successful;

3) if confidentiality protection has been applied to only one of the <mcdata-request-uri> element or <mcdata-client-id> element:

   a) shall determine that confidentiality protection has not been successful;

4) if confidentiality protection has not been applied:

   a) shall identify the MCData ID from the contents of the <mcdata-request-uri> element in the application/vnd.3gpp.mcdata-info+xml MIME body; and

   b) shall identify the MCData client ID from the <mcdata-client-id> element received in the application/vnd.3gpp.mcdata-info+xml MIME body.

7.3.2 SIP REGISTER request for service authorisation

The MCData server shall support obtaining service authorization specific information from the SIP REGISTER request sent from the MCData client and included in the body of a third-party SIP REGISTER request.

NOTE 1: 3GPP TS 24.229 [5] defines how based on initial filter criteria the SIP REGISTER request sent from the UE is included in the body of the third-party SIP REGISTER request.

Upon receiving a third party SIP REGISTER request with a message/sip MIME body containing the SIP REGISTER request sent from the MCData client containing an application/vnd.3gpp.mcdata-info+xml MIME body with an <mcdata-access-token> element and an <mcdata-client-id> element within a message/sip MIME body of the SIP REGISTER request sent from the MCData client, the MCData server:

1) shall identify the IMS public user identity from the third-party SIP REGISTER request;

2) shall identify the MCData ID from the SIP REGISTER request sent from the MCData client and included in the message/sip MIME body of the third-party SIP REGISTER request by following the procedures in subclause 7.3.1A;

3) shall perform service authorization for the identified MCData ID as described in 3GPP TS 33.180 [26]; and

4) if service authorization was successful, shall bind the MCData ID to the IMS public user identity.

NOTE 2: The MCData server will store the binding MCData ID, IMS public user identity and an identifier addressing the MCData server in an external database.

7.3.3 SIP PUBLISH request for service authorisation and service settings

The MCData server shall support obtaining service authorization specific information from a SIP PUBLISH request for MCData server settings.

Upon receiving a SIP PUBLISH request containing:

1) an Event header field set to the "poc-settings" value;

2) an application/poc-settings+xml MIME body; and

3) an application/vnd.3gpp.mcdata-info+xml MIME body containing an <mcdata-access-token> element and an <mcdata-client-id> element;

the MCData server:

1) shall identify the IMS public user identity from the P-Asserted-Identity header field;

2) shall perform the procedures in subclause 7.3.1A;

3) if the procedures in subclause 7.3.1A were not successful shall send a SIP 403 (Forbidden) response towards the MCData server with the warning text set to: "140 unable to decrypt XML content " in a Warning header field as specified in subclause 4.9, and not continue with the rest of the steps in this subclause;

4) shall perform service authorization for the identified MCData ID as described in 3GPP TS 33.180 [26];

5) if service authorization was successful shall bind the MCData ID to the IMS public user identity;

NOTE 1: The MCData server will store the binding MCData ID, IMS public user identity and an identifier addressing the MCData server in an external database.

6) if service authorization was not successful, shall send a SIP 403 (Forbidden) response towards the MCData server with the warning text set to: "101 service authorisation failed" in a Warning header field as specified in subclause 4.9, and not continue with the rest of the steps in this subclause;

7) shall process the SIP PUBLISH request according to rules and procedures of IETF RFC 3903 [34] and if processing of the SIP request was not successful, do not continue with the rest of the steps;

8) shall cache the received MCData service settings until the MCData service settings expiration timer expires;

9) shall send a SIP 200 (OK) response according 3GPP TS 24.229 [5];

10) shall download the MCData user profile from the MCData user database as defined in 3GPP TS 29.283 [37] if not already stored at the MCData server and use the <selected-user-profile-index> element of the poc-settings event package if included to identify the active MCData user profile for the MCData client;

NOTE 2: If the <selected-user-profile-index> element of the poc-settings event package is included then only that MCData user profile is needed to be downloaded from the MCData user database.

11) if there is no <selected-user-profile-index> element included in the poc-settings event package then if multiple MCData user profiles are stored at the MCData server or downloaded for the MCData user from the MCData user database, shall determine the pre-selected MCData user profile to be used as the active MCData user profile by identifying the MCData user profile (see the MCData user profile document in 3GPP TS 24.484 [12]) in the collection of MCData user profiles that contains a <Pre-selected-indication> element; and

NOTE 3: If only one MCData user profile is stored at the MCData server or only one MCData user profile is downloaded from the MCData user database, then by default this MCData user profile is the pre-selected MCData user profile.

12) if an <ImplicitAffiliations> element is contained in the <OnNetwork> element of the MCData user profile document with one or more <entry> elements containing an MCData group ID (see the MCData user profile document in 3GPP TS 24.484 [12]) for the served MCData ID, shall perform implicit affiliation as specified in subclause 8.2.2.2.15

7.3.4 Receiving SIP PUBLISH request for MCData service settings only

Upon receiving a SIP PUBLISH request containing:

1) an Event header field set to the "poc-settings" value;

2) an application/poc-settings+xml MIME body; and

3) an application/vnd.3gpp.mcdata-info+xml MIME body containing an <mcdata-request-uri> element and an <mcdata-client-id> element;

The MCData server:

1) shall identify the IMS public user identity from the P-Asserted-Identity header field;

2) shall perform the procedures in subclause 7.3.1A;

3) if the procedures in subclause 7.3.1A were not successful, shall send a SIP 403 (Forbidden) response towards the MCData server with the warning text set to: "140 unable to decrypt XML content" in a Warning header field as specified in subclause 4.9, and not continue with the rest of the steps in this subclause;

4) shall verify that a binding between the IMS public user identity in the Request-URI and the MCData ID in the <mcdata-request-uri> element of the application/vnd.3gpp.mcdata-info+xml exists at the MCData server;

5) if a binding exists between the IMS public user identity and the MCData ID in the request and the validity period of the binding has not expired shall download the MCData user profile from the MCData user database as defined in 3GPP TS 29.283 [37] if not already stored at the MCData server;

6) if a binding does not exist between the IMS public user identity and the MCData ID in the request or the binding exists, but the validity period of the binding has expired, shall reject the SIP PUBLISH request with a SIP 404 (Not Found) response and not continue with any of the remaining steps;

7) shall process the SIP PUBLISH request according to rules and procedures of IETF RFC 3903 [34] and if processing of the SIP request was not successful, do not continue with the rest of the steps;

8) shall cache the received MCData service settings until the MCData service settings expiration timer expires;

9) shall send a SIP 200 (OK) response according 3GPP TS 24.229 [5];

10) shall download the MCData user profile from the MCData user database as defined in 3GPP TS 29.283 [37] if not already stored at the MCData server and use the <selected-user-profile-index> element of the poc-settings event package if included to identify the active MCData user profile for the MCData client;

NOTE 1: If the <selected-user-profile-index> element of the poc-settings event package is included then only that MCData user profile is needed to be downloaded from the MCData user database.

11) if there is no <selected-user-profile-index> element included in the poc-settings event package then if multiple MCData user profiles are stored at the MCData server or downloaded for the MCData user from the MCData user database, shall determine the pre-selected MCData user profile to be used as the active MCData user profile by identifying the MCData user profile (see the MCData user profile document in 3GPP TS 24.484 [12]) in the collection of MCData user profiles that contains a <Pre-selected-indication> element; and

NOTE 2: If only one MCData user profile is stored at the MCData server or only one MCData user profile is downloaded from the MCData user database, then by default this MCData user profile is the pre-selected MCData user profile.

12) if an <ImplicitAffiliations> element is contained in the <OnNetwork> element of the MCData user profile document with one or more <entry> elements containing an MCData group ID (see the MCData user profile document in 3GPP TS 24.484 [12]) for the served MCData ID, shall perform implicit affiliation as specified in subclause 8.2.2.2.15.

7.3.5 Receiving SIP PUBLISH request with "Expires=0"

Upon receiving a SIP PUBLISH request containing:

1) an Event header field set to the "poc-settings" value; and

2) an Expires header field set to 0;

the MCData server:

1) shall identify the IMS public user identity from the P-Asserted-Identity header field;

2) shall process the SIP PUBLISH request according to rules and procedures of IETF RFC 3903 [34] and if processing of the SIP request was successful, continue with the rest of the steps;

3) shall remove the MCData service settings;

4) shall remove the binding between the MCData ID and public user identity; and

5) shall send a SIP 200 (OK) response according to 3GPP TS 24.229 [5].

7.3.6 Subscription to and notification of MCData service settings

7.3.6.1 Receiving subscription to MCData service settings

Upon receiving a SIP SUBSCRIBE request such that:

1) Request-URI of the SIP SUBSCRIBE request contains the public service identity identifying the participating MCData function of the served MCData user;

2) the SIP SUBSCRIBE request contains an application/vnd.3gpp.mcdata-info+xml MIME body containing the<mcdata-request-uri> element which identifies an MCData ID served by the MCData server;

3) the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata,sds" (coded as specified in 3GPP TS 24.229 [5]), in a P-Asserted-Service header field according to IETF RFC 6050 [7]; and

3) the Event header field of the SIP SUBSCRIBE request contains the 'poc-settings' event type.

the MCData server:

1) shall identify the served MCData ID in the <mcdata-request-uri> element of the application/vnd.3gpp.mcdata-info+xml MIME body of the SIP SUBSCRIBE request;

2) if the Request-URI of the SIP SUBSCRIBE request contains the public service identity identifying the participating MCData function serving the MCData user, shall identify the originating MCData ID from public user identity in the P-Asserted-Identity header field of the SIP SUBSCRIBE request;

3) if the originating MCData ID is different than the served MCData ID, shall send a 403 (Forbidden) response and shall not continue with the rest of the steps; and

4) shall generate a 200 (OK) response to the SIP SUBSCRIBE request according to 3GPP TS 24.229 [5], IETF RFC 6665 [36] and IETF RFC 4354 [35].

For the duration of the subscription, the MCData server shall notify subscriber about changes of the MCData service settings of the subscribed MCData user, as described in subclause 7.3.6.2.

7.3.6.2 Sending notification of change of MCData service settings

In order to notify the subscriber about changes of the MCData service settings of the subscribed MCData client of the subscribed MCData user, the MCData server:

1) shall generate an application/poc-settings+xml MIME body as defined in 3GPP TS 24.379 [10] containing:

   a) the <selected-user-profile-index> element identifying the active MCData user profile; and

2) send a SIP NOTIFY request according to 3GPP TS 24.229 [5], IETF RFC 6665 [36] and IETF RFC 4354 [35] with the constructed application/poc-settings+xml MIME body.

8 Affiliation

8.1 General

Subclause 8.2 contains the procedures for explicit affiliation at the MCData client.

Subclause 8.3 contains the procedures for explicit affiliation at the MCData server serving the MCData user and the MCData server owning the MCData group.

Subclause 8.3 contains the procedures for implicit affiliation at the MCData server serving the MCData user and the MCData server owning the MCData group.

Subclause 8.4 describes the coding used for explicit affiliation.

The procedures for implicit affiliation in this clause are triggered at the MCData server serving the MCData user in the following circumstances:

- on receipt of a SIP MESSAGE request from an MCData client when initiating an MCData emergency alert targeted to an MCData group and the MCData client is not already affiliated to the MCData group; and
- on receipt of a SIP REGISTER request for service authorisation (as described in subclause 7.3.2) or SIP PUBLISH request for service authorisation and service settings (as described in subclause 7.3.3), as determined by configuration in the MCData user profile document as specified in 3GPP TS 24.484 [12].

The procedures for implicit affiliation in this clause are triggered at the MCData server owning the MCData group in the following circumstances:

- on receipt of a SIP MESSAGE request from the MCData server serving the MCData user when the MCData user initiates an MCData emergency alert targeted to an MCData group and the MCData client is not already affiliated to the MCData group.

8.2 MCData client procedures

8.2.1 General

The MCData client procedures consist of:

- an affiliation status change procedure;
- an affiliation status determination procedure;
- a procedure for sending affiliation status change request in negotiated mode to target MCData user; and
- a procedure for receiving affiliation status change request in negotiated mode from authorized MCData user.

In order to obtain information about success or rejection of changes triggered by the affiliation status change procedure for an MCData user, the MCData client needs to initiate the affiliation status determination procedure for the MCData user before starting the affiliation status change procedure for the MCData user.

8.2.2 Affiliation status change procedure

In order:

- to indicate that an MCData user is interested in one or more MCData group(s) at an MCData client;
- to indicate that the MCData user is no longer interested in one or more MCData group(s) at the MCData client;
- to refresh indication of an MCData user interest in one or more MCData group(s) at an MCData client due to near expiration of the expiration time of an MCData group with the affiliation status set to the "affiliated" state received in a SIP NOTIFY request in subclause 8.2.3;

- to send an affiliation status change request in mandatory mode to another MCData user; or
- any combination of the above;

the MCData client shall generate a SIP PUBLISH request according to 3GPP TS 24.229 [5], IETF RFC 3903 [34], and IETF RFC 3856 [39].

In the SIP PUBLISH request, the MCData client:

1) shall set the Request-URI to the public service identity identifying the originating participating MCData function serving the MCData user;
2) shall include an application/vnd.3gpp.mcdata-info+xml MIME body. In the application/vnd.3gpp.mcdata-info+xml MIME body, the MCData client shall include the <mcdata-request-uri> element set to the MCData ID of the MCData user;
3) shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata" (coded as specified in 3GPP TS 24.229 [5]), in a P-Preferred-Service header field according to IETF RFC 6050 [7];
4) if the targeted MCData user is interested in at least one MCData group at the targeted MCData client, shall set the Expires header field according to IETF RFC 3903 [34], to 4294967295;

NOTE 1: 4294967295, which is equal to 2^{32}-1, is the highest value defined for Expires header field in IETF RFC 3261 [4].

5) if the targeted MCData user is no longer interested in any MCData group at the targeted MCData client, shall set the Expires header field according to IETF RFC 3903 [34], to zero; and
6) shall include an application/pidf+xml MIME body indicating per-user affiliation information according to subclause 8.4.1. In the MIME body, the MCData client:
   a) shall include all MCData groups where the targeted MCData user indicates its interest at the targeted MCData client;
   b) shall include the MCData client ID of the targeted MCData client;
   c) shall not include the "status" attribute and the "expires" attribute in the <affiliation> element; and
   d) shall set the <p-id> child element of the <presence> root element to a globally unique value.

The MCData client shall send the SIP PUBLISH request according to 3GPP TS 24.229 [5].

8.2.3 Affiliation status determination procedure

NOTE 1: The MCData UE also uses this procedure to determine which MCData groups the MCData user successfully affiliated to.

In order to discover MCData groups:

1) which the MCData user at an MCData client is affiliated to; or
2) which another MCData user is affiliated to;

the MCData client shall generate an initial SIP SUBSCRIBE request according to 3GPP TS 24.229 [5], IETF RFC 3856 [39], and IETF RFC 6665 [36].

In the SIP SUBSCRIBE request, the MCData client:

1) shall set the Request-URI to the public service identity identifying the originating participating MCData function serving the MCData user;
2) shall include an application/vnd.3gpp.mcdata-info+xml MIME body. In the application/vnd.3gpp.mcdata-info+xml MIME body, the MCData client shall include the <mcdata-request-uri> element set to the MCData ID of the targeted MCData user;

3) shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata" (coded as specified in 3GPP TS 24.229 [5]), in a P-Preferred-Service header field according to IETF RFC 6050 [7];

4) if the MCData client wants to receive the current status and later notification, shall set the Expires header field according to IETF RFC 6665 [36], to 4294967295;

NOTE 2: 4294967295, which is equal to 2^{32}-1, is the highest value defined for Expires header field in IETF RFC 3261 [4].

5) if the MCData client wants to fetch the current state only, shall set the Expires header field according to IETF RFC 6665 [36], to zero; and

6) shall include an Accept header field containing the application/pidf+xml MIME type; and

7) if requesting MCData groups where the MCData user is affiliated to at the MCData client, shall include an application/simple-filter+xml MIME body indicating per-client restrictions of presence event package notification information according to subclause 8.4.2, indicating the MCData client ID of the MCData client.

In order to re-subscribe or de-subscribe, the MCData client shall generate an in-dialog SIP SUBSCRIBE request according to 3GPP TS 24.229 [5], IETF RFC 3856 [39], and IETF RFC 6665 [36]. In the SIP SUBSCRIBE request, the MCData client:

1) if the MCData client wants to receive the current status and later notification, shall set the Expires header field according to IETF RFC 6665 [36], to 4294967295;

NOTE 3: 4294967295, which is equal to 2^{32}-1, is the highest value defined for Expires header field in IETF RFC 3261 [4].

2) if the MCData client wants to de-subscribe, shall set the Expires header field according to IETF RFC 6665 [36], to zero; and

3) shall include an Accept header field containing the application/pidf+xml MIME type.

Upon receiving a SIP NOTIFY request according to 3GPP TS 24.229 [5], IETF RFC 3856 [39], and IETF RFC 6665 [36], if SIP NOTIFY request contains an application/pidf+xml MIME body indicating per-user affiliation information constructed according to subclause 8.4.1, then the MCData client shall determine affiliation status of the MCData user for each MCData group at the MCData client(s) in the MIME body. If the <p-id> child element of the <presence> root element of the application/pidf+xml MIME body of the SIP NOTIFY request is included, the <p-id> element value indicates the SIP PUBLISH request which triggered sending of the SIP NOTIFY request.

8.2.4 Procedure for sending affiliation status change request in negotiated mode to target MCData user

NOTE: Procedure for sending affiliation status change request in negotiated mode to several target MCData users is not supported in this version of the specification.

Upon receiving a request from the MCData user to send an affiliation status change request in negotiated mode to a target MCData user, the MCData client shall generate a SIP MESSAGE request in accordance with 3GPP TS 24.229 [5] and IETF RFC 3428 [6]. In the SIP MESSAGE request, the MCData client:

1) shall set the Request-URI to the public service identity identifying the originating participating MCData function serving the MCData user;

2) shall include an application/vnd.3gpp.mcdata-info+xml MIME body. In the application/vnd.3gpp.mcdata-info+xml MIME body, the MCData client shall include the <mcdata-request-uri> element set to the MCData ID of the target MCData user;

3) shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata" (coded as specified in 3GPP TS 24.229 [5]), in a P-Preferred-Service header field according to IETF RFC 6050 [7] in the SIP MESSAGE request;

4) shall include an application/vnd.3gpp.mcdata-affiliation-command+xml MIME body as specified in Annex D.3; and

5) shall send the SIP MESSAGE request according to rules and procedures of 3GPP TS 24.229 [5].

On receiving a SIP 2xx response to the SIP MESSAGE request, the MCData client shall indicate to the user that the request has been delivered to an MCData client of the target MCData user.

8.2.5 Procedure for receiving affiliation status change request in negotiated mode from authorized MCData user

Upon receiving a SIP MESSAGE request containing:

1) the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata" (coded as specified in 3GPP TS 24.229 [5]), in a P-Asserted-Service header field according to IETF RFC 6050 [7]; and

2) an application/vnd.3gpp.mcdata-affiliation-command+xml MIME body with a list of MCData groups for affiliation under the <affiliate> element and a list of MCData groups for de-affiliation under the <de-affiliate> element;

then the MCData client:

1) shall send a 200 (OK) response to the SIP MESSAGE request;

2) shall seek confirmation of the list of MCData groups for affiliation and the list of MCData groups for de-affiliation, resulting in an accepted list of MCData groups for affiliation and an accepted list of MCData groups for de-affiliation; and

3) if the user accepts the request:

   a) shall perform affiliation for each entry in the accepted list of MCData groups for affiliation for which the MCData client is not affiliated, as specified in subclause 8.2.2; and

   b) shall perform de-affiliation for each entry in the accepted list of MCData groups for de-affiliation for which the MCData client is affiliated, as specified in subclause 8.2.2.

8.3 MCData server procedures

8.3.1 General

The MCData server procedures consist of:

- procedures of MCData server serving the MCData user; and
- procedures of MCData server owning the MCData group.

8.3.2 Procedures of MCData server serving the MCData user

8.3.2.1 General

The procedures of MCData server serving the MCData user consist of:

- a receiving affiliation status change from MCData client procedure;
- a receiving subscription to affiliation status procedure;
- a sending notification of change of affiliation status procedure;
- a sending affiliation status change towards MCData server owning MCData group procedure;
- an affiliation status determination from MCData server owning MCData group procedure;
- a procedure for authorizing affiliation status change request in negotiated mode sent to served MCData user;
- a forwarding affiliation status change towards another MCData user procedure;

- a forwarding subscription to affiliation status towards another MCData user procedure
- an affiliation status determination procedure;
- an affiliation status change by implicit affiliation procedure;
- an implicit affiliation status change completion procedure;
- an implicit affiliation status change cancellation procedure; and
- an implicit affiliation to configured groups procedure.

8.3.2.2 Stored information

The MCData server shall maintain a list of MCData user information entries. The list of the MCData user information entries contains one MCData user information entry for each served MCData ID.

In each MCData user information entry, the MCData server shall maintain:

1) an MCData ID. This field uniquely identifies the MCData user information entry in the list of the MCData user information entries; and
2) a list of MCData client information entries.

In each MCData client information entry, the MCData server shall maintain:

1) an MCData client ID. This field uniquely identifies the MCData client information entry in the list of the MCData client information entries; and
2) a list of MCData group information entries.

In each MCData group information, the MCData server shall maintain:

1) an MCData group ID. This field uniquely identifies the MCData group information entry in the list of the MCData group information entries;
2) an affiliation status;
3) an expiration time;
4) an affiliating p-id; and
5) a next publishing time.

8.3.2.3 Receiving affiliation status change from MCData client procedure

Upon receiving a SIP PUBLISH request such that:

1) Request-URI of the SIP PUBLISH request contains either the public service identity identifying the originating participating MCData function serving the MCData user, or the public service identity identifying the terminating participating MCData function serving the MCData user;
2) the SIP PUBLISH request contains an application/vnd.3gpp.mcdata-info+xml MIME body containing the<mcdata-request-uri> element which identifies an MCData ID served by the MCData server;
3) the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata" (coded as specified in 3GPP TS 24.229 [5]), in a P-Asserted-Service header field according to IETF RFC 6050 [7];
4) the Event header field of the SIP PUBLISH request contains the "presence" event type; and
5) SIP PUBLISH request contains an application/pidf+xml MIME body indicating per-user affiliation information according to subclause 8.4.1;

then the MCData server:

1) shall identify the served MCData ID in the <mcdata-request-uri> element of the application/vnd.3gpp.mcdata-info+xml MIME body of the SIP PUBLISH request;

2) if the Request-URI of the SIP PUBLISH request contains the public service identity identifying the originating participating MCData function serving the MCData user, shall identify the originating MCData ID from public user identity in the P-Asserted-Identity header field of the SIP PUBLISH request;

3) if the Request-URI of the SIP PUBLISH request contains the public service identity identifying the terminating participating MCData function serving the MCData user, shall identify the originating MCData ID in the <mcdata-calling-user-identity> element of the application/vnd.3gpp.mcdata-info+xml MIME body of the SIP PUBLISH request;

4) if the originating MCData ID is different than the served MCData ID and the originating MCData ID is not authorized to modify affiliation status of the served MCData ID, shall send a 403 (Forbidden) response and shall not continue with the rest of the steps;

5) if the Expires header field of the SIP PUBLISH request is not included or has nonzero value lower than 4294967295, shall send a SIP 423 (Interval Too Brief) response to the SIP PUBLISH request, where the SIP 423 (Interval Too Brief) response contains a Min-Expires header field set to 4294967295, and shall not continue with the rest of the steps;

6) if the Expires header field of the SIP PUBLISH request has nonzero value, shall determine the candidate expiration interval to according to IETF RFC 3903 [34];

7) if the Expires header field of the SIP PUBLISH request has zero value, shall set the candidate expiration interval to zero;

8) shall respond with SIP 200 (OK) response to the SIP PUBLISH request according to 3GPP TS 24.229 [5], IETF RFC 3903 [34]. In the SIP 200 (OK) response, the MCData server:

   a) shall set the Expires header field according to IETF RFC 3903 [34], to the candidate expiration time;

9) if the "entity" attribute of the <presence> element of the application/pidf+xml MIME body of the SIP PUBLISH request is different than the served MCData ID, shall not continue with the rest of the steps;

10) shall identify the served MCData client ID in the "id" attribute of the <tuple> element of the <presence> element of the application/pidf+xml MIME body of the SIP PUBLISH request;

11) shall consider an MCData user information entry such that:

   a) the MCData user information entry is in the list of MCData user information entries described in subclause 8.3.2.2; and

   b) the MCData ID of the MCData user information entry is equal to the served MCData ID;

   as the served MCData user information entry;

12) shall consider an MCData client information entry such that:

   a) the MCData client information entry is in the list of MCData client information entries of the served MCData user information entry; and

   b) the MCData client ID of the MCData client information entry is equal to the served MCData client ID;

   as the served MCData client information entry;

13) shall consider a copy of the list of the MCData group information entries of the served MCData client information entry as the served list of the MCData group information entries;

14) if the candidate expiration interval is nonzero:

   a) shall construct the candidate list of the MCData group information entries as follows:

      i) for each MCData group ID which has an MCData group information entry in the served list of the MCData group information entries, such that the expiration time of the MCData group information entry has not expired yet, and which is indicated in a "group" attribute of an <affiliation> element of the

<status> element of the <tuple> element of the <presence> root element of the application/pidf+xml MIME body of the SIP PUBLISH request:

A) shall copy the MCData group information entry into a new MCData group information entry of the candidate list of the MCData group information entries;

B) if the affiliation status of the MCData group information entry is "deaffiliating" or "deaffiliated", shall set the affiliation status of the new MCData group information entry to the "affiliating" state and shall reset the affiliating p-id of the new MCData group information entry; and

C) shall set the expiration time of the new MCData group information entry to the current time increased with the candidate expiration interval;

ii) for each MCData group ID which has an MCData group information entry in the served list of the MCData group information entries, such that the expiration time of the MCData group information entry has not expired yet, and which is not indicated in any "group" attribute of the <affiliation> element of the <status> element of the <tuple> element of the <presence> root element of the application/pidf+xml MIME body of the SIP PUBLISH request:

A) shall copy the MCData group information entry into a new MCData group information entry of the candidate list of the MCData group information entries; and

B) if the affiliation status of the MCData group information entry is "affiliated" or "affiliating":

- shall set the affiliation status of the new MCData group information entry to the "de-affiliating" state; and

- shall set the expiration time of the new MCData group information entry to the current time increased with twice the value of timer F; and

iii) for each MCData group ID:

A) which does not have an MCData group information entry in the served list of the MCData group information entries; or

B) which has an MCData group information entry in the served list of the MCData group information entries, such that the expiration time of the MCData group information entry has already expired;

and which is indicated in a "group" element of the <affiliation> element of the <status> element of the <tuple> element of the <presence> root element of the application/pidf+xml MIME body of the SIP PUBLISH request:

A) shall add a new MCData group information entry in the candidate list of the MCData group information list for the MCData group ID;

B) shall set the affiliation status of the new MCData group information entry to the "affiliating" state;

C) shall set the expiration time of the new MCData group information entry to the current time increased with the candidate expiration interval; and

D) shall reset the affiliating p-id of the new MCData group information entry;

b) determine the candidate number of MCData group IDs as number of different MCData group IDs which have an MCData group information entry:

i) in the candidate list of the MCData group information entries; or

ii) in the list of the MCData group information entries of an MCData client information entry such that:

A) the MCData client information entry is in the list of the MCData client information entries of the served MCData user information entry; and

B) the MCData client ID of the MCData client information entry is not equal to the served MCData client ID;

with the affiliation status set to the "affiliating" state or the "affiliated" state and with the expiration time which has not expired yet; and

c) if the candidate number of MCData group IDs is bigger than N2 value of the served MCData ID, shall based on MCData service provider policy reduce the candidate MCData group IDs to that equal to N2;

NOTE: The MCData service provider policy can determine to remove an MCData group ID based on the order it appeared in the PUBLISH request or based on the importance or priority of the MCData group or some other policy to determine which MCData groups are preferred.

15) if the candidate expiration interval is zero, constructs the candidate list of the MCData group information entries as follows:

a) for each MCData group ID which has an entry in the served list of the MCData group information entries:

i) shall copy the MCData group entry of the served list of the MCData group information into a new MCData group information entry of the candidate list of the MCData group information entries;

ii) shall set the affiliation status of the new MCData group information entry to the "de-affiliating" state; and

iii) shall set the expiration time of the new MCData group information entry to the current time increased with twice the value of timer F;

16) shall replace the list of the MCData group information entries stored in the served MCData client information entry with the candidate list of the MCData group information entries;

17) shall perform the procedures specified in subclause 8.3.2.6 for the served MCData ID and each MCData group ID:

a) which does not have an MCData group information entry in the served list of the MCData group information entries and which has an MCData group information entry in the candidate list of the MCData group information entries with the affiliation status set to the "affiliating" state;

b) which has an MCData group information entry in the served list of the MCData group information entries with the expiration time already expired, and which has an MCData group information entry in the candidate list of the MCData group information entries with the affiliation status set to the "affiliating" state;

c) which has an MCData group information entry in the served list of the MCData group information entries with the affiliation status set to the "deaffiliating" state or the "deaffiliated" state and with the expiration time not expired yet, and which has an MCData group information entry in the candidate list of the MCData group information entries with the affiliation status set to the "affiliating" state; or

d) which has an MCData group information entry in the served list of the MCData group information entries with the affiliation status set to the "affiliated" state and with the expiration time not expired yet, and which has an MCData group information entry in the candidate list of the MCData group information entries with the affiliation status set to the "de-affiliating" state;

18) shall identify the handled p-id in the <p-id> child element of the <presence> root element of the application/pidf+xml MIME body of the SIP PUBLISH request; and

19) shall perform the procedures specified in subclause 8.3.2.5 for the served MCData ID.

8.3.2.4 Receiving subscription to affiliation status procedure

Upon receiving a SIP SUBSCRIBE request such that:

1) Request-URI of the SIP SUBSCRIBE request contains either the public service identity identifying the originating participating MCData function serving the MCData user, or the public service identity identifying the terminating participating MCData function serving the MCData user;

2) the SIP SUBSCRIBE request contains an application/vnd.3gpp.mcdata-info+xml MIME body containing the<mcdata-request-uri> element which identifies an MCData ID served by the MCData server;

3) the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata" (coded as specified in 3GPP TS 24.229 [5]), in a P-Asserted-Service header field according to IETF RFC 6050 [7]; and

4) the Event header field of the SIP SUBSCRIBE request contains the "presence" event type;

the MCData server:

1) shall identify the served MCData ID in the <mcdata-request-uri> element of the application/vnd.3gpp.mcdata-info+xml MIME body of the SIP SUBSCRIBE request;

2) if the Request-URI of the SIP SUBSCRIBE request contains the public service identity identifying the originating participating MCData function serving the MCData user, shall identify the originating MCData ID from public user identity in the P-Asserted-Identity header field of the SIP SUBSCRIBE request;

3) if the Request-URI of the SIP SUBSCRIBE request contains the public service identity identifying the terminating participating MCData function serving the MCData user, shall identify the originating MCData ID in the <mcdata-calling-user-identity> element of the application/vnd.3gpp.mcdata-info+xml MIME body of the SIP SUBSCRIBE request;

4) if the originating MCData ID is different than the served MCData ID and the originating MCData ID is not authorized to modify affiliation status of the served MCData ID, shall send a 403 (Forbidden) response and shall not continue with the rest of the steps; and

5) shall generate a 200 (OK) response to the SIP SUBSCRIBE request according to 3GPP TS 24.229 [5], IETF RFC 6665 [36].

For the duration of the subscription, the MCData server shall notify the subscriber about changes of the information of the served MCData ID, as described in subclause 8.3.2.5.

8.3.2.5 Sending notification of change of affiliation status procedure

In order to notify the subscriber about changes of the served MCData ID, the MCData server:

1) shall consider an MCData user information entry such that:

   a) the MCData user information entry is in the list of MCData user information entries described in subclause 8.3.2.2; and

   b) the MCData ID of the MCData user information entry is equal to the served MCData ID;

   as the served MCData user information entry;

2) shall consider the list of the MCData client information entries of the served MCData user information entry as the served list of the MCData client information entries;

3) shall generate an application/pidf+xml MIME body indicating per-user affiliation information according to subclause 8.4.1 and the served list of the MCData client information entries with the following clarifications:

   a) the MCData server shall not include information from an MCData group information entry with the expiration time already expired;

   b) the MCData server shall not include information from an MCData group information entry with the affiliation status set to the "deaffiliated" state;

   c) if the SIP SUBSCRIBE request creating the subscription of this notification contains an application/simple-filter+xml MIME body indicating per-client restrictions of presence event package notification information according to subclause 8.4.2, the MCData server shall restrict the application/pidf+xml MIME body according to the application/simple-filter+xml MIME body; and

   d) if this procedures is invoked by procedure in subclause 8.3.2.3 where the handled p-id value was identified, the MCData server shall set the <p-id> child element of the <presence> root element of the application/pidf+xml MIME body of the SIP NOTIFY request to the handled p-id value; and

4) send a SIP NOTIFY request according to 3GPP TS 24.229 [5], and IETF RFC 6665 [36] for the subscription created in subclause 8.3.2.4. In the SIP NOTIFY request, the MCData server shall include the generated application/pidf+xml MIME body indicating per-user affiliation information.

8.3.2.6 Sending affiliation status change towards MCData server owning MCData group procedure

NOTE 1: Usage of one SIP PUBLISH request to carry information about change of affiliation state of several MCData users served by the same MCData server is not supported in this version of the specification.

In order:

- to send an affiliation request of a served MCData ID to a handled MCData group ID;
- to send an de-affiliation request of a served MCData ID from a handled MCData group ID; or
- to send an affiliation request of a served MCData ID to a handled MCData group ID due to near expiration of the previously published information;

the MCData server shall generate a SIP PUBLISH request according to 3GPP TS 24.229 [5], IETF RFC 3903 [34] and IETF RFC 3856 [39]. In the SIP PUBLISH request, the MCData server:

1) shall set the Request-URI to the public service identity of the controlling MCData function associated with the handled MCData group ID;
2) shall include an application/vnd.3gpp.mcdata-info+xml MIME body. In the application/vnd.3gpp.mcdata-info+xml MIME body, the MCData server:
   a) shall include the <mcdata-request-uri> element set to the handled MCData group ID; and
   b) shall include the <mcdata-calling-user-id> element set to the served MCData ID;
3) shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata" (coded as specified in 3GPP TS 24.229 [5]), in a P-Asserted-Service header field according to IETF RFC 6050 [7];
4) if sending an affiliation request, shall set the Expires header field according to IETF RFC 3903 [34], to 4294967295;

NOTE 1: 4294967295, which is equal to 2^{32}-1, is the highest value defined for Expires header field in IETF RFC 3261 [4].

5) if sending an de-affiliation request, shall set the Expires header field according to IETF RFC 3903 [34], to zero;
6) shall include an P-Asserted-Identity header field set to the public service identity of the MCData server according to 3GPP TS 24.229 [5];
7) shall set the current p-id to a globally unique value;
8) shall consider an MCData user information entry such that:
   a) the MCData user information entry is in the list of MCData user information entries described in subclause 8.3.2.2; and
   b) the MCData ID of the MCData user information entry is equal to the served MCData ID;

   as the served MCData user information entry;
9) for each MCData group information entry such that:
   a) the MCData group information entry has the "affiliating" affiliation status, the MCData group ID set to the handled MCData group ID, the expiration time has not expired yet and the affiliating p-id is not set;
   b) the MCData group information entry is in the list of the MCData group information entries of an MCData client information entry; and
   c) the MCData client information entry is in the list of the MCData client information entries of the served MCData user information entry;

   shall set the affiliating p-id of the MCData group information entry to the current p-id; and

10) shall include an application/pidf+xml MIME body indicating per-group affiliation information constructed according to subclause 9.2.3.2. The MCData server shall indicate all served MCData client IDs, such that:

   a) the affiliation status is set to "affiliating" or "affiliated", and the expiration time has not expired yet in an MCData group information entry with the MCData group ID set to the handled MCData group;

   b) the MCData group information entry is in the list of the MCData group information entries of an MCData client information entry;

   c) the MCData client information entry has the MCData client ID set to the served MCData client ID; and

   d) the MCData client information entry is in the list of the MCData client information entries of the served MCData user information entry.

   The MCData server shall set the <p-id> child element of the <presence> root element to the current p-id.

   The MCData server shall not include the "expires" attribute in the <affiliation> element.

The MCData server shall send the SIP PUBLISH request according to 3GPP TS 24.229 [5].

If timer F expires for the SIP PUBLISH request sent for a (de)affiliation request of served MCData ID to the MCData group ID or upon receiving a SIP 3xx, 4xx, 5xx or 6xx response to the SIP PUBLISH request, the MCData server:

1) shall remove each MCData group ID entry such that:

   a) the MCData group information entry has the MCData group ID set to the handled MCData group ID;

   b) the MCData group information entry is in the list of the MCData group information entries of an MCData client information entry; and

   c) the MCData client information entry is in the list of the MCData client information entries of the served MCData user information entry.

8.3.2.7 Affiliation status determination from MCData server owning MCData group procedure

NOTE 1: Usage of one SIP SUBSCRIBE request to subscribe for notification about change of affiliation state of several MCData users served by the same MCData server is not supported in this version of the specification.

In order to discover whether a served MCData user was successfully affiliated to a handled MCData group in the MCData server owning the handled MCData group, the MCData server shall generate an initial SIP SUBSCRIBE request according to 3GPP TS 24.229 [5], IETF RFC 3856 [39], and IETF RFC 6665 [36].

In the SIP SUBSCRIBE request, the MCData server:

1) shall set the Request-URI to the public service identity of the controlling MCData function associated with the handled MCData group ID;

2) shall include an application/vnd.3gpp.mcdata-info+xml MIME body. In the application/vnd.3gpp.mcdata-info+xml MIME body, the MCData server:

   a) shall include the <mcdata-request-uri> element set to the handled MCData group ID; and

   b) shall include the <mcdata-calling-user-id> element set to the served MCData ID;

3) shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata" (coded as specified in 3GPP TS 24.229 [5]), in a P-Asserted-Service header field according to IETF RFC 6050 [7];

4) if the MCData server wants to receive the current status and later notification, shall set the Expires header field according to IETF RFC 6665 [36], to 4294967295;

NOTE 2: 4294967295, which is equal to 2^{32}-1, is the highest value defined for Expires header field in IETF RFC 3261 [4].

5) if the MCData server wants to fetch the current state only, shall set the Expires header field according to IETF RFC 6665 [36], to zero;

6) shall include an Accept header field containing the application/pidf+xml MIME type; and

7) shall include an application/simple-filter+xml MIME body indicating per-user restrictions of presence event package notification information according to subclause 8.4.2, indicating the served MCData ID.

In order to re-subscribe or de-subscribe, the MCData server shall generate an in-dialog SIP SUBSCRIBE request according to 3GPP TS 24.229 [5], IETF RFC 3856 [39], and IETF RFC 6665 [36]. In the SIP SUBSCRIBE request, the MCData server:

1) if the MCData server wants to receive the current status and later notification, shall set the Expires header field according to IETF RFC 6665 [36], to 4294967295;

NOTE 3: 4294967295, which is equal to 2^{32}-1, is the highest value defined for Expires header field in IETF RFC 3261 [4].

2) if the MCData server wants to de-subscribe, shall set the Expires header field according to IETF RFC 6665 [36], to zero; and

3) shall include an Accept header field containing the application/pidf+xml MIME type.

Upon receiving a SIP NOTIFY request according to 3GPP TS 24.229 [5], IETF RFC 3856 [39], and IETF RFC 6665 [36], if SIP NOTIFY request contains an application/pidf+xml MIME body indicating per-group affiliation information constructed according to subclause 8.4.1, then the MCData server:

1) for each served MCData ID and served MCData client ID such that the application/pidf+xml MIME body of SIP NOTIFY request contains:

   a) a <tuple> element of the root <presence> element;

   b) the "id" attribute of the <tuple> element indicating the served MCData ID;

   c) an <affiliation> child element of the <status> element of the <tuple> element;

   d) the "client" attribute of the <affiliation> element indicating the served MCData client ID; and

   d) the "expires" attribute of the <affiliation> element indicating expiration of affiliation;

   perform the following:

   a) if an MCData group information entry exists such that:

      i) the MCData group information entry has the "affiliating" affiliation status, the MCData group ID set to the handled MCData group ID, and the expiration time has not expired yet;

      ii) the MCData group information entry is in the list of the MCData group information entries of an MCData client information entry with the MCData client ID set to the served MCData client ID;

      iii) the MCData client information entry is in the list of the MCData client information entries of a served MCData user information entry with the MCData ID set to the served MCData ID; and

      iv) the MCData user information entry is in the list of MCData user information entries described in subclause 8.3.2.2; and

      shall set the affiliation status of the MCData group information entry to "affiliated"; and

      shall set the next publishing time of the MCData group information entry to the current time and half of the time between the current time and the expiration of affiliation; and

2) for each MCData group information entry such that:

   a) the MCData group information entry has the "affiliated" affiliation status or the "deaffiliating" affiliation status, the MCData group ID set to the handled MCData group ID, and the expiration time has not expired yet;

b) the MCData group information entry is in the list of the MCData group information entries of an MCData client information entry with the MCData client ID set to a served MCData client ID;

c) the MCData client information entry is in the list of the MCData client information entries of the served MCData user information entry with the MCData ID set to a served MCData ID; and

d) the MCData user information entry is in the list of MCData user information entries described in subclause 8.3.2.2; and

for which the application/pidf+xml MIME body of SIP NOTIFY request does not contain:

a) a <tuple> element of the root <presence> element;

b) the "id" attribute of the <tuple> element indicating the served MCData ID;

c) an <affiliation> child element of the <status> child element of the <tuple> element; and

d) the "client" attribute of the <affiliation> element indicating the served MCData client ID.

perform the following:

a) shall set the affiliation status of the MCData group information entry to "deaffiliated"; and

b) shall set the expiration time of the MCData group information entry to the current time; and

3) if a <p-id> element is included in the <presence> root element of the application/pidf+xml MIME body of the SIP NOTIFY request, then for each MCData group information entry such that:

a) the MCData group information entry has the "affiliating" affiliation status, the MCData group ID set to the handled MCData group ID, the expiration time has not expired yet and with the affiliating p-id set to the value of the <p-id> element;

b) the MCData group information entry is in the list of the MCData group information entries of an MCData client information entry with the MCData client ID set to a served MCData client ID;

c) the MCData client information entry is in the list of the MCData client information entries of the served MCData user information entry with the MCData ID set to a served MCData ID; and

d) the MCData user information entry is in the list of MCData user information entries described in subclause 8.3.2.2; and

for which the application/pidf+xml MIME body of SIP NOTIFY request does not contain:

a) a <tuple> element of the root <presence> element;

b) the "id" attribute of the <tuple> element indicating the served MCData ID;

c) an <affiliation> child element of the <status> child element of the <tuple> element; and

d) the "client" attribute of the <affiliation> element indicating the served MCData client ID;

perform the following:

a) shall set the affiliation status of the MCData group information entry to "deaffiliated"; and

b) shall set the expiration time of the MCData group information entry to the current time.

8.3.2.8 Procedure for authorizing affiliation status change request in negotiated mode sent to served MCData user

Upon receiving a SIP MESSAGE request such that:

1) Request-URI of the SIP MESSAGE request contains the public service identity identifying the terminating participating MCData function serving the MCData user;

2) the SIP MESSAGE request contains an application/vnd.3gpp.mcdata-info+xml MIME body containing the<mcdata-request-uri> element and the <mcdata-calling-user-identity> element;

3) the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata" (coded as specified in 3GPP TS 24.229 [5]), in a P-Asserted-Service header field according to IETF RFC 6050 [7]; and

4) the SIP MESSAGE request contains an application/vnd.3gpp.mcdata-affiliation-command+xml MIME body;

then the MCData server:

1) shall identify the served MCData ID in the <mcdata-request-uri> element of the application/vnd.3gpp.mcdata-info+xml MIME body of the SIP MESSAGE request;

2) shall identify the originating MCData ID in the <mcdata-calling-user-identity> element of the application/vnd.3gpp.mcdata-info+xml MIME body of the SIP MESSAGE request;

3) if the originating MCData ID is not authorized to send an affiliation status change request in negotiated mode to the served MCData ID, shall send a 403 (Forbidden) response and shall not continue with the rest of the steps;

4) shall set the Request-URI of the SIP MESSAGE request to the public user identity bound to the served MCData ID in the MCData server; and

5) shall include an Accept-Contact header field with the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata" along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [8];

before forwarding the SIP MESSAGE request further.

8.3.2.9 Forwarding affiliation status change towards another MCData user procedure

Upon receiving a SIP PUBLISH request such that:

1) Request-URI of the SIP PUBLISH request contains the public service identity identifying the originating participating MCData function serving the MCData user;

2) the SIP PUBLISH request contains an application/vnd.3gpp.mcdata-info MIME body containing the<mcdata-request-uri> element which identifies an MCData ID not served by the MCData server;

3) the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata" (coded as specified in 3GPP TS 24.229 [5]), in a P-Asserted-Service header field according to IETF RFC 6050 [7];

4) the Event header field of the SIP PUBLISH request contains the "presence" event type; and

5) SIP PUBLISH request contains an application/pidf+xml MIME body indicating per-user affiliation information according to subclause 8.4.1;

then the MCData server:

1) shall identify the target MCData ID in the <mcdata-request-uri> element of the application/vnd.3gpp.mcdata-info MIME body of the SIP PUBLISH request;

2) shall identify the originating MCData ID from public user identity in the P-Asserted-Identity header field of the SIP PUBLISH request;

3) shall generate a SIP PUBLISH request from the received SIP PUBLISH request. In the generated SIP PUBLISH request, the MCData server:

   a) shall set the Request-URI to the public service identity identifying the terminating participating MCData function serving the target MCData ID;

   b) shall include a P-Asserted-Identity header field containing the public service identity identifying the originating participating MCData function serving the MCData user;

   c) shall include an application/vnd.3gpp.mcdata-info+xml MIME body. In the application/vnd.3gpp.mcdata-info+xml MIME body, the MCData server:

      A) shall include the <mcdata-request-uri> element set to the target MCData ID; and

      B) shall include the <mcdata-calling-user-id> element set to the originating MCData ID; and

d) shall include other signalling elements from the received SIP PUBLISH request; and

4) shall send the generated SIP PUBLISH request according to 3GPP TS 24.229 [5].

The MCData server shall forward received SIP responses to the SIP PUBLISH request.

8.3.2.10 Forwarding subscription to affiliation status towards another MCData user procedure

Upon receiving a SIP SUBSCRIBE request such that:

1) Request-URI of the SIP SUBSCRIBE request contains the public service identity identifying the originating participating MCData function serving the MCData user;

2) the SIP SUBCRIBE request contains an application/vnd.3gpp.mcdata-info MIME body containing the<mcdata-request-uri> element which identifies an MCData ID not served by MCData server;

3) the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata" (coded as specified in 3GPP TS 24.229 [5]), in a P-Asserted-Service header field according to IETF RFC 6050 [7]; and

4) the Event header field of the SIP SUBSCRIBE request contains the "presence" event type;

then the MCData server:

1) shall identify the target MCData ID in the <mcdata-request-uri> element of the application/vnd.3gpp.mcdata-info MIME body of the SIP SUBSCRIBE request;

2) shall identify the originating MCData ID from public user identity in the P-Asserted-Identity header field of the SIP SUBSCRIBE request;

3) shall generate a SIP SUBSCRIBE request from the received SIP SUBSCRIBE request. In the generated SIP SUBSCRIBE request, the MCData server:

   a) shall set the Request-URI to the public service identity identifying the terminating participating MCData function serving the target MCData ID;

   b) shall include a P-Asserted-Identity header field containing the public service identity identifying the originating participating MCData function serving the MCData user;

   c) shall include an application/vnd.3gpp.mcdata-info+xml MIME body. In the application/vnd.3gpp.mcdata-info+xml MIME body, the MCData server:

      A) shall include the <mcdata-request-uri> element set to the target MCData ID; and

      B) shall include the <mcdata-calling-user-id> element set to the originating MCData ID; and

   d) shall include other signalling elements from the received SIP SUBSCRIBE request; and

4) shall send the generated SIP SUBSCRIBE request according to 3GPP TS 24.229 [5].

The MCData server shall forward any received SIP responses to the SIP SUBSCRIBE request, any received SIP NOTIFY request and any received SIP responses to the SIP NOTIFY request.

8.3.2.11 Affiliation status determination

This subclause is referenced from other procedures.

If the participating MCData function needs to determine the affiliation status of an MCData user to an MCData group, the participating function:

1) shall find the user information entry in the list of MCData user information entries described in subclause 8.3.2.2 such that the MCData ID of the MCData user information entry is equal to the MCData ID of the originator of the received SIP request;

a) if the applicable MCData group information entry cannot be found, then the participating MCData function shall determine that the MCData user is not affiliated to the MCData group at the MCData client and the skip the rest of the steps;

2) shall find the MCData client information entry in the list of MCData client information entries of MCData user information entry found in step 1) in which the MCData client id matches the value of the <mcdata-client-id> element contained in the application/vnd.3gpp.mcdata-info+xml MIME body in the received SIP request;

a) if the applicable MCData client information entry cannot be found, then the participating MCData function shall determine that the MCData user is not affiliated to the MCData group at the MCData client and the skip the rest of the steps;

3) shall find the MCData group information entry in the list of MCData group information entries of MCData client information entry found in step 2 such that the MCData group identity matches the value of the identity of the targeted MCData group;

a) if the applicable MCData group information entry was found in step 3) and the affiliation status of the MCData group information entry is "affiliating" or "affiliated", shall determine that the MCData user at the MCData client to be affiliated to the targeted MCData group and skip the rest of the steps;

b) if the applicable MCData group information entry was found in step 3) and the affiliation status of the MCData group information entry is "deaffiliating" or "deaffiliated", shall determine that the MCData user at the MCData client to not be affiliated to the targeted MCData group and skip the rest of the steps; or

c) if the applicable MCData group information entry was not found in step 3), shall determine that the MCData user at the MCData client is not affiliated to the targeted MCData group.

8.3.2.12 Affiliation status change by implicit affiliation

This subclause is referenced from other procedures.

Upon receiving a SIP request that requires implicit affiliation of the sending MCData client to an MCData group, the participating MCData function:

1) shall determine the served MCData client ID from the <mcdata-client-id> element of the application/vnd.3gpp.mcdata-info+xml MIME body in the received SIP request;

2) shall determine the MCData group ID from the <mcdata-request-uri> element of the application/vnd.3gpp.mcdata-info+xml MIME body in the received SIP request;

3) shall determine the served MCData ID by using the public user identity in the P-Asserted-Identity header field of the SIP request;

NOTE 1: The MCData ID of the calling user is bound to the public user identity at the time of service authorisation, as documented in subclause 7.3.

4) shall consider an MCData user information entry such that:

a) the MCData user information entry is in the list of MCData user information entries described in subclause 8.3.2.2; and

b) the MCData ID of the MCData user information entry is equal to the served MCData ID;

as the served MCData user information entry;

5) shall consider an MCData client information entry such that:

a) the MCData client information entry is in the list of MCData client information entries of the served MCData user information entry; and

b) the MCData client ID of the MCData client information entry is equal to the served MCData client ID;

as the served MCData client information entry;

6) shall consider a copy of the list of the MCData group information entries of the served MCData client information entry as the served list of the MCData group information entries;

7) shall construct the candidate list of the MCData group information entries as follows:

   a) for each MCData group ID which has an MCData group information entry in the served list of the MCData group information entries shall copy the MCData group information entry into a new MCData group information entry of the candidate list of the MCData group information entries; and

   b) if the determined MCData group ID does not have an MCData group information entry in the served list of the MCData group information entries or has an MCData group information entry in the served list of the MCData group information entries, such that the expiration time of the MCData group information entry has already expired:

      i) shall add a new MCData group information entry in the candidate list of the MCData group information list for the determined MCData group ID;

      ii) shall set the affiliation status of the new MCData group information entry to the "affiliating" state; and

      iii) shall set the expiration time of the new MCData group information entry to the current time increased with the candidate expiration interval;

8) determine the candidate number of MCData group IDs as the number of different MCData group IDs which have an MCData group information entry:

   a) in the candidate list of the MCData group information entries; or

   b) in the list of the MCData group information entries of an MCData client information entry such that:

      i) the MCData client information entry is in the list of the MCData client information entries of the served MCData user information entry; and

      ii) the MCData client ID of the MCData client information entry is not equal to the served MCData client ID;

   with the affiliation status set to the "affiliating" state or the "affiliated" state and with the expiration time which has not expired yet; and

9) if the candidate number of MCData group IDs is bigger than the N2 value of the served MCData ID, shall based on MCData service provider policy reduce the candidate MCData group IDs to that equal to N2;

10) if the determined MCData group ID cannot be added to the the candidate list of the MCData group information entries due to exceeding the MCData user's N2 limit, shall discard the candidate list of the MCData group information entries and skip the remaining steps of the current procedure; and

11) shall replace the list of the MCData group information entries stored in the served MCData client information entry with the candidate list of the MCData group information entries.

8.3.2.13 Implicit affiliation status change completion

This subclause is referenced from other procedures.

If the participating MCData function has received a SIP 2xx response from the controlling MCData function to a SIP request that had triggered performing the procedures of subclause 8.3.2.12, the participating MCData function:

1) shall set the affiliation status of the MCData group information entry added to the candidate list of the MCData group information entries by the procedures of subclause 8.3.2.12 to "affiliated"; and

2) shall perform the procedures specified in subclause 8.3.2.5 for the served MCData ID.

8.3.2.14 Implicit affiliation status change cancellation

This subclause is referenced from other procedures.

If the participating MCData function determines that a received SIP request that had triggered performing the procedures of subclause 8.3.2.12 needs to be rejected or if the participating MCData function receives a SIP 4xx, 5xx or 6xx response from the controlling MCData function for the received SIP request, the participating MCData function:

1) shall remove the MCData group ID entry added by the procedures of subclause 8.3.2.12 such that:

   a) the MCData group information entry has the MCData group ID set to the MCData group ID of the MCData group targeted by the received SIP request;

   b) the MCData group information entry is in the list of the MCData group information entries of an MCData client information entry containing the MCData client ID included in the received SIP request; and

   c) the MCData client information entry is in the list of the MCData client information entries of the MCData user information entry containing the MCData ID of the sender of the received SIP request.

8.3.2.15 Implicit affiliation to configured groups procedure

This subclause is referenced from other procedures.

If the participating MCData function has successfully performed service authorization for the MCData ID identified in the service authorisation procedure as described in 3GPP TS 33.179 [56], the participating MCData function:

1) shall identify the MCData ID included in the SIP request received for service authorisation procedure as the served MCData ID;

2) shall identify the MCData client ID from the <mcdata-client-id> element contained in the application/vnd.3gpp.mcdata-info+xml MIME body included in the SIP request received for service authorisation as the served MCData client ID;

3) shall download the MCData user profile from the MCData user database as defined in 3GPP TS 29.283 [37] if not already stored at the participating MCData function;

4) if no <ImplicitAffiliations> element is contained in the <OnNetwork> element of the MCData user profile document (see the MCData user profile document in 3GPP TS 24.484 [12]) for the served MCData ID or the <ImplicitAffiliations> element contains no <entry> elements containing an MCData group ID, shall skip the remaining steps;

5) shall consider an MCData user information entry such that:

   a) the MCData user information entry is in the list of MCData user information entries described in subclause 8.3.2.2; and

   b) the MCData ID of the MCData user information entry is equal to the served MCData ID;

   as the served MCData user information entry;

6) shall consider an MCData client information entry such that:

   a) the MCData client information entry is in the list of MCData client information entries of the served MCData user information entry; and

   b) the MCData client ID of the MCData client information entry is equal to the served MCData client ID;

   as the served MCData client information entry;

7) shall consider a copy of the list of the MCData group information entries of the served MCData client information entry as the served list of the MCData group information entries;

8) shall construct the candidate list of the MCData group information entries as follows:

   a) for each MCData group ID which has an MCData group information entry in the served list of the MCData group information entries shall copy the MCData group information entry into a new MCData group information entry of the candidate list of the MCData group information entries;

   b) for each MCData group ID contained in an <entry> element of the <ImplicitAffiliations> element in the <OnNetwork> element of the MCData user profile document (see the MCData user profile document in 3GPP TS 24.484 [12]) for the served MCData ID that does not have an MCData group information entry in the served list of the MCData group information entries or has an MCData group information entry in the served list of the MCData group information entries such that the expiration time of the MCData group information entry has already expired:

i) shall add a new MCData group information entry in the candidate list of the MCData group information list for the MCData group ID;

ii) shall set the affiliation status of the new MCData group information entry to the "affiliating" state; and

iii) shall set the expiration time of the new MCData group information entry to the current time increased with the candidate expiration interval;

c) if in step b) above, no new MCData group information entries were added to the candidate list of the MCData group information list for the MCData group ID:

i) shall discard the candidate list; and

ii) shall skip the remaining steps;

9) determine the candidate number of MCData group IDs as the number of different MCData group IDs which have an MCData group information entry:

a) in the candidate list of the MCData group information entries; or

b) in the list of the MCData group information entries of an MCData client information entry such that:

i) the MCData client information entry is in the list of the MCData client information entries of the served MCData user information entry; and

ii) the MCData client ID of the MCData client information entry is not equal to the served MCData client ID;

with the affiliation status set to the "affiliating" state or the "affiliated" state and with the expiration time which has not expired yet; and

c) if the candidate number of MCData group IDs is bigger than the N2 value of the served MCData ID, shall based on MCData service provider policy reduce the candidate MCData group IDs to that equal to N2;

10) shall replace the list of the MCData group information entries stored in the served MCData client information entry with the candidate list of the MCData group information entries; and

11) for each MCData group ID contained in an <entry> element of the <ImplicitAffiliations> element in the <OnNetwork> element of the MCData user profile document (see the MCData user profile document in 3GPP TS 24.484 [12]) for the served MCData ID and which has an MCData group information entry in the candidate list of the MCData group information entries with an affiliation status of "affiliating", shall perform the procedures specified in subclause 8.3.2.6 for the served MCData ID and each MCData group ID.

NOTE 2: To learn of the MCData groups successfully affiliated to, the MCData client can subscribe to that information by the procedures specified in subclause 8.2.3.

8.3.3 Procedures of MCData server owning the MCData group

8.3.3.1 General

The procedures of MCData server owning the MCData group consist of:

- receiving group affiliation status change procedure;
- receiving subscription to affiliation status procedure;
- sending notification of change of affiliation status procedure;
- implicit affiliation eligibilty check procedure; and
- affiliation status change by implicit affiliation procedure.

NOTE: Usage of CSC-3 part of MCData group affiliation procedure and of CSC-3 part of MCData group de-affiliation procedure is not specified in this version of the specification.

8.3.3.2 Stored information

The MCData server shall maintain a list of MCData group information entries.

In each MCData group information entry, the MCData server shall maintain:

1) an MCData group ID. This field uniquely identifies the MCData group information entry in the list of the MCData group information entries; and

2) a list of MCData user information entries.

In each MCData user information entry, the MCData server shall maintain:

1) an MCData ID. This field uniquely identifies the MCData user information entry in the list of the MCData user information entries;

2) a list of MCData client information entries; and

3) an expiration time.

In each MCData client information entry, the MCData server shall maintain:

1) an MCData client ID. This field uniquely identifies the MCData client information entry in the list of the MCData client information entries.

8.3.3.3 Receiving group affiliation status change procedure

Upon receiving a SIP PUBLISH request such that:

1) Request-URI of the SIP PUBLISH request contains the public service identity of the controlling MCData function associated with the served MCData group;

2) the SIP PUBLISH request contains an application/vnd.3gpp.mcdata-info+xml MIME body containing the <mcdata-request-uri> element and the <mcdata-calling-user-identity> element;

3) the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata" (coded as specified in 3GPP TS 24.229 [5]), in a P-Asserted-Service header field according to IETF RFC 6050 [7];

4) the Event header field of the SIP PUBLISH request contains the "presence" event type; and

5) SIP PUBLISH request contains an application/pidf+xml MIME body indicating per-group affiliation information constructed according to subclause 8.4.1;

then the MCData server:

1) shall identify the served MCData group ID in the <mcdata-request-uri> element of the application/vnd.3gpp.mcdata-info+xml MIME body of the SIP PUBLISH request;

2) shall identify the handled MCData ID in the <mcdata-calling-user-identity> element of the application/vnd.3gpp.mcdata-info+xml MIME body of the SIP PUBLISH request;

3) if the Expires header field of the SIP PUBLISH request is not included or has nonzero value lower than 4294967295, shall send a SIP 423 (Interval Too Brief) response to the SIP PUBLISH request, where the SIP 423 (Interval Too Brief) response contains a Min-Expires header field set to 4294967295, and shall not continue with the rest of the steps;

4) if an MCData group for the served MCData group ID does not exist in the group management server according to 3GPP TS 24.481 [11], shall reject the SIP PUBLISH request with SIP 403 (Forbidden) response to the SIP PUBLISH request according to 3GPP TS 24.229 [5], IETF RFC 3903 [34] and IETF RFC 3856 [39] and skip the rest of the steps;

5) if the handled MCData ID is not a member of the MCData group identified by the served MCData group ID, shall reject the SIP PUBLISH request with SIP 403 (Forbidden) response to the SIP PUBLISH request according to 3GPP TS 24.229 [5], IETF RFC 3903 [34] and IETF RFC 3856 [39] and skip the rest of the steps;

6) shall respond with SIP 200 (OK) response to the SIP PUBLISH request according to 3GPP TS 24.229 [5], IETF RFC 3903 [34]. In the SIP 200 (OK) response, the MCData server:

   a) shall set the Expires header field according to IETF RFC 3903 [34], to the selected expiration time;

7) if the "entity" attribute of the <presence> element of the application/pidf+xml MIME body of the SIP PUBLISH request is different than the served MCData group ID, shall not continue with the rest of the steps;

8) if the handled MCData ID is different from the MCData ID in the "id" attribute of the <tuple> element of the <presence> root element of the application/pidf+xml MIME body of the SIP PUBLISH request, shall not continue with the rest of the steps;

9) shall consider an MCData group information entry such that:

   a) the MCData group information entry is in the list of MCData group information entries described in subclause 8.3.3.2; and

   b) the MCData group ID of the MCData group information entry is equal to the served MCData group ID;

   as the served MCData group information entry;

10) if the selected expiration time is zero:

   a) shall remove the MCData user information entry such that:

      i) the MCData user information entry is in the list of the MCData user information entries of the served MCData group information entry; and

      ii) the MCData user information entry has the MCData ID set to the served MCData ID;

11) if the selected expiration time is not zero:

   a) shall consider an MCData user information entry such that:

      i) the MCData user information entry is in the list of the MCData user information entries of the served MCData group information entry; and

      ii) the MCData ID of the MCData user information entry is equal to the handled MCData ID;

      as the served MCData user information entry;

   b) if the MCData user information entry does not exist:

      i) shall insert an MCData user information entry with the MCData ID set to the handled MCData ID into the list of the MCData user information entries of the served MCData group information entry; and

      ii) shall consider the inserted MCData user information entry as the served MCData user information entry; and

   c) shall set the following information in the served MCData user information entry:

      i) set the MCData client ID list according to the "client" attributes of the <affiliation> elements of the <status> element of the <tuple> element of the <presence> root element of the application/pidf+xml MIME body of the SIP PUBLISH request; and

      ii) set the expiration time according to the selected expiration time;

12) shall identify the handled p-id in the <p-id> child element of the <presence> root element of the application/pidf+xml MIME body of the SIP PUBLISH request; and

13) shall perform the procedures specified in subclause 8.3.3.5 for the served MCData group ID.

8.3.3.4 Receiving subscription to affiliation status procedure

NOTE: Usage of one SIP SUBSCRIBE request to subscribe for notification about change of affiliation state of several MCData users served by the same MCData server is not supported in this version of the specification.

Upon receiving a SIP SUBSCRIBE request such that:

1) Request-URI of the SIP SUBSCRIBE request contains the public service identity of the controlling MCData function associated with the served MCData group;

2) the SIP SUBSCRIBE request contains an application/vnd.3gpp.mcdata-info+xml MIME body containing the<mcdata-request-uri> element and the <mcdata-calling-user-identity> element;

3) the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata" (coded as specified in 3GPP TS 24.229 [5]), in a P-Asserted-Service header field according to IETF RFC 6050 [7];

4) the Event header field of the SIP SUBSCRIBE request contains the "presence" event type; and

5) the SIP SUBSCRIBE request contains an application/simple-filter+xml MIME body indicating per-user restrictions of presence event package notification information according to subclause 8.4.2 indicating the same MCData ID as in the <mcdata-calling-user-identity> element of the application/vnd.3gpp.mcdata-info+xml MIME body of the SIP SUBSCRIBE request;

then the MCData server:

1) shall identify the served MCData group ID in the <mcdata-request-uri> element of the application/vnd.3gpp.mcdata-info+xml MIME body of the SIP SUBSCRIBE request;

2) shall identify the handled MCData ID in the <mcdata-calling-user-identity> element of the application/vnd.3gpp.mcdata-info+xml MIME body of the SIP SUBSCRIBE request;

3) if the Expires header field of the SIP SUBSCRIBE request is not included or has nonzero value lower than 4294967295, shall send a SIP 423 (Interval Too Brief) response to the SIP SUBSCRIBE request, where the SIP 423 (Interval Too Brief) response contains a Min-Expires header field set to 4294967295, and shall not continue with the rest of the steps;

4) if an MCData group for the served MCData group ID does not exist in the group management server according to 3GPP TS 24.481 [11], shall reject the SIP SUBSCRIBE request with SIP 403 (Forbidden) response to the SIP SUBSCRIBE request according to 3GPP TS 24.229 [5], IETF RFC 3903 [34] and IETF RFC 3856 [39] and skip the rest of the steps;

5) if the handled MCData ID is not a member of the MCData group identified by the served MCData group ID, shall reject the SIP SUBSCRIBE request with SIP 403 (Forbidden) response to the SIP SUBSCRIBE request according to 3GPP TS 24.229 [5], IETF RFC 3903 [34] and IETF RFC 3856 [39] and skip the rest of the steps; and

6) shall generate a SIP 200 (OK) response to the SIP SUBSCRIBE request according to 3GPP TS 24.229 [5], IETF RFC 6665 [36].

For the duration of the subscription, the MCData server shall notify subscriber about changes of the information of the served MCData ID, as described in subclause 8.3.3.5.

8.3.3.5 Sending notification of change of affiliation status procedure

In order to notify the subscriber identified by the handled MCData ID about changes of the affiliation status of the served MCData group ID, the MCData server:

1) shall consider an MCData group information entry such that:

   a) the MCData group information entry is in the list of MCData group information entries described in subclause 8.3.3.2; and

   b) the MCData group ID of the MCData group information entry is equal to the served MCData group ID;

2) shall consider an MCData user information entry such:

   a) the MCData user information entry is in the list of the MCData user information entries of the served MCData group information entry; and

   b) the MCData ID of the MCData user information entry is equal to the handled MCData ID;

as the served MCData user information entry;

3) shall generate an application/pidf+xml MIME body indicating per-group affiliation information according to subclause 8.4.1 and the served list of the served MCData user information entry of the MCData group information entry with following clarifications:

   a) the MCData server shall include the "expires" attribute in the <affiliation> element; and

   b) if this procedures is invoked by procedure in subclause 8.3.3.3 where the handled p-id was identified, the MCData server shall set the <p-id> child element of the <presence> root element of the application/pidf+xml MIME body of the SIP NOTIFY request to the handled p-id value; and

4) send a SIP NOTIFY request according to 3GPP TS 24.229 [5], and IETF RFC 6665 [36] for the subscription created in subclause 8.3.3.4. In the SIP NOTIFY request, the MCData server shall include the generated application/pidf+xml MIME body indicating per-group affiliation information.

8.3.3.6 Implicit affiliation eligibilty check procedure

This subclause is referenced from other procedures.

Upon receiving a SIP request for an MCData group that the MCData user is not currently affiliated to and that requires the controlling MCData function to check on the eligibility of the MCData user to be implicitly affiliated to the MCData group, the controlling MCData function:

1) shall identify the served MCData group ID in the <mcdata-request-uri> element of the application/vnd.3gpp.mcdata-info+xml MIME body of the SIP request;

2) shall identify the handled MCData ID in the <mcdata-calling-user-identity> element of the application/vnd.3gpp.mcdata-info+xml MIME body of the SIP request;

3) if an MCData group for the served MCData group ID does not exist in the group management server according to 3GPP TS 24.481 [11], shall consider the MCData user to be ineligible for implicit affiliation and skip the rest of the steps;

4) if the handled MCData ID is not a member of the MCData group identified by the served MCData group ID, shall consider the MCData user to be ineligible for implicit affiliation and skip the rest of the steps;

5) if there is no MCData group information entry in the list of MCData group information entries described in subclause 8.3.3.2 with an MCData group identity matching the served MCData group ID, then shall consider the MCData user to be ineligible for implicit affiliation and skip the rest of the steps; or

6) shall consider the MCData user to be eligible for implicit affiliation.

8.3.3.7 Affiliation status change by implicit affiliation procedure

This subclause is referenced from other procedures.

Upon receiving a SIP request for an MCData group that the MCData user is not currently affiliated to and that requires the controlling MCData function to perform an implicit affiliation to, the controlling MCData function:

1) shall identify the served MCData group ID in the <mcdata-request-uri> element of the application/vnd.3gpp.mcdata-info+xml MIME body of the SIP request;

2) shall identify the handled MCData ID in the <mcdata-calling-user-identity> element of the application/vnd.3gpp.mcdata-info+xml MIME body of the SIP request;

3) shall consider an MCData group information entry such that:

   a) the MCData group information entry is in the list of MCData group information entries described in subclause 8.3.3.2; and

   b) the MCData group ID of the MCData group information entry is equal to the served MCData group ID;

   as the served MCData group information entry;

4) shall consider an MCData user information entry such that:

   a) the MCData user information entry is in the list of the MCData user information entries of the served MCData group information entry; and

   b) the MCData ID of the MCData user information entry is equal to the handled MCData ID;

   as the served MCData user information entry;

   c) if the MCData user information entry does not exist:

      i) shall insert an MCData user information entry with the MCData ID set to the handled MCData ID into the list of the MCData user information entries of the served MCData group information entry; and

      ii) shall consider the inserted MCData user information entry as the served MCData user information entry; and

   d) shall make the following modifications in the served MCData user information entry:

      i) add the MCData client ID derived from the received SIP request to the MCData client ID list if not already present; and

      ii) set the expiration time as determined by local policy;

5) shall perform the procedures specified in subclause 8.3.3.5 for the served MCData group ID.

8.4 Coding

8.4.1 Extension of application/pidf+xml MIME type

8.4.1.1 Introduction

The subclauses of the parent subclause describe an extension of the application/pidf+xml MIME body specified in IETF RFC 3863 [40]. The extension is used to indicate:

- per-user affiliation information; and
- per-group affiliation information.

8.4.1.2 Syntax

The application/pidf+xml MIME body indicating per-user affiliation information is constructed according to IETF RFC 3863 [40] and:

1) contains a <presence> root element according to IETF RFC 3863 [40];

2) contains an "entity" attribute of the <presence> element set to the MCData ID of the MCData user;

3) contains one <tuple> child element according to IETF RFC 3863 [40] per each MCData client of the <presence> element;

4) can contain a <p-id> child element defined in the XML schema defined in table 8.4.1.2-1, of the <presence> element set to an identifier of a SIP PUBLISH request;

5) contains an "id" attribute of the <tuple> element set to the MCData client ID;

6) contains one <status> child element of each <tuple> element;

7) contains one <affiliation> child element defined in the XML schema defined in table 8.4.1.2-1, of the <status> element, for each MCData group in which the MCData user is interested at the MCData client;

8) contains a "group" attribute of each <affiliation> element set to the MCData group ID of the MCData group in which the MCData user is interested at the MCData client;

9) can contain a "status" attribute of each <affiliation> element indicating the affiliation status of the MCData user to MCData group at the MCData client; and

10) can contain an "expires" attribute of each <affiliation> element indicating expiration of affiliation of the MCData user to MCData group at the MCData client.

The application/pidf+xml MIME body indicating per-group affiliation information is constructed according to IETF RFC 3856 [39] and:

1) contains the <presence> root element according to IETF RFC 3863 [40];

2) contains an "entity" attribute of the <presence> element set to the MCData group ID of the MCData group;

3) contains one <tuple> child element according to IETF RFC 3863 [40] of the <presence> element;

4) can contain a <p-id> child element defined in the XML schema defined in table 8.4.1.2-1, of the <presence> element set to an identifier of a SIP PUBLISH request;

5) contains an "id" attribute of the <tuple> element set to the MCData ID of the MCData user;

6) contains one <status> child element of each <tuple> element;

7) contains one <affiliation> child element defined in the XML schema defined in table 8.4.1.2-1, of the <status> element, for each MCData client at which the MCData user is interested in the MCData group;

8) contains one "client" attribute defined in the XML schema defined in table 8.4.1.2-2, of the <affiliation> element set to the MCData client ID; and

9) can contain an "expires" attribute defined in the XML schema defined in table 8.4.1.2-2, of the <affiliation> element indicating expiration of affiliation of the MCData user to MCData group at the MCData client.

Table 8.4.1.2-1: XML schema with elements and attributes extending the application/pidf+xml MIME body

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema
  targetNamespace="urn:3gpp:ns:mcdataPresInfo:1.0"
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
  xmlns:mcdataPI10="urn:3gpp:ns:mcdataPresInfo:1.0"
  elementFormDefault="qualified" attributeFormDefault="unqualified">

  <!-- MCData specific child elements of tuple element -->
  <xs:element name="affiliation" type="mcdataPI10:affiliationType"/>
  <xs:complexType name="affiliationType">
    <xs:sequence>
      <xs:any namespace="##any" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
    <xs:attribute name="group" type="xs:anyURI" use="optional"/>
    <xs:attribute name="client" type="xs:anyURI" use="optional"/>
    <xs:attribute name="status" type="mcdataPI10:statusType" use="optional"/>
    <xs:attribute name="expires" type="xs:dateTime" use="optional"/>
    <xs:anyAttribute namespace="##any" processContents="lax"/>
  </xs:complexType>

  <xs:simpleType name="statusType">
    <xs:restriction base="xs:string">
      <xs:enumeration value="affiliating"/>
      <xs:enumeration value="affiliated"/>
      <xs:enumeration value="deaffiliating"/>
    </xs:restriction>
  </xs:simpleType>

  <xs:element name="p-id" type="xs:string"/>

  </xs:schema>
```

The application/pidf+xml MIME body refers to namespaces using prefixes specified in table 8.4.1.2-2.

Table 8.4.1.2-2: Assignment of prefixes to namespace names in the application/pidf+xml MIME body

Prefix	Namespace
mcdataPI10	urn:3gpp:ns:mcdataPresInfo:1.0
NOTE: The "urn:ietf:params:xml:ns:pidf" namespace is the default namespace so no prefix is used for it in the application/pidf+xml MIME body.	

8.4.2 Extension of application/simple-filter+xml MIME type

8.4.2.1 Introduction

The subclauses of the parent subclause describe an extension of the application/simple-filter+xml MIME body specified in IETF RFC 4661 [41].

The extension is used to indicate per-client restrictions of presence event package notification information and per-user restrictions of presence event package notification information.

8.4.2.2 Syntax

The application/simple-filter+xml MIME body indicating per-client restrictions of presence event package notification information is constructed according to IETF RFC 4661 [41] and:

1) contains a <filter-set> root element according to IETF RFC 4661 [41];

2) contains a <ns-bindings> child element according to IETF RFC 4661 [41], of the <filter-set> element;

3) contains a <ns-binding> child element according to IETF RFC 4661 [41], of the <ns-bindings> element where the <ns-binding> element:

   A) contains a "prefix" attribute according to IETF RFC 4661 [41] set to "pidf"; and

   B) contains a "urn" attribute set to the "urn:ietf:params:xml:ns:pidf" value;

4) contains a <ns-binding> child element according to IETF RFC 4661 [41], of the <ns-bindings> element where the <ns-binding> element:

   A) contains a "prefix" attribute according to IETF RFC 4661 [41], set to "mcdataPI10"; and

   B) contains an "urn" attribute according to IETF RFC 4661 [41], set to the "urn:3gpp:ns:mcdataPresInfo:1.0" value;

5) contains a <filter> child element according to IETF RFC 4661 [41], of the <filter-set> element where the <filter> element;

   A) contains an "id" attribute set to a value constructed according to IETF RFC 4661 [41];

   B) does not contain an "uri" attribute of the <filter> child element according to IETF RFC 4661 [41]; and

   C) does not contain an "domain" attribute according to IETF RFC 4661 [41];

6) contains a <what> child element according to IETF RFC 4661 [41], of the <filter> element; and

7) contains an <include> child element according to IETF RFC 4661 [41], of the <what> element where the <include> element;

   A) does not contain a "type" attribute according to IETF RFC 4661 [41]; and

   B) contains the value, according to IETF RFC 4661 [41], set to concatenation of the '//pidf:presence/pidf:tuple[@id="' string, the MCData client ID, and the '"]' string.

The application/simple-filter+xml MIME body indicating per-user restrictions of presence event package notification information is constructed according to IETF RFC 4661 [41] and:

1) contains a <filter-set> root element according to IETF RFC 4661 [41];

2) contains a <ns-bindings> child element according to IETF RFC 4661 [41], of the <filter-set> element;

3) contains a <ns-binding> child element according to IETF RFC 4661 [41], of the <ns-bindings> element where the <ns-binding> element:

   A) contains a "prefix" attribute according to IETF RFC 4661 [41] set to "pidf"; and

   B) contains a "urn" attribute set to the "urn:ietf:params:xml:ns:pidf" value;

4) contains a <ns-binding> child element according to IETF RFC 4661 [41], of the <ns-bindings> element where the <ns-binding> element:

   A) contains a "prefix" attribute according to IETF RFC 4661 [41], set to "mcdataPI10"; and

   B) contains an "urn" attribute according to IETF RFC 4661 [41], set to the "urn:3gpp:ns:mcdataPresInfo:1.0" value;

5) contains a <filter> child element according to IETF RFC 4661 [41], of the <filter-set> element where the <filter> element;

   A) contains an "id" attribute set to a value constructed according to IETF RFC 4661 [41];

   B) does not contain an "uri" attribute of the <filter> child element according to IETF RFC 4661 [41]; and

   C) does not contain an "domain" attribute according to IETF RFC 4661 [41];

6) contains a <what> child element according to IETF RFC 4661 [41], of the <filter> element; and

7) contains an <include> child element according to IETF RFC 4661 [41], of the <what> element where the <include> element;

   A) does not contain a "type" attribute according to IETF RFC 4661 [41]; and

   B) contains the value, according to IETF RFC 4661 [41], set to concatenation of the '//pidf:presence/pidf:tuple[@id="' string, the MCData ID, and the '"]' string.

9 Short Data Service (SDS)

9.1 General

The group administrator can disable the SDS service on a MCData group by setting the <mcdata-allow-short-data-service> element under the <list-service> element, in the group document, to "false".

If the <mcdata-allow-short-data-service> element under the <list-service> element, in the group document, is set to "false" for a MCData group:

- an MCData client should not use the procedures in the subclauses of the parent subclause to send SDS to the said MCData group.

- a terminating MCData controlling function should reject the request to send SDS to the said MCData group.

9.2 On-network SDS

9.2.1 General

9.2.1.1 Sending an SDS message

When the MCData user wishes to send:

- a one-to-one standalone Short Data Service (SDS) message to another MCData user; or

- a group standalone Short Data Service (SDS) message to a pre-arranged group ;

the MCData client:

1) shall follow the procedures in subclause 11.1 for transmission control; and

2) if the procedures in subclause 11.1 are successful and the size of the payload the MCData user wishes to send:

   a) is less than or equal to the value contained in the <max-payload-size-sds-cplane-bytes> element in the MCData service configuration document as specified in 3GPP TS 24.484 [12], shall follow the procedures specified in subclause 9.2.2.2.1:

   b) is greater than the value contained in the <max-payload-size-sds-cplane-bytes> element in the MCData service configuration document as specified in 3GPP TS 24.484 [12], shall follow the procedures specified in subclause 9.2.3.2.3.

When the MCData user wishes to:

- initiate a Short Data Service (SDS) session with another MCData user; or

- initiate a group Short Data Service (SDS) session to a pre-configured group or to particular members of the pre-configured group;

the MCData client:

1) shall follow the procedures in subclause 11.1 for transmission control; and

2) if the procedures in subclause 11.1 are successful, shall follow the procedures specified in subclause 9.2.4.2.3.

9.2.1.2 Handling of received SDS messages with or without disposition requests

When a MCData client has received a SIP request containing:

- an application/vnd.3gpp.mcdata-signalling MIME body as specified in subclause E.1; and

- an application/vnd.3gpp.mcdata-payload MIME body as specified in subclause E.2;

the MCData 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 ID IE:

   a) shall determine that the payload contained in the DATA PAYLOAD message is for user consumption

   b) may notify the MCData user; and

c) shall render the contents of the Payload IE(s) to the MCData user;

7) if the SDS SIGNALLING PAYLOAD message contains an Application ID IE:

a) shall determine that the payload contained in the DATA PAYLOAD message is not for user consumption,

b) shall not notify the MCData user;

c) if the Application ID value is unknown, shall discard the SDS message; and

d) if the Application ID value is known, shall deliver the contents of the Payload IE(s) to the identified application;

NOTE 1: If required, the MCData client decrypts the Payload IEs before rendering the SDS message to the user or delivering the SDS message to the application.

NOTE 2: The actions taken when the payload contains application data not meant for user consumption or command instructions are based upon the contents of the payload. If the payload content is addressed to a non-MCData application that is not running, the MCData client starts the local non-MCData application and delivers the payload to that application.

NOTE 3: User consent is not required before accepting the data.

8) may store the message payload in local storage along with the Conversation ID, Message ID, InReplyTo message ID and Date and time; and

9) if the received SDS SIGNALLING PAYLOAD message contains an SDS disposition request type IE shall follow the procedures in subclause 9.2.1.3.

9.2.1.3 Handling of disposition requests

To handle the disposition requests, the MCData client:

1) If the SDS disposition request type IE is set to:

a) "DELIVERY" then, shall send a delivered notification as described in subclause 12.2.1.1;

b) "READ", shall send a read notification as described in subclause 12.2.1.1, when a display indication is received; or

c) "DELIVERY AND READ" then, shall start timer TDU1 (delivery and read).

Upon receiving a display indication before timer TDU1 (delivery and read) expires, the MCData client:

1) shall stop timer TDU1 (delivery and read); and

2) shall send a delivered and read notification as described in subclause 12.2.1.1.

Upon expiry of timer TDU1 (delivery and read), the MCData client:

1) shall send a delivered notification as described in subclause 12.2.1.1; and

2) upon receiving a display indication, send a read notification as described in subclause 12.2.1.1.

9.2.2 Standalone SDS using signalling control plane

9.2.2.1 General

The procedures in the subclauses of the parent subclause are used by a MCData functional entity to send or receive:

- a one-to-one standalone SDS message using the signalling control plane; or
- a group standalone SDS message using the signalling control plane.

9.2.2.2 MCData client procedures

9.2.2.2.1 MCData client originating procedures

The MCData client shall generate a SIP MESSAGE request in accordance with 3GPP TS 24.229 [5] and IETF RFC 3428 [6] with the clarifications given below.

The MCData client:

1) shall build the SIP MESSAGE request as specified in subclause 6.2.4.1;

2) if a one-to-one standalone SDS message is to be sent, shall insert in the SIP MESSAGE request:

   a) an application/resource-lists+xml MIME body with the MCData ID of the target MCData user, according to rules and procedures of IETF RFC 4826 [9];

   b) an application/vnd.3gpp.mcdata-info+xml MIME body with a <request-type> element set to a value of "one-to-one-sds"; and

   c) if end-to-end security is required and the security context does not exist or if the existing security context has expired, an application/mikey MIME body with the MIKEY-SAKKE I_MESSAGE as specified in 3GPP TS 33.180 [26]. The MCData client:

      i) if necessary, shall instruct the key management client to request keying material from the key management server as described in 3GPP TS 33.180 [26];

      ii) shall use the keying material to generate a PCK as described in 3GPP TS 33.180 [26];

      iii) shall use the PCK to generate a PCK-ID with the four most significant bits set to "0001" to indicate that the purpose of the PCK is to protect one-to-one communications and with the remaining twenty eight bits being randomly generated as described in 3GPP TS 33.180 [26];

      iv) shall encrypt the PCK to a UID associated to the MCData client using the MCData ID of the invited user and a time related parameter as described in 3GPP TS 33.180 [26];

      v) shall generate a MIKEY-SAKKE I_MESSAGE using the encapsulated PCK and PCK-ID as specified in 3GPP TS 33.180 [26]; and

      vi) shall add the MCData ID of the originating MCData to the initiator field (IDRi) of the I_MESSAGE as described in 3GPP TS 33.180 [26];

      vii) shall sign the MIKEY-SAKKE I_MESSAGE using the originating MCData user's signing key provided in the keying material together with a time related parameter; and

      viii) shall include the MIKEY-SAKKE I_MESSAGE in an application/mikey MIME body as specified in 3GPP TS 33.180 [26];

3) if a group standalone SDS message is to be sent:

   a) if the "/<*x*>/<*x*>/Common/MCData/AllowedSDS" leaf node present in the group document of the requested MCData group, configured on the group management client as specified in 3GPP TS 24.483 [42] is set to "false", shall reject the request to send SDS and not continue with the rest of the steps in this subclause; and

   b) shall insert in the SIP MESSAGE request an application/vnd.3gpp.mcdata-info+xml MIME body with:

      i) the <request-type> element set to a value of "group-sds";

      ii) the <mcdata-request-uri> element set to the MCData group identity; and

      iii) the <mcdata-client-id> element set to the MCData client ID of the originating MCData client;

4) shall generate a standalone SDS message as specified in subclause 6.2.2.1; and

5) shall send the SIP MESSAGE request according to rules and procedures of 3GPP TS 24.229 [5].

9.2.2.2.2 MCData client terminating procedures

Upon receipt of a "SIP MESSAGE request for standalone SDS for terminating MCData client", the MCData client:

1) may reject the SIP MESSAGE request if there are not enough resources to handle the SIP MESSAGE request;

2) if the SIP MESSAGE request is rejected in step 1), shall respond toward participating MCData function with a SIP 480 (Temporarily unavailable) response and skip the rest of the steps of this subclause;

3) if the SIP MESSAGE request contains an application/mikey MIME body containing a MIKEY-SAKKE I_MESSAGE:

   a) shall extract the MCData ID of the originating MCData user from the initiator field (IDRi) of the I_MESSAGE as described in 3GPP TS 33.180 [26];

   b) shall convert the MCData ID to a UID as described in 3GPP TS 33.180 [26];

   c) shall use the UID to validate the signature of the MIKEY-SAKKE I_MESSAGE as described in 3GPP TS 33.180 [26];

   d) if authentication verification of the MIKEY-SAKKE I_MESSAGE fails, shall reject the SIP MESSAGE request with a SIP 606 (Not Acceptable) response, and include warning text set to "136 authentication of the MIKEY-SAKKE I_MESSAGE failed" in a Warning header field as specified in subclause 4.9 and not continue with rest of the steps in this subclause; and

   e) if the signature of the MIKEY-SAKKE I_MESSAGE was successfully validated:

      i) shall extract and decrypt the encapsulated PCK using the terminating user's (KMS provisioned) UID key as described in 3GPP TS 33.180 [26]; and

      ii) shall extract the PCK-ID, from the payload as specified in 3GPP TS 33.180 [26];

NOTE: With the PCK successfully shared between the originating MCData client and the terminating MCData client, both clients are able to exchange end-to-end secure message.

4) shall generate a SIP 200 (OK) response according to rules and procedures of 3GPP TS 24.229 [5];

5) shall send the SIP 200 (OK) response towards the MCData server according to rules and procedures of 3GPP TS 24.229 [5]; and

6) shall handle the received message as specified in subclause 9.2.1.2.

9.2.2.3 Participating MCData function procedures

9.2.2.3.1 Originating participating MCData function procedures

Upon receipt of a "SIP MESSAGE request for standalone SDS for originating participating MCData function", the participating MCData function:

1) if unable to process the request due to a lack of resources or a risk of congestion exists, may reject the SIP MESSAGE request with a SIP 500 (Server Internal Error) response. The participating MCData function may include a Retry-After header field to the SIP 500 (Server Internal Error) response as specified in IETF RFC 3261 [4] and skip the rest of the steps;

2) shall determine the MCData ID of the originating user from the public user identity in the P-Asserted-Identity header field of the SIP MESSAGE request, and shall authorise the calling user;

NOTE: The MCData ID of the calling user is bound to the public user identity at the time of service authorisation, as documented in subclause 7.3.

3) if the participating MCData function cannot find a binding between the public user identity and an MCData ID or if the validity period of an existing binding has expired, then the participating MCData function shall reject the SIP MESSAGE request with a SIP 404 (Not Found) response with the warning text set to "141 user unknown to the participating function" in a Warning header field as specified in subclause 4.9, and shall not continue with any of the remaining steps;

4) if the <request-type> element in the application/vnd.3gpp.mcdata-info+xml MIME body of the SIP MESSAGE request is:

   a) set to a value of "group-sds", shall determine the public service identity of the controlling MCData function associated with the MCData group identity in the <mcdata-request-uri> element of the application/vnd.3gpp.mcdata-info+xml MIME body in the SIP MESSAGE request; or

   b) set to a value of "one-to-one-sds", shall determine the public service identity of the controlling MCData function hosting the one-to-one standalone SDS service for the calling user;

5) if unable to identify the controlling MCData function for standalone SDS, it shall reject the SIP MESSAGE request with a SIP 404 (Not Found) response with the warning text "142 unable to determine the controlling function" in a Warning header field as specified in subclause 4.9, and shall not continue with any of the remaining steps;

6) shall determine whether the MCData user identified by the MCData ID is authorised for MCData communications by following the procedures in subclause 11.1;

7) if the procedures in subclause 11.1 indicate that the user identified by the MCData ID:

   a) is not allowed to send MCData communications as determined by step 1) of subclause 11.1, shall reject the "SIP MESSAGE request for standalone SDS for originating participating MCData function" with a SIP 403 (Forbidden) response to the SIP MESSAGE request, with warning text set to "200 user not authorised to transmit data" in a Warning header field as specified in subclause 4.9, and shall not continue with the rest of the steps in this subclause;

   b) is not allowed to initiate one-to-one MCData communications due to exceeding the maximum amount of data that can be sent in a single request as determined by step 7) of subclause 11.1, shall reject the "SIP MESSAGE request for standalone SDS for originating participating MCData function" with a SIP 403 (Forbidden) response to the SIP MESSAGE request, with warning text set to "202 user not authorised for one-to-one MCData communications due to exceeding the maximum amount of data that can be sent in a single request" in a Warning header field as specified in subclause 4.9, and shall not continue with the rest of the steps in this subclause; and

8) if the payload size of the message is larger than the value contained in the <max-payload-size-sds-cplane-bytes> element in the MCData service configuration document as specified in 3GPP TS 24.484 [12], shall reject the "SIP MESSAGE request for standalone SDS for originating participating MCData function" with a SIP 403 (Forbidden) response to the SIP MESSAGE request, with warning text set to "203 message too large to send over signalling control plane" in a Warning header field as specified in subclause 4.9;

NOTE: The term "payload size" refers to the "Length of Payload contents" of the payload IE of the DATA PAYLOAD message transported in the SIP MESSAGE request, minus 1 (to account for the added "Payload content type" field).

9) shall generate a SIP MESSAGE request in accordance with 3GPP TS 24.229 [5] and IETF RFC 3428 [6];

10) shall set the Request-URI of the outgoing SIP MESSAGE request to the public service identity of the controlling MCData function as determined by step 4) in this subclause;

11) shall copy all MIME bodies included in the incoming SIP MESSAGE request to the outgoing SIP MESSAGE request;

12) shall include the MCData ID of the originating user in the <mcdata-calling-user-identity> element of the application/vnd.3gpp.mcdata-info+xml MIME body of the outgoing SIP MESSAGE request;

13) shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds" (coded as specified in 3GPP TS 24.229 [5]), into the P-Asserted-Service header field of the outgoing SIP MESSAGE request;

14) shall set the P-Asserted-Identity in the outgoing SIP MESSAGE request to the public user identity in the P-Asserted-Identity header field contained in the received SIP MESSAGE request; and

15) shall send the SIP MESSAGE request as specified in 3GPP TS 24.229 [5].

Upon receipt of a SIP 202 (Accepted) response in response to the SIP MESSAGE request in step 15):

1) shall generate a SIP 202 (Accepted) response as specified in 3GPP TS 24.229 [5]; and

2) shall send the SIP 202 (Accepted) response to the MCData client according to 3GPP TS 24.229 [5].

Upon receipt of a SIP 200 (OK) response in response to the SIP MESSAGE request in step 15):

1) shall generate a SIP 200 (OK) response as specified in 3GPP TS 24.229 [5]; and

2) shall send the SIP 200 (OK) response to the MCData client according to 3GPP TS 24.229 [5].

Upon receipt of a SIP 4xx, 5xx or 6xx response to the SIP MESSAGE request in step 15) the participating MCData function:

1) shall generate a SIP response according to 3GPP TS 24.229 [5];

2) shall include Warning header field(s) that were received in the incoming SIP response; and

3) shall forward the SIP response to the MCData client according to 3GPP TS 24.229 [5].

9.2.2.3.2 Terminating participating MCData function procedures

Upon receipt of a "SIP MESSAGE request for standalone SDS for terminating participating MCData function", the participating MCData function:

1) if unable to process the request due to a lack of resources or a risk of congestion exists, may reject the SIP MESSAGE request with a SIP 500 (Server Internal Error) response. The participating MCData function may include a Retry-After header field to the SIP 500 (Server Internal Error) response as specified in IETF RFC 3261 [4] and skip the rest of the steps;

2) shall use the MCData ID present in the <mcdata-request-uri> element of the application/vnd.3gpp.mcdata-info+xml MIME body of the incoming SIP MESSAGE request to retrieve the binding between the MCData ID and public user identity of the terminating MCData user;

3) if the binding between the MCData ID and public user identity of the terminating MCData user does not exist, then the participating MCData function shall reject the SIP MESSAGE request with a SIP 404 (Not Found) response, and shall not continue with the rest of the steps;

4) shall generate an outgoing SIP MESSAGE request as specified in subclause 6.3.2.1;

5) shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds" (coded as specified in 3GPP TS 24.229 [5]), into the P-Asserted-Service header field of the outgoing SIP MESSAGE request; and

6) shall send the SIP MESSAGE request as specified in 3GPP TS 24.229 [5].

Upon receipt of a SIP 200 (OK) response in response to the above SIP MESSAGE request, the participating MCData function:

1) shall generate a SIP 200 (OK) response as specified in 3GPP TS 24.229 [5]; and

2) shall send the SIP 200 (OK) response to the controlling MCData function according to 3GPP TS 24.229 [5].

Upon receipt of a SIP 4xx, 5xx or 6xx response to the above SIP MESSAGE request, the participating MCData function:

1) shall generate a SIP response according to 3GPP TS 24.229 [5];

2) shall include Warning header field(s) that were received in the incoming SIP response; and

3) shall forward the SIP response to the controlling MCData function according to 3GPP TS 24.229 [5].

9.2.2.4 Controlling MCData function procedures

9.2.2.4.1 Originating controlling MCData function procedures

This subclause describes the procedures for sending a SIP MESSAGE from the controlling MCData function and is initiated by the controlling MCData function as a result of an action in subclause 9.2.2.4.2.

The controlling MCData function:

1) shall generate a SIP MESSAGE request in accordance with 3GPP TS 24.229 [5] and IETF RFC 3428 [6];

2) shall include an Accept-Contact header field containing the g.3gpp.mcdata.sds media feature tag along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [8] in the outgoing SIP MESSAGE request;

3) shall include an Accept-Contact header field with the media feature tag g.3gpp.icsi-ref with the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds" along with parameters "require" and "explicit" according to IETF RFC 3841 [8] in the outgoing SIP MESSAGE request;

4) shall copy the following MIME bodies in the received SIP MESSAGE request into the outgoing SIP MESSAGE request by following the guidelines in subclause 6.4:

   a) application/vnd.3gpp.mcdata-info+xml MIME body;

   b) application/vnd.3gpp.mcdata-signalling MIME body; and

   c) application/vnd.3gpp.mcdata-payload MIME body

5) in the application/vnd.3gpp.mcdata-info+xml MIME body:

   a) shall set the <mcdata-request-uri> element set to the MCData ID of the terminating user; and

   b) if the <request-type> element in the application/vnd.3gpp.mcdata-info+xml MIME body of the incoming SIP MESSAGE request was set to a value of "group-sds", shall set the <mcdata-calling-group-id> element to the group identity;

6) shall set the Request-URI to the public service identity of the terminating participating MCData function associated to the MCData user to be invited;

7) shall copy the public user identity of the calling MCData user from the P-Asserted-Identity header field of the incoming SIP MESSAGE request into the P-Asserted-Identity header field of the outgoing SIP MESSAGE request;

8) shall include a P-Asserted-Service header field with the value "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds"; and

9) shall send the SIP MESSAGE request according to according to rules and procedures of 3GPP TS 24.229 [5].

9.2.2.4.2 Terminating controlling MCData function procedures

Upon receipt of a "SIP MESSAGE request for standalone SDS for controlling MCData function", the controlling MCData function:

1) if unable to process the request due to a lack of resources or a risk of congestion exists, may reject the SIP MESSAGE request with a SIP 500 (Server Internal Error) response. The controlling MCData function may include a Retry-After header field to the SIP 500 (Server Internal Error) response as specified in IETF RFC 3261 [4]. Otherwise, continue with the rest of the steps;

2) if the SIP MESSAGE does not contain:

   a) an application/vnd.3gpp.mcdata-info+xml MIME body;

   b) an application/vnd.3gpp.mcdata-signalling MIME body; and

   c) an application/vnd.3gpp.mcdata-payload MIME body;

   shall reject the SIP MESSAGE request with a SIP 403 (Forbidden) response, with warning text set to "199 expected MIME bodies not in the request" in a Warning header field as specified in subclause 4.9, and shall not continue with the rest of the steps in this subclause;

3) shall decode the contents of the application/vnd.3gpp.mcdata-signalling MIME body contained in the SIP MESSAGE;

4) if the application/vnd.3gpp.mcdata-signalling MIME body contains a SDS SIGNALLING PAYLOAD message with a SDS disposition request type IE, shall store the value of the Conversation ID IE and the value of the Message ID IE in the SDS SIGNALLING PAYLOAD message;

NOTE: The controlling MCData function uses the Conversation ID and Message ID for correlation with disposition notifications.

5) if the <request-type> element in the application/vnd.3gpp.mcdata-info+xml MIME body of the SIP MESSAGE request is set to a value of "one-to-one-sds" and:

   a) the conditions in subclause 11.1 indicate that the MCData user is not allowed to SDS communications due to message size as determined by step 3) of subclause 11.1, shall reject the SIP MESSAGE request with a SIP 403 (Forbidden) response to the SIP MESSAGE request, with warning text set to "218 user not authorised for one-to-one SDS communications due to message size" in a Warning header field as specified in subclause 4.9, and shall not continue with the rest of the steps in this subclause; and

   b) the SIP MESSAGE request:

      i) does not contain an application/resource-lists MIME body or contains an application/resource-lists MIME body with more than one <entry> element, shall return a SIP 403 (Forbidden) response with the warning text set to "204 unable to determine targeted user for one-to-one SDS" in a Warning header field as specified in subclause 4.9, and skip the rest of the steps below; and

      ii) contains an application/resource-lists MIME body with exactly one <entry> element, shall send a SIP MESSAGE request to the MCData user identified in the <entry> element of the MIME body, as specified in subclause 9.2.2.4.1;

6) if the <request-type> element in the application/vnd.3gpp.mcdata-info+xml MIME body of the SIP MESSAGE request is set to a value of "group-sds":

   a) shall retrieve the group document associated with the group identity in the SIP MESSAGE request by following the procedures in subclause 6.3.3, and shall continue with the remaining steps if the procedures in subclause 6.3.3 were successful;

   b) if the <on-network-disabled> element is present in the group document, shall send a SIP 403 (Forbidden) response with the warning text set to "115 group is disabled" in a Warning header field as specified in subclause 4.9 and shall not continue with the rest of the steps;

   c) if the <entry> element of the <list> element of the <list-service> element in the group document does not contain an <mcdata-mcdata-id> element with a "uri" attribute matching the MCData ID of the originating user contained in the <mcdata-calling-user-identity> element of the application/vnd.3gpp.mcdata-info+xml MIME body in the SIP MESSAGE request, shall send a SIP 403 (Forbidden) response with the warning text set to "116 user is not part of the MCData group" in a Warning header field as specified in subclause 4.9 and shall not continue with the rest of the steps;

   d) if the <list-service> element contains a <mcdata-allow-short-data-service> element in the group document set to a value of "false", shall send a SIP 403 (Forbidden) response with the warning text set to "206 short data service not allowed for this group" in a Warning header field as specified in subclause 4.9 and shall not continue with the rest of the steps;

   e) if the <supported-services> element is not present in the group document or is present and contains a <service> element containing an "enabler" attribute which is not set to the value "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds", shall send a SIP 488 (Not Acceptable) response with the warning text set to "207 SDS services not supported for this group" in a Warning header field as specified in subclause 4.9 and shall not continue with the rest of the steps;

   f) if the MCData server group SDS procedures in subclause 11.1 indicate that the user identified by the MCData ID:

      i) is not allowed to send group MCData communications on this group identity as determined by step 2) of subclause 11.1, shall reject the SIP MESSAGE request with a SIP 403 (Forbidden) response, with warning text set to "201 user not authorised to transmit data on this group identity" in a Warning header field as specified in subclause 4.9, and shall not continue with the rest of the steps in this subclause;

ii) is not allowed to send group MCData communications on this group identity due to exceeding the maximum amount of data that can be sent in a single request as determined by step 8) of subclause 11.1, shall reject the SIP MESSAGE request with a SIP 403 (Forbidden) response to the SIP MESSAGE request, with warning text set to "208 user not authorised for MCData communications on this group identity due to exceeding the maximum amount of data that can be sent in a single request" in a Warning header field as specified in subclause 4.9, and shall not continue with the rest of the steps in this subclause; and

iii) is not allowed to send SDS communications on this group identity due to message size as determined by step 5) of subclause 11.1, shall reject the SIP MESSAGE request with a SIP 403 (Forbidden) response to the SIP MESSAGE request, with warning text set to "217 user not authorised for SDS communications on this group identity due to message size" in a Warning header field as specified in subclause 4.9, and shall not continue with the rest of the steps in this subclause;

g) the originating user identified by the MCData ID is not affiliated to the group identity contained in the SIP MESSAGE request, as specified in subclause 6.3.5, shall return a SIP 403 (Forbidden) response with the warning text set to "120 user is not affiliated to this group" in a Warning header field as specified in subclause 4.9, and skip the rest of the steps below;

h) shall determine targeted group members for MCData communications by following the procedures in subclause 6.3.4;

j) if the procedures in subclause 6.3.4 result in no affiliated members found in the selected MCData group, shall return a SIP 403 (Forbidden) response with the warning text set to "198 no users are affiliated to this group" in a Warning header field as specified in subclause 4.9, and skip the rest of the steps below; and

k) shall send SIP MESSAGE requests to the targeted group members identified in step h) above by following the procedure in subclause 9.2.2.4.1;

7) shall generate a SIP 202 (Accepted) response in response to the "SIP MESSAGE request for standalone SDS for controlling MCData function"; and

8) shall send the SIP 202 (Accepted) response towards the originating participating MCData function according to 3GPP TS 24.229 [5].

9.2.3 Standalone SDS using media plane

9.2.3.1 General

The procedures in the subclauses of the parent subclause are used by a MCData functional entity to send or receive:

- a one-to-one standalone SDS message using the media control plane; or
- a group standalone SDS message using the media control plane.

9.2.3.2 MCData client procedures

9.2.3.2.1 SDP offer generation

When composing an SDP offer according to 3GPP TS 24.229 [5], IETF RFC 4975 [17], IETF RFC 6135 [19] and IETF RFC 6714 [20] the MCData client:

1) shall include an "m=message" media-level section for the MCData media stream consisting of:

a) the port number;

b) a protocol field value of "TCP/MSRP", or "TCP/TLS/MSRP" for TLS;

c) a format list field set to ‘*’;

d) an "a=sendonly" attribute;

e) an "a=path" attribute containing its own MSRP URI;

f) set the content type as "a=accept-types:application/vnd.3gpp.mcdata-signalling application/vnd.3gpp.mcdata-payload"; and

g) set the a=setup attribute as "actpass"; and

2) if end-to-end security is required for a one-to-one communication and the security context does not exist or if the existing security context has expired, shall include the MIKEY-SAKKE I_MESSAGE in an "a=key-mgmt" attribute as a "mikey" attribute value in the SDP offer as specified in IETF RFC 4567 [45].

9.2.3.2.2 SDP answer generation

When the MCData client receives an initial SDP offer for an MCData standalone SDS, the MCData client shall process the SDP offer and shall compose an SDP answer according to 3GPP TS 24.229 [5] and IETF RFC 4975 [17].

When composing an SDP answer, the MCData client:

1) shall include an "m=message" media-level section for the accepted MCData media stream consisting of:

a) the port number;

b) a protocol field value of "TCP/MSRP", or "TCP/TLS/MSRP" for TLS according to the received SDP offer;

c) a format list field set to ‘*’;

d) an "a=recvonly" attribute;

e) an "a=path" attribute containing its own MSRP URI;

f) set the content type as a=accept-types: application/vnd.3gpp.mcdata-signalling application/vnd.3gpp.mcdata-payload; and

g) set the a=setup attribute according to IETF RFC 6135 [19].

9.2.3.2.3 MCData client originating procedures

The MCData client shall generate a SIP INVITE request in accordance with 3GPP TS 24.229 [5] with the clarifications given below.

The MCData client:

1) shall include the g.3gpp.mcdata.sds media feature tag and the g.3gpp.icsi-ref media feature tag with the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds" in the Contact header field of the SIP INVITE request according to IETF RFC 3840 [16];

2) shall include an Accept-Contact header field containing the g.3gpp.mcdata.sds media feature tag along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [8];

3) shall include an Accept-Contact header field with the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds" along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [8];

4) shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds" (coded as specified in 3GPP TS 24.229 [5]), in a P-Preferred-Service header field according to IETF RFC 6050 [7] in the SIP INVITE request;

5) should include the "timer" option tag in the Supported header field;

6) should include the Session-Expires header field according to IETF RFC 4028 [38]. It is recommended that the "refresher" header field parameter is omitted. If included, the "refresher" header field parameter shall be set to "uac";

7) if a one-to-one standalone SDS message is to be sent:

a) shall insert in the SIP INVITE request a MIME resource-lists body with the MCData ID of the invited MCData user, according to rules and procedures of IETF RFC 5366 [18];

b) shall contain an application/vnd.3gpp.mcdata-info+xml MIME body with the <mcdatainfo> element containing the <mcdata-Params> element with:

i) the <request-type> element set to a value of "one-to-one-sds"; and

c) if an end-to-end security context needs to be established and the security context does not exist or if the existing security context has expired, then:

i) if necessary, shall instruct the key management client to request keying material from the key management server as described in 3GPP TS 33.180 [26];

ii) shall use the keying material to generate a PCK as described in 3GPP TS 33.180 [26];

iii) shall use the PCK to generate a PCK-ID with the four most significant bits set to "0001" to indicate that the purpose of the PCK is to protect one-to-one communications and with the remaining twenty eight bits being randomly generated as described in 3GPP TS 33.180 [26];

iv) shall encrypt the PCK to a UID associated to the MCData client using the MCData ID of the invited user and a time related parameter as described in 3GPP TS 33.180 [26];

v) shall generate a MIKEY-SAKKE I_MESSAGE using the encapsulated PCK and PCK-ID as specified in 3GPP TS 33.180 [26];

vi) shall add the MCData ID of the originating MCData to the initiator field (IDRi) of the I_MESSAGE as described in 3GPP TS 33.180 [26]; and

vii) shall sign the MIKEY-SAKKE I_MESSAGE using the originating MCData user's signing key provided in the keying material together with a time related parameter, and add this to the MIKEY-SAKKE payload, as described in 3GPP TS 33.180 [26];

8) if a group standalone SDS message is to be sent:

a) if the "/<*x*>/<x>/Common/MCData/AllowedSDS" leaf node present in the group document of the requested MCData group, configured on the group management client as specified in 3GPP TS 24.483 [42] is set to "false", shall reject the request to send SDS and not continue with the rest of the steps in this subclause; and

b) shall contain in an application/vnd.3gpp.mcdata-info+xml MIME body with the <mcdatainfo> element containing the <mcdata-Params> element with:

i) the <request-type> element set to a value of "group-sds";

ii) the <mcdata-request-uri> element set to the MCData group identity; and

iii) the <mcdata-client-id> element set to the MCData client ID of the originating MCData client;

NOTE 1: The MCData client does not include the MCData ID of the originating MCData user in the body, as this will be inserted into the body of the SIP INVITE request that is sent from the originating participating MCData function.

9) shall set the Request-URI of the SIP INVITE request to the public service identity identifying the participating MCData function serving the MCData user;

NOTE 2: The MCData client is configured with public service identity identifying the participating MCData function serving the MCData user.

10) may include a P-Preferred-Identity header field in the SIP INVITE request containing a public user identity as specified in 3GPP TS 24.229 [5];

11) shall include an SDP offer according to 3GPP TS 24.229 [5] with the clarifications given in subclause 9.2.3.2.1; and

12) shall send the SIP INVITE request towards the MCData server according to 3GPP TS 24.229 [5].

On receipt of a SIP 2xx response to the SIP INVITE request, the MCData client:

1) shall send a SIP ACK request as specified in 3GPP TS 24.229 [5];

2) shall start the SIP Session timer according to rules and procedures of IETF RFC 4028 [38]; and

3) shall interact with the media plane as specified in 3GPP TS 24.582 [15] subclause 6.1.1.2.

On receipt of a SIP 4xx response, a SIP 5xx response or a SIP 6xx response to the SIP INVITE request:

1) shall indicate to the MCData user that the SDS message could not be sent; and

2) shall send a SIP ACK request as specified in 3GPP TS 24.229 [5].

On receipt of an indication from the media plane indicating that the standalone SDS message was not sent successfully, the MCData client shall:

1) shall generate a SIP BYE request according to 3GPP TS 24.229 [5] with:

   a) Reason code set to "SIP";

   b) cause set to "480"; and

   c) text set to "transmission failed";

2) shall set the Request-URI to the MCData session identity to release; and

3) shall send a SIP BYE request towards MCData server according to 3GPP TS 24.229 [5].

On receipt of an indication from the media plane indicating that the standalone SDS message has been successfully transferred, the MCData client shall:

1) shall generate a SIP BYE request according to 3GPP TS 24.229 [5] with:

   a) Reason code set to "SIP";

   b) cause set to "200"; and

   c) text set to "transmission succeeded";

2) shall set the Request-URI to the MCData session identity to release; and

3) shall send a SIP BYE request towards MCData server according to 3GPP TS 24.229 [5].

Upon receiving a SIP 200 (OK) response to the SIP BYE request, the MCData client shall interact with the media plane and indicate to terminate the session, as specified in 3GPP TS 24.582 [15].

9.2.3.2.4 MCData client terminating procedures

Upon receipt of an initial SIP INVITE request, the MCData client shall follow the procedures for termination of multimedia sessions in the IM CN subsystem as specified in 3GPP TS 24.229 [5] with the clarifications below.

The MCData client:

1) may reject the SIP INVITE request if either of the following conditions are met:

   a) MCData client does not have enough resources to handle the call; or

   b) any other reason outside the scope of this specification;

   and skip the rest of the steps after step 2;

2) if the SIP INVITE request is rejected in step 1), shall respond toward participating MCData function either with appropriate reject code as specified in 3GPP TS 24.229 [5] and warning texts as specified in subclause 4.9 or with SIP 480 (Temporarily unavailable) response not including warning texts if the user is authorised to restrict the reason for failure and skip the rest of the steps of this subclause;

3) if the SDP offer of the SIP INVITE request contains an "a=key-mgmt" attribute field with a "mikey" attribute value containing a MIKEY-SAKKE I_MESSAGE:

a) shall extract the MCData ID of the originating MCData user from the initiator field (IDRi) of the I_MESSAGE as described in 3GPP TS 33.180 [26];

b) shall convert the MCData ID to a UID as described in 3GPP TS 33.180 [26];

c) shall use the UID to validate the signature of the MIKEY-SAKKE I_MESSAGE as described in 3GPP TS 33.180 [26];

d) if authentication verification of the MIKEY-SAKKE I_MESSAGE fails, shall reject the SIP INVITE request with a SIP 488 (Not Acceptable Here) response as specified in IETF RFC 4567 [45], and include warning text set to "136 authentication of the MIKEY-SAKKE I_MESSAGE failed" in a Warning header field as specified in subclause 4.9 and not continue with rest of the steps in this subclause; and

e) if the signature of the MIKEY-SAKKE I_MESSAGE was successfully validated:

i) shall extract and decrypt the encapsulated PCK using the terminating user's (KMS provisioned) UID key as described in 3GPP TS 33.180 [26]; and

ii) shall extract the PCK-ID, from the payload as specified in 3GPP TS 33.180 [26];

NOTE: With the PCK successfully shared between the originating MCData client and the terminating MCData client, both clients are able to create an end-to-end secure session.

3) may display to the MCData user the MCData ID of the inviting MCData user and the type of SDS request;

4) shall accept the SIP INVITE request and generate a SIP 200 (OK) response according to rules and procedures of 3GPP TS 24.229 [5];

5) shall include the option tag "timer" in a Require header field of the SIP 200 (OK) response;

6) shall include the Session-Expires header field in the SIP 200 (OK) response and start the SIP session timer according to IETF RFC 4028 [38]. The "refresher" parameter in the Session-Expires header field shall be set to "uas";

7) shall include the g.3gpp.mcdata.sds media feature tag in the Contact header field of the SIP 200 (OK) response;

8) shall include the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds" in the Contact header field of the SIP 200 (OK) response;

9) shall include an SDP answer in the SIP 200 (OK) response to the SDP offer in the incoming SIP INVITE request according to 3GPP TS 24.229 [5] with the clarifications given in subclause 9.2.3.2.2; and

10) shall send the SIP 200 (OK) response towards the MCData server according to rules and procedures of 3GPP TS 24.229 [5].

On receipt of an SIP ACK message to the sent SIP 200 (OK) message, the MCData client shall:

1) shall interact with the media plane as specified in 3GPP TS 24.582 [15] subclause 6.1.1.3.

9.2.3.3 Participating MCData function procedures

9.2.3.3.1 SDP offer generation

The SDP offer is generated based on the received SDP offer. The SDP offer generated by the participating MCData function:

1) shall contain only one SDP media-level section for SDS message as contained in the received SDP offer; and

2) shall contain an "a=key-mgmt" attribute field with a "mikey" attribute value, if present in the received SDP offer.

When composing the SDP offer according to 3GPP TS 24.229 [5], the participating MCData function:

1) shall replace the IP address and port number for the offered media stream in the received SDP offer with the IP address and port number of the participating MCData function, if required; and

NOTE 1: Requirements can exist for the participating MCData function to be always included in the path of the offered media stream, for example: for the support of features such as MBMS, lawful interception and recording. Other examples can exist.

NOTE 2: If the participating MCData function and the controlling MCData function are in the same MCData server, and the participating MCData function does not have a dedicated IP address or a dedicated port number for media stream, the replacement of the IP address or the port number is omitted.

2) if the IP address is replaced, shall insert its MSRP URI before the MSRP URI in the "a=path" attribute in the SDP offer.

9.2.3.3.2 SDP answer generation

When composing the SDP answer according to 3GPP TS 24.229 [5], the participating MCData function:

1) shall replace the IP address and port number in the received SDP answer with the IP address and port number of the participating MCData function, for the accepted media stream in the received SDP offer, if required; and

NOTE 1: Requirements can exist for the participating MCData function to be always included in the path of the offered media stream, for example: for the support of features such as MBMS, lawful interception and recording. Other examples can exist.

NOTE 2: If the participating MCData function and the controlling MCData function are in the same MCData server, and the participating MCData function does not have a dedicated IP address or a dedicated port number for media stream, the replacement of the IP address or the port number is omitted.

2) if the IP address is replaced shall insert its MSRP URI before the MSRP URI in the "a=path" attribute in the SDP answer.

9.2.3.3.3 Originating participating MCData function procedures

Upon receipt of a "SIP INVITE request for standalone SDS over media plane for originating participating MCData function", the participating MCData function:

1) if unable to process the request, may reject the SIP INVITE request with a SIP 500 (Server Internal Error) response. The participating MCData function may include a Retry-After header field to the SIP 500 (Server Internal Error) response as specified in IETF RFC 3261 [4] and skip the rest of the steps;

2) shall determine the MCData ID of the calling user from the public user identity in the P-Asserted-Identity header field of the SIP INVITE request, and shall authorise the calling user;

NOTE: The MCData ID of the calling user is bound to the public user identity at the time of service authorisation, as documented in subclause 7.3.

3) if the participating MCData function cannot find a binding between the public user identity and an MCData ID or if the validity period of an existing binding has expired, then the participating MCData function shall reject the SIP INVITE request with a SIP 404 (Not Found) response with the warning text set to "141 user unknown to the participating function" in a Warning header field as specified in subclause 4.9, and shall not continue with any of the remaining steps;

4) if the <request-type> element in the application/vnd.3gpp.mcdata-info+xml MIME body of the SIP INVITE request is:

   a) set to a value of "group-sds", shall determine the public service identity of the controlling MCData function associated with the MCData group identity in the <mcdata-request-uri> element of the application/vnd.3gpp.mcdata-info+xml MIME body in the SIP INVITE request; or

   b) set to a value of "one-to-one-sds", shall determine the public service identity of the controlling MCData function hosting the one-to-one standalone SDS over media plane service for the calling user;

5) if unable to identify the controlling MCData function for standalone SDS over media plane, it shall reject the SIP INVITE request with a SIP 404 (Not Found) response with the warning text "142 unable to determine the controlling function" in a Warning header field as specified in subclause 4.9, and shall not continue with any of the remaining steps;

6) shall determine whether the MCData user identified by the MCData ID is authorised for MCData communications by following the procedures in subclause 11.1;

7) if the procedures in subclause 11.1 indicate that the user identified by the MCData ID is not allowed to initiate MCData communications, shall reject the "SIP INVITE request for standalone SDS over media plane for originating participating MCData function" with a SIP 403 (Forbidden) response to the SIP INVITE request, with warning text set to "200 user not authorised to transmit data" in a Warning header field as specified in subclause 4.9, and shall not continue with the rest of the steps in this subclause;

8) shall generate a SIP INVITE request in accordance with 3GPP TS 24.229 [5];

9) shall include the option tag "timer" in the Supported header field;

10) should include the Session-Expires header field according to IETF RFC 4028 [38]. It is recommended that the "refresher" header field parameter is omitted. If included, the "refresher" header field parameter shall be set to "uac";

11) shall set the Request-URI of the outgoing SIP INVITE request to the public service identity of the controlling MCData function as determined by step 4) in this subclause;

12) shall include the MCData ID of the originating user in the <mcdata-calling-user-identity> element of the application/vnd.3gpp.mcdata-info+xml MIME body of the outgoing SIP INVITE request;

13) shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds" (coded as specified in 3GPP TS 24.229 [5]), into the P-Asserted-Service header field of the outgoing SIP INVITE request;

14) shall set the P-Asserted-Identity in the outgoing SIP INVITE request to the public user identity in the P-Asserted-Identity header field contained in the received SIP INVITE request;

15) shall include in the SIP INVITE request an SDP offer based on the SDP offer in the received SIP INVITE request from the MCData client as specified in subclause 9.2.3.3.1; and

16) shall send the SIP INVITE request as specified to 3GPP TS 24.229 [5].

Upon receipt of a SIP 200 (OK) response in response to the SIP INVITE request in step 16):

1) shall generate a SIP 200 (OK) response as specified in 3GPP TS 24.229 [5];

2) shall include in the SIP 200 (OK) response an SDP answer as specified in the subclause 9.2.3.3.2;

3) shall include the option tag "timer" in a Require header field;

4) shall include the Session-Expires header field according to rules and procedures of IETF RFC 4028 [38], "UAS Behavior". If the "refresher" parameter is not included in the received request, the "refresher" parameter in the Session-Expires header field shall be set to "uac";

5) shall include the following in the Contact header field:

   a) the g.3gpp.mcdata.sds media feature tag;

   b) the g.3gpp.icsi-ref media feature tag containing the value of “urn:urn-7:3gpp-service.ims.icsi.mcdata.sds”; and

   c) the isfocus media feature tag;

6) shall include Warning header field(s) that were received in the incoming SIP 200 (OK) response;

7) shall include an MCData session identity mapped to the MCData session identity provided in the Contact header field of the received SIP 200 (OK) response;

8) if the incoming SIP 200 (OK) response contained an application/vnd.3gpp.mcdata-info+xml MIME body, shall copy the application/vnd.3gpp.mcdata-info+xml MIME body to the outgoing SIP 200 (OK) response.

9) shall include the public service identity received in the P-Asserted-Identity header field of the incoming SIP 200 (OK) response into the P-Asserted-Identity header field of the outgoing SIP 200 (OK) response; and

10) shall interact with the media plane as specified in 3GPP TS 24.582 [15] subclause 6.2.1.4

11) shall send the SIP 200 (OK) response to the MCData client according to 3GPP TS 24.229 [5]; and

12) shall start the SIP Session timer according to rules and procedures of IETF RFC 4028 [38].

Upon receipt of a SIP 4xx, 5xx or 6xx response to the SIP INVITE request in step 16) the participating MCData function:

1) shall generate a SIP response according to 3GPP TS 24.229 [5];

2) shall include Warning header field(s) that were received in the incoming SIP response; and

3) shall forward the SIP response to the MCData client according to 3GPP TS 24.229 [5].

9.2.3.3.4 Terminating participating MCData function procedures

Upon receipt of a "SIP INVITE request for standalone SDS over media plane for terminating participating MCData function", the participating MCData function:

1) if unable to process the request, may reject the SIP INVITE request with a SIP 500 (Server Internal Error) response. The participating MCData function may include a Retry-After header field to the SIP 500 (Server Internal Error) response as specified in IETF RFC 3261 [4] and skip the rest of the steps;

2) shall check the presence of the isfocus media feature tag in the URI of the Contact header field and if it is not present then the participating MCData function shall reject the request with a SIP 403 (Forbidden) response with the warning text set to "104 isfocus not assigned" in a Warning header field as specified in subclause 4.4, and shall not continue with the rest of the steps;

3) shall use the MCData ID present in the <mcdata-request-uri> element of the application/vnd.3gpp.mcdata-info+xml MIME body of the incoming SIP INVITE request to retrieve the binding between the MCData ID and public user identity of the terminating MCData user;

4) if the binding between the MCData ID and public user identity of the terminating MCData user does not exist, then the participating MCData function shall reject the SIP INVITE request with a SIP 404 (Not Found) response, and shall not continue with the rest of the steps;

5) shall generate a SIP INVITE request accordance with 3GPP TS 24.229 [5];

6) should include the Session-Expires header field according to IETF RFC 4028 [38]. It is recommended that the "refresher" header field parameter is omitted. If included, the "refresher" header field parameter shall be set to "uac";

7) shall include the option tag "timer" in the Supported header field;

8) shall include the following in the Contact header field:

   a) the g.3gpp.mcdata.sds media feature tag;

   b) the g.3gpp.icsi-ref media feature tag containing the value of “urn:urn-7:3gpp-service.ims.icsi.mcdata.sds”;

   c) the isfocus media feature tag;

   d) an MCData session identity mapped to the MCData session identity provided in the Contact header field of the incoming SIP INVITE request; and

   e) any other uri-parameter provided in the Contact header field of the incoming SIP INVITE request;

9) shall include in the SIP INVITE request all Accept-Contact header fields and all Reject-Contact header fields, with their feature tags and their corresponding values along with parameters according to rules and procedures of IETF RFC 3841 [8] that were received (if any) in the incoming SIP INVITE request;

10) shall set the Request-URI of the outgoing SIP INVITE request to the public user identity associated to the MCData ID of the terminating MCData user;

11) shall populate the outgoing SIP INVITE request with the MIME bodies that were present in the incoming SIP INVITE request;

12) shall copy the contents of the P-Asserted-Identity header field of the incoming SIP INVITE request to the P-Asserted-Identity header field of the outgoing SIP INVITE request;

13) shall include in the SIP INVITE request an SDP offer based on the SDP offer in the received "SIP INVITE request for standalone SDS over media plane for terminating participating MCData function" as specified in subclause 9.2.3.3.1; and

14) shall send the SIP INVITE request as specified in 3GPP TS 24.229 [5].

Upon receipt of a SIP 200 (OK) response in response to the above SIP INVITE request, the participating MCData function:

1) shall generate a SIP 200 (OK) response as specified in 3GPP TS 24.229 [5];

2) shall include in the SIP 200 (OK) response an SDP answer based on the SDP answer in the received SIP 200 (OK) response as specified in subclause 9.2.3.3.2;

3) shall include the option tag "timer" in a Require header field;

4) shall include the Session-Expires header field according to rules and procedures of IETF RFC 4028 [38], "UAS Behavior". If no "refresher" parameter was included in the SIP INVITE request, the "refresher" parameter in the Session-Expires header field shall be set to "uas";

5) shall include the following in the Contact header field:

   a) the g.3gpp.mcdata.sds media feature tag;

   b) the g.3gpp.icsi-ref media feature tag containing the value of “urn:urn-7:3gpp-service.ims.icsi.mcdata.sds”; and

   c) an MCData session identity mapped to the MCData session identity provided in the Contact header field of the received SIP INVITE request from the controlling MCData function;

6) if the incoming SIP response contained an application/vnd.3gpp.mcdata-info+xml MIME body, shall copy the application/vnd.3gpp.mcdata-info+xml MIME body to the outgoing SIP 200 (OK) response.

7) shall copy the P-Asserted-Identity header field from the incoming SIP 200 (OK) response to the outgoing SIP 200 (OK) response;

8) shall start the SIP Session timer according to rules and procedures of IETF RFC 4028 [38];

9) shall interact with the media plane as specified in 3GPP TS 24.582 [15] subclause 6.2.1.5; and

10) shall send the SIP 200 (OK) response to the controlling MCData function according to 3GPP TS 24.229 [5].

Upon receipt of a SIP 4xx, 5xx or 6xx response to the above SIP INVITE request, the participating MCData function:

1) shall generate a SIP response according to 3GPP TS 24.229 [5];

2) shall include Warning header field(s) that were received in the incoming SIP response; and

3) shall forward the SIP response to the controlling MCData function according to 3GPP TS 24.229 [5].

9.2.3.4 Controlling MCData function procedures

9.2.3.4.1 SDP offer generation

When composing an SDP offer according to 3GPP TS 24.229 [5], IETF RFC 4975 [17], IETF RFC 6135 [19] and IETF RFC 6714 [20] the controlling MCData function:

1) shall include an "m=message" media-level section for the MCData media stream received from the originating MCData client consisting of:

   a) the port number;

   b) a protocol field value of "TCP/MSRP" or "TCP/TLS/MSRP" for TLS;

c) a format list field set to '*';

d) an "a=sendonly" attribute;

e) an "a=path" attribute containing its own MSRP URI;

f) set the content type as "a=accept-types:application/vnd.3gpp.mcdata-signalling application/vnd.3gpp.mcdata-payload"; and

g) set the a=setup attribute as "actpass".

9.2.3.4.2 SDP answer generation

When composing the SDP answer according to 3GPP TS 24.229 [5], the controlling MCData function:

1) shall include an "m=message" media-level section for the accepted MCData media stream consisting of:

   a) the port number;

   b) a protocol field value of "TCP/MSRP" or "TCP/TLS/MSRP" for TLS according to the received SDP offer;

   c) a format list field set to '*';

   d) an "a=recvonly" attribute;

   e) an "a=path" attribute containing its own MSRP URI;

   f) set the content type as a=accept-types: application/vnd.3gpp.mcdata-signalling application/vnd.3gpp.mcdata-payload; and

   g) set the a=setup attribute set to "passive" according to IETF RFC 6135 [19].

9.2.3.4.3 Originating controlling MCData function procedures

This subclause describes the procedures for inviting an MCData user to an MCData session. The procedure is initiated by the controlling MCData function as the result of an action in subclause 9.2.3.4.4.

The controlling MCData function:

1) shall generate a SIP INVITE request according to 3GPP TS 24.229 [5];

2) shall include the Supported header field set to "timer";

3) should include the Session-Expires header field according to rules and procedures of IETF RFC 4028 [38]. The refresher parameter shall be omitted;

4) shall include an Accept-Contact header field containing the g.3gpp.mcdata.sds media feature tag along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [8];

5) shall include an Accept-Contact header field with the media feature tag g.3gpp.icsi-ref with the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds" along with parameters "require" and "explicit" according to IETF RFC 3841 [8];

6) shall include a Referred-By header field with the public user identity of the inviting MCData client;

7) shall include in the Contact header field an MCData session identity for the MCData session with the g.3gpp.mcdata.sds media feature tag, the isfocus media feature tag and the g.3gpp.icsi-ref media feature tag with the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds" according to IETF RFC 3840 [16];

8) shall include in the application/vnd.3gpp.mcdata-info+xml MIME body in the outgoing SIP INVITE request:

   a) the <mcdata-request-uri> element set to the MCData ID of the terminating user; and

   b) the <mcdata-calling-group-id> element set to the group identity;

9) shall set the Request-URI to the public service identity of the terminating participating MCData function associated to the MCData user to be invited;

NOTE 1: How the controlling MCData function finds the address of the terminating participating MCData function is out of the scope of the current release.

10) shall set the P-Asserted-Identity header field to the public service identity of the controlling MCData function;

11) shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds" (coded as specified in 3GPP TS 24.229 [5]), in a P-Asserted-Service-Id header field according to IETF RFC 6050 [7] in the SIP INVITE request;

12) shall include in the SIP INVITE request an SDP offer based on the SDP offer in the received SIP INVITE request from the originating client according to the procedures specified in subclause 9.2.3.4.1; and

13) shall send the SIP INVITE request towards the terminating client in accordance with 3GPP TS 24.229 [5].

Upon receiving a SIP 200 (OK) response for the SIP INVITE request the controlling MCData function:

1) shall interact with the media plane as specified in 3GPP TS 24.582 [15] subclause 6.3.1.

NOTE 2: The procedures executed by the controlling MCData function prior to sending a response to the inviting MCData client are specified in subclause 9.2.3.4.4.

9.2.3.4.4 Terminating controlling MCData function procedures

In the procedures in this subclause:

1) MCData ID in an incoming SIP INVITE request refers to the MCData ID of the originating user from the <mcdata-calling-user-id> element of the application/vnd.3gpp.mcdata-info+xml MIME body of the incoming SIP INVITE request;

2) group identity in an incoming SIP INVITE request refers to the group identity from the <mcdata-request-uri> element of the application/vnd.3gpp.mcdata-info+xml MIME body of the incoming SIP INVITE request; and

3) MCData ID in an outgoing SIP INVITE request refers to the MCData ID of the called user in the <mcdata-request-uri> element of the application/vnd.3gpp.mcdata-info+xml MIME body of the outgoing SIP INVITE request;

Upon receipt of a "SIP INVITE request for controlling MCData function for standalone SDS over media plane", the controlling MCData function:

1) if unable to process the request due to a lack of resources or a risk of congestion exists, may reject the SIP INVITE request with a SIP 500 (Server Internal Error) response. The controlling MCData function may include a Retry-After header field to the SIP 500 (Server Internal Error) response as specified in IETF RFC 3261 [4] and skip the rest of the steps;

2) shall determine if the media parameters are acceptable and the MSRP URI is offered in the SDP offer and if not reject the request with a SIP 488 (Not Acceptable Here) response and skip the rest of the steps;

3) shall reject the SIP request with a SIP 403 (Forbidden) response and not process the remaining steps if:

   a) an Accept-Contact header field does not include the g.3gpp.mcdata.sds media feature tag; or

   b) an Accept-Contact header field does not include the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds";

4) shall cache SIP feature tags, if received in the Contact header field and if the specific feature tags are supported;

5) shall start the SIP Session timer according to rules and procedures of IETF RFC 4028 [38];

6) if the <request-type> element in the application/vnd.3gpp.mcdata-info+xml MIME body of the SIP INVITE request is set to a value of "one-to-one-sds" and the SIP INVITE request:

   a) does not contain an application/resource-lists MIME body or contains an application/resource-lists MIME body with more than one <entry> element, shall return a SIP 403 (Forbidden) response with the warning text

set to "204 unable to determine targeted user for one-to-one SDS" in a Warning header field as specified in subclause 4.9, and skip the rest of the steps below; and

b) contains an application/resource-lists MIME body with exactly one <entry> element, shall invite the MCData user identified by the <entry> element of the MIME body, as specified in subclause 9.2.3.4.3; and

c) shall interact with the media plane as specified in 3GPP TS 24.582 [15] subclause 6.3.1;

7) if the <request-type> element in the application/vnd.3gpp.mcdata-info+xml MIME body of the SIP INVITE request is set to a value of "group-sds":

a) shall retrieve the necessary group document(s) from the group management server for the group identity contained in the SIP INVITE request and carry out initial processing as specified in subclause 6.3.3, and shall continue with the remaining steps if the procedures in subclause 6.3.3 were successful;

b) if the <on-network-disabled> element is present in the group document, shall send a SIP 403 (Forbidden) response with the warning text set to "115 group is disabled" in a Warning header field as specified in subclause 4.9 and shall not continue with the rest of the steps;

c) if the <entry> element of the <list> element of the <list-service> element in the group document does not contain an <mcdata-mcdata-id> element with a "uri" attribute matching the MCData ID of the originating user contained in the <mcdata-calling-user-identity> element of the application/vnd.3gpp.mcdata-info+xml MIME body in the SIP INVITE request, shall send a SIP 403 (Forbidden) response with the warning text set to "116 user is not part of the MCData group" in a Warning header field as specified in subclause 4.9 and shall not continue with the rest of the steps;

d) if the <list-service> element contains a <mcdata-allow-short-data-service> element in the group document set to a value of "false", shall send a SIP 403 (Forbidden) response with the warning text set to "206 short data service not allowed for this group" in a Warning header field as specified in subclause 4.x and shall not continue with the rest of the steps;

e) if the <supported-services> element is not present in the group document or is present and contains a <service> element containing an "enabler" attribute which is not set to the value "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds", shall send a SIP 488 (Not Acceptable) response with the warning text set to "207 SDS services not supported for this group" in a Warning header field as specified in subclause 4.9 and shall not continue with the rest of the steps;

f) if the MCData server group SDS procedures in subclause 11.1 indicate that the user identified by the MCData ID is not allowed to send group MCData communications on this group identity as determined by step 2) of subclause 11.1, shall reject the SIP INVITE request with a SIP 403 (Forbidden) response, with warning text set to "201 user not authorised to transmit data on this group identity" in a Warning header field as specified in subclause 4.9, and shall not continue with the rest of the steps in this subclause;

g) the originating user identified by the MCData ID is not affiliated to the group identity contained in the SIP INVITE request, as specified in subclause 6.3.5, shall return a SIP 403 (Forbidden) response with the warning text set to "120 user is not affiliated to this group" in a Warning header field as specified in subclause 4.9, and skip the rest of the steps below;

h) shall determine targeted group members for MCData communications by following the procedures in subclause 6.3.4;

i) if the procedures in subclause 6.3.4 result in no affiliated members found in the selected MCData group, shall return a SIP 403 (Forbidden) response with the warning text set to "198 no users are affiliated to this group" in a Warning header field as specified in subclause 4.9, and skip the rest of the steps below; and

j) shall invite each group member determined in step h) above, to the group session, as specified in subclause 9.2.3.4.3; and

k) shall interact with the media plane as specified in 3GPP TS 24.582 [15] subclause 6.3.1.

Upon receiving a SIP 200 (OK) response for a SIP INVITE request as specified in subclause 9.2.3.4.3 and if the MCData ID in the SIP 200 (OK) response matches to the MCData ID in the corresponding SIP INVITE request. the controlling MCData function:

1) shall generate SIP 200 (OK) response to the SIP INVITE request according to 3GPP TS 24.229 [5];

2) shall include the option tag "timer" in a Require header field;

3) shall include the Session-Expires header field and start supervising the SIP session according to rules and procedures of IETF RFC 4028 [38], "UAS Behavior". The "refresher" parameter in the Session-Expires header field shall be set to "uac";

4) shall include a P-Asserted-Identity header field with the public service identity of the controlling MCData function;

5) shall include a SIP URI for the MCData session identity in the Contact header field identifying the MCData session at the controlling MCData function;

6) shall include the following in the Contact header field:

   a) the g.3gpp.mcdata.sds media feature tag;

   b) the g.3gpp.icsi-ref media feature tag containing the value of “urn:urn-7:3gpp-service.ims.icsi.mcdata.sds”; and

   c) the isfocus media feature tag;

7) shall include Warning header field(s) received in incoming responses to the SIP INVITE request;

8) shall include in the SIP 200 (OK) response an SDP answer to the SDP offer in the incoming SIP INVITE request as specified in the subclause 9.2.3.4.2;

9) shall interact with the media plane as specified in 3GPP TS 24.582 [15] subclause 6.3.1; and

10) shall send a SIP 200 (OK) response to the inviting MCData client according to 3GPP TS 24.229 [5].

9.2.4 SDS session

9.2.4.1 General

The procedures in the subclauses of the parent subclause are used by a MCData functional entity to establish:

- a one-to-one SDS session; or
- a group SDS session.

9.2.4.2 MCData client procedures

9.2.4.2.1 SDP offer generation

When composing an SDP offer according to 3GPP TS 24.229 [5], IETF RFC 4975 [17], IETF RFC 6135 [19] and IETF RFC 6714 [20] the MCData client:

1) shall include an "m=message" media-level section for the MCData media stream consisting of:

   a) the port number;

   b) a protocol field value of "TCP/MSRP" or "TCP/TLS/MSRP" for TLS;

   c) an "a=sendrecv" attribute;

   d) an "a=path" attribute containing its own MSRP URI;

   e) set the content type as "a=accept-types:application/vnd.3gpp.mcdata-signalling application/vnd.3gpp.mcdata-payload"; and

   f) set the a=setup attribute as "actpass"; and

2) if end-to-end security is required for a one-to-one communication and the security context does not exist or if the existing security context has expired, shall include the MIKEY-SAKKE I_MESSAGE in an "a=key-mgmt" attribute as a "mikey" attribute value in the SDP offer as specified in IETF RFC 4567 [45].

9.2.4.2.2 SDP answer generation

When the MCData client receives an initial SDP offer for an MCData SDS session, the MCData client shall process the SDP offer and shall compose an SDP answer according to 3GPP TS 24.229 [5] and IETF RFC 4975 [17].

When composing an SDP answer, the MCData client:

1) shall include an "m=message" media-level section for the accepted MCData media stream consisting of:

   a) the port number;

   b) a protocol field value of "TCP/MSRP" or "TCP/TLS/MSRP" for TLS according to the received SDP offer;

   c) an "a=sendrecv" attribute;

   d) an "a=path" attribute containing its own MSRP URI;

   e) set the content type as a=accept-types: application/vnd.3gpp.mcdata-signalling application/vnd.3gpp.mcdata-payload; and

   f) set the a=setup attribute according to IETF RFC 6135 [19].

9.2.4.2.3 MCData client originating procedures

The MCData client shall generate a SIP INVITE request in accordance with 3GPP TS 24.229 [5] with the clarifications given below.

The MCData client:

1) shall include the g.3gpp.mcdata.sds media feature tag and the g.3gpp.icsi-ref media feature tag with the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds" in the Contact header field of the SIP INVITE request according to IETF RFC 3840 [16];

2) shall include an Accept-Contact header field containing the g.3gpp.mcdata.sds media feature tag along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [8];

3) shall include an Accept-Contact header field with the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds" along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [8];

4) shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds" (coded as specified in 3GPP TS 24.229 [5]), in a P-Preferred-Service header field according to IETF RFC 6050 [7] in the SIP INVITE request;

5) should include the "timer" option tag in the Supported header field;

6) should include the Session-Expires header field according to IETF RFC 4028 [38]. It is recommended that the "refresher" header field parameter is omitted. If included, the "refresher" header field parameter shall be set to "uac";

7) if a one-to-one SDS session is requested:

   a) shall insert in the SIP INVITE request a MIME resource-lists body with the MCData ID of the invited MCData user, according to rules and procedures of IETF RFC 5366 [18];

   b) shall contain an application/vnd.3gpp.mcdata-info+xml MIME body with the <mcdatainfo> element containing the <mcdata-Params> element with:

      i) the <request-type> element set to a value of "one-to-one-sds-session"; and

   c) if an end-to-end security context needs to be established and the security context does not exist or if the existing security context has expired, then:

      i) if necessary, shall instruct the key management client to request keying material from the key management server as described in 3GPP TS 33.180 [26];

ii) shall use the keying material to generate a PCK as described in 3GPP TS 33.180 [26];

iii) shall use the PCK to generate a PCK-ID with the four most significant bits set to "0001" to indicate that the purpose of the PCK is to protect one-to-one communications and with the remaining twenty eight bits being randomly generated as described in 3GPP TS 33.180 [26];

iv) shall encrypt the PCK to a UID associated to the MCData client using the MCData ID of the invited user and a time related parameter as described in 3GPP TS 33.180 [26];

v) shall generate a MIKEY-SAKKE I_MESSAGE using the encapsulated PCK and PCK-ID as specified in 3GPP TS 33.180 [26];

vi) shall add the MCData ID of the originating MCData to the initiator field (IDRi) of the I_MESSAGE as described in 3GPP TS 33.180 [26]; and

vii) shall sign the MIKEY-SAKKE I_MESSAGE using the originating MCData user's signing key provided in the keying material together with a time related parameter, and add this to the MIKEY-SAKKE payload, as described in 3GPP TS 33.180 [26];

8) if a group SDS session is requested:

a) if the "/<*x*>/<*x*>/Common/MCData/AllowedSDS" leaf node present in the group document of the requested MCData group, configured on the group management client as specified in 3GPP TS 24.483 [42] is set to "false", shall reject the request to send SDS and not continue with the rest of the steps in this subclause; and

b) shall contain in an application/vnd.3gpp.mcdata-info+xml MIME body with the <mcdatainfo> element containing the <mcdata-Params> element with:

i) the <request-type> element set to a value of "group-sds-session";

ii) the <mcdata-request-uri> element set to the MCData group identity; and

iii) the <mcdata-client-id> element set to the MCData client ID of the originating MCData client;

NOTE 1: The MCData client does not include the MCData ID of the originating MCData user in the body, as this will be inserted into the body of the SIP INVITE request that is sent from the originating participating MCData function.

9) shall set the Request-URI of the SIP INVITE request to the public service identity identifying the participating MCData function serving the MCData user;

NOTE 2: The MCData client is configured with public service identity identifying the participating MCData function serving the MCData user.

10) may include a P-Preferred-Identity header field in the SIP INVITE request containing a public user identity as specified in 3GPP TS 24.229 [5];

11) shall include an SDP offer according to 3GPP TS 24.229 [5] with the clarifications given in subclause 9.2.4.2.1; and

12) shall send the SIP INVITE request towards the MCData server according to 3GPP TS 24.229 [5].

On receipt of a SIP 2xx response to the SIP INVITE request, the MCData client:

1) shall send a SIP ACK request as specified in 3GPP TS 24.229 [5];

2) shall start the SIP Session timer according to rules and procedures of IETF RFC 4028 [38]; and

3) shall interact with the media plane as specified in 3GPP TS 24.582 [15] subclause 6.1.2.2.

On receipt of a SIP 4xx response, a SIP 5xx response or a SIP 6xx response to the SIP INVITE request, the MCData client:

1) shall indicate to the MCData user that the SDS message could not be sent; and

2) shall send a SIP ACK request as specified in 3GPP TS 24.229 [5].

On receipt of an indication from the media plane indicating that the SDS message was not sent successfully, the MCData client:

1) shall generate a SIP BYE request according to 3GPP TS 24.229 [5] with:

   a) Reason code set to "SIP";

   b) cause set to "480"; and

   c) text set to "transmission failed";

2) shall set the Request-URI to the MCData session identity to release; and

3) shall send a SIP BYE request towards MCData server according to 3GPP TS 24.229 [5].

9.2.4.2.4 MCData client terminating procedures

Upon receipt of an initial SIP INVITE request, the MCData client shall follow the procedures for termination of multimedia sessions in the IM CN subsystem as specified in 3GPP TS 24.229 [5] with the clarifications below.

The MCData client:

1) may reject the SIP INVITE request if either of the following conditions are met:

   a) MCData client does not have enough resources to handle the call; or

   b) any other reason outside the scope of this specification;

   and skip the rest of the steps after step 2;

2) if the SIP INVITE request is rejected in step 1), shall respond toward participating MCData function either with appropriate reject code as specified in 3GPP TS 24.229 [5] and warning texts as specified in subclause 4.9 or with SIP 480 (Temporarily unavailable) response not including warning texts if the user is authorised to restrict the reason for failure and skip the rest of the steps of this subclause;

3) if the SDP offer of the SIP INVITE request contains an "a=key-mgmt" attribute field with a "mikey" attribute value containing a MIKEY-SAKKE I_MESSAGE:

   a) shall extract the MCData ID of the originating MCData user from the initiator field (IDRi) of the I_MESSAGE as described in 3GPP TS 33.180 [26];

   b) shall convert the MCData ID to a UID as described in 3GPP TS 33.180 [26];

   c) shall use the UID to validate the signature of the MIKEY-SAKKE I_MESSAGE as described in 3GPP TS 33.180 [26];

   d) if authentication verification of the MIKEY-SAKKE I_MESSAGE fails, shall reject the SIP INVITE request with a SIP 488 (Not Acceptable Here) response as specified in IETF RFC 4567 [45], and include warning text set to "136 authentication of the MIKEY-SAKKE I_MESSAGE failed" in a Warning header field as specified in subclause 4.9 and not continue with rest of the steps in this subclause; and

   e) if the signature of the MIKEY-SAKKE I_MESSAGE was successfully validated:

      i) shall extract and decrypt the encapsulated PCK using the terminating user's (KMS provisioned) UID key as described in 3GPP TS 33.180 [26]; and

      ii) shall extract the PCK-ID, from the payload as specified in 3GPP TS 33.180 [26];

NOTE: With the PCK successfully shared between the originating MCData client and the terminating MCData client, both clients are able to create an end-to-end secure session.

4) may display to the MCData user the MCData ID of the inviting MCData user and the type of SDS request;

5) shall accept the SIP INVITE request and generate a SIP 200 (OK) response according to rules and procedures of 3GPP TS 24.229 [5];

6) shall include the option tag "timer" in a Require header field of the SIP 200 (OK) response;

7) shall include the Session-Expires header field in the SIP 200 (OK) response and start the SIP session timer according to IETF RFC 4028 [38]. The "refresher" parameter in the Session-Expires header field shall be set to "uas";

8) shall include the g.3gpp.mcdata.sds media feature tag in the Contact header field of the SIP 200 (OK) response;

9) shall include the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds" in the Contact header field of the SIP 200 (OK) response;

10) shall include an SDP answer in the SIP 200 (OK) response to the SDP offer in the incoming SIP INVITE request according to 3GPP TS 24.229 [5] with the clarifications given in subclause 9.2.4.2.2; and

11) shall send the SIP 200 (OK) response towards the MCData server according to rules and procedures of 3GPP TS 24.229 [5].

On receipt of an SIP ACK message to the sent SIP 200 (OK) message, the MCData client shall:

1) shall interact with the media plane as specified in 3GPP TS 24.582 [15] subclause 6.1.2.3.

To send a disposition notification after the media plane is released, the MCData client:

1) shall follow the procedures described in subclause 12.2.1.1.

9.2.4.3 Participating MCData function procedures

9.2.4.3.1 SDP offer generation

The SDP offer is generated based on the received SDP offer. The SDP offer generated by the participating MCData function:

1) shall contain only one SDP media-level section for SDS message as contained in the received SDP offer;and

2) shall contain an "a=key-mgmt" attribute field with a "mikey" attribute value, if present in the received SDP offer.

When composing the SDP offer according to 3GPP TS 24.229 [5], the participating MCData function:

1) shall replace the IP address and port number for the offered media stream in the received SDP offer with the IP address and port number of the participating MCData function, if required; and

NOTE 1: Requirements can exist for the participating MCData function to be always included in the path of the offered media stream, for example: for the support of features such as MBMS, lawful interception and recording. Other examples can exist.

NOTE 2: If the participating MCData function and the controlling MCData function are in the same MCData server, and the participating MCData function does not have a dedicated IP address or a dedicated port number for media stream, the replacement of the IP address or the port number is omitted.

2) if the IP address is replaced, shall insert its MSRP URI before the MSRP URI in the "a=path" attribute in the SDP offer.

9.2.4.3.2 SDP answer generation

When composing the SDP answer according to 3GPP TS 24.229 [5], the participating MCData function:

1) shall replace the IP address and port number in the received SDP answer with the IP address and port number of the participating MCData function, for the accepted media stream in the received SDP offer, if required; and

NOTE 1: Requirements can exist for the participating MCData function to be always included in the path of the offered media stream, for example: for the support of features such as MBMS, lawful interception and recording. Other examples can exist.

NOTE 2: If the participating MCData function and the controlling MCData function are in the same MCData server, and the participating MCData function does not have a dedicated IP address or a dedicated port number for media stream, the replacement of the IP address or the port number is omitted.

2) if the IP address is replaced shall insert its MSRP URI before the MSRP URI in the "a=path" attribute in the SDP answer.

9.2.4.3.3 Originating participating MCData function procedures

Upon receipt of a "SIP INVITE request for SDS session for originating participating MCData function", the participating MCData function:

1) if unable to process the request, may reject the SIP INVITE request with a SIP 500 (Server Internal Error) response. The participating MCData function may include a Retry-After header field to the SIP 500 (Server Internal Error) response as specified in IETF RFC 3261 [4] and skip the rest of the steps;

2) shall determine the MCData ID of the calling user from the public user identity in the P-Asserted-Identity header field of the SIP INVITE request, and shall authorise the calling user;

NOTE: The MCData ID of the calling user is bound to the public user identity at the time of service authorisation, as documented in subclause 7.3.

3) if the participating MCData function cannot find a binding between the public user identity and an MCData ID or if the validity period of an existing binding has expired, then the participating MCData function shall reject the SIP INVITE request with a SIP 404 (Not Found) response with the warning text set to "141 user unknown to the participating function" in a Warning header field as specified in subclause 4.9, and shall not continue with any of the remaining steps;

4) if the <request-type> element in the application/vnd.3gpp.mcdata-info+xml MIME body of the SIP INVITE request is:

   a) set to a value of "group-sds-session", shall determine the public service identity of the controlling MCData function associated with the MCData group identity in the <mcdata-request-uri> element of the application/vnd.3gpp.mcdata-info+xml MIME body in the SIP INVITE request; or

   b) set to a value of "one-to-one-sds-session", shall determine the public service identity of the controlling MCData function hosting the one-to-one SDS session service for the calling user;

5) if unable to identify the controlling MCData function for SDS session, it shall reject the SIP INVITE request with a SIP 404 (Not Found) response with the warning text "142 unable to determine the controlling function" in a Warning header field as specified in subclause 4.9, and shall not continue with any of the remaining steps;

6) shall determine whether the MCData user identified by the MCData ID is authorised for MCData communications by following the procedures in subclause 11.1;

7) if the procedures in subclause 11.1 indicate that the user identified by the MCData ID is not allowed to send MCData communications as determined by step 1) of subclause 11.1, shall reject the "SIP INVITE request for SDS session for originating participating MCData function" with a SIP 403 (Forbidden) response to the SIP INVITE request, with warning text set to "221 user not authorised to initiate one-to-one SDS session" in a Warning header field as specified in subclause 4.9, and shall not continue with the rest of the steps in this subclause;

8) shall generate a SIP INVITE request in accordance with 3GPP TS 24.229 [5];

9) shall include the option tag "timer" in the Supported header field;

10) should include the Session-Expires header field according to IETF RFC 4028 [38]. It is recommended that the "refresher" header field parameter is omitted. If included, the "refresher" header field parameter shall be set to "uac";

11) shall set the Request-URI of the outgoing SIP INVITE request to the public service identity of the controlling MCData function as determined by step 4) in this subclause;

12) shall include the MCData ID of the originating user in the <mcdata-calling-user-identity> element of the application/vnd.3gpp.mcdata-info+xml MIME body of the outgoing SIP INVITE request;

13) shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds" (coded as specified in 3GPP TS 24.229 [5]), into the P-Asserted-Service header field of the outgoing SIP INVITE request;

14) shall set the P-Asserted-Identity in the outgoing SIP INVITE request to the public user identity in the P-Asserted-Identity header field contained in the received SIP INVITE request;

15) shall include in the SIP INVITE request an SDP offer based on the SDP offer in the received SIP INVITE request from the MCData client as specified in subclause 9.2.4.3.1; and

16) shall send the SIP INVITE request as specified to 3GPP TS 24.229 [5].

Upon receipt of a SIP 200 (OK) response in response to the SIP INVITE request in step 16):

1) shall generate a SIP 200 (OK) response as specified in 3GPP TS 24.229 [5];

2) shall include in the SIP 200 (OK) response an SDP answer as specified in the subclause 9.2.4.3.2;

3) shall include the option tag "timer" in a Require header field;

4) shall include the Session-Expires header field according to rules and procedures of IETF RFC 4028 [38], "UAS Behavior". If the "refresher" parameter is not included in the received request, the "refresher" parameter in the Session-Expires header field shall be set to "uac";

5) shall include the following in the Contact header field:

   a) the g.3gpp.mcdata.sds media feature tag;

   b) the g.3gpp.icsi-ref media feature tag containing the value of “urn:urn-7:3gpp-service.ims.icsi.mcdata.sds”; and

   c) the isfocus media feature tag;

6) shall include Warning header field(s) that were received in the incoming SIP 200 (OK) response;

7) shall include an MCData session identity mapped to the MCData session identity provided in the Contact header field of the received SIP 200 (OK) response;

8) if the incoming SIP 200 (OK) response contained an application/vnd.3gpp.mcdata-info+xml MIME body, shall copy the application/vnd.3gpp.mcdata-info+xml MIME body to the outgoing SIP 200 (OK) response.

9) shall include the public service identity received in the P-Asserted-Identity header field of the incoming SIP 200 (OK) response into the P-Asserted-Identity header field of the outgoing SIP 200 (OK) response; and

10) shall interact with the media plane as specified in 3GPP TS 24.582 [15] subclause 6.2.2.4;

11) shall send the SIP 200 (OK) response to the MCData client according to 3GPP TS 24.229 [5]; and

12) shall start the SIP Session timer according to rules and procedures of IETF RFC 4028 [38].

Upon receipt of a SIP 4xx, 5xx or 6xx response to the SIP INVITE request in step 16) the participating MCData function:

1) shall generate a SIP response according to 3GPP TS 24.229 [5];

2) shall include Warning header field(s) that were received in the incoming SIP response; and

3) shall forward the SIP response to the MCData client according to 3GPP TS 24.229 [5].

9.2.4.3.4 Terminating participating MCData function procedures

Upon receipt of a "SIP INVITE request for SDS session for terminating participating MCData function", the participating MCData function:

1) if unable to process the request, may reject the SIP INVITE request with a SIP 500 (Server Internal Error) response. The participating MCData function may include a Retry-After header field to the SIP 500 (Server Internal Error) response as specified in IETF RFC 3261 [4] and skip the rest of the steps;

2) shall check the presence of the isfocus media feature tag in the URI of the Contact header field and if it is not present then the participating MCData function shall reject the request with a SIP 403 (Forbidden) response with

the warning text set to "104 isfocus not assigned" in a Warning header field as specified in subclause 4.4, and shall not continue with the rest of the steps;

3) shall use the MCData ID present in the <mcdata-request-uri> element of the application/vnd.3gpp.mcdata-info+xml MIME body of the incoming SIP INVITE request to retrieve the binding between the MCData ID and public user identity of the terminating MCData user;

4) if the binding between the MCData ID and public user identity of the terminating MCData user does not exist, then the participating MCData function shall reject the SIP INVITE request with a SIP 404 (Not Found) response, and shall not continue with the rest of the steps;

5) shall generate a SIP INVITE request accordance with 3GPP TS 24.229 [5];

6) should include the Session-Expires header field according to IETF RFC 4028 [38]. It is recommended that the "refresher" header field parameter is omitted. If included, the "refresher" header field parameter shall be set to "uac";

7) shall include the option tag "timer" in the Supported header field;

8) shall include the following in the Contact header field:

   a) the g.3gpp.mcdata.sds media feature tag;

   b) the g.3gpp.icsi-ref media feature tag containing the value of “urn:urn-7:3gpp-service.ims.icsi.mcdata.sds”;

   c) the isfocus media feature tag;

   d) an MCData session identity mapped to the MCData session identity provided in the Contact header field of the incoming SIP INVITE request; and

   e) any other uri-parameter provided in the Contact header field of the incoming SIP INVITE request;

9) shall include in the SIP INVITE request all Accept-Contact header fields and all Reject-Contact header fields, with their feature tags and their corresponding values along with parameters according to rules and procedures of IETF RFC 3841 [8] that were received (if any) in the incoming SIP INVITE request;

10) shall set the Request-URI of the outgoing SIP INVITE request to the public user identity associated to the MCData ID of the terminating MCData user;

11) shall populate the outgoing SIP INVITE request with the MIME bodies that were present in the incoming SIP INVITE request;

12) shall copy the contents of the P-Asserted-Identity header field of the incoming SIP INVITE request to the P-Asserted-Identity header field of the outgoing SIP INVITE request;

13) shall include in the SIP INVITE request an SDP offer based on the SDP offer in the received "SIP INVITE request for SDS session for terminating participating MCData function" as specified in subclause 9.2.4.3.1; and

14) shall send the SIP INVITE request as specified in 3GPP TS 24.229 [5].

Upon receipt of a SIP 200 (OK) response in response to the above SIP INVITE request, the participating MCData function:

1) shall generate a SIP 200 (OK) response as specified in 3GPP TS 24.229 [5];

2) shall include in the SIP 200 (OK) response an SDP answer based on the SDP answer in the received SIP 200 (OK) response as specified in subclause 9.2.4.3.2;

3) shall include the option tag "timer" in a Require header field;

4) shall include the Session-Expires header field according to rules and procedures of IETF RFC 4028 [38], "UAS Behavior". If no "refresher" parameter was included in the SIP INVITE request, the "refresher" parameter in the Session-Expires header field shall be set to "uas";

5) shall include the following in the Contact header field:

   a) the g.3gpp.mcdata.sds media feature tag;

b) the g.3gpp.icsi-ref media feature tag containing the value of “urn:urn-7:3gpp-service.ims.icsi.mcdata.sds”; and

c) an MCData session identity mapped to the MCData session identity provided in the Contact header field of the received SIP INVITE request from the controlling MCData function;

6) if the incoming SIP response contained an application/vnd.3gpp.mcdata-info+xml MIME body, shall copy the application/vnd.3gpp.mcdata-info+xml MIME body to the outgoing SIP 200 (OK) response.

7) shall copy the P-Asserted-Identity header field from the incoming SIP 200 (OK) response to the outgoing SIP 200 (OK) response;

8) shall start the SIP Session timer according to rules and procedures of IETF RFC 4028 [38].

9) shall interact with the media plane as specified in 3GPP TS 24.582 [15] subclause 6.2.2.5; and

10) shall send the SIP 200 (OK) response to the controlling MCData function according to 3GPP TS 24.229 [5].

Upon receipt of a SIP 4xx, 5xx or 6xx response to the above SIP INVITE request, the participating MCData function:

1) shall generate a SIP response according to 3GPP TS 24.229 [5];

2) shall include Warning header field(s) that were received in the incoming SIP response; and

3) shall forward the SIP response to the controlling MCData function according to 3GPP TS 24.229 [5].

9.2.4.4 Controlling MCData function procedures

9.2.4.4.1 SDP offer generation

When composing an SDP offer according to 3GPP TS 24.229 [5], IETF RFC 4975 [17], IETF RFC 6135 [19] and IETF RFC 6714 [20] the controlling MCData function:

1) shall include an "m=message" media-level section for the MCData media stream received from the originating MCData client consisting of:

a) the port number;

b) a protocol field value of "TCP/MSRP" or "TCP/TLS/MSRP" for TLS;

c) an "a=sendrecv" attribute;

d) an "a=path" attribute containing its own MSRP URI;

e) set the content type as "a=accept-types:application/vnd.3gpp.mcdata-signalling application/vnd.3gpp.mcdata-payload"; and

f) set the a=setup attribute as "actpass".

9.2.4.4.2 SDP answer generation

When composing the SDP answer according to 3GPP TS 24.229 [5], the controlling MCData function:

1) shall include an "m=message" media-level section for the accepted MCData media stream consisting of:

a) the port number;

b) a protocol field value of "TCP/MSRP" or "TCP/TLS/MSRP" for TLS according to the received SDP offer;

c) an "a=sendrecv" attribute;

d) an "a=path" attribute containing its own MSRP URI;

e) set the content type as a=accept-types: application/vnd.3gpp.mcdata-signalling application/vnd.3gpp.mcdata-payload; and

f) set the a=setup attribute set to "passive" according to IETF RFC 6135 [19].

9.2.4.4.3 Originating controlling MCData function procedures

This subclause describes the procedures for inviting an MCData user to an MCData session. The procedure is initiated by the controlling MCData function as the result of:

- an action in subclause 9.2.4.4.4; or
- for group SDS session, when an MCData client successfully affiliates the MCData group after the SDS session has been established.

The controlling MCData function:

1) shall generate a SIP INVITE according to 3GPP TS 24.229 [5];
2) shall include the Supported header field set to "timer";
3) should include the Session-Expires header field according to rules and procedures of IETF RFC 4028 [38]. The refresher parameter shall be omitted;
4) shall include an Accept-Contact header field containing the g.3gpp.mcdata.sds media feature tag along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [8];
5) shall include an Accept-Contact header field with the media feature tag g.3gpp.icsi-ref with the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds" along with parameters "require" and "explicit" according to IETF RFC 3841 [8];
6) shall include a Referred-By header field with the public user identity of the inviting MCData client;
7) shall include in the Contact header field an MCData session identity for the MCData session with the g.3gpp.mcdata.sds media feature tag, the isfocus media feature tag and the g.3gpp.icsi-ref media feature tag with the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds" according to IETF RFC 3840 [16];
8) shall include in the application/vnd.3gpp.mcdata-info+xml MIME body in the outgoing SIP INVITE request:
   a) the <mcdata-request-uri> element set to the MCData ID of the terminating user; and
   b) the <mcdata-calling-group-id> element set to the group identity if the request is for group sds;
9) shall set the Request-URI to the public service identity of the terminating participating MCData function associated to the MCData user to be invited;

NOTE 1: How the controlling MCData function finds the address of the terminating participating MCData function is out of the scope of the current release.

10) shall set the P-Asserted-Identity header field to the public service identity of the controlling MCData function;
11) shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds" (coded as specified in 3GPP TS 24.229 [5]), in a P-Asserted-Service-Id header field according to IETF RFC 6050 [7] in the SIP INVITE request;
12) shall include in the SIP INVITE request an SDP offer based on the SDP offer in the received SIP INVITE request from the originating client according to the procedures specified in subclause 9.2.4.4.1; and
13) shall send the SIP INVITE request towards the terminating client in accordance with 3GPP TS 24.229 [5].

Upon receiving a SIP 200 (OK) response for the SIP INVITE request the controlling MCData function:

1) shall interact with the media plane as specified in 3GPP TS 24.582 [15] subclause 6.3.2.

NOTE 2: The procedures executed by the controlling MCData function prior to sending a response to the inviting MCData client are specified in subclause 9.2.4.4.4.

9.2.4.4.4 Terminating controlling MCData function procedures

In the procedures in this subclause:

1) MCData ID in an incoming SIP INVITE request refers to the MCData ID of the originating user from the <mcdata-calling-user-id> element of the application/vnd.3gpp.mcdata-info+xml MIME body of the incoming SIP INVITE request;

2) group identity in an incoming SIP INVITE request refers to the group identity from the <mcdata-request-uri> element of the application/vnd.3gpp.mcdata-info+xml MIME body of the incoming SIP INVITE request; and

3) MCData ID in an outgoing SIP INVITE request refers to the MCData ID of the called user in the <mcdata-request-uri> element of the application/vnd.3gpp.mcdata-info+xml MIME body of the outgoing SIP INVITE request;

Upon receipt of a "SIP INVITE request for controlling MCData function for SDS session", the controlling MCData function:

1) if unable to process the request due to a lack of resources or a risk of congestion exists, may reject the SIP INVITE request with a SIP 500 (Server Internal Error) response. The controlling MCData function may include a Retry-After header field to the SIP 500 (Server Internal Error) response as specified in IETF RFC 3261 [4] and skip the rest of the steps;

2) shall determine if the media parameters are acceptable and the MSRP URI is offered in the SDP offer and if not reject the request with a SIP 488 (Not Acceptable Here) response and skip the rest of the steps;

3) shall reject the SIP request with a SIP 403 (Forbidden) response and not process the remaining steps if:

   a) an Accept-Contact header field does not include the g.3gpp.mcdata.sds media feature tag; or

   b) an Accept-Contact header field does not include the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds";

4) shall cache SIP feature tags, if received in the Contact header field and if the specific feature tags are supported;

6) shall start the SIP Session timer according to rules and procedures of IETF RFC 4028 [38];

7) if the <request-type> element in the application/vnd.3gpp.mcdata-info+xml MIME body of the SIP INVITE request is set to a value of "one-to-one-sds-session" and the SIP INVITE request:

   a) does not contain an application/resource-lists MIME body or contains an application/resource-lists MIME body with more than one <entry> element, shall return a SIP 403 (Forbidden) response with the warning text set to "204 unable to determine targeted user for one-to-one SDS" in a Warning header field as specified in subclause 4.9, and skip the rest of the steps below;

   b) contains an application/resource-lists MIME body with exactly one <entry> element, shall invite the MCData user identified by the <entry> element of the MIME body, as specified in subclause 9.2.4.4.3; and

   c) shall interact with the media plane as specified in 3GPP TS 24.582 [15] subclause 6.3.2;

8) if the <request-type> element in the application/vnd.3gpp.mcdata-info+xml MIME body of the SIP INVITE request is set to a value of "group-sds-session":

   a) shall retrieve the necessary group document(s) from the group management server for the group identity contained in the SIP INVITE request and carry out initial processing as specified in subclause 6.3.3, and shall continue with the remaining steps if the procedures in subclause 6.3.3 were successful;

   b) if the <on-network-disabled> element is present in the group document, shall send a SIP 403 (Forbidden) response with the warning text set to "115 group is disabled" in a Warning header field as specified in subclause 4.9 and shall not continue with the rest of the steps;

   c) if the <entry> element of the <list> element of the <list-service> element in the group document does not contain an <mcdata-mcdata-id> element with a "uri" attribute matching the MCData ID of the originating user contained in the <mcdata-calling-user-identity> element of the application/vnd.3gpp.mcdata-info+xml MIME body in the SIP INVITE request, shall send a SIP 403 (Forbidden) response with the warning text set

to "116 user is not part of the MCData group" in a Warning header field as specified in subclause 4.9 and shall not continue with the rest of the steps;

d) if the <list-service> element contains a <mcdata-allow-short-data-service> element in the group document set to a value of "false", shall send a SIP 403 (Forbidden) response with the warning text set to "206 short data service not allowed for this group" in a Warning header field as specified in subclause 4.x and shall not continue with the rest of the steps;

e) if the <supported-services> element is not present in the group document or is present and contains a <service> element containing an "enabler" attribute which is not set to the value "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds", shall send a SIP 488 (Not Acceptable) response with the warning text set to "207 SDS services not supported for this group" in a Warning header field as specified in subclause 4.9 and shall not continue with the rest of the steps;

f) if the MCData server group SDS procedures in subclause 11.1 indicate that the user identified by the MCData ID is not allowed to send group MCData communications on this group identity as determined by step 2) of subclause 11.1, shall reject the SIP INVITE request with a SIP 403 (Forbidden) response, with warning text set to "222 user not authorised to initiate group SDS session on this group identity" in a Warning header field as specified in subclause 4.9, and shall not continue with the rest of the steps in this subclause;

g) if the originating user identified by the MCData ID is not affiliated to the group identity contained in the SIP INVITE request, as specified in subclause 6.3.5, shall return a SIP 403 (Forbidden) response with the warning text set to "120 user is not affiliated to this group" in a Warning header field as specified in subclause 4.9, and skip the rest of the steps below;

h) shall determine targeted group members for MCData communications by following the procedures in subclause 6.3.4;

i) if the procedures in subclause 6.3.4 result in no affiliated members found in the selected MCData group, shall return a SIP 403 (Forbidden) response with the warning text set to "198 no users are affiliated to this group" in a Warning header field as specified in subclause 4.9, and skip the rest of the steps below; and

j) shall invite each group member determined in step g) above, to the group session, as specified in subclause 9.2.4.4.3; and

k) shall interact with the media plane as specified in 3GPP TS 24.582 [15] subclause 6.3.2.

Upon receiving a SIP 200 (OK) response for a SIP INVITE request as specified in subclause 9.2.4.4.3 and if the MCData ID in the SIP 200 (OK) response matches to the MCData ID in the corresponding SIP INVITE request the controlling MCData function:

1) shall generate SIP 200 (OK) response to the SIP INVITE request according to 3GPP TS 24.229 [5];

2) shall include the option tag "timer" in a Require header field;

3) shall include the Session-Expires header field and start supervising the SIP session according to rules and procedures of IETF RFC 4028 [38], "UAS Behavior". The "refresher" parameter in the Session-Expires header field shall be set to "uac";

4) shall include a P-Asserted-Identity header field with the public service identity of the controlling MCData function;

5) shall include a SIP URI for the MCData session identity in the Contact header field identifying the MCData session at the controlling MCData function;

6) shall include the following in the Contact header field:

   a) the g.3gpp.mcdata.sds media feature tag;

   b) the g.3gpp.icsi-ref media feature tag containing the value of “urn:urn-7:3gpp-service.ims.icsi.mcdata.sds”; and

   c) the isfocus media feature tag;

7) shall include Warning header field(s) received in incoming responses to the SIP INVITE request;

8) shall include in the SIP 200 (OK) response an SDP answer to the SDP offer in the incoming SIP INVITE request as specified in the subclause 9.2.4.4.2;

9) shall interact with the media plane as specified in 3GPP TS 24.582 [15] subclause 6.3.2; and

10) shall send a SIP 200 (OK) response to the inviting MCData client according to 3GPP TS 24.229 [5].

9.3 Off-network SDS

9.3.1 General

9.3.1.1 Message transport to a MCData Client

In order to transmit an off-network SDS message or SDS notification to an MCData user, the MCData client:

1) shall send the message as a UDP message to the local IP address of the MCData user, on UDP port TBD, with an IP time-to-live set to 255; and

Editor's note: Port number for the message is FFS. Registration form for port number needs to be provided in an Annex to this TS

2) shall treat UDP messages received on the port TBD as received messages.

NOTE: An MCData client that supports IPv6 shall listen to the IPv6 addresses.

9.3.1.2 Message transport to a MCData Group

In order to transmit an off-network SDS message or SDS notification to an MCData group, the MCData client:

1) shall send the message as a UDP message to the multicast IP address of the MCData group, on UDP port TBD, with an IP time-to-live set to 255; and

Editor's note: Port number for the message is FFS.

2) shall treat UDP messages received on the multicast IP address of the MCData group as mentioned in "/<x>/<x>/OffNetwork/MCPTTGroupParameter/<x>/IPMulticastAddress" leaf node present in group configuration as specified in 3GPP TS 24.483 [45[43] and on port TBD as received messages.

The message is the entire payload of the UDP message.

9.3.2 Standalone SDS using signalling control plane

9.3.2.1 General

9.3.2.2 Sending SDS message

Upon receiving an indication to send an SDS message, the MCData client:

1) if the request to send the SDS message is for a MCData group, shall check if the value of "/<x>/<x>/Common/MCData/AllowedSDS" leaf node, present in the group configuration as specified in 3GPP TS 24.483 [42], is set to "false". It the value is set to "false", shall reject the request to send the SDS message and not continue with the remaining procedures in this subclause;

2) if:

   a) a one-to-one SDS message is to be sent then, shall store the MCData user ID of the intended recipient as the target MCData user ID; or

   b) a group SDS message is to be sent then, shall store the MCData group ID as the target MCData group ID;

3) may set the stored SDS disposition request type as:

a) "DELIVERY", if only delivery disposition is requested;

b) "READ", if only read disposition is requested; or

c) "DELIVERY AND READ", if both delivery and read dispositions are requested;

4) if an existing conversation is indicated then, shall store the conversation identifier of the indicated conversation as SDS conversation ID. Otherwise, shall generate an UUID as described in IETF RFC 4122 [14] and store SDS conversation ID;

5) shall generate an UUID as described in IETF RFC 4122 [14] and store as the SDS message ID;

6) if indicated that the SDS message is in reply to another SDS message then, shall store the message identifier of the indicated message as SDS reply ID;

7) if indicated that the target recipient of the SDS message is an application then, shall store the application ID of the indicated application as SDS application ID;

8) shall store the received payload as the SDS payload;

9) shall store the received payload type as the SDS payload type;

10) shall store the current UTC time as the SDS transmission time;

11) shall generate a SDS OFF-NETWORK MESSAGE message as specified in subclause 15.1.7. In the SDS OFF-NETWORK MESSAGE message, the MCData client:

a) shall set the Sender MCData user ID IE to its own MCData user ID;

b) if:

i) a one-to-one SDS message is to be sent then shall set the Recipient MCData user ID IE to the stored target MCData user ID as specified in subclause 15.2.15; or

ii) a group SDS message is to be sent then, shall set the MCData group ID IE to the stored target MCData group ID as specified in subclause 15.2.14;

c) may set the SDS disposition request type IE to the stored the SDS disposition request type as specified in subclause 15.2.3;

d) shall set the Conversation ID IE to the stored conversation ID as specified in subclause 15.2.9;

e) shall set the Message ID IE to the stored SDS message ID as specified in subclause 15.2.10;

f) shall set the Date and time IE to the stored SDS transmission time as specified in subclause 15.2.8;

g) may include the InReplyTo message ID IE set to the stored SDS reply ID as specified in subclause 15.2.11;

h) may include the Application ID IE set to the stored SDS application ID as specified in subclause 15.2.7;

i) if end-to-end security is required for a one-to-one communication and the security context does not exist or if the existing security context has expired, shall include the Security parameters and Payload IE with security parameters as described in 3GPP TS 33.180 [26];

j) if

i) end-to-end security is not required for a one-to-one communication, or

ii) sending the SDS OFF-NETWORK MESSAGE message to a MCData group;

mayinclude the Payload IE as specified in subclause 15.2.13 with:

i) the Payload content type to the stored SDS payload type; and

ii) the Payload data set to the stored SDS payload;

12) if:

a) a one-to-one SDS message is to be sent then, shall send the SDS OFF-NETWORK MESSAGE message as specified in subclause 9.3.1.1; or

b) a group SDS message is to be sent then, shall send the SDS OFF-NETWORK MESSAGE message as specified in subclause 9.3.1.2;

13) shall initialise the counter CFS1 (SDS retransmission) with the value set to 1; and

14) shall start timer TFS1 (SDS retransmission).

9.3.2.3 Retransmitting SDS message

Upon expiry of timer TFS1 (SDS retransmission), the MCData client:

1) shall generate a SDS OFF-NETWORK MESSAGE message as specified in subclause 15.1.7. In the SDS OFF-NETWORK MESSAGE message, the MCData client:

   a) shall set the Sender MCData user ID IE to its own MCData user ID;

   b) if:

      i) a one-to-one SDS message is to be sent then, shall set the Recipient MCData user ID IE to the stored target MCData user ID; or

      ii) a group SDS message is to be sent then, shall set the MCData group ID IE to the stored target MCData group ID;

   c) may set the SDS disposition request type IE to the stored the SDS disposition request type as specified in subclause 15.2.3;

   d) shall set the Conversation ID IE to the stored conversation ID as specified in subclause 15.2.9;

   e) shall set the Message ID IE to the stored SDS message ID as specified in subclause 15.2.10;

   f) shall set the Date and time IE to the stored the SDS transmission time as specified in subclause 15.2.8;

   g) may include the InReplyTo message ID IE set to the stored SDS reply ID as specified in subclause 15.2.11;

   h) may include the Application ID IE set to the stored SDS application ID as specified in subclause 15.2.7;

   i) if end-to-end security is required for a one-to-one communication and the security context does not exist or if the existing security context has expired, shall include the Security parameters IE with security parameters as described in 3GPP TS 33.180 [26];

   j) if:

      i) end-to-end security is not required for a one-to-one communication, or

      ii) sending the SDS OFF-NETWORK MESSAGE message to a MCData group;

      mayinclude the Payload IE as specified in subclause 15.2.13 with:

      i) the Payload content type to the stored SDS payload type; and

      ii) the Payload data set to the stored SDS payload;

2) if:

   a) a one-to-one SDS message was sent then, shall send the SDS OFF-NETWORK MESSAGE message as specified in subclause 9.3.1.1; or

   b) a group SDS message was sent then, shall send the SDS OFF-NETWORK MESSAGE message as specified in subclause 9.3.1.2;

3) shall increment the counter CFS1(SDS retransmission) by 1; and

4) shall start timer TFS1 (SDS retransmission) if the associated counter CFS1 (SDS retransmission) has not reached its upper limit.

9.3.2.4 Receiving SDS message

Upon receiving an SDS OFF-NETWORK MESSAGE message with a SDS disposition request type IE, the MCData client:

1) shall store the value of Sender MCData user ID IE as the stored notification target MCData user ID;

2) shall store the value of Conversation ID IE as the stored conversation ID;

3) shall store the value of Message ID IE as the stored SDS message ID;

4) shall store the current UTC time as the stored SDS notification time;

5) if present, shall store the value of Application ID IE set to the stored SDS application ID; and

6) if present, shall store the value of MCData group ID IE to the stored target MCData group ID;

7) if the SDS disposition request type IE is set to:

   a) "DELIVERY" then, shall send a SDS OFF-NETWORK NOTIFICATION message as described in subclause 12.3.2;

   b) "READ" then, shall send a SDS OFF-NETWORK NOTIFICATION message as described in subclause 12.3.3; or

   c) "DELIVERY AND READ" then, shall start timer TFS3 (delivery and read).

NOTE: Duplicate messages (re-transmissions) that are received by the MCData client should not be processed again.

9.3.2.5 SDS Read while TFS3 (delivery and read) is running

Upon receiving a display indication before timer TFS3 (delivery and read) expires, the MCData client:

1) shall generate and send a SDS OFF-NETWORK NOTIFICATION message as described in subclause 12.3.4.

9.3.2.6 Timer TFS3 (delivery and read) expires

Upon expiry of timer TFS3 (delivery and read), the MCData client:

1) shall generate and send a SDS OFF-NETWORK NOTIFICATION message as described in subclause 12.3.2; and

2) upon receiving a display indication, shall generate and send a SDS OFF-NETWORK NOTIFICATION message as described in subclause 12.3.3.

10 File Distribution (FD)

10.1 General

The group administrator can disable the FD service on a MCData group by setting the <mcdata-allow-file-distribution> element under the <list-service> element, in the group document, to "false".

If the <mcdata-allow-file-distribution> element under the <list-service> element, in the group document, is set to "false" for a MCData group:

-- an MCData client should not use the procedures in the subclauses of the parent subclause for FD to the said MCData group.

- a terminating MCData controlling function should reject the request for FD to the said MCData group.

10.2 On-network FD

10.2.1 General

10.2.1.1 Sending an FD message

When the MCData user wishes to send:

- a one-to-one standalone File Distribution (FD) message to another MCData user; or
- a group standalone File Distribution (FD) message to a pre-configured group;

the MCData client:

1) shall follow the procedures in subclause 11.1 for transmission control; and
2) if the procedures in subclause 11.1 are successful:
   a) if requiring to send data without mandatory download, shall follow the procedures in subclause 10.2.4; and
   b) if requiring to send data with mandatory download, shall follow the the procedures in subclause 10.2.5.

10.2.1.2 Handling of received FD messages

10.2.1.2.1 Initial processing of the received FD message

When a MCData client has received a SIP request containing an application/vnd.3gpp.mcdata-signalling MIME body as specified in subclause E.1, the MCData Client:

1) shall decode the contents of the application/vnd.3gpp.mcdata-signalling MIME body;
2) if the application/vnd.3gpp.mcdata-signalling MIME body does not contain an FD SIGNALLING PAYLOAD message as specified in subclause 15.1.3, shall exit this subclause;
3) if more than one Payload IE is included in the FD SIGNALLING PAYLOAD message, shall exit this subclause;
4) if the Payload content type in the Payload IE in the FD SIGNALLING PAYLOAD message is not set to "FILEURL", shall exit this subclause;
5) if the FD SIGNALLING PAYLOAD message contains a Mandatory download IE set to the value of "MANDATORY DOWNLOAD" shall follow the procedures in subclause 10.2.1.2.2; and
6) if the FD SIGNALLING PAYLOAD message does not contain a Mandatory download IE, shall follow the procedures in subclause 10.2.1.2.3.

10.2.1.2.2 Mandatory Download

The MCData client:

1) if the FD SIGNALLING PAYLOAD message contains a new Conversation ID, shall instantiate a new conversation with the Message ID in the FD SIGNALLING PAYLOAD identifying the first message in the conversation thread;
2) if the FD SIGNALLING PAYLOAD message contains an existing Conversation ID and:
   a) if the FD SIGNALLING PAYLOAD message does not contain an InReplyTo message ID, shall use the Message ID in the FD SIGNALLING PAYLOAD to identify a new message in the existing conversation thread; and

b) if the FD 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 FD SIGNALLING PAYLOAD, and use the Message ID in the FD SIGNALLING PAYLOAD to identify the new message;

3) may store the Conversation ID, Message ID, InReplyTo message ID and Date and time in local storage;

4) if the FD SIGNALLING PAYLOAD message does not contain an Application ID IE:

a) shall determine that the payload contained in the Payload IE in the FD SIGNALLING PAYLOAD message is for user consumption;

b) shall notify the user or application that the file identified by file URL in the Payload data in the Payload IE will be downloaded automatically; and

c) if the FD SIGNALLING PAYLOAD message contains a Metadata IE, shall deliver the contents of the Metadata IE to the user or application;

5) if the FD SIGNALLING PAYLOAD message contains an Application ID IE:

a) shall determine that the payload contained in the Payload IE in the FD SIGNALLING PAYLOAD message is not for user consumption;

b) if the Application ID value is unknown, shall discard the FD message and exit this subclause;

c) if the Application ID value is known, shall notify the application that the file identified by file URL in the Payload data in the Payload IE will be downloaded automatically; and

NOTE: If FD request is addressed to a non-MCData application that is not running, the MCData client starts the local non-MCData application. Subsequent automatic download of the file is then started and the file is delivered to that application.

d) if the FD SIGNALLING PAYLOAD message contains a Metadata IE, shall deliver the contents of the Metadata IE to the application;

6) shall generate an FD NOTIFICATION indicating acceptance of the FD request as specified in subclause 12.2.1.1;

7) shall attempt to download the file as identified by the file URL in the Payload IE in the FD SIGNALLING PAYLOAD message, as specified in subclause 10.2.3.1; and

8) if the received FD SIGNALLING PAYLOAD message contains an FD disposition request type IE requesting a file download completed update indication, then after the file has been successfully downloaded, shall generate an FD NOTIFICATION indicating file download completed, by following the procedures in subclause 12.2.1.1.

10.2.1.2.3 Non-Mandatory download

The MCData client:

1) if the FD SIGNALLING PAYLOAD message does not contain an Application ID IE:

a) shall determine that the payload contained in the Payload IE in the FD SIGNALLING PAYLOAD message is for user consumption;

b) shall notify the user about the incoming FD request; and

c) if the FD SIGNALLING PAYLOAD message contains a Metadata IE, shall deliver the contents of the Metadata IE to the user;

2) if the FD SIGNALLING PAYLOAD message contains an Application ID IE:

a) shall determine that the payload contained in the Payload IE in the FD SIGNALLING PAYLOAD message is not for user consumption;

b) if the Application ID value is unknown, shall discard the FD message and exit this subclause;

c) if the Application ID value is known, shall notify the application of the incoming FD request; and

NOTE 1: If FD request is addressed to a non-MCData application that is not running, the MCData client starts the local non-MCData application.

d) if the FD SIGNALLING PAYLOAD message contains a Metadata IE, shall deliver the contents of the Metadata IE to the application;

3) shall start a timer TDU2 (FD non-mandatory download timer) with the timer value as specified in subclause F.2.3;

4) shall wait for the user or application to request to download the file indicated by file URL in the Payload data in the Payload IE in the FD SIGNALLING PAYLOAD message;

5) if the user or application accepts or rejects or decides to defer the FD request, shall stop timer TDU2 (FD non-mandatory download timer);

6) if the user defered the FD request while the timer TDU2 (FD non-mandatory download timer) was running, shall generate an FD NOTIFICATION indicating deferral of the FD request as specified in subclause 12.2.1.1;

NOTE 2: Once the timer TDU2 (FD non-mandatory download timer) has expired the FD request can only be accepted or rejected with an appropriate action by the MCData client.

NOTE 3: Once the timer TDU2 (FD non-mandatory download timer) has expired, no action is taken by the MCData client if the FD request is deferred.

7) if the user or application rejects the FD request, shall generate an FD NOTIFICATION indicating rejection of the FD request as specified in subclause 12.2.1.1 and shall exit this subclause; and

8) if the user accepts the FD request:

a) shall generate an FD NOTIFICATION indicating acceptance of the FD request as specified in subclause 12.2.1.1;

b) if the FD SIGNALLING PAYLOAD message contains a new Conversation ID, shall instantiate a new conversation with the Message ID in the FD SIGNALLING PAYLOAD identifying the first message in the conversation thread;

c) if the FD SIGNALLING PAYLOAD message contains an existing Conversation ID and:

i) if the FD SIGNALLING PAYLOAD message does not contain an InReplyTo message ID, shall use the Message ID in the FD SIGNALLING PAYLOAD to identify a new message in the existing conversation thread; and

ii) if the FD 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 FD SIGNALLING PAYLOAD, and use the Message ID in the FD SIGNALLING PAYLOAD to identify the new message;

d) may store the Conversation ID, Message ID, InReplyTo message ID and Date and time in local storage;

e) shall attempt to download the file as identified by the file URL in the Payload IE in the FD SIGNALLING PAYLOAD message, as specified in subclause 10.2.3.1; and

f) if the received FD SIGNALLING PAYLOAD message contains an FD disposition request type IE requesting a file download completed update, then after the file download has been successfully downloaded, shall generate an FD NOTIFICATION by following the procedures in subclause 12.2.1.1.

10.2.1.3 Discovery of the Absolute URI of the media storage function

10.2.1.3.1 General

In order to upload a file to the media storage function on the controlling MCData function, the MCData UE if not aware of the absolute URI of the media storage function, discovers the absolute URI of the media storage function.

10.2.1.3.2 MCData client procedures

To discover the absolute URI of the media storage function, the MCData client shall generate a SIP MESSAGE request towards the participating MCData function, in accordance with 3GPP TS 24.229 [5] and IETF RFC 3428 [6] with the clarifications given below.

The MCData client:

1) shall build the SIP MESSAGE request as specified in subclause 6.2.4.1;

2) shall follow the rules specified in subclause 6.4 for the handling of MIME bodies in a SIP message when processing the remaining steps in this subclause;

3) shall insert in the SIP MESSAGE request an application/vnd.3gpp.mcdata-info+xml MIME body with a <request-type> element containing the value "msf-disc-req";

4) if the upload of a file is for a group standalone FD request, shall include in an application/vnd.3gpp.mcdata-info+xml MIME body, the <mcdata-calling-group-id> element set to the required MCData group identity; and

NOTE 1: The absence of a group identity in the <mcdata-calling-group-id> element of the application/vnd.3gpp.mcdata-info+xml MIME body implies that the MCData client intends to upload a file for a one-to-one FD request. In this case, the participating MCData function identifies the MCData ID of the user from the binding between the public user identity and the MCData ID.

5) shall send the SIP MESSAGE request according to rules and procedures of 3GPP TS 24.229 [5].

On receipt of a "SIP MESSAGE request for absolute URI discovery response", the MCData client:

1) shall store the absolute URI found in the <mcdata-controller-psi> element;

2) shall generate a SIP 200 (OK) response according to rules and procedures of 3GPP TS 24.229 [5]; and

3) shall send the SIP 200 (OK) response towards the MCData server according to rules and procedures of 3GPP TS 24.229 [5].

10.2.1.3.3 Participating MCData function procedures

On receipt of a "SIP MESSAGE request for absolute URI discovery request for participating MCData function", the originating participating MCData function:

1) if unable to process the request due to a lack of resources or a risk of congestion exists, may reject the SIP MESSAGE request with a SIP 500 (Server Internal Error) response. The participating MCData function may include a Retry-After header field to the SIP 500 (Server Internal Error) response as specified in IETF RFC 3261 [4] and skip the rest of the steps;

2) shall determine the MCData ID of the calling user from the public user identity in the P-Asserted-Identity header field of the SIP MESSAGE request;

NOTE 1: The MCData ID of the calling user is bound to the public user identity at the time of service authorisation, as documented in subclause 7.3.

3) if the participating MCData function cannot find a binding between the public user identity and an MCData ID or if the validity period of an existing binding has expired, then the participating MCData function shall reject the SIP MESSAGE request with a SIP 404 (Not Found) response with the warning text set to "141 user unknown to the participating function" in a Warning header field as specified in subclause 4.9, and shall not continue with any of the remaining steps;

4) if the <request-type> element in the application/vnd.3gpp.mcdata-info+xml MIME body of the SIP MESSAGE request is "msf-disc-req":

   a) if the application/vnd.3gpp.mcdata-info+xml MIME body does not contain a MCData group ID, shall determine the public service identity of the controlling MCData function hosting the one-to-one FD using HTTP service for the calling user; and

b) if the application/vnd.3gpp.mcdata-info+xml MIME body contains a MCData group ID, shall determine the public service identity of the controlling MCData function hosting the group standalone FD using HTTP service, associated with the MCData group identity in the <mcdata-calling-group-id> element of the application/vnd.3gpp.mcdata-info+xml MIME body in the SIP MESSAGE request;

5) if unable to identify the controlling MCData function, it shall reject the SIP MESSAGE request with a SIP 404 (Not Found) response with the warning text "142 unable to determine the controlling function" in a Warning header field as specified in subclause 4.9, and shall not continue with any of the remaining steps;

6) shall determine whether the MCData user identified by the MCData ID is authorised for MCData communications by following the procedures in subclause 11.1;

7) if the application/vnd.3gpp.mcdata-info+xml MIME body of the SIP MESSAGE request does not contain a <mcdata-calling-group-id> element or the procedures in subclause 11.1 indicate that the user identified by the MCData ID is not allowed to send MCData communications as determined by step 1) of subclause 11.1, shall reject the "SIP MESSAGE request for and absolute URI discovery request for participating MCData function" with a SIP 403 (Forbidden) response to the SIP MESSAGE request, with warning text set to "200 user not authorised to transmit data" in a Warning header field as specified in subclause 4.9, and shall not continue with the rest of the steps in this subclause;

8) shall generate a SIP MESSAGE request accordance with 3GPP TS 24.229 [5] and IETF RFC 3428 [6];

9) shall copy all MIME bodies included in the incoming SIP MESSAGE request to the outgoing SIP MESSAGE request;

10) shall include the MCData ID of the originating user in the <mcdata-calling-user-identity> element of the application/vnd.3gpp.mcdata-info+xml MIME body of the outgoing SIP MESSAGE request;

11) shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd" (coded as specified in 3GPP TS 24.229 [5]), into the P-Asserted-Service header field of the outgoing SIP MESSAGE request;

12) shall set the Request-URI of the outgoing SIP MESSAGE request to the public user identity of the controlling MCData function as determined by step 4) in this subclause;

13) shall set the P-Asserted-Identity header field of the outgoing SIP MESSAGE request to the public user identity in the P-Asserted-Identity header field contained in the received SIP MESSAGE request; and

14) shall send the SIP MESSAGE request as specified in 3GPP TS 24.229 [5].

Upon receipt of a SIP 200 (OK) response in response to the SIP MESSAGE request in step 14):

1) shall generate a SIP 200 (OK) response as specified in 3GPP TS 24.229 [5]; and

2) shall send the SIP 200 (OK) response to the originating MCData client according to 3GPP TS 24.229 [5].

On receipt of a "SIP MESSAGE request for absolute URI discovery response for the participating function", the participating MCData function shall: forward the SIP MESSAGE request to the originating MCData client.

Upon receipt of a SIP 200 (OK) response in response to the forwarded SIP MESSAGE request, the participating MCData function:

1) shall generate a SIP 200 (OK) response as specified in 3GPP TS 24.229 [5]; and

2) shall send the SIP 200 (OK) response to the controlling MCData function according to 3GPP TS 24.229 [5].

10.2.1.3.4 Controlling MCData function procedures

Upon receiving a "SIP MESSAGE request for absolute URI discovery request" message, the controlling MCData function:

1) if unable to process the request due to a lack of resources or a risk of congestion exists, may reject the SIP MESSAGE request with a SIP 500 (Server Internal Error) response. The controlling MCData function may include a Retry-After header field to the SIP 500 (Server Internal Error) response as specified in IETF RFC 3261 [4]. Otherwise, continue with the rest of the steps;

2) if the SIP MESSAGE does not contain an application/vnd.3gpp.mcdata-info+xml MIME body, shall reject the SIP MESSAGE request with a SIP 403 (Forbidden) response, with warning text set to "199 expected MIME bodies not in the request" in a Warning header field as specified in subclause 4.9, and shall not continue with the rest of the steps in this subclause;

3) shall decode the contents of the application/vnd.3gpp.mcdata-info+xml MIME body contained in the SIP MESSAGE;

4) if the <mcdata-calling-group-id> element in the application/vnd.3gpp.mcdata-info+xml MIME body of the SIP MESSAGE request is present:

   a) shall retrieve the group document associated with the group identity in the SIP MESSAGE request by following the procedures in subclause 6.3.3, and shall continue with the remaining steps if the procedures in subclause 6.3.3 were successful;

   b) if the <on-network-disabled> element is present in the group document, shall send a SIP 403 (Forbidden) response with the warning text set to "115 group is disabled" in a Warning header field as specified in subclause 4.9 and shall not continue with the rest of the steps;

   c) if the <list> element of the <list-service> element in the group document does not contain an <entry> element with a "uri" attribute matching the MCData ID of the originating user contained in the <mcdata-calling-user-identity> element of the application/vnd.3gpp.mcdata-info+xml MIME body in the SIP MESSAGE request, shall send a SIP 403 (Forbidden) response with the warning text set to "116 user is not part of the MCData group" in a Warning header field as specified in subclause 4.9 and shall not continue with the rest of the steps;

   d) if the <list-service> element contains a<mcdata-allow-file-distribution> element in the group document set to a value of "false", shall send a SIP 403 (Forbidden) response with the warning text set to "213 file distribution not allowed for this group" in a Warning header field as specified in subclause 4.9 and shall not continue with the rest of the steps;

   e) if the <supported-services> element is not present in the group document or is present and contains a <service> element containing an "enabler" attribute which is not set to the value "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd", shall send a SIP 488 (Not Acceptable) response with the warning text set to "214 FD services not supported for this group" in a Warning header field as specified in subclause 4.9 and shall not continue with the rest of the steps;

   f) if the MCData server group FD procedures in subclause 11.1 indicate that the user identified by the MCData ID:

      i) is not allowed to send group MCData communications on this group identity as determined by step 1) of subclause 11.1, shall reject the SIP MESSAGE request with a SIP 403 (Forbidden) response, with warning text set to "201 user not authorised to transmit data on this group identity" in a Warning header field as specified in subclause 4.9, and shall not continue with the rest of the steps in this subclause; and

      ii) the originating user identified by the MCData ID is not affiliated to the group identity contained in the SIP MESSAGE request, as specified in subclause 6.x.x, shall return a SIP 403 (Forbidden) response with the warning text set to "120 user is not affiliated to this group" in a Warning header field as specified in subclause 4.9, and skip the rest of the steps below;

5) shall generate a SIP 200 (OK) response in response to the "SIP MESSAGE request for absolute URI discovery request for controlling MCData function";

6) shall send the SIP 200 (OK) response towards the originating participating MCData function according to 3GPP TS 24.229 [5]; and

7) shall generate a SIP MESSAGE request in accordance with 3GPP TS 24.229 [5] and IETF RFC 3428 [6]. In the generation of the SIP MESSAGE request, the controlling MCData function:

   a) shall include an Accept-Contact header field with the media feature tag g.3gpp.icsi-ref with the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd" along with parameters "require" and "explicit" according to IETF RFC 3841 [8] in the outgoing SIP MESSAGE request;

   b) shall identify the absolute URI of the media storage function associated with the controlling function:

c) shall include a P-Asserted-Service header field with the value "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd";

d) shall include an application/vnd.3gpp.mcdata-info+xml MIME body in the SIP MESSAGE request, following the rules specified in subclause 6.4 for the handling of MIME bodies in a SIP message, with:

i) a <request-type> element containing the value "msf-disc-res"; and

ii) an <mcdata-controller-psi> element set to the absolute URI of the media storage function if in step b) above;

e) shall set the Request-URI of the outgoing SIP MESSAGE request to the public service identity of the participating MCData function associated to the MCData ID of the originating user mentioned in the <mcdata-calling-user-identity> element of the application/vnd.3gpp.mcdata-info+xml MIME body of the outgoing SIP MESSAGE request; and

f) shall copy the public user identity of the calling MCData user from the P-Asserted-Identity header field of the incoming SIP MESSAGE request into the P-Asserted-Identity header field of the outgoing SIP MESSAGE request; and

8) shall send the SIP MESSAGE request towards the participating MCData function as specified in 3GPP TS 24.229 [5].

10.2.2 File upload using HTTP

10.2.2.1 Media storage client procedures

If the media storage client is not aware of the absolute URI of the media storage function, the media storage client shall request the MCData client to discover the absolute URI associated with the media storage function by following the procedures in subclause 10.2.1.3.

The media storage client shall send HTTP requests over a TLS connection as specified for the HTTP client in the UE in annex A of 3GPP TS 24.482 [24].

NOTE 1: The HTTP client encodes the MCData ID in the bearer access token of the Authorization header field of an HTTP request as specified in 3GPP TS 24.482 [24].

NOTE 2: The HTTP client always sends the HTTP requests to an HTTP proxy. Annex A of 3GPP TS 24.482 [24] indicates how the HTTP proxy forwards the HTTP request to the HTTP server.

To upload a file to media storage function, the media storage client:

1) shall generate an HTTP POST request as specified in IETF RFC 7230 [22] and IETF RFC 7231 [23];

2) shall set the Request-URI to the absolute URI identifying the resource on a media storage function;

3) shall set the Host header field to a hostname identifying the media storage function;

4) shall set the Content-Type header field to multipart/mixed and with a boundary delimiter parameter set to any chosen value;

5) if the file upload is for one-to-one file distribution, shall insert an application/vnd.3gpp.mcdata-info+xml MIME body with:

a) the <request-type> element set to a value of "one-to-one-fd"; and

b) the <mcdata-calling-user-id> element set to the originating MCData ID;

6) if the file upload is for group file distribution, shall insert an application/vnd.3gpp.mcdata-info+xml MIME body with:

a) the <request-type> element set to a value of "group-fd";

b) the <mcdata-request-uri> element set to the MCData group identity; and

c) the <mcdata-calling-user-id> element set to the originating MCData ID;

7) if end-to-end security is required for a one-to-one communication, the MCData client protects the binary data representing the file and prefixes the protected binary data with security parameters as described in 3GPP TS 33.180 [26];

8) if

   i) end-to-end security is not required for a one-to-one communication, or

   ii) the file upload is for group file distribution;

   shall include the binary data representing the file with Content-Type field set to application/octet-stream and Content-Length field set to the file size; and

9) shall send the HTTP POST request towards the media storage function.

On receipt of a HTTP 201 Created containing a Location header field with a URL identifying the location of the resource where the file has been stored on the media storage function, then the media storage client shall store this information.

10.2.2.2 Media storage function procedures

The media storage function shall act as an HTTP server as defined in annex A of 3GPP TS 24.482 [24].

NOTE: The HTTP server validates the MCData ID in the bearer access token of the Authorization header field of an HTTP request as specified in 3GPP TS 24.482 [24].

On receipt of an HTTP POST request with a Request-URI identifying a resource on the media storage function, the media storage function:

1) shall decode the contents of application/vnd.3gpp.mcdata-info+xml MIME body:

   a) if the user indicated by <mcdata-calling-user-id> element is not allowed to upload files due to transmission control policy, shall return a HTTP 403 Forbidden response and not continue with the remaining steps in this subclause;

   b) If the <request-type> element is set to:

      a) "one-to-one-fd" and the Content-Length header under application/octet-stream MIME is greater than <max-data-size-fd-bytes> element present in the service configuration document as specified in 3GPP TS 24.484 [12], shall generate and send a HTTP 413 Payload Too Large response and not continue with the remaing steps in this subclause;

      b) "group-fd":

         i) shall retrieve the group document associated with the group identity indicated in the <mcdata-request-uri> element by following the procedures in subclause 6.3.3, and shall continue with the remaining steps if the procedures in subclause 6.3.3 were successful;

         ii) if the Content-Length header under application/octet-stream MIME is greater than <mcdata-on-network-max-data-size-for-FD> element present in the group document retrieved in step i), shall generate and send a HTTP 413 Payload Too Large response and not continue with the remaing steps in this subclause;

2) shall process the HTTP POST request by following the procedures in IETF RFC 7230 [22] and IETF RFC 7231 [23] with the following clarifications:

   a) shall store the file in the resource location as identified by the Request-URI; and

   b) shall generate and send a HTTP 201 Created response containing a Location header field with a URL identifying the location of the stored file.

10.2.3 File download using HTTP

10.2.3.1 Media storage client procedures

The media storage client on the MCData client shall send HTTP requests over a TLS connection as specified for the HTTP client in the UE, in annex A of 3GPP TS 24.482 [24].

NOTE 1: The HTTP client encodes the MCData ID in the bearer access token of the Authorization header field of an HTTP request as specified in 3GPP TS 24.482 [24].

NOTE 2: The HTTP client always sends the HTTP requests to an HTTP proxy. Annex A of 3GPP TS 24.482 [24] indicates how the HTTP proxy forwards the HTTP request to the HTTP server.

To download a file from the media storage function on the controlling MCData function, the media storage client on the MCData client:

1) shall generate an HTTP GET request as specified in IETF RFC 7230 [22] and IETF RFC 7231 [23] with a Request-URI set to an absolute URI identifying the URL of the file being requested from the media storage function on the controlling MCData function; and

2) shall send the HTTP GET request towards the media storage function on the controlling MCData function.

On receipt of a HTTP 200 OK response containing the requested file, the MCData client shall notify the user or application that the file has been successfully downloaded.

10.2.3.2 Media storage function procedures

The media storage function on the controlling MCData function shall act as an HTTP server as defined in annex A of 3GPP TS 24.482 [24].

NOTE 1: The HTTP server validates the MCData ID in the bearer access token of the Authorization header field of an HTTP request as specified in 3GPP TS 24.482 [24].

On receipt of an HTTP GET request with a Request-URI identifying a file, the media storage function on the controlling MCData function:

1) if the MCData user is not allowed to download files due to reception control policy, shall return an HTTP 403 Forbidden response;

2) shall process the HTTP GET request by following the procedures in IETF RFC 7230 [22] and IETF RFC 7231 [23], and shall return a HTTP 200 OK response containing the requested file.

10.2.4 FD using HTTP

10.2.4.1 General

The procedures in the subclauses of the parent subclause describe the SIP signalling procedures for:

- one-to-one file distribution using HTTP; and
- group standalone file distribution using HTTP.

When the MCData user wishes to perform file distribution via HTTP, the MCData client:

1) shall check that the file size is less than or equal to the:

   a) <mcdata-on-network-max-data-size-for-FD> element present in the group document retrieved by the group management client as specified in 3GPP TS 24.481 [11], if the file upload is for a group file distribution; or

   b) <max-data-size-fd-bytes> element present in the service configuration document as specified in 3GPP TS 24.484 [12], if the file upload is for a one-to-one file distribution;

2) if the size of the file:

a) is acceptable for upload as determined by step 1), shall discover the absolute URI of the media storage function if necessary by following the procedures in subclause 10.2.1.3;

b) is not acceptable for upload, shall not continue with the remaining steps in this subclause;

3) shall request the media storage client to upload the file to the media storage function by following the procedures in subclause 10.2.2.1; and

4) shall initiate an FD request containing a file URL as specified in subclause 10.2.4.2.1.

10.2.4.2 MCData client procedures

10.2.4.2.1 MCData client originating procedures

The MCData client shall generate a SIP MESSAGE request in accordance with 3GPP TS 24.229 [5] and IETF RFC 3428 [6] with the clarifications given below.

The MCData client:

1) shall build the SIP MESSAGE request as specified in subclause 6.2.4.1;

2) if a one-to-one standalone FD message is to be sent shall insert in the SIP MESSAGE request:

a) an application/resource-lists+xml MIME body with the MCData ID of the target MCData user, according to rules and procedures of IETF RFC 4826 [9]; and

b) an application/vnd.3gpp.mcdata-info+xml MIME body with a <request-type> element set to a value of "one-to-one-fd";

3) if a group standalone FD message is to be sent:

a) if the "/<*x*>/<*x*>/Common/MCData/AllowedFD" leaf node present in the group document of the requested MCData group, configured on the group management client as specified in 3GPP TS 24.483 [42] is set to "false", shall reject the request for FD and not continue with the rest of the steps in this subclause; and

b) shall insert in the SIP MESSAGE request an application/vnd.3gpp.mcdata-info+xml MIME body with:

i) the <request-type> element set to a value of "group-fd";

ii) the <mcdata-request-uri> element set to the MCData group identity; and

iii) the <mcdata-client-id> element set to the MCData client ID of the originating MCData client;

4) shall generate a standalone FD message as specified in subclause 6.2.2.2; and

5) shall send the SIP MESSAGE request according to rules and procedures of 3GPP TS 24.229 [5].

10.2.4.2.2 MCData client terminating procedures

Upon receipt of a "SIP MESSAGE request for FD using HTTP for terminating MCData client", the MCData client:

1) may reject the SIP MESSAGE request if there are not enough resources to handle the SIP MESSAGE request;

2) if the SIP MESSAGE request is rejected in step 1), shall respond towards the participating MCData function with a SIP 480 (Temporarily unavailable) response and skip the rest of the steps of this subclause;

3) shall generate a SIP 200 (OK) response according to rules and procedures of 3GPP TS 24.229 [5];

4) shall send the SIP 200 (OK) response towards the MCData server according to rules and procedures of 3GPP TS 24.229 [5]; and

5) shall handle the received message as specified in subclause 10.2.1.2.

10.2.4.3 Participating MCData function procedures

10.2.4.3.1 Originating participating MCData function procedures

Upon receipt of a "SIP MESSAGE request for FD using HTTP for originating participating MCData function", the participating MCData function:

1) if unable to process the request due to a lack of resources or a risk of congestion exists, may reject the SIP MESSAGE request with a SIP 500 (Server Internal Error) response. The participating MCData function may include a Retry-After header field to the SIP 500 (Server Internal Error) response as specified in IETF RFC 3261 [4] and skip the rest of the steps;

2) shall determine the MCData ID of the originating user from the public user identity in the P-Asserted-Identity header field of the SIP MESSAGE request, and shall authorise the calling user;

NOTE: The MCData ID of the calling user is bound to the public user identity at the time of service authorisation, as documented in subclause 7.3.

3) if the participating MCData function cannot find a binding between the public user identity and an MCData ID or if the validity period of an existing binding has expired, then the participating MCData function shall reject the SIP MESSAGE request with a SIP 404 (Not Found) response with the warning text set to "141 user unknown to the participating function" in a Warning header field as specified in subclause 4.9, and shall not continue with any of the remaining steps;

4) if the <request-type> element in the application/vnd.3gpp.mcdata-info+xml MIME body of the SIP MESSAGE request is:

   a) set to a value of "group-fd", shall determine the public service identity of the controlling MCData function hosting the group standalone FD using HTTP service, associated with the MCData group identity in the <mcdata-request-uri> element of the application/vnd.3gpp.mcdata-info+xml MIME body in the SIP MESSAGE request; or

   b) set to a value of "one-to-one-fd", shall determine the public service identity of the controlling MCData function hosting the one-to-one FD using HTTP service for the calling user;

5) if unable to identify the controlling MCData function, it shall reject the SIP MESSAGE request with a SIP 404 (Not Found) response with the warning text "142 unable to determine the controlling function" in a Warning header field as specified in subclause 4.9, and shall not continue with any of the remaining steps;

6) shall determine whether the MCData user identified by the MCData ID is authorised for MCData communications by following the procedures in subclause 11.1;

7) if the procedures in subclause 11.1 indicate that the user identified by the MCData ID:

   a) is not allowed to initiate MCData communications as determined by step 1) of subclause 11.1, shall reject the "SIP MESSAGE request for FD using HTTP for originating participating MCData function" with a SIP 403 (Forbidden) response to the SIP MESSAGE request, with warning text set to "200 user not authorised to transmit data" in a Warning header field as specified in subclause 4.9, and shall not continue with the rest of the steps in this subclause; and

   b) is not allowed to initiate one-to-one MCData communications due to exceeding the maximum amount of data that can be sent in a single request as determined by step 7) of subclause 11.1, shall reject the "SIP MESSAGE request for FD using HTTP for originating participating MCData function" with a SIP 403 (Forbidden) response to the SIP MESSAGE request, with warning text set to "202 user not authorised for one-to-one MCData communications due to exceeding the maximum amount of data that can be sent in a single request" in a Warning header field as specified in subclause 4.9, and shall not continue with the rest of the steps in this subclause;

8) shall generate a SIP MESSAGE request in accordance with 3GPP TS 24.229 [5] and IETF RFC 3428 [6];

9) shall set the Request-URI of the outgoing SIP MESSAGE request to the public service identity of the controlling MCData function as determined by step 4) in this subclause;

10) shall copy all MIME bodies included in the incoming SIP MESSAGE request to the outgoing SIP MESSAGE request;

11) shall include the MCData ID of the originating user in the <mcdata-calling-user-identity> element of the application/vnd.3gpp.mcdata-info+xml MIME body of the outgoing SIP MESSAGE request;

12) shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd" (coded as specified in 3GPP TS 24.229 [5]), into the P-Asserted-Service header field of the outgoing SIP MESSAGE request;

13) shall set the P-Asserted-Identity in the outgoing SIP MESSAGE request to the public user identity in the P-Asserted-Identity header field contained in the received SIP MESSAGE request; and

14) shall send the SIP MESSAGE request as specified to 3GPP TS 24.229 [5].

Upon receipt of a SIP 202 (Accepted) response in response to the SIP MESSAGE request in step 14):

1) shall generate a SIP 202 (Accepted) response as specified in 3GPP TS 24.229 [5]; and

2) shall send the SIP 202 (Accepted) response to the MCData client according to 3GPP TS 24.229 [5].

Upon receipt of a SIP 200 (OK) response in response to the SIP MESSAGE request in step 14):

1) shall generate a SIP 200 (OK) response as specified in 3GPP TS 24.229 [5]; and

2) shall send the SIP 200 (OK) response to the MCData client according to 3GPP TS 24.229 [5].

Upon receipt of a SIP 4xx, 5xx or 6xx response to the SIP MESSAGE request in step 14) the participating MCData function:

1) shall generate a SIP response according to 3GPP TS 24.229 [5];

2) shall include Warning header field(s) that were received in the incoming SIP response; and

3) shall forward the SIP response to the MCData client according to 3GPP TS 24.229 [5].

10.2.4.3.2 Terminating participating MCData function procedures

Upon receipt of a "SIP MESSAGE request for FD using HTTP for terminating participating MCData function", the participating MCData function:

1) if unable to process the request due to a lack of resources or a risk of congestion exists, may reject the SIP MESSAGE request with a SIP 500 (Server Internal Error) response. The participating MCData function may include a Retry-After header field to the SIP 500 (Server Internal Error) response as specified in IETF RFC 3261 [4] and skip the rest of the steps;

2) shall use the MCData ID present in the <mcdata-request-uri> element of the application/vnd.3gpp.mcdata-info+xml MIME body of the incoming SIP MESSAGE request to retrieve the binding between the MCData ID and public user identity of the terminating MCData user;

3) if the binding between the MCData ID and public user identity of the terminating MCData user does not exist, then the participating MCData function shall reject the SIP MESSAGE request with a SIP 404 (Not Found) response, and shall not continue with the rest of the steps;

4) shall generate an outgoing SIP MESSAGE request as specified in subclause 6.3.2.1;

5) shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd" (coded as specified in 3GPP TS 24.229 [5]), into the P-Asserted-Service header field of the outgoing SIP MESSAGE request; and

6) shall send the SIP MESSAGE request as specified in 3GPP TS 24.229 [5].

Upon receipt of a SIP 200 (OK) response in response to the above SIP MESSAGE request, the participating MCData function:

1) shall generate a SIP 200 (OK) response as specified in 3GPP TS 24.229 [5]; and

2) shall send the SIP 200 (OK) response to the controlling MCData function according to 3GPP TS 24.229 [5].

Upon receipt of a SIP 4xx, 5xx or 6xx response to the above SIP MESSAGE request, the participating MCData function:

1) shall generate a SIP response according to 3GPP TS 24.229 [5];

2) shall include Warning header field(s) that were received in the incoming SIP response; and

3) shall forward the SIP response to the controlling MCData function according to 3GPP TS 24.229 [5].

10.2.4.4 Controlling MCData function procedures

10.2.4.4.1 Originating controlling MCData function procedures

This subclause describes the procedures for sending a SIP MESSAGE from the controlling MCData function and is initiated by the controlling MCData function as a result of an action in subclause 10.2.4.4.2.

The controlling MCData function:

1) shall generate a SIP MESSAGE request in accordance with 3GPP TS 24.229 [5] and IETF RFC 3428 [6];

2) shall include an Accept-Contact header field containing the g.3gpp.mcdata.fd media feature tag along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [8] in the outgoing SIP MESSAGE request;

3) shall include an Accept-Contact header field with the media feature tag g.3gpp.icsi-ref with the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd" along with parameters "require" and "explicit" according to IETF RFC 3841 [8] in the outgoing SIP MESSAGE request;

4) shall copy the following MIME bodies in the received SIP MESSAGE request into the outgoing SIP MESSAGE request by following the guidelines in subclause 6.4:

   a) application/vnd.3gpp.mcdata-info+xml MIME body; and

   b) application/vnd.3gpp.mcdata-signalling MIME body;

5) if the application/vnd.3gpp.mcdata-signalling MIME body in the received SIP MESSAGE request contained a FD SIGNALLING PAYLOAD message without the Mandatory download IE included, then:

   a) shall execute the procedures in subclause 11.2;

   b) if the procedures in subclause 11.2 indicate that the mandatory download indication needs to be included,shall include the Mandatory download IE set to a value of "MANDATORY DOWNLOAD" in the FD SIGNALLING PAYLOAD message of the outgoing SIP MESSAGE request;

6) in the application/vnd.3gpp.mcdata-info+xml MIME body:

   a) shall set the <mcdata-request-uri> element set to the MCData ID of the terminating user; and

   b) if the <request-type> element in the application/vnd.3gpp.mcdata-info+xml MIME body of the incoming SIP MESSAGE request was set to a value of "group-fd", shall set the <mcdata-calling-group-id> element to the group identity;

7) shall set the Request-URI to the public service identity of the terminating participating MCData function associated to the MCData user to be invited;

8) shall copy the public user identity of the calling MCData user from the P-Asserted-Identity header field of the incoming SIP MESSAGE request into the P-Asserted-Identity header field of the outgoing SIP MESSAGE request;

9) shall include a P-Asserted-Service header field with the value "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd"; and

10) shall send the SIP MESSAGE request according to according to rules and procedures of 3GPP TS 24.229 [5].

10.2.4.4.2 Terminating controlling MCData function procedures

The procedures in this subclause are executed upon:

- receipt of a "SIP MESSAGE request for FD using HTTP for controlling MCData function", the controlling MCData function; or

- a decision to now process a previously received "SIP MESSAGE request for FD using HTTP for controlling MCData function" that had been queued for later transmission;

NOTE 1: The controlling MCData function may postpone the continuation of an FD using HTTP procedure by queuing the received "SIP MESSAGE request for FD using HTTP for controlling MCData function". The management of the queue is specified in Annex B of 3GPP TS 23.282 [2].

the controlling MCData function:

1) if unable to process the request due to a lack of resources or a risk of congestion exists, may reject the SIP MESSAGE request with a SIP 500 (Server Internal Error) response or queue the received SIP MESSAGE. The controlling MCData function may include a Retry-After header field to the SIP 500 (Server Internal Error) response as specified in IETF RFC 3261 [4];

2) if the received SIP MESSAGE request has been queued for later transmission, shall include warning text set to "215 request to transmit is queued by the server" in a Warning header field as specified in subclause 4.9;, in the SIP 202 (Accepted) response and not continue with the remaining steps in this subclause. Otherwise, continue with the rest of the steps;

3) if the SIP MESSAGE does not contain:

   a) an application/vnd.3gpp.mcdata-info+xml MIME body; and

   b) an application/vnd.3gpp.mcdata-signalling MIME body;

   shall reject the SIP MESSAGE request with a SIP 403 (Forbidden) response, with warning text set to "199 expected MIME bodies not in the request" in a Warning header field as specified in subclause 4.9, and shall not continue with the rest of the steps in this subclause;

4) shall decode the contents of the application/vnd.3gpp.mcdata-signalling MIME body contained in the SIP MESSAGE;

5) if the application/vnd.3gpp.mcdata-signalling MIME body does not contain only one FD SIGNALLING PAYLOAD message, shall reject the SIP MESSAGE request with a SIP 403 (Forbidden) response, with warning text set to "209 one FD SIGNALLING PAYLOAD message only must be present in FD request" in a Warning header field as specified in subclause 4.9, and shall not continue with the rest of the steps in this subclause;

6) if the FD SIGNALLING PAYLOAD message does not contain only one Payload IE, shall reject the SIP MESSAGE request with a SIP 403 (Forbidden) response, with warning text set to "210 Only one File URL must be present in the FD request" in a Warning header field as specified in subclause 4.9, and shall not continue with the rest of the steps in this subclause;

7) if the Payload IE has Payload contents:

   a) with a Payload content type set to a value other than "FILEURL" shall reject the SIP MESSAGE request with a SIP 403 (Forbidden) response, with warning text set to "211 payload for an FD request is not FILEURL" in a Warning header field as specified in subclause 4.9, and shall not continue with the rest of the steps in this subclause; and

   b) with Payload data containing a file URL identifying a file that does not exist on the media storage function, shall reject the SIP MESSAGE request with a SIP 403 (Forbidden) response, with warning text set to "212 file referenced by file URL does not exist" in a Warning header field as specified in subclause 4.9, and shall not continue with the rest of the steps in this subclause;

8) if the application/vnd.3gpp.mcdata-signalling MIME body contains an FD SIGNALLING PAYLOAD message with a FD disposition request type IE, shall store the value of the Conversation ID IE and the value of the Message ID IE in the FD SIGNALLING PAYLOAD message;

NOTE 2: The controlling MCData function uses the Conversation ID and Message ID for correlation with disposition notifications.

9) if the application/vnd.3gpp.mcdata-signalling MIME body contains an FD SIGNALLING PAYLOAD message:

a) with a Metadata IE, shall derive a timer value for the file availability timer as the minimum of the file availability information in the metadata and the value contained in the <max-file-availability> element in the MCData service configuration document as specified in 3GPP TS 24.484 [12]; and

b) without a Metadata IE, shall derive a timer value for the file availability timer as the value contained in the <default-file-availability> element in the MCData service configuration document as specified in 3GPP TS 24.484 [12];

10) if the <request-type> element in the application/vnd.3gpp.mcdata-info+xml MIME body of the SIP MESSAGE request is set to a value of "one-to-one-fd" and the SIP MESSAGE request:

a) does not contain an application/resource-lists MIME body or contains an application/resource-lists MIME body with more than one <entry> element, shall return a SIP 403 (Forbidden) response with the warning text set to "205 unable to determine targeted user for one-to-one FD" in a Warning header field as specified in subclause 4.9, and skip the rest of the steps below; and

b) contains an application/resource-lists MIME body with exactly one <entry> element, shall send a SIP MESSAGE request to the MCData user identified in the <entry> element of the MIME body, as specified in subclause 10.2.4.4.1;

11) if the <request-type> element in the application/vnd.3gpp.mcdata-info+xml MIME body of the SIP MESSAGE request is set to a value of "group-fd":

a) shall retrieve the group document associated with the group identity in the SIP MESSAGE request by following the procedures in subclause 6.3.3, and shall continue with the remaining steps if the procedures in subclause 6.3.3 were successful;

b) if the <on-network-disabled> element is present in the group document, shall send a SIP 403 (Forbidden) response with the warning text set to "115 group is disabled" in a Warning header field as specified in subclause 4.9 and shall not continue with the rest of the steps;

c) if the <entry> element of the <list> element of the <list-service> element in the group document does not contain an <mcdata-mcdata-id> element with a "uri" attribute matching the MCData ID of the originating user contained in the <mcdata-calling-user-identity> element of the application/vnd.3gpp.mcdata-info+xml MIME body in the SIP MESSAGE request, shall send a SIP 403 (Forbidden) response with the warning text set to "116 user is not part of the MCData group" in a Warning header field as specified in subclause 4.9 and shall not continue with the rest of the steps;

d) if the <list-service> element contains a <mcdata-allow-file-distribution> element in the group document set to a value of "false", shall send a SIP 403 (Forbidden) response with the warning text set to "213 file distribution not allowed for this group" in a Warning header field as specified in subclause 4.9 and shall not continue with the rest of the steps;

e) if the <supported-services> element is not present in the group document or is present and contains a <service> element containing an "enabler" attribute which is not set to the value "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd", shall send a SIP 488 (Not Acceptable) response with the warning text set to "214 FD services not supported for this group" in a Warning header field as specified in subclause 4.9 and shall not continue with the rest of the steps;

f) if the MCData server group FD procedures in subclause 11.1 indicate that the user identified by the MCData ID:

i) is not allowed to initiate group MCData communications on this group identity as determined by step 2) of subclause 11.1, shall reject the SIP MESSAGE request with a SIP 403 (Forbidden) response, with warning text set to "201 user not authorised to transmit data on this group identity" in a Warning header field as specified in subclause 4.9, and shall not continue with the rest of the steps in this subclause; and

ii) is not allowed to initiate group MCData communications on this group identity due to exceeding the maximum amount of data that can be sent in a single request as determined by step 8) of subclause 11.1, shall reject the SIP MESSAGE request with a SIP 403 (Forbidden) response to the SIP MESSAGE request, with warning text set to "208 user not authorised for MCData communications on this group identity due to exceeding the maximum amount of data that can be sent in a single request" in a Warning header field as specified in subclause 4.9, and shall not continue with the rest of the steps in this subclause;

iii) is not allowed to initiate group MCData communications on this group identity due to exceeding the maximum allowed file size as determined by step 6) of subclause 11.1, shall reject the SIP MESSAGE request with a SIP 403 (Forbidden) response to the SIP MESSAGE request, with warning text set to "208 user not authorised for MCData communications on this group identity due to exceeding the maximum amount of data that can be sent in a single request" in a Warning header field as specified in subclause 4.9, and shall not continue with the rest of the steps in this subclause;

g) if the originating user identified by the MCData ID is not affiliated to the group identity contained in the SIP MESSAGE request, as specified in subclause 6.3.5, shall return a SIP 403 (Forbidden) response with the warning text set to "120 user is not affiliated to this group" in a Warning header field as specified in subclause 4.9, and skip the rest of the steps below;

j) shall determine targeted group members for MCData communications by following the procedures in subclause 6.3.4;

k) if the procedures in subclause 6.3.4 result in no affiliated members found in the selected MCData group, shall return a SIP 403 (Forbidden) response with the warning text set to "198 no users are affiliated to this group" in a Warning header field as specified in subclause 4.9, and skip the rest of the steps below; and

l) shall send SIP MESSAGE requests to the targeted group members identified in step j) above by following the procedure in subclause 10.2.4.4.1;

12) shall start TDC2 (file availability timer) with the value derived in step 9 of this subclause;

13) shall associate the running timer TDC2 (file availability timer) to the Conversation ID, Message ID and Application ID (if included) contained in the FD SIGNALLING PAYLOAD message;

NOTE 3: Multiple file availability timers can be running for a file. Each file availability timer is uniquely associated to a Conversation ID and Message ID.

14) shall generate a SIP 202 (Accepted) response in response to the "SIP MESSAGE request for FD using HTTP for controlling MCData function"; and

15) shall send the SIP 202 (Accepted) response towards the originating participating MCData function according to 3GPP TS 24.229 [5].

10.2.5 FD using media plane

10.2.5.1 General

The procedures in the subclauses of the parent subclause describe the SIP signalling procedures for:

- one-to-one file distribution using media plane; and
- group standalone file distribution using media plane.

10.2.5.2 MCData client procedures

10.2.5.2.1 SDP offer generation

When composing an SDP offer according to 3GPP TS 24.229 [5], IETF RFC 5547 [r5547] IETF RFC 6135 [19] and IETF RFC 6714 [20] the MCData client:

1) shall include an "m=message" media-level section for the MCData media stream consisting of:

a) the port number;

b) a protocol field value of "TCP/MSRP" or "TCP/TLS/MSRP" for TLS;

c) an "a=sendonly" attribute;

d) an "a=path" attribute containing its own MSRP URI;

e) set the content type as "a=accept-types:application/vnd.3gpp.mcdata-signalling";

f) set the a=setup attribute as "actpass";

g) a file-selector attribute containing:

i) a 'name' selector;

ii) a 'type' selector;

iii) a 'size' selector; and

iv) a 'hash' selector;

h) a file-date attribute; and

2) if end-to-end security is required for a one-to-one communication and the security context does not exist or if the existing security context has expired, shall include the MIKEY-SAKKE I_MESSAGE in an "a=key-mgmt" attribute as a "mikey" attribute value in the SDP offer as specified in IETF RFC 4567 [45].

10.2.5.2.2 SDP answer generation

When the MCData client receives an initial SDP offer for file distribution, the MCData client shall process the SDP offer and shall compose an SDP answer according to 3GPP TS 24.229 [5] and IETF RFC 5547 [r5547].

When composing an SDP answer, the MCData client:

1) shall include an "m=message" media-level section for the accepted MCData media stream consisting of:

a) the port number;

b) a protocol field value of "TCP/MSRP" or "TCP/TLS/MSRP" for TLS according to the received SDP offer;

c) an "a=recvonly" attribute;

d) an "a=path" attribute containing its own MSRP URI;

e) set the content type as a=accept-types:application/vnd.3gpp.mcdata-signalling;

f) set the a=setup attribute according to IETF RFC 6135 [19]; and

g) a file-selector attribute containing:

i) a 'name' selector;

ii) a 'type' selector;

iii) a 'size' selector; and

iv) a 'hash' selector.

10.2.5.2.3 MCData client originating procedures

The MCData client shall generate a SIP INVITE request in accordance with 3GPP TS 24.229 [5] with the clarifications given below.

The MCData client:

1) shall include the g.3gpp.mcdata.fd media feature tag and the g.3gpp.icsi-ref media feature tag with the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd" in the Contact header field of the SIP INVITE request according to IETF RFC 3840 [16];

2) shall include an Accept-Contact header field containing the g.3gpp.mcdata.fd media feature tag along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [8];

3) shall include an Accept-Contact header field with the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd" along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [8];

4) shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd" (coded as specified in 3GPP TS 24.229 [5]), in a P-Preferred-Service header field according to IETF RFC 6050 [7] in the SIP INVITE request;

5) should include the "timer" option tag in the Supported header field;

6) should include the Session-Expires header field according to IETF RFC 4028 [38]. It is recommended that the "refresher" header field parameter is omitted. If included, the "refresher" header field parameter shall be set to "uac";

7) shall generate and contain an application/vnd.3gpp.mcdata-signalling MIME body with the FD SIGNALLING PAYLOAD as described in subclause 6.2.2.3;

8) if a one-to-one file distribution is requested:

   a) shall insert in the SIP INVITE request a MIME resource-lists body with the MCData ID of the invited MCData user, according to rules and procedures of IETF RFC 5366 [18]; and

   b) shall contain an application/vnd.3gpp.mcdata-info+xml MIME body with the <mcdatainfo> element containing the <mcdata-Params> element with:

      i) the <request-type> element set to a value of "one-to-one-fd";

   c) if an end-to-end security context needs to be established and the security context does not exist or if the existing security context has expired, then:

      i) if necessary, shall instruct the key management client to request keying material from the key management server as described in 3GPP TS 33.180 [26];

      ii) shall use the keying material to generate a PCK as described in 3GPP TS 33.180 [26];

      iii) shall use the PCK to generate a PCK-ID with the four most significant bits set to "0001" to indicate that the purpose of the PCK is to protect one-to-one communications and with the remaining twenty eight bits being randomly generated as described in 3GPP TS 33.180 [26];

      iv) shall encrypt the PCK to a UID associated to the MCData client using the MCData ID of the invited user and a time related parameter as described in 3GPP TS 33.180 [26];

      v) shall generate a MIKEY-SAKKE I_MESSAGE using the encapsulated PCK and PCK-ID as specified in 3GPP TS 33.180 [26]; and

      vi) shall add the MCData ID of the originating MCData to the initiator field (IDRi) of the I_MESSAGE as described in 3GPP TS 33.180 [26]; and

      vii) shall sign the MIKEY-SAKKE I_MESSAGE using the originating MCData user's signing key provided in the keying material together with a time related parameter, and add this to the MIKEY-SAKKE payload, as described in 3GPP TS 33.180 [26];

9) if a group file distribution is requested:

   a) if the "/<*x*>/<x>/Common/MCData/AllowedFD" leaf node present in the group document of the requested MCData group, configured on the group management client as specified in 3GPP TS 24.483 [42] is set to "false", shall reject the request for FD and not continue with the rest of the steps in this subclause; and

   b) shall contain in an application/vnd.3gpp.mcdata-info+xml MIME body with the <mcdatainfo> element containing the <mcdata-Params> element with:

      i) the <request-type> element set to a value of "group-fd";

      ii) the <mcdata-request-uri> element set to the MCData group identity; and

      iii) the <mcdata-client-id> element set to the MCData client ID of the originating MCData client;

NOTE 1: The MCData client does not include the MCData ID of the originating MCData user in the body, as this will be inserted into the body of the SIP INVITE request that is sent from the originating participating MCData function.

10) shall set the Request-URI of the SIP INVITE request to the public service identity identifying the participating MCData function serving the MCData user;

NOTE 2: The MCData client is configured with public service identity identifying the participating MCData function serving the MCData user.

11) may include a P-Preferred-Identity header field in the SIP INVITE request containing a public user identity as specified in 3GPP TS 24.229 [5];

12) shall include an SDP offer according to 3GPP TS 24.229 [5] with the clarifications given in subclause 10.2.5.2.1; and

13) shall send the SIP INVITE request towards the MCData server according to 3GPP TS 24.229 [5].

On receipt of a SIP 2xx response to the SIP INVITE request, the MCData client:

1) shall send a SIP ACK request as specified in 3GPP TS 24.229 [5];

2) shall start the SIP Session timer according to rules and procedures of IETF RFC 4028 [38]; and

3) shall interact with the media plane as specified in 3GPP TS 24.582 [15] subclause 10.2.5.1.1..

On receipt of a SIP 4xx response, a SIP 5xx response or a SIP 6xx response to the SIP INVITE request:

1) shall indicate to the MCData user that the file could not be sent; and

2) shall send a SIP ACK request as specified in 3GPP TS 24.229 [5].

On receipt of an indication from the media plane indicating that the file was not sent successfully, the MCData client shall:

1) shall generate a SIP BYE request according to 3GPP TS 24.229 [5] with:

   a) Reason code set to "SIP";

   b) cause set to "480"; and

   c) text set to "transmission failed";

2) shall set the Request-URI to the MCData session identity to release; and

3) shall send a SIP BYE request towards MCData server according to 3GPP TS 24.229 [5].

10.2.5.2.4 MCData client terminating procedures

Upon receipt of an initial SIP INVITE request, the MCData client shall follow the procedures for termination of multimedia sessions in the IM CN subsystem as specified in 3GPP TS 24.229 [5] with the clarifications below.

The MCData client:

1) may reject the SIP INVITE request if either of the following conditions are met:

   a) MCData client does not have enough resources to handle the call; or

   b) any other reason outside the scope of this specification;

   and skip the rest of the steps after step 2;

2) if the SIP INVITE request is rejected in step 1), shall respond toward participating MCData function either with appropriate reject code as specified in 3GPP TS 24.229 [5] and warning texts as specified in subclause 4.9 or with SIP 480 (Temporarily unavailable) response not including warning texts if the user is authorised to restrict the reason for failure and skip the rest of the steps of this subclause;

3) if the SDP offer of the SIP INVITE request contains an "a=key-mgmt" attribute field with a "mikey" attribute value containing a MIKEY-SAKKE I_MESSAGE:

a) shall extract the MCData ID of the originating MCData user from the initiator field (IDRi) of the I_MESSAGE as described in 3GPP TS 33.180 [26];

b) shall convert the MCData ID to a UID as described in 3GPP TS 33.180 [26];

c) shall use the UID to validate the signature of the MIKEY-SAKKE I_MESSAGE as described in 3GPP TS 33.180 [26];

d) if authentication verification of the MIKEY-SAKKE I_MESSAGE fails, shall reject the SIP INVITE request with a SIP 488 (Not Acceptable Here) response as specified in IETF RFC 4567 [45], and include warning text set to "136 authentication of the MIKEY-SAKKE I_MESSAGE failed" in a Warning header field as specified in subclause 4.9 and not continue with rest of the steps in this subclause; and

e) if the signature of the MIKEY-SAKKE I_MESSAGE was successfully validated:

i) shall extract and decrypt the encapsulated PCK using the terminating user's (KMS provisioned) UID key as described in 3GPP TS 33.180 [26]; and

ii) shall extract the PCK-ID, from the payload as specified in 3GPP TS 33.180 [26];

NOTE: With the PCK successfully shared between the originating MCData client and the terminating MCData client, both clients are able to create an end-to-end secure session.

4) may display to the MCData user the MCData ID of the inviting MCData user;

5) may display to the MCData user the file meta-data of the incoming file as described by the SDP included in the received SIP INVITE request;

6) if the Mandatory indication IE of the FD SIGNALLING PAYLOAD contained in the application/vnd.3gpp.mcdata-signalling MIME body received in the SIP INVITE request is set to "MANDATORY", then:

i) shall accept the SIP INVITE request and generate a SIP 200 (OK) response according to rules and procedures of 3GPP TS 24.229 [5];

ii) shall include the option tag "timer" in a Require header field of the SIP 200 (OK) response;

iii) shall include the Session-Expires header field in the SIP 200 (OK) response and start the SIP session timer according to IETF RFC 4028 [38]. The "refresher" parameter in the Session-Expires header field shall be set to "uas";

iv) shall include the g.3gpp.mcdata.fd media feature tag in the Contact header field of the SIP 200 (OK) response;

v) shall include the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd" in the Contact header field of the SIP 200 (OK) response;

vi) shall include an SDP answer in the SIP 200 (OK) response to the SDP offer in the incoming SIP INVITE request according to 3GPP TS 24.229 [5] with the clarifications given in subclause 10.2.5.2.2; and

vii) shall send the SIP 200 (OK) response towards the MCData server according to rules and procedures of 3GPP TS 24.229 [5].

On receipt of an SIP ACK message to the sent SIP 200 (OK) message, the MCData client shall:

1) shall interact with the media plane as specified in 3GPP TS 24.582 [15] subclause 10.2.5.1.2.

On receipt of an indication from the media plane of the successful download of the file and if the received FD SIGNALLING PAYLOAD message contained an FD disposition request type IE requesting a file download completed update indication, then, the MCData client:

1) shall follow the procedures described in subclause 12.2.1.1.

10.2.5.3 Participating MCData function procedures

10.2.5.3.1 SDP offer generation

The SDP offer is generated based on the received SDP offer. The SDP offer generated by the participating MCData function:

1) shall contain only one SDP media-level section for file distribution as contained in the received SDP offer; and

2) shall contain an "a=key-mgmt" attribute field with a "mikey" attribute value, if present in the received SDP offer.

When composing the SDP offer according to 3GPP TS 24.229 [5], the participating MCData function:

1) shall replace the IP address and port number for the offered media stream in the received SDP offer with the IP address and port number of the participating MCData function, if required; and

NOTE 1: Requirements can exist for the participating MCData function to be always included in the path of the offered media stream, for example: for the support of features such as MBMS, lawful interception and recording. Other examples can exist.

NOTE 2: If the participating MCData function and the controlling MCData function are in the same MCData server, and the participating MCData function does not have a dedicated IP address or a dedicated port number for media stream, the replacement of the IP address or the port number is omitted.

2) if the IP address is replaced shall insert its MSRP URI before the MSRP URI in the "a=path" attribute in the SDP answer.

10.2.5.3.2 SDP answer generation

When composing the SDP answer according to 3GPP TS 24.229 [5], the participating MCData function:

1) shall replace the IP address and port number in the received SDP answer with the IP address and port number of the participating MCData function, for the accepted media stream in the received SDP offer, if required; and

NOTE 1: Requirements can exist for the participating MCData function to be always included in the path of the offered media stream, for example: for the support of features such as MBMS, lawful interception and recording. Other examples can exist.

NOTE 2: If the participating MCData function and the controlling MCData function are in the same MCData server, and the participating MCData function does not have a dedicated IP address or a dedicated port number for media stream, the replacement of the IP address or the port number is omitted.

2) if the IP address is replaced shall insert its MSRP URI before the MSRP URI in the "a=path" attribute in the SDP answer.

10.2.5.3.3 Originating participating MCData function procedures

Upon receipt of a "SIP INVITE request for file distribution for originating participating MCData function", the participating MCData function:

1) if unable to process the request, may reject the SIP INVITE request with a SIP 500 (Server Internal Error) response. The participating MCData function may include a Retry-After header field to the SIP 500 (Server Internal Error) response as specified in IETF RFC 3261 [4] and skip the rest of the steps;

2) shall determine the MCData ID of the calling user from the public user identity in the P-Asserted-Identity header field of the SIP INVITE request, and shall authorise the calling user;

NOTE: The MCData ID of the calling user is bound to the public user identity at the time of service authorisation, as documented in subclause 7.3.

3) if the participating MCData function cannot find a binding between the public user identity and an MCData ID or if the validity period of an existing binding has expired, then the participating MCData function shall reject the SIP INVITE request with a SIP 404 (Not Found) response with the warning text set to "141 user unknown to

the participating function" in a Warning header field as specified in subclause 4.9, and shall not continue with any of the remaining steps;

4) if the <request-type> element in the application/vnd.3gpp.mcdata-info+xml MIME body of the SIP INVITE request is:

   a) set to a value of "group-fd", shall determine the public service identity of the controlling MCData function associated with the MCData group identity in the <mcdata-request-uri> element of the application/vnd.3gpp.mcdata-info+xml MIME body in the SIP INVITE request; or

   b) set to a value of "one-to-one-fd", shall determine the public service identity of the controlling MCData function hosting the file distribution service for the calling user;

5) if unable to identify the controlling MCData function for file distribution, it shall reject the SIP INVITE request with a SIP 404 (Not Found) response with the warning text "142 unable to determine the controlling function" in a Warning header field as specified in subclause 4.9, and shall not continue with any of the remaining steps;

6) shall determine whether the MCData user identified by the MCData ID is authorised for MCData communications by following the procedures in subclause 11.1;

7) if the procedures in subclause 11.1 indicate that the user identified by the MCData ID:

   a) is not allowed to initiate MCData communications as determined by step 1) of subclause 11.1, shall reject the "SIP INVITE request for file distribution for originating participating MCData function" with a SIP 403 (Forbidden) response to the SIP INVITE request, with warning text set to "200 user not authorised to transmit data" in a Warning header field as specified in subclause 4.9, and shall not continue with the rest of the steps in this subclause; and

   b) is not allowed to initiate one-to-one MCData communications due to exceeding the maximum amount of data that can be sent in a single request as determined by step 7) of subclause 11.1, shall reject the "SIP INVITE request for file distribution for originating participating MCData function" with a SIP 403 (Forbidden) response to the SIP INVITE request, with warning text set to "202 user not authorised for one-to-one MCData communications due to exceeding the maximum amount of data that can be sent in a single request" in a Warning header field as specified in subclause 4.9, and shall not continue with the rest of the steps in this subclause;

8) shall generate a SIP INVITE request in accordance with 3GPP TS 24.229 [5];

9) shall include the option tag "timer" in the Supported header field;

10) should include the Session-Expires header field according to IETF RFC 4028 [38]. It is recommended that the "refresher" header field parameter is omitted. If included, the "refresher" header field parameter shall be set to "uac";

11) shall set the Request-URI of the outgoing SIP INVITE request to the public service identity of the controlling MCData function as determined by step 4) in this subclause;

12) shall include the MCData ID of the originating user in the <mcdata-calling-user-identity> element of the application/vnd.3gpp.mcdata-info+xml MIME body of the outgoing SIP INVITE request;

11) shall include in the outgoing SIP INVITE request, the application/vnd.3gpp.mcdata-signalling MIME body that was present in the incoming SIP INVITE request;

13) shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd" (coded as specified in 3GPP TS 24.229 [5]), into the P-Asserted-Service header field of the outgoing SIP INVITE request;

14) shall set the P-Asserted-Identity in the outgoing SIP INVITE request to the public user identity in the P-Asserted-Identity header field contained in the received SIP INVITE request;

15) shall include in the SIP INVITE request an SDP offer based on the SDP offer in the received SIP INVITE request from the MCData client as specified in subclause 10.2.5.3.1; and

16) shall send the SIP INVITE request as specified to 3GPP TS 24.229 [5].

Upon receipt of a SIP 200 (OK) response in response to the SIP INVITE request in step 16):

1) shall generate a SIP 200 (OK) response as specified in 3GPP TS 24.229 [5];

2) shall include in the SIP 200 (OK) response an SDP answer as specified in the subclause 10.2.5.3.2;

3) shall include the option tag "timer" in a Require header field;

4) shall include the Session-Expires header field according to rules and procedures of IETF RFC 4028 [38], "UAS Behavior". If the "refresher" parameter is not included in the received request, the "refresher" parameter in the Session-Expires header field shall be set to "uac";

5) shall include the following in the Contact header field:

   a) the g.3gpp.mcdata.fd media feature tag;

   b) the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd"; and

   c) the isfocus media feature tag;

6) shall include Warning header field(s) that were received in the incoming SIP 200 (OK) response;

7) shall include an MCData session identity mapped to the MCData session identity provided in the Contact header field of the received SIP 200 (OK) response;

8) if the incoming SIP 200 (OK) response contained an application/vnd.3gpp.mcdata-info+xml MIME body, shall copy the application/vnd.3gpp.mcdata-info+xml MIME body to the outgoing SIP 200 (OK) response.

9) shall include the public service identity received in the P-Asserted-Identity header field of the incoming SIP 200 (OK) response into the P-Asserted-Identity header field of the outgoing SIP 200 (OK) response; and

10) shall interact with the media plane as specified in 3GPP TS 24.582 [15] subclause 7.2.1;

11) shall send the SIP 200 (OK) response to the MCData client according to 3GPP TS 24.229 [5]; and

12) shall start the SIP Session timer according to rules and procedures of IETF RFC 4028 [38].

Upon receipt of a SIP 4xx, 5xx or 6xx response to the SIP INVITE request in step 16) the participating MCData function:

1) shall generate a SIP response according to 3GPP TS 24.229 [5];

2) shall include Warning header field(s) that were received in the incoming SIP response; and

3) shall forward the SIP response to the MCData client according to 3GPP TS 24.229 [5].

10.2.5.3.4 Terminating participating MCData function procedures

Upon receipt of a "SIP INVITE request for file distribution for terminating participating MCData function", the participating MCData function:

1) if unable to process the request, may reject the SIP INVITE request with a SIP 500 (Server Internal Error) response. The participating MCData function may include a Retry-After header field to the SIP 500 (Server Internal Error) response as specified in IETF RFC 3261 [4] and skip the rest of the steps;

2) shall check the presence of the isfocus media feature tag in the URI of the Contact header field and if it is not present then the participating MCData function shall reject the request with a SIP 403 (Forbidden) response with the warning text set to "104 isfocus not assigned" in a Warning header field as specified in subclause 4.4, and shall not continue with the rest of the steps;

3) shall use the MCData ID present in the <mcdata-request-uri> element of the application/vnd.3gpp.mcdata-info+xml MIME body of the incoming SIP INVITE request to retrieve the binding between the MCData ID and public user identity of the terminating MCData user;

4) if the binding between the MCData ID and public user identity of the terminating MCData user does not exist, then the participating MCData function shall reject the SIP INVITE request with a SIP 404 (Not Found) response, and shall not continue with the rest of the steps;

5) shall generate a SIP INVITE request accordance with 3GPP TS 24.229 [5];

6) should include the Session-Expires header field according to IETF RFC 4028 [38]. It is recommended that the "refresher" header field parameter is omitted. If included, the "refresher" header field parameter shall be set to "uac";

7) shall include the option tag "timer" in the Supported header field;

8) shall include the following in the Contact header field:

   a) the g.3gpp.mcdata.fd media feature tag;

   b) the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd";

   c) the isfocus media feature tag;

   d) an MCData session identity mapped to the MCData session identity provided in the Contact header field of the incoming SIP INVITE request; and

   e) any other uri-parameter provided in the Contact header field of the incoming SIP INVITE request;

9) shall include in the SIP INVITE request all Accept-Contact header fields and all Reject-Contact header fields, with their feature tags and their corresponding values along with parameters according to rules and procedures of IETF RFC 3841 [8] that were received (if any) in the incoming SIP INVITE request;

10) shall set the Request-URI of the outgoing SIP INVITE request to the public user identity associated to the MCData ID of the terminating MCData user;

11) shall populate the outgoing SIP INVITE request with the MIME bodies that were present in the incoming SIP INVITE request;

12) shall copy the contents of the P-Asserted-Identity header field of the incoming SIP INVITE request to the P-Asserted-Identity header field of the outgoing SIP INVITE request;

13) shall include in the SIP INVITE request an SDP offer based on the SDP offer in the received "SIP INVITE request for file distribution for terminating participating MCData function" as specified in subclause 10.2.5.3.1; and

14) shall send the SIP INVITE request as specified in 3GPP TS 24.229 [5].

Upon receipt of a SIP 200 (OK) response in response to the above SIP INVITE request, the participating MCData function:

1) shall generate a SIP 200 (OK) response as specified in 3GPP TS 24.229 [5];

2) shall include in the SIP 200 (OK) response an SDP answer based on the SDP answer in the received SIP 200 (OK) response as specified in subclause 10.2.5.3.2;

3) shall include the option tag "timer" in a Require header field;

4) shall include the Session-Expires header field according to rules and procedures of IETF RFC 4028 [38], "UAS Behavior". If no "refresher" parameter was included in the SIP INVITE request, the "refresher" parameter in the Session-Expires header field shall be set to "uas";

5) shall include the following in the Contact header field:

   a) the g.3gpp.mcdata.fd media feature tag;

   b) the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd"; and

   c) an MCData session identity mapped to the MCData session identity provided in the Contact header field of the received SIP INVITE request from the controlling MCData function;

6) if the incoming SIP response contained an application/vnd.3gpp.mcdata-info+xml MIME body, shall copy the application/vnd.3gpp.mcdata-info+xml MIME body to the outgoing SIP 200 (OK) response.

7) shall copy the P-Asserted-Identity header field from the incoming SIP 200 (OK) response to the outgoing SIP 200 (OK) response;

8) shall start the SIP Session timer according to rules and procedures of IETF RFC 4028 [38];

9) shall interact with the media plane as specified in 3GPP TS 24.582 [15] subclause 7.2.2; and

10) shall send the SIP 200 (OK) response to the controlling MCData function according to 3GPP TS 24.229 [5].

Upon receipt of a SIP 4xx, 5xx or 6xx response to the above SIP INVITE request, the participating MCData function:

1) shall generate a SIP response according to 3GPP TS 24.229 [5];

2) shall include Warning header field(s) that were received in the incoming SIP response; and

3) shall forward the SIP response to the controlling MCData function according to 3GPP TS 24.229 [5].

10.2.5.4 Controlling MCData function procedures

10.2.5.4.1 SDP offer generation

When composing an SDP offer according to 3GPP TS 24.229 [5], IETF RFC 5547 [r5547] IETF RFC 6135 [19] and IETF RFC 6714 [20] the MCData client:

1) shall include an "m=message" media-level section for the MCData media stream consisting of:

   a) the port number;

   b) a protocol field value of "TCP/MSRP" or "TCP/TLS/MSRP" for TLS;

   c) an "a=sendonly" attribute;

   d) an "a=path" attribute containing its own MSRP URI;

   e) set the content type as "a=accept-types:application/vnd.3gpp.mcdata-signalling";

   f) set the a=setup attribute as "actpass";

   g) a file-selector attribute containing:

      i) a 'name' selector;

      ii) a 'type' selector;

      iii) a 'size' selector; and

      iv) a 'hash' selector; and

   h) a file-date attribute;

10.2.5.4.2 SDP answer generation

When composing the SDP answer according to 3GPP TS 24.229 [5], the controlling MCData function:

1) shall include an "m=message" media-level section for the accepted MCData media stream consisting of:

   a) the port number;

   b) a protocol field value of "TCP/MSRP" or "TCP/TLS/MSRP" for TLS according to the received SDP offer;

   c) a format list field set to ‘*’;

   d) an "a=recvonly" attribute;

   e) an "a=path" attribute containing its own MSRP URI;

   f) set the content type as a=accept-types:application/vnd.3gpp.mcdata-signalling; and

g) set the a=setup attribute set to "passive", according to IETF RFC 6135 [19]; and

h) a file-selector attribute containing:

i) a 'name' selector;

ii) a 'type' selector;

iii) a 'size' selector; and

iv) a 'hash' selector.

10.2.5.4.3 Originating controlling MCData function procedures

This subclause describes the procedures for inviting an MCData user to an MCData session. The procedure is initiated by the controlling MCData function as the result of an action in subclause 10.2.5.4.4.

The controlling MCData function:

1) shall generate a SIP INVITE according to 3GPP TS 24.229 [5];

2) shall include the Supported header field set to "timer";

3) should include the Session-Expires header field according to rules and procedures of IETF RFC 4028 [38]. The refresher parameter shall be omitted;

4) shall include an Accept-Contact header field containing the g.3gpp.mcdata.fd media feature tag along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [8];

5) shall include an Accept-Contact header field with the media feature tag g.3gpp.icsi-ref with the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd" along with parameters "require" and "explicit" according to IETF RFC 3841 [8];

6) shall include a Referred-By header field with the public user identity of the inviting MCData client;

7) shall include in the Contact header field an MCData session identity for the MCData session with the g.3gpp.mcdata.fd media feature tag, the isfocus media feature tag and the g.3gpp.icsi-ref media feature tag with the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd" according to IETF RFC 3840 [16];

8) shall include in the application/vnd.3gpp.mcdata-info+xml MIME body in the outgoing SIP INVITE request:

a) the <mcdata-request-uri> element set to the MCData ID of the terminating user; and

b) the <mcdata-calling-group-id> element set to the group identity if the request is for group file distribution ;

9) shall include in the outgoing SIP INVITE request, the application/vnd.3gpp.mcdata-signalling MIME body that was present in the incoming SIP INVITE request;

10) shall set the Request-URI to the public service identity of the terminating participating MCData function associated to the MCData user to be invited;

NOTE 1: How the controlling MCData function finds the address of the terminating participating MCData function is out of the scope of the current release.

11) shall set the P-Asserted-Identity header field to the public service identity of the controlling MCData function;

12) shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd" (coded as specified in 3GPP TS 24.229 [5]), in a P-Asserted-Service-Id header field according to IETF RFC 6050 [7] in the SIP INVITE request;

13) shall include in the SIP INVITE request an SDP offer based on the SDP offer in the received SIP INVITE request from the originating client according to the procedures specified in subclause 10.2.5.4.1; and

14) shall send the SIP INVITE request towards the terminating client in accordance with 3GPP TS 24.229 [5].

Upon receiving a SIP 200 (OK) response for the SIP INVITE request the controlling MCData function:

1) shall interact with the media plane as specified in 3GPP TS 24.582 [15] subclause 7.3.

NOTE 2: The procedures executed by the controlling MCData function prior to sending a response to the inviting MCData client are specified in subclause 10.2.5.4.4.

10.2.5.4.4 Terminating controlling MCData function procedures

In the procedures in this subclause:

1) MCData ID in an incoming SIP INVITE request refers to the MCData ID of the originating user from the <mcdata-calling-user-id> element of the application/vnd.3gpp.mcdata-info+xml MIME body of the incoming SIP INVITE request;

2) group identity in an incoming SIP INVITE request refers to the group identity from the <mcdata-request-uri> element of the application/vnd.3gpp.mcdata-info+xml MIME body of the incoming SIP INVITE request; and

3) MCData ID in an outgoing SIP INVITE request refers to the MCData ID of the called user in the <mcdata-request-uri> element of the application/vnd.3gpp.mcdata-info+xml MIME body of the outgoing SIP INVITE request;

The procedures in this subclause are executed upon:

- receipt of a "SIP INVITE request for controlling MCData function for file distribution"; or

- a decision to now process a previously received "SIP INVITE request for controlling MCData function for file distribution" that had been queued for later transmission;

NOTE 1: The controlling MCData function may postpone the continuation of an FD using media plane procedure by queuing the received "SIP INVITE request for controlling MCData function for file distribution". The management of the queue is specified in Annex B of 3GPP TS 23.282 [2].

the controlling MCData function:

1) if unable to process the request due to a lack of resources or a risk of congestion exists, may reject the SIP INVITE request with a SIP 500 (Server Internal Error) response or queue the received SIP INVITE. The controlling MCData function may include a Retry-After header field to the SIP 500 (Server Internal Error) response as specified in IETF RFC 3261 [4];

2) if the received SIP INVITE request has been queued for later transmission, shall include warning text set to "215 request to transmit is queued by the server" in a Warning header field as specified in subclause 4.9, in the SIP 100 (Trying) response, and shall send the SIP 100 (TRYING) response towards the originating participating MCData function according to 3GPP TS 24.229 [5] and not continue with the remaining steps in this subclause. Otherwise, continue with the rest of the steps;

3) shall determine if the media parameters are acceptable and the MSRP URI is offered in the SDP offer and if not reject the request with a SIP 488 (Not Acceptable Here) response and skip the rest of the steps;

4) if the incoming SIP INVITE request does not contain an application/vnd.3gpp.mcdata-signalling MIME body with the FD SIGNALLING PAYLOAD as described in subclause 6.2.2.3, shall reject the SIP INVITE request with appropriate reject code;

5) shall reject the SIP request with a SIP 403 (Forbidden) response and not process the remaining steps if:

   a) an Accept-Contact header field does not include the g.3gpp.mcdata.fd media feature tag; or

   b) an Accept-Contact header field does not include the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd";

6) shall cache SIP feature tags, if received in the Contact header field and if the specific feature tags are supported;

7) shall start the SIP Session timer according to rules and procedures of IETF RFC 4028 [38];

8) if the <request-type> element in the application/vnd.3gpp.mcdata-info+xml MIME body of the SIP INVITE request is set to a value of "one-to-one-fd" and:

a) the conditions in subclause 11.1 indicate that the MCData user is not allowed to initiate FD communications due to file size exceeding allowed limits as determined by step 4) of subclause 11.1, shall reject the SIP INVITE request with a SIP 403 (Forbidden) response to the SIP INVITE request, with warning text set to "220 user not authorised for FD communications due to file size" in a Warning header field as specified in subclause 4.9, and shall not continue with the rest of the steps in this subclause; and

NOTE 2: The size of the file intended for transfer over the media plane is obtained from the 'size' selector of the file-selector attribute in the received SDP offer.

b) the SIP INVITE request:

i) does not contain an application/resource-lists MIME body or contains an application/resource-lists MIME body with more than one <entry> element, shall return a SIP 403 (Forbidden) response with the warning text set to "205 unable to determine targeted user for one-to-one FD " in a Warning header field as specified in subclause 4.9, and skip the rest of the steps below;

ii) contains an application/resource-lists MIME body with exactly one <entry> element, shall invite the MCData user identified by the <entry> element of the MIME body, as specified in subclause 10.2.5.4.3; and

shall interact with the media plane as specified in 3GPP TS 24.582 [15] subclause 7.3;

9) if the <request-type> element in the application/vnd.3gpp.mcdata-info+xml MIME body of the SIP INVITE request is set to a value of "group-fd":

a) shall retrieve the necessary group document(s) from the group management server for the group identity contained in the SIP INVITE request and carry out initial processing as specified in subclause 6.3.3, and shall continue with the remaining steps if the procedures in subclause 6.3.3 were successful;

b) if the <on-network-disabled> element is present in the group document, shall send a SIP 403 (Forbidden) response with the warning text set to "115 group is disabled" in a Warning header field as specified in subclause 4.9 and shall not continue with the rest of the steps;

c) if the <entry> element of the <list> element of the <list-service> element in the group document does not contain an <mcdata-mcdata-id> element with a "uri" attribute matching the MCData ID of the originating user contained in the <mcdata-calling-user-identity> element of the application/vnd.3gpp.mcdata-info+xml MIME body in the SIP INVITE request, shall send a SIP 403 (Forbidden) response with the warning text set to "116 user is not part of the MCData group" in a Warning header field as specified in subclause 4.9 and shall not continue with the rest of the steps;

d) if the <list-service> element contains a <mcdata-allow-file-distribution> element in the group document set to a value of "false", shall send a SIP 403 (Forbidden) response with the warning text set to "213 file distribution not allowed for this group" in a Warning header field as specified in subclause 4.x and shall not continue with the rest of the steps;

e) if the <supported-services> element is not present in the group document or is present and contains a <service> element containing an "enabler" attribute which is not set to the value "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd", shall send a SIP 488 (Not Acceptable) response with the warning text set to "214 FD services not supported for this group" in a Warning header field as specified in subclause 4.9 and shall not continue with the rest of the steps;

f) if the user identified by the MCData ID:

i) is not allowed to initiate group MCData communications on this group identity as determined by step 2) of subclause 11.1, shall reject the SIP INVITE request with a SIP 403 (Forbidden) response, with warning text set to "201 user not authorised to transmit data on this group identity" in a Warning header field as specified in subclause 4.9, and shall not continue with the rest of the steps in this subclause;

ii) is not allowed to initiate group MCData communications on this group identity due to exceeding the maximum amount of data that can be sent in a single request as determined by step 8) of subclause 11.1, shall reject the SIP INVITE request with a SIP 403 (Forbidden) response to the SIP INVITE request, with warning text set to "208 user not authorised for MCData communications on this group identity due exceeding the maximum amount of data that can be sent in a single request" in a Warning header field as specified in subclause 4.9, and shall not continue with the rest of the steps in this subclause; and

iii) is not allowed to initiate FD communications on this group identity due to file size exceeding the allowed limits as determined by step 6) of subclause 11.1, shall reject the SIP INVITE request with a SIP 403 (Forbidden) response to the SIP INVITE request, with warning text set to "219 user not authorised for FD communications on this group identity due to file size" in a Warning header field as specified in subclause 4.9, and shall not continue with the rest of the steps in this subclause.

NOTE 3: The size of the file intended for transfer over the media plane is obtained from the 'size' selector of the file-selector attribute in the received SDP offer.

g) the originating user identified by the MCData ID is not affiliated to the group identity contained in the SIP INVITE request, as specified in subclause 6.3.5, shall return a SIP 403 (Forbidden) response with the warning text set to "120 user is not affiliated to this group" in a Warning header field as specified in subclause 4.9, and skip the rest of the steps below;

h) shall determine targeted group members for MCData communications by following the procedures in subclause 6.3.4;

j) if the procedures in subclause 6.3.4 result in no affiliated members found in the selected MCData group, shall return a SIP 403 (Forbidden) response with the warning text set to "198 no users are affiliated to this group" in a Warning header field as specified in subclause 4.9, and skip the rest of the steps below; and

k) shall invite each group member determined in step h) above, to the group session, as specified in subclause 10.2.5.4.3; and

l) shall interact with the media plane as specified in 3GPP TS 24.582 [15] subclause 7.3.

Upon receiving a SIP 200 (OK) response for a SIP INVITE request as specified in subclause 10.2.5.4.3 and if the MCData ID in the SIP 200 (OK) response matches to the MCData ID in the corresponding SIP INVITE request the controlling MCData function:

1) shall generate SIP 200 (OK) response to the SIP INVITE request according to 3GPP TS 24.229 [5];

2) shall include the option tag "timer" in a Require header field;

3) shall include the Session-Expires header field and start supervising the SIP session according to rules and procedures of IETF RFC 4028 [38], "UAS Behavior". The "refresher" parameter in the Session-Expires header field shall be set to "uac";

4) shall include a P-Asserted-Identity header field with the public service identity of the controlling MCData function;

5) shall include a SIP URI for the MCData session identity in the Contact header field identifying the MCData session at the controlling MCData function;

6) shall include the following in the Contact header field:

a) the g.3gpp.mcdata.fd media feature tag;

b) the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd"; and

c) the isfocus media feature tag;

7) shall include Warning header field(s) received in incoming responses to the SIP INVITE request;

8) shall include in the SIP 200 (OK) response an SDP answer to the SDP offer in the incoming SIP INVITE request as specified in the subclause 10.2.5.4.2;

9) shall interact with the media plane as specified in 3GPP TS 24.582 [15] subclause 7.3; and

10) shall send a SIP 200 (OK) response to the inviting MCData client according to 3GPP TS 24.229 [5].

11 Transmission and Reception Control

11.1 General

The MCData functional entities (as specified in subclause 5.2 and subclause 5.3) check if the MCData user is allowed to initiate MCData communications by following the procedures specified below:

1) if the MCData user wishes to send one-to-one MCData communications and the <allow-transmit-data> element of an <actions> element is not present in the MCData user profile document or is present with the value "false" (see the MCData user profile document in 3GPP TS 24.484 [12]), , the MCData client and participating MCData function shall determine that the MCData user is not allowed to send MCData communications and shall not continue with the rest of the steps;

2) if the MCData user wishes to send group MCData communications on an MCData group identity and the <mcdata-allow-transmit-data-in-this-group> element of an <actions> element is not present in the MCData group document or is present with the value "false" as specified in 3GPP TS 24.481 [11], the MCData client and controlling MCData function shall determine that the MCData user is not allowed to send group MCData communications on this group identity, and shall not continue with the rest of the steps;

3) if the MCData user wishes to send one-to-one SDS communications and the size of the payload is greater than the value contained in the <max-data-size-sds-bytes> element in the MCData service configuration document as specified in 3GPP TS 24.484 [12], the MCData client and controlling MCData function shall determine that the MCData user is not allowed to send SDS communications due to message size and shall not continue with the rest of the steps;

4) if the MCData user wishes to send one-to-one FD communications and the size of the data that the MCData user wishes to send is greater than the value contained in the <max-data-size-fd-bytes> element in the MCData service configuration document as specified in 3GPP TS 24.484 [12], the MCData client and controlling MCData function shall determine that the MCData user is not allowed to send FD communications due to file size and shall not continue with the rest of the steps;

5) if the MCData user wishes to send group SDS communications on an MCData group identity and the size of the data that the MCData user wishes to send is greater than the value contained in the <mcdata-on-network-max-data-size-for-SDS> element in the MCData group document for the MCData group ID as specified in 3GPP TS 24.481 [11], then the MCData client and the controlling MCData function shall determine that the MCData user is not allowed to send SDS communications on this group identity due to message size and shall not continue with the rest of the steps;

6) if the MCData user wishes to send group FD communications on an MCData group identity and the size of the data that the MCData user wishes to send is greater than the value contained in the <mcdata-on-network-max-data-size-for-FD> element in the MCData group document for the MCData group ID as specified in 3GPP TS 24.481 [11], then the MCData client and the controlling MCData function shall determine that the MCData user is not allowed to send FD communications on this group identity due to file size and shall not continue with the rest of the steps;

7) if the MCData user wishes to send one-to-one MCData communications to another MCData user and the size of the payload is greater than the maximum amount of data that the MCData user can transmit in a single request during one-to-one communications contained in the <MaxData1To1> element of the MCData user profile document (see the MCData user profile document in 3GPP TS 24.484 [12]), the MCData client and participating MCData function shall determine that the MCData user is not allowed to send one-to-one MCData communications due to exceeding the maximum amount of data that can be sent in a single request and shall not continue with the rest of the steps;

8) if the MCData user wishes to send group MCData communications on an MCData group identity and the size of the payload is greater than the maximum amount of data that the MCData user can transmit in a single request during group communications in the group identified by the MCData group identity in the request contained in the <mcdata-max-data-in-single-request> element of the <entry> element of the MCData group document as specified in 3GPP TS 24.481 [11], the MCData client and the controlling MCData function shall determine that the MCData user is not allowed to send group MCData communications on this group identity due to exceeding the maximum amount of data that can be sent in a single request and shall not continue with the rest of the steps;

9) if the MCData user wishes to initiate a SDS session for later use with one-to-one MCData communications there are no further checks for the MCData client which shall continue at step 11). If, for either the originating user or the terminating user, the <allow-transmit-data> element of an <actions> element is not present in the MCData user profile document or is present with the value "false" (see the MCData user profile document in 3GPP TS 24.484 [12]), the participating MCData function shall determine that the MCData user is not allowed to initiate a SDS session and shall not continue with the rest of the steps;

10) if the MCData user wishes to initiate a SDS session on an MCData group identity and the <mcdata-allow- short-data-service> element of a <list-service> element is not present in the MCData group document or is present with the value "false" as specified in 3GPP TS 24.481 [11], the MCData client and controlling MCData function shall determine that the MCData user is not allowed to initiate a SDS session on this group identity and shall not continue with the rest of the steps; and

9) the MCData functional entity shall determine that the MCData user is allowed to initiate MCData communications.

11.2 Auto-receive for File Distribution

If the controlling MCData function receives a one-to-one file distribution using HTTP or a group standalone file distribution using HTTP without the mandatory download indication the controlling MCData function:

1) if the file distribution request contained metadata, shall retrieve the filesize contained in the fileselector of the Metadata IE in the FD request;

2) if the file distribution request did not contain metadata, shall determine the size of the file referenced by the file URL contained in FD request;

3) for one-to-one file distribution using HTTP, shall determine if the filesize is less than or equal to the value contained in the <max-data-size-auto-recv-bytes> element of the MCData service configuration document as specified in 3GPP TS 24.484 [12];

4) for group standalone file distribution using HTTP, shall determine if the filesize is less than or equal to the value contained the <mcdata-on-network-max-data-size-auto-recv> element of the MCData group document associated with the MCData group identity in the request, as specified in 3GPP TS 24.481 [11]

5) ifcondition 3) or 4) is true, shall determine that the mandatory download indication needs to be included in the file distribution request sent to the terminating MCData client;

12 Dispositions and Notifications

12.1 General

The procedures in clause 12 describe:

- the on-network procedures for generating out-of-band dispositions for on-network SDS and on-network FD;
- the on-network procedures for generating network notifications for file distribution; and
- the off-network procedures for generating SDS dispositions.

The MCData client can send a disposition notification as a direct result of receiving an MCData message (e.g. delivery notification) or can send a disposition notification at a later time (e.g. read notification). In certain circumstances the delivery and read notification can be delivered in one notification message.

In-band dispositions are sent in the media plane as specified in 3GPP TS 24.582 [15].

12.2 On-network disposition notifications

12.2.1 MCData client procedures

12.2.1.1 MCData client sends a disposition notification message

The MCData client shall follow the procedures in this subclause to:

- indicate to an MCData client that an SDS message was delivered, read or delivered and read when the originating client requested a delivery, read or delivery and read report;
- indicate to the participating MCData function serving the MCData user that an SDS message was undelivered. The participating MCData function can store the message for later re-delivery;
- indicate to an MCData client that a request for FD was accepted, deferred or rejected; or
- indicate to an MCData client that a file download has been completed;

Before sending a disposition notification the MCData client needs to determine:

- the group identity related to an SDS or FD message request received as part of a group communication. The MCData client determines the group identity from the contents of the <mcdata-calling-group-id> element contained in the application/vnd.3gpp.mcdata-info+xml MIME body of the incoming SDS or FD message request; and
- the MCData user targeted for the disposition notification. The MCData client determines the targetted MCData user from the contents of the <mcdata-calling-user-id> element contained in the application/vnd.3gpp.mcdata-info+xml MIME body of the incoming SDS or FD message request.

The MCData client shall generate a SIP MESSAGE request in accordance with 3GPP TS 24.229 [5] and IETF RFC 3428 [6] with the clarifications given below.

The MCData client:

1) shall build the SIP MESSAGE request as specified in subclause 6.2.4.1;
2) shall follow the rules specified in subclause 6.4 for the handling of MIME bodies in a SIP message when processing the remaining steps in this subclause;
3) shall insert in the SIP MESSAGE request an application/resource-lists+xml MIME body containing the MCData ID of the targeted MCData user, according to rules and procedures of IETF RFC 5366 [18];
4) void;
5) if sending a disposition notification in response to an MCData group data request, shall include an <mcdata-calling-group-id> element set to the MCData group identity in the application/vnd.3gpp.mcdata-info+xml MIME body;
6) if requiring to send an SDS notification, shall generate an SDS NOTIFICATION message and include it in the SIP MESSAGE request as specified in subclause 6.2.3.1;
7) if requiring to send an FD notification, shall generate an FD NOTIFICATION message and include it in the SIP MESSAGE request as specified in subclause 6.2.3.2; and
8) shall send the SIP MESSAGE request according to rules and procedures of 3GPP TS 24.229 [5].

12.2.1.2 MCData client receives a disposition notification message

Upon receipt of a:

"SIP MESSAGE request for SDS disposition notification for terminating MCData client"; or

"SIP MESSAGE request for FD disposition notification for terminating MCData client";

the MCData 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.

12.2.2 Participating MCData function procedures

12.2.2.1 Participating MCData function receives disposition notification from a MCData user

Upon receipt of a:

- "SIP MESSAGE request for SDS disposition notification for MCData server"; or

- "SIP MESSAGE request for FD disposition notification for MCData server";

the participating MCData function:

1) if unable to process the request due to a lack of resources or a risk of congestion exists, may reject the SIP MESSAGE request with a SIP 500 (Server Internal Error) response. The participating MCData function may include a Retry-After header field to the SIP 500 (Server Internal Error) response as specified in IETF RFC 3261 [4] and skip the rest of the steps;

2) shall determine the MCData ID of the calling user from the public user identity in the P-Asserted-Identity header field of the SIP MESSAGE request;

NOTE: The MCData ID of the calling user is bound to the public user identity at the time of service authorisation, as documented in subclause 7.3.

3) if the participating MCData function cannot find a binding between the public user identity and an MCData ID or if the validity period of an existing binding has expired, then the participating MCData function shall reject the SIP MESSAGE request with a SIP 404 (Not Found) response with the warning text set to "141 user unknown to the participating function" in a Warning header field as specified in subclause 4.9, and shall not continue with any of the remaining steps;

4) void;

5) if the SIP MESSAGE is a "SIP MESSAGE request for SDS disposition notification for MCData server" containing an SDS disposition notification type set to a value of "UNDELIVERED", shall temporarily store the message for re-delivery, shall start timer TD1 (SDS re-delivery timer) with the timer value as specified in subclause F.2.1, and shall not continue with the remaining steps;

NOTE: The participating MCData function attempts re-delivery of the SDS message after timer TD1 (SDS re-delivery timer) expiry.

6) if the SIP MESSAGE is a "SIP MESSAGE request for SDS disposition notification for MCData server " containing an SDS disposition notification type set to a value of "DELIVERED", "READ" or "DELIVERED AND READ" and the message was temporarily stored for re-delivery, shall delete the message from temporary store and shall stop TD1 (SDS re-delivery timer);

7) shall generate a SIP MESSAGE request in accordance with 3GPP TS 24.229 [5] and IETF RFC 3428 [6];

8) shall set the Request-URI of the outgoing SIP MESSAGE request to the public service identity of the controlling MCData function;

NOTE: How the participating MCData function determines the controlling MCData function to forward notification message is out of scope of the present document.

9) shall copy all MIME bodies included in the incoming SIP MESSAGE request to the outgoing SIP MESSAGE request;

10) if not already included as part of step 8) above, shall include an application/vnd.3gpp.mcdata-info+xml MIME body in the outgoing SIP MESSAGE request, containing an <mcdata-calling-user-identity> element set to the MCData ID of the originating user;

11) if the SIP MESSAGE is a "SIP MESSAGE request for SDS disposition notification for MCData server ", shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds" (coded as specified in 3GPP TS 24.229 [5]), into the P-Asserted-Service header field of the outgoing SIP MESSAGE request;

12) if the SIP MESSAGE is a "SIP MESSAGE request for FD disposition notification for MCData server ", shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd" (coded as specified in 3GPP TS 24.229 [5]), into the P-Asserted-Service header field of the outgoing SIP MESSAGE request;

13) shall set the P-Asserted-Identity in the outgoing SIP MESSAGE request to the public user identity in the P-Asserted-Identity header field contained in the received SIP MESSAGE request; and

14) shall send the SIP MESSAGE request as specified to 3GPP TS 24.229 [5].

Upon receipt of a SIP 202 (Accepted) response in response to the above SIP MESSAGE request, the participating MCData function:

1) shall generate a SIP 202 (Accepted) response as specified in 3GPP TS 24.229 [5]; and

2) shall send the SIP 202 (Accepted) response to the MCData client according to 3GPP TS 24.229 [5].

Upon receipt of a SIP 200 (OK) response in response to the above SIP MESSAGE request, the participating MCData function:

1) shall generate a SIP 200 (OK) response as specified in 3GPP TS 24.229 [5]; and

2) shall send the SIP 200 (OK) response to the MCData client according to 3GPP TS 24.229 [5].

Upon receipt of a SIP 4xx, 5xx or 6xx response to the above SIP MESSAGE request, the participating MCData function:

1) shall generate a SIP response according to 3GPP TS 24.229 [5];

2) shall include Warning header field(s) that were received in the incoming SIP response; and

3) shall forward the SIP response to the MCData client according to 3GPP TS 24.229 [5].

12.2.2.2 Participating MCData function receives disposition notification from a Controlling MCData function

Upon receipt of a:

- "SIP MESSAGE request for SDS disposition notification for terminating MCData client "; or
- "SIP MESSAGE request for FD disposition notification for terminating MCData client ";

the participating MCData function:

1) if unable to process the request due to a lack of resources or a risk of congestion exists, may reject the SIP MESSAGE request with a SIP 500 (Server Internal Error) response. The participating MCData function may include a Retry-After header field to the SIP 500 (Server Internal Error) response as specified in IETF RFC 3261 [4] and skip the rest of the steps;

2) shall use the MCData ID present in the <mcdata-request-uri> element of the application/vnd.3gpp.mcdata-info+xml MIME body of the incoming SIP MESSAGE request to retrieve the binding between the MCData ID and public user identity;

3) if the binding between the MCData ID and public user identity does not exist, then the participating MCData function shall reject the SIP MESSAGE request with a SIP 404 (Not Found) response. Otherwise, continue with the rest of the steps;

4) shall generate an outgoing SIP MESSAGE request as specified in subclause 6.3.2.1;

5) if sending an SDS disposition notification, shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds" (coded as specified in 3GPP TS 24.229 [5]), into the P-Asserted-Service header field of the outgoing SIP MESSAGE request;

5) if sending an FD disposition notification, shall include the ICSI value "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd" (coded as specified in 3GPP TS 24.229 [5]), into the P-Asserted-Service header field of the outgoing SIP MESSAGE request;

6) shall send the SIP MESSAGE request as specified in 3GPP TS 24.229 [5].

Upon receipt of SIP 2xx responses to the outgoing SIP MESSAGE requests, the participating MCData function shall forward the SIP 2xx response to the controlling MCData function.

Upon receipt of a SIP 4xx, 5xx or 6xx response to the SIP MESSAGE request, shall forward the response to the controlling MCData function.

12.2.3 Controlling MCData function procedures

Upon receipt of a:

- "SIP MESSAGE request for SDS disposition notification for MCData server"; or

- "SIP MESSAGE request for FD disposition notification for MCData server";

the controlling MCData function:

1) if unable to process the request due to a lack of resources or a risk of congestion exists, may reject the SIP MESSAGE request with a SIP 500 (Server Internal Error) response. The controlling MCData function may include a Retry-After header field to the SIP 500 (Server Internal Error) response as specified in IETF RFC 3261 [4]. Otherwise, continue with the rest of the steps;

2) shall reject the SIP request with a SIP 403 (Forbidden) response and not process the remaining steps if an Accept-Contact header field does not include the g.3gpp.icsi-ref media feature tag containing the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds" or "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd";

3) if the incoming SIP MESSAGE request does not contain an application/resource-lists MIME body or contains an application/resource-lists MIME body with more than one <entry> element, shall reject the SIP MESSAGE request with a SIP 403 (Forbidden) response including warning text set to "145 unable to determine called party" in a Warning header field as specified in subclause 4.4, and shall not continue with the rest of the steps;

4) shall attempt to correlate the disposition notification to the original SDS or FD request using the values contained in the Conversation ID and Message ID of the SDS NOTIFICATION message or FD NOTIFICATION message contained in the application/vnd.3gpp.mcdata-signalling MIME body of the SIP MESSAGE;

5) if unable to correlate the disposition notification as determined by step 4), shall reject the SIP MESSAGE request with a SIP 403 (Forbidden) response including warning text set to "216 unable to correlate the disposition notification" in a Warning header field as specified in subclause 4.4, and shall not continue with the rest of the steps;

6) if:

   a) a "SIP MESSAGE request for FD disposition notification for MCData server" has been received;

   b) the FD disposition notification type IE in the FD NOTIFICATION message is set to "FILE DOWNLOAD REQUEST REJECTED"; and

   c) the SIP MESSAGE does not contain an application/vnd.3gpp.mcdata-info+xml MIME body with an <mcdata-calling-group-id> element, or the SIP MESSAGE contains an application/vnd.3gpp.mcdata-info+xml MIME body with an <mcdata-calling-group-id> element and all other FD disposition notifications have been received from the invited group members and were all set to "FILE DOWNLOAD REQUEST REJECTED";

then:

a) shall delete the file stored in the media storage function that is associated with the Conversation ID and Message ID that was included in the FD NOTIFICATION message;

7) shall generate a SIP MESSAGE request in accordance with 3GPP TS 24.229 [5] and IETF RFC 3428 [6];

8) if sending an SDS disposition notification:

a) shall include an Accept-Contact header field containing the g.3gpp.mcdata.sds media feature tag along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [8] in the outgoing SIP MESSAGE request;

b) shall include an Accept-Contact header field with the media feature tag g.3gpp.icsi-ref with the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds" along with parameters "require" and "explicit" according to IETF RFC 3841 [8]] in the outgoing SIP MESSAGE request;

9) if sending an FD disposition notification:

a) shall include an Accept-Contact header field containing the g.3gpp.mcdata.fd media feature tag along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [8];

b) shall include an Accept-Contact header field with the media feature tag g.3gpp.icsi-ref with the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd" along with parameters "require" and "explicit" according to IETF RFC 3841 [8];

10) shall set the Request-URI to the public service identity of the terminating participating MCData function associated to the MCData user to be invited;

NOTE 1: How the controlling MCData function finds the address of the terminating MCData participating function is out of the scope of the current release.

11) if sending an SDS disposition notification, shall include a P-Asserted-Service header field with the value "urn:urn-7:3gpp-service.ims.icsi.mcdata.sds";

12) if sending an FD disposition notification, shall include a P-Asserted-Service header field with the value "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd";

13) shall copy the public user identity of the calling MCData user from the P-Asserted-Identity header field of the incoming SIP MESSAGE request into the P-Asserted-Identity header field of the outgoing SIP MESSAGE request;

14) shall copy the MCData ID of the MCData user listed in the MIME resources body of the incoming SIP MESSAGE request, into the <mcdata-request-uri> element in the application/vnd.3gpp.mcdata-info+xml MIME body of the outgoing SIP MESSAGE request;

15) if the incoming SIP MESSAGE request contains an application/vnd.3gpp.mcdata-info+xml MIME body with an <mcdata-calling-group-id> element:

a) shall retrieve the group document for the MCData group id contained in the <mcdata-calling-group-id> element from the group management server, if not already cached, and identify the group members;

b) shall verify that the MCData ID contained in the <mcdata-calling-user-identity> element matches to a group member. If there is no match, the controlling MCData function shall reject the SIP request with a SIP 403 (Forbidden) response including warning text set to "116 user is not part of the MCData group" in a Warning header field as specified in subclause 4.4, and shall not continue with the rest of the steps;

c) if MCData disposition notifications need to be aggregated and an aggregated disposition notification has not yet been sent:

i) if timer TDC1 (disposition aggregation timer) is not running, shall start timer TDC1 (disposition aggregation timer) with the timer value as specified in subclause F.2.2;

ii) shall copy the application/vnd.3gpp.mcdata-signalling MIME body in the received SIP MESSAGE request to the outgoing SIP MESSAGE request;

NOTE 2: If the aggregated MCData disposition notifications do not fit into one SIP MESSAGE request, then the controlling MCData function needs to generate a new SIP MESSAGE request for the remaining disposition notifications.

iii) on expiry of timer TDC1 (disposition aggregation timer) shall continue with step 16; and

iv) if all MCData disposition notifications have been received from all group members shall continue with step 16; and

d) if MCData disposition notifications do not need to be aggregated, shall copy the application/vnd.3gpp.mcdata-signalling MIME body in the received SIP MESSAGE request to the outgoing SIP MESSAGE request and shall continue with step 16;

16) if the incoming SIP MESSAGE request contains an application/vnd.3gpp.mcdata-info+xml MIME body without an <mcdata-calling-group-id> element shall copy the application/vnd.3gpp.mcdata-signalling MIME body in the received SIP MESSAGE request to the outgoing SIP MESSAGE request;

17) shall send the SIP MESSAGE request according to according to rules and procedures of 3GPP TS 24.229 [5];

18) shall generate a SIP 202 (Accepted) response in response to the

- "SIP MESSAGE request for SDS disposition notification for MCData server"; or
- "SIP MESSAGE request for FD disposition notification for MCData server"; and

19) shall send the SIP 202 (Accepted) response towards the originating participating MCData function according to 3GPP TS 24.229 [5].

12.3 Off-network dispositions

12.3.1 General

12.3.2 Sending off-network SDS delivery notification

To send an off-network SDS delivery notification, the MCData client:

1) shall store "DELIVERED" as the disposition type;

2) shall generate a SDS OFF-NETWORK NOTIFICATION message as specified in subclause 15.1.8. In the SDS OFF-NETWORK NOTIFICATION message, the MCData client:

a) shall set the Sender MCData user ID IE to its own MCData user ID as specified in subclause 15.2.15;

b) shall set the Conversation ID IE as the stored conversation ID as specified in subclause 15.2.9;

c) shall set the Message ID IE as the stored SDS message ID as specified in subclause 15.2.10;

d) shall set the Date and time IE as the stored SDS notification time as specified in subclause 15.2.8;

e) shall set the SDS disposition notification type IE to the stored disposition type as specified in subclause 15.2.5; and

f) may set the Application ID IE set to the stored SDS application ID as specified in subclause 15.2.7;

2) shall send the SDS OFF-NETWORK NOTIFICATION message to the stored notification target MCData user ID as specified in subclause 9.3.1.1;

3) shall initialise the counter CFS2 (SDS notification retransmission) with the value set to 1; and

4) shall start timer TFS2 (SDS notification retransmission).

12.3.3 Sending off-network SDS read notification

Upon receiving a display indication for the payload to the user or processing of the payload by the target application, the MCData client:

1) shall store "READ" as the disposition type;
2) shall store the current UTC time as the stored SDS notification time;
3) shall generate SDS OFF-NETWORK NOTIFICATION message as specified in subclause 15.1.8. In the SDS OFF-NETWORK NOTIFICATION message, the MCData client:
   a) shall set the Sender MCData user ID IE to its own MCData user ID as specified in subclause 15.2.15;
   b) shall set the Conversation ID IE as the stored conversation ID as specified in subclause 15.2.9;
   c) shall set the Message ID IE as the stored SDS message ID as specified in subclause 15.2.10;
   d) shall set the Data and time IE as the SDS notification time as specified in subclause 15.2.8;
   e) shall set the SDS disposition notification type IE to the stored disposition type as specified in subclause 15.2.5; and
   f) may set the Application ID IE set to the stored SDS application ID as specified in subclause 15.2.7;
4) shall send the SDS OFF-NETWORK NOTIFICATION message to the stored sender MCData user ID as specified in subclause 9.3.1.1;
5) shall initialise the counter CFS2 (SDS notification retransmission) with the value set to 1; and
6) shall start timer TFS2 (SDS notification retransmission).

12.3.4 Sending off-network SDS delivered and read notification

Upon receiving a display indication for the payload to the user or processing of the payload by the target application, the MCData client:

1) shall store "DELIVERED AND READ" as the disposition type and stop the timer TFS3 (display and read);
2) shall store the current UTC time as the stored SDS notification time;
3) shall generate SDS OFF-NETWORK NOTIFICATION message. In the SDS OFF-NETWORK NOTIFICATION message, the MCData client:
   a) shall set the Sender MCData user ID IE to its own MCData user ID as specified in subclause 15.2.15;
   b) shall set the Conversation ID IE as the stored conversation ID as specified in subclause 15.2.9;
   c) shall set the Message ID IE as the stored SDS message ID as specified in subclause 15.2.10;
   d) shall set the Date and time IE as the SDS notification time as specified in subclause 15.2.8;
   e) shall set the SDS disposition notification type IE to the stored disposition type as specified in subclause 15.2.5; and
   f) may set the Application ID IE set to the stored SDS application ID as specified in subclause 15.2.7;
4) shall send the SDS OFF-NETWORK NOTIFICATION message to the stored sender MCData user ID as specified in subclause 9.3.1.1;
5) shall initialise the counter CFS2 (SDS notification retransmission) with the value set to 1; and
6) shall start timer TFS2 (SDS notification retransmission).

12.3.5 Off-network SDS notification retransmission

Upon expiry of timer TFS2 (SDS notification retransmission), the MCData client:

1) shall generate a SDS OFF-NETWORK NOTIFICATION message as specified in subclause 15.1.8. In the SDS OFF-NETWORK NOTIFICATION message, the MCData client:
   a) shall set the Sender MCData user ID IE to its own MCData user ID as specified in subclause 15.2.15;
   b) shall set the Conversation ID IE as the stored conversation ID as specified in subclause 15.2.9;
   c) shall set the Message ID IE as the stored SDS message ID as specified in subclause 15.2.10;
   d) shall set the Date and time IE as the stored SDS notification time as specified in subclause 15.2.8;
   e) shall set the SDS disposition type IE to the stored disposition type as specified in subclause 15.2.5; and
   f) may set the Application ID IE set to the stored SDS application ID as specified in subclause 15.2.8;
2) shall send the SDS OFF-NETWORK NOTIFICATION message to the stored sender MCData user ID as specified in subclause 9.3.1.1;
3) shall increment the counter CFS2 (SDS notification retransmission) by 1; and
4) shall start timer TFS2 (SDS notification retransmission) if the associated counter CFS2 (SDS notification retransmission) has not reached its upper limit.

12.4 Network-triggered notifications for FD

12.4.1 General

12.4.1.1 File availability expiry

When the controlling MCData function receives a "SIP MESSAGE request for FD using HTTP for controlling MCData function" (referred to as FD request), it starts a timer TDC2 (file availability timer). The timer value is derived from the "file availability" information contained in metadata in the FD request (if included) or by local policy. The timer running for the file is uniquely associated to the Conversation ID and Message ID in the FD request.

The controlling MCData function tracks which MCData client(s) have downloaded the file referenced by the file URL received in an FD request which is associated to a Conversation ID and Message ID. On expiry of timer TDC2 (file availability timer), the controlling MCData function sends a FD NETWORK NOTIFICATION message with a notification type set to "FILE EXPIRED UNAVAILABLE TO DOWNLOAD". The MCData client is notified that the file associated with the Conversation ID and Message ID is no longer available to download.

12.4.2 Controlling MCData function procedures

12.4.2.1 Generation of a SIP MESSAGE request for notification

This subclause is referenced from other procedures and is not run standalone.

The controlling MCData function

1) shall generate a SIP MESSAGE request in accordance with 3GPP TS 24.229 [5] and IETF RFC 3428 [6];
2) shall include an Accept-Contact header field containing the g.3gpp.mcdata.fd media feature tag along with the "require" and "explicit" header field parameters according to IETF RFC 3841 [8] in the outgoing SIP MESSAGE request;
3) shall include an Accept-Contact header field with the media feature tag g.3gpp.icsi-ref with the value of "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd" along with parameters "require" and "explicit" according to IETF RFC 3841 [8] in the outgoing SIP MESSAGE request;

4) shall follow the rules specified in subclause 6.4 for the handling of MIME bodies in a SIP message when processing the remaining steps in this subclause;

5) shall include in an application/vnd.3gpp.mcdata-info+xml MIME body of the outgoing SIP MESSAGE request:

   - the <mcdata-request-uri> element set to the MCData ID of the MCData user; and

   - the <request-type> element set to a value of "notify";

6) shall set the Request-URI to the public service identity of the terminating participating MCData function associated to the MCData user to be invited;

7) shall include the public service identity of the controlling MCData function in the P-Asserted-Identity header field; and

8) shall include a P-Asserted-Service header field with the value "urn:urn-7:3gpp-service.ims.icsi.mcdata.fd".

12.4.2.1 Expiry of timer TDC2 (file availability timer)

When timer TDC2 (file availability timer) associated to a specific Conversation ID and Message ID expires, the controlling MCData function shall identify a target set of MCData client(s) as being:

- the MCData client that received a one-to-one file distribution using HTTP for the associated Conversation ID and Message ID, but has not yet downloaded the file; or

- each MCData client that received a group standalone file distribution using HTTP for the associated Conversation ID and Message ID, but have not yet downloaded the file;

On expiry of timer TDC2 (file availability timer), for each identified MCData client, the controlling MCData function:

NOTE: The file availability timer is associated to the Conversation ID and Message ID that was present in the initial FD request.

1) shall generate a SIP MESSAGE request as specified in subclause 12.x.2.1;

2) shall include an FD NETWORK NOTIFICATION message in an application/vnd.3gpp.mcdata-signalling MIME body of the SIP MESSAGE request with:

   a) the FD notification type IE as "FILE EXPIRED UNAVAILABLE TO DOWNLOAD" as specified in subclause 15.2.6;

   b) shall set the Date and time IE to the current time as specified in subclause 15.2.8;

   c) the Conversation ID IE set to a value identifying the conversation, as specified in subclause 15.2.9;

   d) the Message ID IE set to a value identifying the message as specified in subclause 15.2.10; and

   e) if an Application ID was stored against the expired timer TDC2 (file availability timer), shall set the Application ID to the stored value as specified in subclause 15.2.7; and

3) shall send the SIP MESSAGE request according to according to rules and procedures of 3GPP TS 24.229 [5].

12.4.3 Participating MCData function procedures

The participating MCData function shall follow the procedures in subclause 10.2.4.3.2.

12.4.4 MCData client terminating procedures

On receipt of a SIP MESSAGE request containing an application/vnd.3gpp.mcdata-signalling MIME body with a FD NETWORK NOTIFICATION message, the MCData client:

1) may reject the SIP MESSAGE request if there are not enough resources to handle the SIP MESSAGE request;

2) if the SIP MESSAGE request is rejected in step 1), shall respond towards the participating MCData function with a SIP 480 (Temporarily unavailable) response and skip the rest of the steps of this subclause;

3) shall generate a SIP 200 (OK) response according to rules and procedures of 3GPP TS 24.229 [5];

4) shall send the SIP 200 (OK) response towards the MCData server according to rules and procedures of 3GPP TS 24.229 [5];

5) shall decode the contents of the FD NETWORK NOTIFICATION message contained in the application/vnd.3gpp.mcdata-signalling MIME body;

6) if the FD NETWORK NOTIFICATION message contains an Application ID, shall deliver the FD NETWORK NOTIFICATION message to the application; and

7) if the FD NETWORK NOTIFICATION message does not contain an Application ID, shall deliver the FD NETWORK NOTIFICATION message to the user.

13 Communication Release

13.1 General

Communication Release allows MCData user or MCData server to release MCData communications on-demand or based on policies. These procedures are applicable for SDS and FD and can be initiated by communication originator or MCData server.

13.2 On-network

13.2.1 General

13.2.2 MCData originating user initiated communication release

13.2.2.1 General

The MCData client can release the communication to indicate MCData service that the user no longer wants to transmit.

13.2.2.2 Release of MCData communication over media plane

13.2.2.2.1 General

The procedures described in this subclause are applicable to MCData SDS and MCData FD using media plane where originating MCData user initiates the communication release.

13.2.2.2.2 MCData client procedures

13.2.2.2.2.1 MCData client originating procedures

When the MCData client wants to release a MCData communication established over the media plane, the MCData client:

1) shall generate a SIP BYE request according to 3GPP TS 24.229 [5];

2) shall set the Request-URI to the MCData session identity to be released; and

3) shall send the SIP BYE request towards MCData server according to 3GPP TS 24.229 [5].

Upon receiving a SIP 200 (OK) response to the SIP BYE request, the MCData client shall release all media plane resources corresponding to the MCData communication being released.

13.2.2.2.2.2 MCData client terminating procedures

Upon receiving a SIP BYE request, the MCData client:

1) shall send SIP 200 (OK) response towards MCData server according to 3GPP TS 24.229 [5]; and
2) shall release all media plane resources corresponding to the MCData communication being released.

NOTE: Partially received data can be stored and processed.

13.2.2.2.3 Participating MCData function procedures

13.2.2.2.3.1 Originating participating MCData function procedures

Upon receiving a SIP BYE request from the MCData client, the originating participating MCData function:

1) shall generate a SIP BYE request as specified in 3GPP TS 24.229 [5];
2) shall set the Request-URI to the MCData session identity mentioned in the received SIP BYE request;
3) shall copy the contents of the P-Asserted-Identity header field of the incoming SIP BYE request to the P-Asserted-Identity header field of the outgoing SIP BYE request; and
4) shall send the SIP BYE request toward the controlling MCData function, according to 3GPP TS 24.229 [5].

Upon receiving a SIP 200 (OK) response to the SIP BYE request the participating MCData function;

1) shall forward the SIP 200 (OK) response to the originating MCData client and release all media plane resources corresponding to the MCData communication with the originating MCData client; and
2) shall release all media plane resources corresponding to the MCData communication with the controlling MCData function.

13.2.2.2.3.2 Terminating participating MCData function procedures

Upon receiving a SIP BYE request from the controlling MCData function, the participating MCData function:

1) shall generate a SIP BYE request according to 3GPP TS 24.229 [5];
2) shall copy the contents of the P-Asserted-Identity header field of the incoming SIP BYE request to the P-Asserted-Identity header field of the outgoing SIP BYE request; and
3) shall send the SIP BYE request to the MCData client according to 3GPP TS 24.229 [5].

Upon receiving a SIP 200 (OK) response to the SIP BYE request the participating MCData function:

1) shall send the SIP 200 (OK) response to the SIP BYE request received from the controlling MCData function according to 3GPP TS 24.229 [5] and release all media plane resources corresponding to the MCData communication with the controlling MCData function; and
2) shall release all media plane resources corresponding to the MCData communication with the terminating MCData client.

13.2.2.2.4 Controlling MCData function procedures

13.2.2.2.4.1 Communication release policy for group MCData communication

The controlling MCData function shall release the group MCData communication, if:

1) the controlling MCData function receives an indication from the media plane that the transmission time limit has reached;
2) the controlling MCData function receives an indication from the media plane that the transmission data limit per request has reached;

3) there are only one or no participants in the MCData communication;

4) according to a local policy, the initiator of the group call leaves the MCData communication; or

5) the minimum number of affiliated MCData group members is not present;

13.2.2.2.4.2 Communication release policy for one-to-one MCData communication

The controlling MCData function shall release the one-to-one MCData communication if:

1) the controlling MCData function receives an indication from the media plane that the transmission time limit has reached;

2) the controlling MCData function receives an indication from the media plane that the transmission data limit per request has reached; or

3) there are only one or no participants in the MCData communication.

13.2.2.2.4.3 Receiving a SIP BYE request

Upon receiving a SIP BYE request the controlling MCData function:

1) shall release all media plane resources corresponding to the MCData communication with the originating participating MCData function;

2) shall generate a SIP 200 (OK) response and send the SIP response towards the originating MCData client according to 3GPP TS 24.229 [5];

3) shall check the communication release policy as specified in subclause 13.2.2.2.4.1 and subclause 13.2.2.2.4.2 whether the MCData communication needs to be released for each participant of the MCData communication; and

4) if release of the MCData communication is required, perform the procedures as specified in the subclause 13.2.2.2.4.4.

13.2.2.2.4.4 Sending a SIP BYE request

When a participant needs to be removed from the MCData communication, the controlling MCData function:

1) shall interact with the media plane as specified in 3GPP TS 24.582 [15] for the MCData communication release;

2) shall generate a SIP BYE request according to 3GPP TS 24.229 [5]; and

3) shall send the SIP BYE request to the MCData client according to 3GPP TS 24.229 [5].

If group MCData communication needs to be released, the controlling MCData function shall send SIP BYE requests as described in this subclause to all the participants of the communication.

Upon receiving a SIP 200 (OK) response to a SIP BYE request, the controlling MCData function shall release all media plane resources corresponding to the MCData communication with the terminating participating MCData function.

13.2.3 MCData server initiated communication release without prior indication

13.2.3.1 General

Based on local policies and conditions explained in subclause 13.2.2.2.4.1 and subclause 13.2.2.2.4.2, MCData server can release an ongoing MCData communication. Based on the configuration, MCData server can decide to release the communication without prior notification to MCData client.

13.2.3.2 Release of MCData communication over media plane

13.2.3.2.1 General

The procedures described in this subclause are applicable to MCData SDS and MCData FD using media plane where MCData server initiates communication release.

13.2.3.2.2 MCData client procedures

Upon receiving a SIP BYE request from the MCData server, the MCData client should follow the procedure described in subclause 13.2.2.2.2.2 with following clarification:

1) shall notify the MCData user with reason for release of communication if SIP BYE request contains reason header.

13.2.3.2.3 Participating MCData function procedures

Upon receiving SIP BYE request from controlling MCData function, the participating MCData function should follow the procedure described in subclause 13.2.2.2.3.2 with following clarification:

1) if reason header is present in the incoming SIP BYE request, shall copy the contents of the reason header field of the incoming SIP BYE request to the reason header field of the outgoing SIP BYE request.

13.2.3.2.4 Controlling MCData function procedures

Based on communication release policies and configuration, when controlling MCData function wants to release communication, the controlling MCData function should follow the procedure as described in subclause 13.2.2.2.4.4 with following clarification:

1) shall add reason header with reason-text value as appropriate (e.g. data volume limit, time limit expiry).

13.2.4 MCData server initiated communication release with prior indication

13.2.4.1 General

Based on local policies and conditions as mentioned in subclause 13.2.2.2.4.1 and subclause 13.2.2.2.4.2, the MCData server can release an ongoing MCData communication.

If configured to, the MCData server can notify the originating MCData user about the intent to release communication and may request for more data about the communication it intends to release. The procedures described in this subclause are applicable to MCData SDS and MCData FD using media plane where the MCData server initiates the communication release.

13.2.4.2 MCData client procedures

13.2.4.2.1 Receiving intent to release the communication

Upon receiving a SIP INFO request within the SIP dialog of a MCData communication, with the Info-Package header field set to g.3gpp.mcdata-com-release package and containing an application/vnd.3gpp.mcdata-signalling MIME body associated with the Info-Package, the MCData client:

1) shall decode the contents of the application/vnd.3gpp.mcdata-signalling MIME body;

2) if the application/vnd.3gpp.mcdata-signalling MIME body contains a COMMUNICATION RELEASE message as specified in subclause 15.1.10, with the Comm release information type IE set to “INTENT TO RELEASE”, then:

   a) shall generate a SIP 200 (OK) response according to 3GPP TS 24.229 [5];

   b) shall send SIP 200 (OK) response towards MCData server according to 3GPP TS 24.229 [5]; and

c) if an Data query type IE is present and set to “REMAINING AMOUNT OF DATA”, then:

i) shall generate a DATA PAYLOAD message as described in subclause 15.1.4;

ii) shall generate a SIP INFO request according to 3GPP TS 24.229 [5] and IETF RFC 6086 [21];

iii) shall include in the SIP INFO request, the DATA PAYLOAD message in an application/vnd.3gpp.mcdata-payload MIME body as specified in subclause E.2; and

A) shall set a Content-Disposition header field to "Info-Package" value; and

iv) shall send the SIP INFO request within the SIP dialog of the MCData communication, towards the participating MCData function according to 3GPP TS 24.229 [5]; and

3) shall notify MCData user and present the reason, if the reason header is present in incoming SIP INFO message.

When generating an DATA PAYLOAD message as specified in subclause 15.1.4, the MCData client:

1) shall set the Number of payloads IE to 1:

a) shall set the Payload content type as "TEXT" as specified in subclause 15.2.13; and

b) shall include the remaining amount of data in bytes to be sent in the Payload data.

Once the MCData user is notified about the MCData server's intent to release the communication, the MCData user may request for extension of communication as described in subclause 13.2.4.2.2.

13.2.4.2.2 Request for extension of communication

Upon receiving a request from MCData user for extension of the communication as a result of MCData server's intent to release the communication, the MCData client:

1) shall generate a SIP INFO request according to 3GPP TS 24.229 [5] and IETF RFC 6086 [21];

2) shall include a Info-Package with header field set to g.3gpp.mcdata-com-release;

3) shall include in the SIP INFO request, a COMMUNICATION RELEASE message as specified in subclause 15.1.10, in an application/vnd.3gpp.mcdata-signalling MIME body as specified in subclause E.1; and

a) shall set a Content-Disposition header field to "Info-Package" value; and

4) shall send the SIP INFO request within the SIP dialog of the MCData communication, towards the participating MCData function according to 3GPP TS 24.229 [5].

When generating an COMMUNICATION RELEASE message as specified in subclause 15.1.10, the MCData client:

1) shall set the Comm release information type to "EXTENSION REQUEST".

13.2.4.2.3 Receiving response to communication extension request

Upon receiving a SIP INFO request within the SIP dialog of a MCData communication, with the Info-Package header field set to g.3gpp.mcdata-com-release package and containing an application/vnd.3gpp.mcdata-signalling MIME body associated with the Info-Package, the MCData client:

1) shall decode the contents of application/vnd.3gpp.mcdata-signalling MIME body; and

2) if the application/vnd.3gpp.mcdata-signalling MIME body contains a COMMUNICATION RELEASE message as specified in subclause 15.1.10, with the Comm release information type IE set to “EXTENSION RESPONSE”, then:

a) shall generate a SIP 200 (OK) response according to 3GPP TS 24.229 [5];

b) shall send SIP 200 (OK) response towards MCData server according to 3GPP TS 24.229 [5]; and

c) shall notify user about extension response based on Extension Response Type IE.

13.2.4.3 Participating MCData function procedures

13.2.4.3.1 Receiving SIP INFO request from the controlling MCData function

Upon receiving a SIP INFO request with the Info-Package header field set to g.3gpp.mcdata-com-release package, from controlling MCData function within the SIP dialog of the MCData communication, the participating MCData function:

1) shall generate a SIP INFO request according to 3GPP TS 24.229 [5] and IETF RFC 6086 [21];

2) shall copy the contents of the Info-Package header field of the incoming SIP INFO request to the Info-Package header field of the outgoing SIP INFO request;

3) shall copy the MIME bodies present in the incoming SIP INFO request to the outgoing SIP INFO request; and

4) shall send the SIP INFO request to the MCData client within the SIP dialog of the MCData communication according to 3GPP TS 24.229 [5].

Upon receiving a SIP 200 (OK) response from MCData client to the SIP INFO request, the participating MCData function:

1) shall generate a SIP 200 (OK) response according to 3GPP TS 24.229 [5]; and

2) shall send a SIP 200 (OK) response to the SIP INFO request received from the controlling MCData function according to 3GPP TS 24.229 [5].

13.2.4.3.2 Receiving SIP INFO request from the MCData client

Upon receiving a SIP INFO request with the Info-Package header field set to g.3gpp.mcdata-com-release package, from MCData client within the SIP dialog of the MCData communication, the participating MCData function:

1) shall generate a SIP INFO request according to rules and procedures of 3GPP TS 24.229 [5] and IETF RFC 6086 [21];

2) shall copy the contents of the Info-Package header field of the incoming SIP INFO request to the Info-Package header field of the outgoing SIP INFO request;

3) shall copy the MIME bodies present in the incoming SIP INFO request to the outgoing SIP INFO request; and

4) shall send the SIP INFO request to the controlling MCData function, within the SIP dialog of the MCData communication, according to 3GPP TS 24.229 [5].

Upon receiving a SIP 200 (OK) response from controlling MCData function to the SIP INFO request, the participating MCData function:

1) shall generate a SIP 200 (OK) response according to 3GPP TS 24.229 [5]; and

2) shall send a SIP 200 (OK) response to the SIP INFO request received from the MCData client according to 3GPP TS 24.229 [5].

13.2.4.4 Controlling MCData function procedures

13.2.4.4.1 Sending intent to release a communication

To send an intent to release a MCData communication, the controlling MCData function:

1) shall generate a SIP INFO request according to rules and procedures of 3GPP TS 24.229 [5] and IETF RFC 6086 [21];

2) shall include the Info-Package header field set to g.3gpp.mcdata-com-release;

3) shall include in the SIP INFO request, a COMMUNICATION RELEASE message in an application/vnd.3gpp.mcdata-signalling MIME body as specified in subclause E.1:

   a) shall set a Content-Disposition header field to "Info-Package" value;

4) may add reason header with reason-text value as appropriate (e.g. data volume limit, time limit expiry); and

5) shall send a SIP request towards participating MCData function within the SIP dialog of the MCData communication, according to 3GPP TS 24.229 [5].

When generating a COMMUNICATION RELEASE message, the controlling MCData function:

1) shall generate a COMMUNICATION RELEASE message as defined in subclause 15.1.10. In the COMMUNICATION RELEASE message, the controlling MCData function:

   a) shall set Comm Release Information type IE to “INTENT TO RELEASE”; and

   b) if requesting for more information, shall include and set Data query type IE to the “REMAINING AMOUNT OF DATA”.

Upon receiving SIP 200 OK, the controlling MCData function:

1) shall start Timer TDC3 (request for extension).

If timer TDC3 (request for extension) expires before controlling MCData function receives a request for extension of communication from the MCData client, the controlling MCData function shall release MCData communication as described in subclause 13.2.2.2.4.4.

13.2.4.4.2 Receiving more information

Upon receiving a SIP INFO request within the SIP dialog of a MCData communication, with the Info-Package header field set to g.3gpp.mcdata-com-release package and containing an application/vnd.3gpp.mcdata-payload MIME body associated with the Info-Package, the controlling MCData function:

1) shall decode the contents of the application/vnd.3gpp.mcdata-payload MIME body; and

2) shall identify the number of Payload IEs in the DATA PAYLOAD message from the Number of payloads IE in the DATA PAYLOAD message:

   a) For each Payload IE:

      i) shall store the contents of the Payload IE as remaining data information associated with ongoing MCData communication;

13.2.4.4.3 Receiving request for extension of communication

Upon receiving a SIP INFO request within the SIP dialog of a MCData communication, with the Info-Package header field set to g.3gpp.mcdata-com-release package and containing an application/vnd.3gpp.mcdata-signalling MIME body associated with the Info-Package, the controlling MCData function:

1) shall decode the contents of application/vnd.3gpp.mcdata-signalling MIME body; and

2) if application/vnd.3gpp.mcdata-signalling MIME body contains COMMUNICATION RELEASE message with the comm release information type IE set to “EXTENSION REQUEST”, the controlling MCData function:

   a) shall stop the timer TDC3 (request for extension);

   b) shall generate SIP 200 (OK) response and send it towards participating MCData function according to 3GPP TS 24.229 [5]; and

   c) shall send response to communication extension request as described in subclause 13.2.4.4.4.

13.2.4.4.4 Sending response to communication extension request

To send a response to communication extension request from MCData client, the controlling MCData function:

1) shall generate a SIP INFO request according to rules and procedures of 3GPP TS 24.229 [5] and IETF RFC 6086 [21];

2) shall include the Info-Package header field set to g.3gpp.mcdata-com-release;

3) shall include in the SIP INFO request, a COMMUNICATION RELEASE message in an application/vnd.3gpp.mcdata-signalling MIME body as specified in subclause E.1; and

   a) Shall set a Content-Disposition header field to "Info-Package" value; and

4) shall send a SIP request towards participating MCData function within the SIP dialog of the MCData communication, according to 3GPP TS 24.229 [5].

When generating a COMMUNICATION RELEASE message, the controlling MCData function:

1) Shall generate a COMMUNICATION RELEASE message as defined in subclause 15.1.10. In the COMMUNICATION RELEASE message, the controlling MCData function:

   a) Shall set Comm Release Information type IE to “EXTENSION RESPONSE”; and

   b) shall assert the local policy along with already stored remaining data information associated with the MCData communication:

      i) If controlling MCData function decides to accept the request for extension, shall set extension request type information element to "ACCEPTED"; or

      ii) If controlling MCData function, decides to reject the request for extension, shall set extension request type information element to "REJECTED";

Upon receiving a SIP 200 (OK) response,

1) shall release the MCData communication as described in subclause 13.2.2.2.4.4, if controlling MCData function, decides to reject the request for extension.

14. Enhanced Status (ES)

14.1 General

14.2 On-network ES

On-network Enhanced Status is not specified in this release of the specification.

14.3 Off-network ES

Off-network Enhanced Status is not specified in this release of the specification.

15 Message Formats

15.1 MCData message functional definitions and contents

15.1.1 General

The following subclauses describe the MCData message functional definitions and contents. Each message consist of a series of information elements. The standard format of an MCData message and the encoding rules for each type of information element follow that defined for the MCPTT Off-Network Protocol (MONP) as documented in Annex I of 3GPP TS 24.379 [10].

15.1.2 SDS SIGNALLING PAYLOAD message

15.1.2.1 Message definition

This message is sent by the UE to other UEs when sending an SDS data payload. This message provides the signalling content related to the SDS data payload. For the contents of the message see Table 15.1.2.1-1.

Message type: SDS SIGNALLING PAYLOAD

Direction: UE to other UEs (can be via network)

Table 15.1.2.1-1: SDS SIGNALLING PAYLOAD message content

IEI	Information Element	Type/Reference	Presence	Format	Length
	SDS signalling payload message identity	Message type 15.2.2	M	V	1
	Date and time	Date and time 15.2.8	M	V	5
	Conversation ID	Conversation ID 15.2.9	M	V	16
	Message ID	Message ID 15.2.10	M	V	16
21	InReplyTo message ID	InReplyTo message ID 15.2.11	O	TV	17
22	Application ID	Application ID 15.2.7	O	TV	2
8-	SDS disposition request type	SDS disposition request type 15.2.3	O	TV	1

15.1.3 FD SIGNALLING PAYLOAD message

15.1.3.1 Message definition

This message is sent by the UE to other UEs when sending an FD data payload. This message provides the signalling content related to the FD data payload. For the contents of the message see Table 15.1.3.1-1.

Message type: FD SIGNALLING PAYLOAD

Direction: UE to other UEs (via the network)

Table 15.1.3.1-1: FD SIGNALLING PAYLOAD message content

IEI	Information Element	Type/Reference	Presence	Format	Length
	FD signalling payload message identity	Message type 15.2.2	M	V	1
	Date and time	Date and time 15.2.8	M	V	5
	Conversation ID	Conversation ID 15.2.9	M	V	16
	Message ID	Message ID 15.2.10	M	V	16
21	InReplyTo message ID	InReplyTo message ID 15.2.11	O	TV	17
22	Application ID	Application ID 15.2.7	O	TV	2
9-	FD disposition request type	FD disposition request type 15.2.4	O	TV	1
A-	Mandatory download	Mandatory download 15.2.16	O	TV	1
78	Payload	Payload 15.2.13	O	TLV-E	3-x
79	Metadata	Metadata 15.2.17	O	TLV-E	3-x

15.1.4 DATA PAYLOAD message

15.1.4.1 Message definition

This message is sent by the UE to other UEs when sending an SDS data payload or an FD data payload. This message provides the data to be delivered to the user or application. For the contents of the message see Table 15.1.4.1-1.

Message type: DATA PAYLOAD

Direction: UE to other UEs (can be via the network for SDS and always via the network for FD)

Table 15.1.4.1-1: DATA PAYLOAD message content

IEI	Information Element	Type/Reference	Presence	Format	Length
	Data payload message identity	Message type 15.2.2	M	V	1
	Number of payloads	Number of payloads 15.2.12	M	V	1
7A	Security parameters and Payload	MCData Protected Payload message 3GPP TS 33.180 [26]	O	TLV-E	32-x
78	Payload	Payload 15.2.13	O	TLV-E	3-x

NOTE 1: The Number of payloads IE dictates the number of Payload IEs that are included in the message by the sender. Multiple Payload IEs can be part of Security parameters and Payload IE if end-to-end security is required.

NOTE 2: If end-to-end security is required for a one-to-one communication, Security parameters and Payload IE is included. Otherwise, if end-to-end security is not required for a one-to-one communication, Payload IE is included. For group communication, Payload IE is included.

NOTE 3: Formatting of payloads as part of the Security parameters and Payload IE is specified in subclause 15.2.13.

15.1.5 SDS NOTIFICATION message

15.1.5.1 Message definition

This message is sent by the UE to another other UE to share SDS disposition information. For the contents of the message see Table 15.1.5.1-1.

Message type: SDS NOTIFICATION

Direction: UE to other UEs (can be via network)

Table 15.1.5.1-1: SDS NOTIFICATION message content

IEI	Information Element	Type/Reference	Presence	Format	Length
	SDS notification message identity	Message type 15.2.2	M	V	1
	SDS disposition notification type	SDS disposition notification type 15.2.5	M	V	1
	Date and time	Date and time 15.2.8	M	V	5
	Conversation ID	Conversation ID 15.2.9	M	V	16
	Message ID	Message ID 15.2.10	M	V	16
22	Application ID	Application ID 15.2.7	O	TV	2

15.1.6 FD NOTIFICATION message

15.1.6.1 Message definition

This message is sent by the UE to another other UE to share FD disposition information. For the contents of the message see Table 15.1.6.1-1.

Message type: FD NOTIFICATION

Direction: UE to other UEs (via the network)

Table 15.1.6.1-1: FD NOTIFICATION message content

IEI	Information Element	Type/Reference	Presence	Format	Length
	FD notification message identity	Message type 15.2.2	M	V	1
	FD disposition notification type	FD disposition notification type 15.2.6	M	V	1
	Date and time	Date and time 15.2.8	M	V	5
	Conversation ID	Conversation ID 15.2.9	M	V	16
	Message ID	Message ID 15.2.10	M	V	16
22	Application ID	Application ID 15.2.7	O	TV	2

15.1.7 SDS OFF-NETWORK MESSAGE message

15.1.7.1 Message definition

This message is sent by the UE to other UEs to share application or user payload in a SDS message. For contents of the message see Table 15.1.7.1-1.

Message type: SDS OFF-NETWORK MESSAGE

Direction: UE to other UEs

Table 15.1.7.1-1: SDS OFF-NETWORK MESSAGE message content

IEI	Information Element	Type/Reference	Presence	Format	Length
	SDS off-network message message identity	Message Type 15.2.2	M	V	1
	Date and time	Date and time 15.2.8	M	V	5
	Number of payloads	Number of payloads 15.2.12	M	V	1
	Conversation ID	Conversation ID 15.2.9	M	V	16
	Message ID	Message ID 15.2.10	M	V	16
	Sender MCData user ID	MCData user ID 15.2.15	M	LV-E	3-x
21	InReplyTo message ID	InReplyTo message ID 15.2.11	O	TV	17
22	Application ID	Application ID 15.2.7	O	TV	2
8-	SDS disposition request type	SDS disposition request type 15.2.3	O	TV	1
23	Security parameters	MCData Protected Payload message 3GPP TS 33.180 [26]	O	TV	32
7B	MCData group ID	MCData group ID 15.2.14	O	TLV-E	4-x
7C	Recipient MCData user ID	MCData user ID 15.2.15	O	TLV-E	4-x
78	Payload	Payload 15.2.13	O	TLV-E	4-x

15.1.8 SDS OFF-NETWORK NOTIFICATION message

15.1.8.1 Message definition

This message is sent by the UE to other UEs to share disposition status of a SDS message. For contents of the message see Table 15.1.8.1-1.

Message type: SDS OFF-NETWORK NOTIFICATION

Direction: UE to other UEs

Table 15.1.8.1-1: SDS OFF-NETWORK NOTIFICATION message content

IEI	Information Element	Type/Reference	Presence	Format	Length
	SDS off-network notification message identity	Message type 15.2.2	M	V	1
	SDS disposition notification type	SDS disposition notification type 15.2.5	M	V	1
	Date and time	Date and time 15.2.8	M	V	5
	Conversation ID	Conversation ID 15.2.9	M	V	16
	Message ID	Message ID 15.2.10	M	V	16
	Sender MCData user ID	MCData user ID 15.2.15	M	LV-E	3-x
22	Application ID	Application ID 15.2.7	O	TV	2

15.1.9 FD NETWORK NOTIFICATION message

15.1.9.1 Message definition

This message is sent from the network to the UE to provide the UE a file availability indication. For the contents of the message see Table 15.1.9.1-1.

Message type: FD NETWORK NOTIFICATION

Direction: network to UE

Table 15.1.9.1-1: FD NETWORK NOTIFICATION message content

IEI	Information Element	Type/Reference	Presence	Format	Length
	FD network notification message identity	Message type 15.2.2	M	V	1
	FD notification type	Notification type 15.2.18	M	V	1
	Date and time	Date and time 15.2.8	M	V	5
	Conversation ID	Conversation ID 15.2.9	M	V	16
	Message ID	Message ID 15.2.10	M	V	16
22	Application ID	Application ID 15.2.7	O	TV	2

15.1.10 COMMUNICATION RELEASE message

15.1.10.1 Message definition

This message is sent by the MCData server to MCData UE to indicate about intension to release the MCData communication. This message is also sent by the MCData UE to MCData server to request extension for the MCData communication. The MCData server response back about the request using this message. For the contents of the message see Table 15.10.1-1.

Message type: COMMUNICATION RELEASE

Direction: Server to UE, UE to server

Table 15.1.10.1-1: COMMUNICATION RELEASE message content

IEI	Information Element	Type/Reference	Presence	Format	Length
	Comm Release message identity	Message type 15.2.2	M	V	1
	Comm Release Information type	Comm Release Information type 15.2.20	M	V	1
B-	Data query type	Data query type 15.2.19	O	TV	1
C-	Extension response type	Extension response type 15.2.21	O	TV	1

15.2 General message format and information elements coding

15.2.1 General

The least significant bit of a field is represented by the lowest numbered bit of the highest numbered octet of the field. When the field extends over more than one octet, the order of bit values progressively decreases as the octet number increases.

Figure 15.2.1-1 shows an example of a field where the most significant bit of the field is marked MSB and the least significant bit of the field is marked LSB.

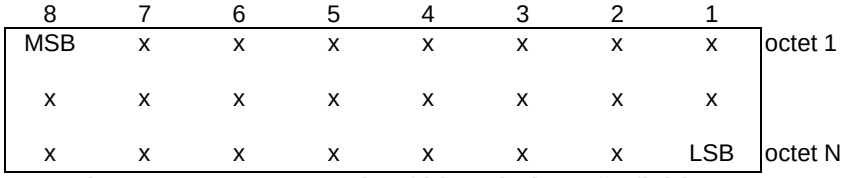

Figure 15.2.1-1: Example of bit ordering of a field

Within the protocols defined in the present document, the message consists of the following parts:

a) message type information element; and

b) other information elements, as required.

The organization of a message is illustrated in the example shown in Figure 15.2.1-2.

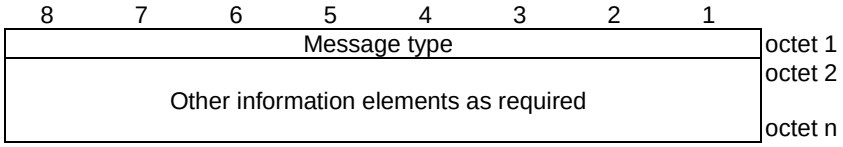

Figure 15.2.1-2: General message organization example

Unless specified otherwise in the message descriptions of subclause 15.1, a particular information element shall not be present more than once in a given message.

The sending entity shall set value of a spare bit to zero. The receiving entity shall ignore value of a spare bit

The sending entity shall not set a value of an information element to a reserved value. The receiving entity shall discard message containing an information element set to a reserved value.

15.2.2 Message type

The purpose of the Message type information element is to identify the type of the message.

The value part of the Message type information element is coded as shown in Table 15.2.2-1.

The Message type information element is a type 3 information element with a length of 1 octet.

Table 15.2.2-1: Message types

Bits 8	7	6	5	4	3	2	1	
x	x	0	0	0	0	0	1	SDS SIGNALLING PAYLOAD
x	x	0	0	0	0	1	0	FD SIGNALLING PAYLOAD
x	x	0	0	0	0	1	1	DATA PAYLOAD
x	x	0	0	0	1	0	1	SDS NOTIFICATION
x	x	0	0	0	1	1	0	FD NOTIFICATION
x	x	0	0	0	1	1	1	SDS OFF-NETWORK MESSAGE
x	x	0	0	1	0	0	0	SDS OFF-NETWORK NOTIFICATION
x	x	0	0	1	0	0	1	FD NETWORK NOTIFICATION
x	x	0	0	1	0	1	0	COMMUNICATION RELEASE
All other values are reserved.								

Bit 7 of the above defined messages is set as follows:

- '0' – if the message is not protected as defined in 3GPP TS 33.180 [26]; or
- '1' – if the message is protected as defined in 3GPP TS 33.180 [26].

Bit 8 of the above defined messages is set as follows:

- '0' – if the message is not authenticated as defined in 3GPP TS 33.180 [26]; or
- '1' – if the message is authenticated as defined in 3GPP TS 33.180 [26].

15.2.3 SDS disposition request type

The purpose of the SDS disposition request type information element is to identify the type of SDS disposition notification that the sender requires from the receiver.

The value part of the SDS disposition request type information element is coded as shown in Table 15.2.3-1.

The SDS disposition request type information element is a type 1 information element.

8	7	6	5	4	3	2	1	
SDS disposition request type IEI				SDS disposition request type value				octet 1

Figure 15.2.3-1: SDS disposition request type

Table 15.2.3-1: SDS disposition request type

SDS disposition request type value (octet 1) Bits 4	3	2	1	
0	0	0	1	DELIVERY
0	0	1	0	READ
0	0	1	1	DELIVERY AND READ
All other values are reserved.				

15.2.4 FD disposition request type

The purpose of the FD disposition request type information element is to identify the type of FD disposition notification that the sender requires from the receiver.

The value part of the FD disposition request type information element is coded as shown in Table 15.2.4-1.

The FD disposition request type information element is a type 1 information element.

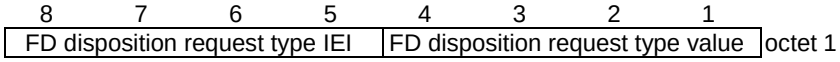

Figure 15.2.4-1: FD disposition request type

Table 15.2.4-1: FD disposition request type

FD disposition request type value (octet 1) Bits 4 3 2 1 0 0 0 1 FILE DOWNLOAD COMPLETED UPDATE All other values are reserved.

15.2.5 SDS disposition notification type

The purpose of the SDS disposition notification type information element is to identify the type of SDS disposition notification sent from receiver to the sender.

The value part of the SDS disposition notification type information element is coded as shown in Table 15.2.5-1.

The SDS disposition notification type information element is a type 3 information element with a length of 1 octet.

Table 15.2.5-1: SDS disposition notification type

Bits 8 7 6 5 4 3 2 1	
0 0 0 0 0 0 0 1	UNDELIVERED
0 0 0 0 0 0 1 0	DELIVERED
0 0 0 0 0 0 1 1	READ
0 0 0 0 0 1 0 0	DELIVERED AND READ
All other values are reserved.	

15.2.6 FD disposition notification type

The purpose of the FD disposition notification type information element is to identify the type of FD disposition notification sent from receiver to the sender.

The value part of the FD disposition notification type information element is coded as shown in Table 15.2.6-1.

The FD disposition notification type information element is a type 3 information element with a length of 1 octet.

Table 15.2.6.1: FD disposition notification type

Bits 8 7 6 5 4 3 2 1	
0 0 0 0 0 0 0 1	FILE DOWNLOAD REQUEST ACCEPTED
0 0 0 0 0 0 1 0	FILE DOWNLOAD REQUEST REJECTED
0 0 0 0 0 0 1 1	FILE DOWNLOAD COMPLETED
0 0 0 0 0 1 0 0	FILE DOWNLOAD DEFERRED
All other values are reserved.	

15.2.7 Application ID

The purpose of the Application ID information element is to uniquely identify the application for which the payload is intended.

The Application ID information element is coded as shown in figure 15.2.7-1 and table 15.2.7-1

The Application ID information element is a type 3 information element with a length of 2 octets.

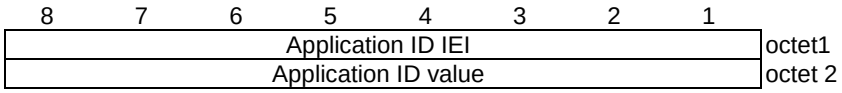

Figure 15.2.7-1: Application ID value

Table 15.2.7-1: Application ID value

Application ID value (octet 1) The Application ID contains a number that uniquely identifies the destination application.

15.2.8 Date and time

The Date and time information element is used to indicate the UTC time when a message or file was sent.

The Date and time information element is coded as shown in Figure 15.2.8-1 and Table 15.2.8-1.

The Date and time information element is a type 3 information element with a length of 5 octets.

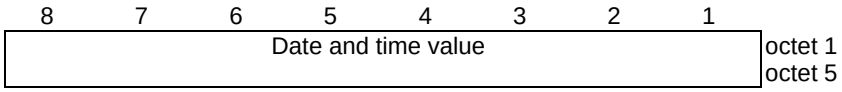

Figure 15.2.8-1: Date and time value

Table 15.2.8-1: Date and time value

Date and time value (octet 1 to 5) The Date and time value is an unsigned integer containing UTC time of the time when a message was sent, in seconds since midnight UTC of January 1, 1970 (not counting leap seconds).

15.2.9 Conversation ID

The Conversation ID information element uniquely identifies the conversation.

The Conversation ID information element is coded as shown in Figure 15.2.9-1 and Table 15.2.9-1.

The Conversation ID information element is a type 3 information element with a length of 16 octets.

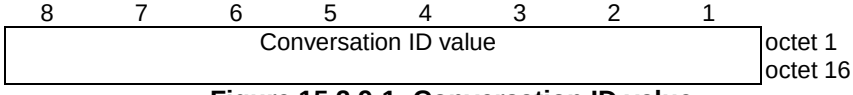

Figure 15.2.9-1: Conversation ID value

Table 15.2.9-1: Conversation ID value

Conversation identifier value (octet 1 to 16) The Conversation ID contains a number uniquely identifying the conversation. The value is a universally unique identifier as specified in IETF RFC 4122 [14].

15.2.10 Message ID

The Message ID information element uniquely identifies a message within a conversation.

The Message ID information element is coded as shown in Figure 15.2.10-1 and Table 15.2.10-1.

The Message ID information element is a type 3 information element with a length of 16 octets.

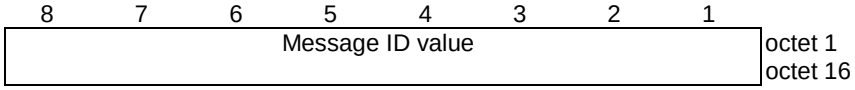

Figure 15.2.10-1: Message ID value

Table 15.2.10-1: Message ID value

Message ID value (octet 1 to 16) The Message ID contains a number uniquely identifying a message. The value is a universally unique identifier as specified in IETF RFC 4122 [14].

15.2.11 InReplyTo message ID

The InReplyTo message ID information element is used to associate a message within a conversation that is a reply to an existing message in a conversation.

The InReplyTo message ID information element is coded as shown in Figure 15.2.11-1 and Table 15.2.11-1.

The InReplyTo message ID information element is a type 3 information element with a length of 17 octets.

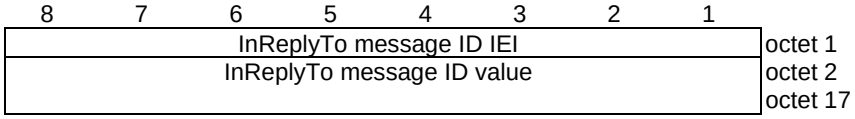

Figure 15.2.11-1: InReplyTo message ID value

Table 15.2.11-1: InReplyTo Message ID value

InReplyTo message ID value (octet 2 to 17) The InReplyTo message ID contains a number uniquely identifying a message. The value is a universally unique identifier as specified in IETF RFC 4122 [14].

15.2.12 Number of payloads

The Number of payloads information element identifies the number of payloads contained in the message.

The Number of payloads information element is coded as shown in Figure 15.2.12-1, Table 15.2.12-1

The Number of payloads information element is a type 3 information element with a length of 1 octet

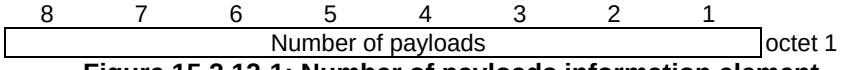

Figure 15.2.12-1: Number of payloads information element

Table 15.2.12-2: Number of payloads information element

Number of payloads value (octet 1) The Number of payloads contains a value from 1 to 255.

15.2.13 Payload

The Payload information element contains the payload intended for the recipient user or application;

The Payload information element is coded as shown in Figure 15.2.13-1, Table 15.2.13-1, Table 15.2.13-2 and Table 15.2.13-3.

The Payload information element is a type 6 information element.

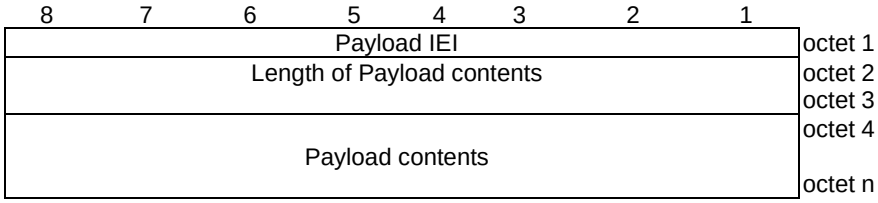

Figure 15.2.13-1: Payload information element

Table 15.2.13-1: Payload contents

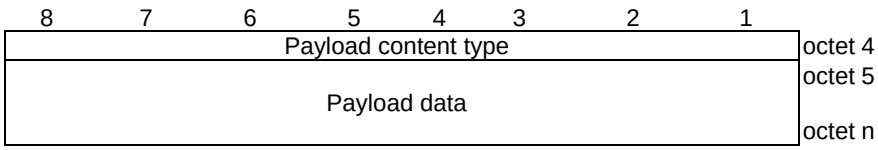

Table 15.2.13-2: Payload content type

Bits								
8	7	6	5	4	3	2	1	
0	0	0	0	0	0	0	1	TEXT
0	0	0	0	0	0	1	0	BINARY
0	0	0	0	0	0	1	1	HYPERLINKS
0	0	0	0	0	1	0	0	FILEURL
0	0	0	0	0	1	0	1	LOCATION
All other values are reserved.								

Table 15.2.13-3: Payload data

Payload data is included in octet 5 to octet n; Max value of 65535 octets. Payload data contains the payload destined for the user or application. A file URL is encoded as specified in IETF RFC 1738 [rfc1738]. The length of location information payload content is 6 bytes. First 3 bytes contain the latitude information and next 3 bytes contain the longitude information.

15.2.14 MCData group ID

The MCData group ID information element is used to indicate the destination MCData group identifier;

The MCData group ID information element is coded as shown in Figure 15.2.14-1 and Table 15.2.14-1.

The MCData group ID information element is a type 6 information element.

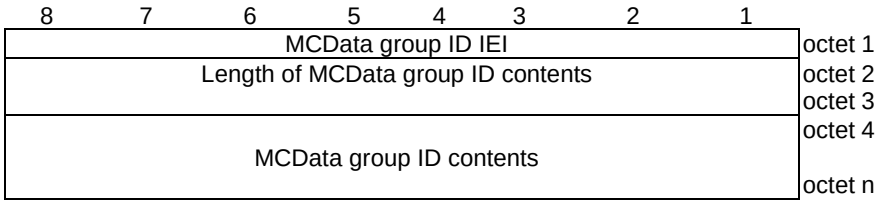

Figure 15.2.14-1: MCData group ID information element

Table 15.2.14-1: MCData group ID information element

MCData group ID is contained in octet 4 to octet n; Max value of 65535 octets.

15.2.15 MCData user ID

The MCData user ID information element is used to indicate an MCData user ID.

The MCData user ID information element is coded as shown in Figure 15.2.15-1 and Table 15.2.15-1.

The MCData user ID information element is a type 6 information element.

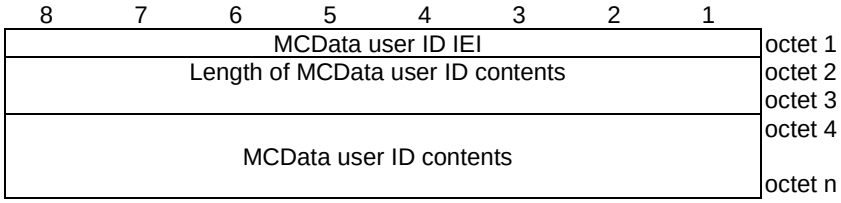

Figure 15.2.15-1: MCData user ID information element

Table 15.2.15-1: MCData user ID information element

MCData user ID is contained in octet 4 to octet n if the IE is used as an optional IE. If used as a mandatory IE, MCData user ID IEI is omitted and MCData user ID is contained in octet 3 to octet n; Max value of 65535 octets.

15.2.16 Mandatory download

The purpose of the Mandatory download information element is for the originating client to inform the terminating client that a file must be downloaded immediately.

The value part of the Mandatory download information element is coded as shown in Figure 15.2.16-1 and Table 15.2.16-1.

The Mandatory download information element is a type 1 information element.

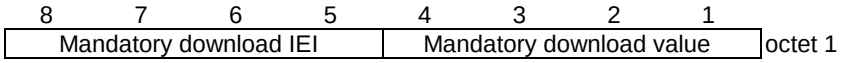

Figure 15.2.16-1: Mandatory download

Table 15.2.16-1: Mandatory download

Mandatory download value (octet 1) Bits 4 3 2 1 0 0 0 1 MANDATORY DOWNLOAD All other values are reserved.

15.2.17 Metadata

The Metadata information element is data that is used to describe a file.

The Metadata information element is coded as shown in Figure 15.2.17-1 and Table 15.2.17-1.

The Metadata information element is a type 6 information element.

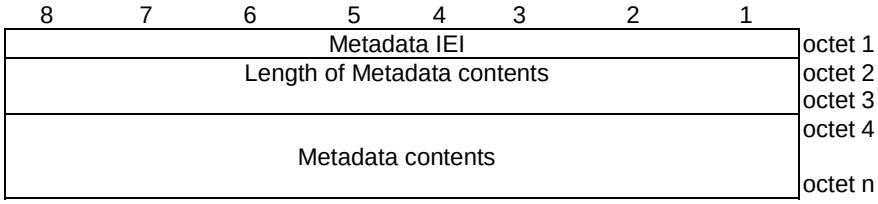

Figure 15.2.17-1: Metadata information element

Table 15.2.17-1: Metadata information element

Metadata is contained in octet 4 to octet n; Max value of 65535 octets. Metadata contains a concatenation of the following data: **- fileselector** (which is a concatenation of filename, filesize, filetype and hash) **- file-date** (which is set to creation", "modification" or "read" with a date/time, to indicate date/time file was created, last modified or last read) **- file-availability** (set to a date and time that the file is available until) The **file-selector** is encoded as shown in the "file-selector-attr" ABNF specified in IETF RFC 5547 [x]. The **file-date** is encoded as shown in the "file-date-attr" ABNF specified in IETF RFC 5547 [x]. The **file-availability** is encoded as file-availability = "file-availability:" date-time ;date-time is defined in IETF RFC 5322 [34]

15.2.18 Notification type

The purpose of the Notification type information element is to identify the type of notification sent from receiver to the sender.

The value part of the Notification type information element is coded as shown in Table 15.2.18-1.

The notification type information element is a type 3 information element with a length of 1 octet.

Table 15.2.18.1: Notification type

Bits 8 7 6 5 4 3 2 1	
0 0 0 0 0 0 0 1	FILE EXPIRED UNAVAILABLE TO DOWNLOAD
All other values are reserved.	

15.2.19 Data query type

The purpose of the data query type information element is to identify the type of data information that the sender requires from the receiver.

The value part of the data query request type information element is coded as shown in Figure 15.2.19-1 and Table 15.2.19-1.

The data query request type information element is a type 1 information element with a length of 1 octet

8	7	6	5	4	3	2	1	
Data query type IEI				Data query type value				octet 1

Figure 15.2.19-1: Data query type

Table 15.2.19-1: Data query type

Data query type value (octet 1) Bits 4 3 2 1	
0 0 0 1	REMAINING AMOUNT OF DATA
All other values are reserved.	

15.2.20 Comm release Information type

The purpose of the comm release information type information element is to identify the type of communication release information that the sender wants to inform to the receiver.

The value part of the comm release information type information element is coded as shown in Table 15.2.20-1.

The comm release information type information element is a type 3 information element with a length of 1 octet

Table 15.2.20-1: Comm release Information type

Bits 8 7 6 5 4 3 2 1	
0 0 0 0 0 0 0 1	INTENT TO RELEASE
0 0 0 0 0 0 1 0	EXTENSION REQUEST
0 0 0 0 0 0 1 1	EXTENSION RESPONSE
All other values are reserved.	

15.2.21 Extension response type

The purpose of the extension request type information element is to inform MCData server's response towards MCData client's request for extension of the MCData communication. This information element is used only when comm release information type IE takes "EXTENSION RESPONSE" value. The receiver can ignore Extension response type information element value if comm release information type IE takes any other value.

The value part of the Extension response type information element is coded as shown in Figure 15.2.21.1 and Table 15.2.21-1.

The Extension response type information element is a type 1 information element.

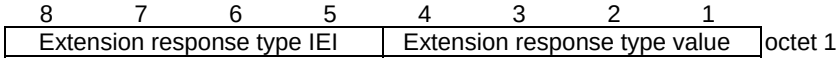

Figure 15.2.21-1: Extension response type

Table 15.2.21-1: Extension response type

Extension response type value (octet 1)				
Bits				
4	3	2	1	
0	0	0	1	ACCEPTED
0	0	1	0	REJECTED
All other values are reserved.				

Annex A (informative): Signalling flows

Annex B (normative): Media feature tags within the current document

B.1 General

This subclause describes the media feature tag definitions that are applicable for the 3GPP IM CN Subsystem for the realisation of the Mission Critical Data (MCData) service.

B.2 Definition of media feature tag for Mission Critical Data (MCData) communications Short Data Service (SDS)

Media feature tag name: g.3gpp.mcdata.sds

ASN.1 Identifier: 1.3.6.1.8.2.29

Summary of the media feature indicated by this media feature tag: This media feature tag when used in a SIP request or a SIP response indicates that the function sending the SIP message supports Mission Critical Data (MCData) communications Short Data Service (SDS).

Values appropriate for use with this media feature tag: Boolean

The media feature tag is intended primarily for use in the following applications, protocols, services, or negotiation mechanisms: This media feature tag is most useful in a communications application, for describing the capabilities of a device, such as a phone or PDA.

Examples of typical use: Indicating that a mobile phone supports the Mission Critical Data (MCData) communications Short Data Service (SDS).

Related standards or documents: 3GPP TS 24.282: "Mission Critical Data (MCData) signalling control Protocol specification"

Security Considerations: Security considerations for this media feature tag are discussed in subclause 11.1 of IETF RFC 3840 [16].

B.3 Definition of media feature tag for Mission Critical Data (MCData) communications File Distribution (FD)

Media feature tag name: g.3gpp.mcdata.fd

ASN.1 Identifier: 1.3.6.1.8.2.30

Summary of the media feature indicated by this media feature tag: This media feature tag when used in a SIP request or a SIP response indicates that the function sending the SIP message supports Mission Critical Data (MCData) communications File Distribution (FD).

Values appropriate for use with this media feature tag: Boolean

The media feature tag is intended primarily for use in the following applications, protocols, services, or negotiation mechanisms: This media feature tag is most useful in a communications application, for describing the capabilities of a device, such as a phone or PDA.

Examples of typical use: Indicating that a mobile phone supports the Mission Critical Data (MCData) communications File Distribution (FD).

Related standards or documents: 3GPP TS 24.282: "Mission Critical Data (MCData) signalling control Protocol specification"

Security Considerations: Security considerations for this media feature tag are discussed in subclause 11.1 of IETF RFC 3840 [16].

Annex C (normative): ICSI values defined within the current document

C.1 General

This subclause describes the IMS Communications Service Identifier (ICSI) definitions that are applicable for the 3GPP IM CN Subsystem for the realisation of the Mission Critical Data (MCData) service.

NOTE: The template has been created using the headers of the table in http://www.3gpp.org/specifications-groups/34-uniform-resource-name-urn-list

C.2 Definition of ICSI value for the Mission Critical Data (MCData) service

C.2.1 URN

urn:urn-7:3gpp-service.ims.icsi.mcdata

C.2.2 Description

This URN indicates that the device has the capabilities to support the Mission Critical Data (MCData) service. This URN is also used by the device to associate a SIP request with the Mission Critical Data (MCData) service.

C.2.3 Reference

3GPP TS 24.282: "Mission Critical Data (MCData) signalling control Protocol specification".

C.2.4 Contact

Name: Ricky Kaura

Email: ricky.kaura@samsung.com

C.2.5 Registration of subtype

Yes

C.2.6 Remarks

This URN is included in the "g.3gpp.icsi-ref" media feature tag in the Contact header field of SIP requests (not SIP MESSAGE) and responses, and the Accept-Contact header fields of non-register SIP requests.

This URN can be included by the device in the P-Preferred-Service header field of SIP requests, and is asserted by the network into the P-Asserted-Service header field of SIP Requests.

C.3 Definition of ICSI value for the Mission Critical Data (MCData) communications Short Data Service (SDS)

C.3.1 URN

urn:urn-7:3gpp-service.ims.icsi.mcdata.sds

C.3.2 Description

This URN indicates that the device has the capabilities to support the Mission Critical Data (MCData) Short Data Service (SDS) IMS communication service. This URN is also used by the device to associate a SIP request with the Mission Critical Data (MCData) Short Data Service (SDS) IMS communication service.

C.3.3 Reference

3GPP TS 24.282: "Mission Critical Data (MCData) signalling control Protocol specification".

C.3.4 Contact

Name: Ricky Kaura

Email: ricky.kaura@samsung.com

C.3.5 Registration of subtype

Yes

C.3.6 Remarks

This URN is included in the "g.3gpp.icsi-ref" media feature tag in the Contact header field of SIP requests (not SIP MESSAGE) and responses, and the Accept-Contact header fields of non-register SIP requests.

This URN can be included by the device in the P-Preferred-Service header field of SIP requests, and is asserted by the network into the P-Asserted-Service header field of SIP Requests.

C.4 Definition of ICSI value for Mission Critical Data (MCData) communications File Distribution (FD)

C.4.1 URN

urn:urn-7:3gpp-service.ims.icsi.mcdata.fd

C.4.2 Description

This URN indicates that the device has the capabilities to support the Mission Critical Data (MCData) File Distribution (FD) IMS communication service. This URN is also used by the device to associate a SIP request with the Mission Critical Data (MCData) File Distribution (FD) IMS communication service.

C.4.3 Reference

3GPP TS 24.282: "Mission Critical Data (MCData) signalling control Protocol specification".

C.4.4 Contact

Name: Ricky Kaura

Email: ricky.kaura@samsung.com

C.4.5 Registration of subtype

Yes

C.4.6 Remarks

This URN is included in the "g.3gpp.icsi-ref" media feature tag in the Contact header field of SIP requests (not SIP MESSAGE) and responses, and the Accept-Contact header fields of non-register SIP requests.

This URN can be included by the device in the P-Preferred-Service header field of SIP requests, and is asserted by the network into the P-Asserted-Service header field of SIP Requests.

Annex D (normative): XML schemas

D.1 XML schema for transporting MCData identities and general services information

D.1.1 General

This subclause defines XML schema and MIME type for transporting MCData identities and general services information.

D.1.2 XML schema

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
  targetNamespace="urn:3gpp:ns:mcdataInfo:1.0"
  xmlns:mcdatainfo="urn:3gpp:ns:mcdataInfo:1.0"
  elementFormDefault="qualified"
  attributeFormDefault="unqualified"
  xmlns:xenc="http://www.w3.org/2001/04/xmlenc#" schemaLocation="http://www.w3.org/TR/xmlenc-
core/xenc-schema.xsd">

  <xs:import namespace="http://www.w3.org/2001/04/xmlenc#"/>

  <!-- root XML element -->
  <xs:element name="mcdatainfo" type="mcdatainfo:mcdatainfo-Type" id="info"/>

  <xs:complexType name="mcdatainfo-Type">
    <xs:sequence>
      <xs:element name="mcdata-Params" type="mcdatainfo:mcdata-ParamsType" minOccurs="0"/>
      <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element name="anyExt" type="mcdatainfo:anyExtType" minOccurs="0"/>
    </xs:sequence>
    <xs:anyAttribute namespace="##any" processContents="lax"/>
  </xs:complexType>

  <xs:complexType name="mcdata-ParamsType">
    <xs:sequence>
      <xs:element name="mcdata-access-token" type="mcdatainfo:contentType" minOccurs="0"/>
      <xs:element name="request-type" type="xs:string" minOccurs="0"/>
      <xs:element name="mcdata-request-uri" type="mcdatainfo:contentType" minOccurs="0"/>
      <xs:element name="mcdata-calling-user-id" type="mcdatainfo:contentType" minOccurs="0"/>
      <xs:element name="mcdata-called-party-id" type="mcdatainfo:contentType" minOccurs="0"/>
      <xs:element name="mcdata-calling-group-id" type="mcdatainfo:contentType" minOccurs="0"/>
      <xs:element name="alert-ind" type="mcdatainfo:contentType" minOccurs="0"/>
      <xs:element name="originated-by" type="mcdatainfo:contentType" minOccurs="0"/>
      <xs:element name="mcdata-client-id" type="mcdatainfo:contentType" minOccurs="0"/>
      <xs:element name="mcdata-controller-psi" type="mcdatainfo:contentType" minOccurs="0"/>
      <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element name="anyExt" type="mcdatainfo:anyExtType" minOccurs="0"/>
    </xs:sequence>
    <xs:anyAttribute namespace="##any" processContents="lax"/>
  </xs:complexType>

  <xs:simpleType name="protectionType">
    <xs:restriction base="xs:string">
       <xs:enumeration value="Normal"/>
       <xs:enumeration value="Encrypted"/>
    </xs:restriction>
  </xs:simpleType>

  <xs:complexType name="contentType">
    <xs:choice>
      <xs:element name="mcdataURI" type="xs:anyURI"/>
      <xs:element name="mcdataString" type="xs:string"/>
      <xs:element name="mcdataBoolean" type="xs:boolean"/>
```

```
      <xs:any namespace="##other" processContents="lax"/>
      <xs:element name="anyExt" type="mcdatainfo:anyExtType" minOccurs="0"/>
    </xs:choice>
    <xs:attribute name="type" type="mcdatainfo:protectionType"/>
    <xs:anyAttribute namespace="##any" processContents="lax"/>
  </xs:complexType>

  <xs:complexType name="anyExtType">
    <xs:sequence>
      <xs:any namespace="##any" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>

</xs:schema>
```

D.1.3 Semantic

The <mcdatainfo> element is the root element of the XML document. The <mcdatainfo> element can contain subelements.

NOTE 1: The subelements of the <mcdata-info> are validated by the <xs:any namespace="##any" processContents="lax" minOccurs="0" maxOccurs="unbounded"/> particle of the <mcdata-info> element

If the <mcdatainfo> contains the <mcdata-Params> element then:

1) the <mcdata-access-token>, <mcdata-request-uri>, <mcdata-controller-psi>, <mcdata-calling-user-id>, <mcdata-called-party-id>, <mcdata-calling-group-id>, <alert-ind>, <originated-by> and <mcdata-client-id> can be included with encrypted content;

2) for each element in 1) that is included with content that is not encrypted:

   a) the element has the "type" attribute set to "Normal";

   b) if the element is the <mcdata-request-uri>, <mcdata-calling-user-id>, <mcdata-called-party-id> or <mcdata-calling-group-id> or <originated-by> then the <mcdataURI> element is included;

   c) if the element is the <mcdata-access-token> or <mcdata-client-id>, then the <mcdataString> element is included; and

   d) if the element is <alert-ind> then the <mcdataBoolean> element is included;

3) for each element in 1) that is included with content that is encrypted:

   a) the element has the "type" attribute set to "Encrypted";

   b) the <xenc:EncryptedData> element from the "http://www.w3.org/2001/04/xmlenc#" namespace is included and:

      i) can have a "Type" attribute can be included with a value of "http://www.w3.org/2001/04/xmlenc#Content";

      ii) can include an <EncryptionMethod> element with the "Algorithm" attribute set to value of "http://www.w3.org/2009/xmlenc11#aes128-gcm";

      iii) can include a <KeyInfo> element with a <KeyName> element containing the base 64 encoded XPK-ID; and

      iv) includes a <CipherData> element with a <CipherValue> element containing the encrypted data.

NOTE 2: When the optional attributes and elements are not included within the <xenc:EncryptedData> element, the information they contain is known to sender and the receiver by other means.

If the <mcdatainfo> contains the <mcdata-Params> element then:

1) the <mcdata-access-token> can be included with the access token received during authentication procedure as described in 3GPP TS 24.382 [49];

2) the <request-type> can be included with:

a) a value of "one-to-one-sds" to indicate that the MCData client wants to initiate a one-to-one SDS request;

b) a value of "group-sds" to indicate the MCData client wants to initiate a group SDS request;

c) a value of "one-to-one-fd" to indicate that the MCData client wants to initiate a one-to-one FD request;

d) a value of "group-fd" to indicate that the MCData client wants to initiate a group FD request;

e) a value of "msf-disc-req" to indicate that the MCData client wishes to discover the absoluteURI of the media storage function for HTTP requests;

f) a value of "msf-disc-res" when the participating MCData function sends the absolute URI to the MCData client;

g) a value of "notify" when the controlling MCData function needs to send a notification to the MCData client;

h) a value of "one-to-one-sds-session" to indicate that the MCData client wants to initiate a one-to-one SDS session; and

i) a value of "group-sds-session" to indicate the MCData client wants to initiate a group SDS session.

3) the <mcdata-request-uri> can be included with an MCData group ID;

4) the <mcdata-calling-user-id> can be included, set to MCData ID of the originating user;

5) the <mcdata-called-party-id> can be included, set to the MCData ID of the terminating user;

6) the <mcdata-calling-group-id> can be included to indicate the MCData group identity to the terminating user;

7) the <alert-ind> can be:

a) set to "true" to indicate that an alert to be sent; or

b) set to "false" to indicate that an alert to is be cancelled;

8) the <originated-by> can be included, set to the MCData ID of the originating user of an MCData emergency alert when being cancelled by another authorised MCDATA user;

9) the <mcdata-client-id>: can be included, set to the MCData client ID of the MCData client that originated a SIP INVITE request, SIP REFER request or SIP MESSAGE request; and

10) the <mcdata-controller-psi> can be included, set to the PSI of the controlling MCData function that handled the one-to-one or group MCData data request.

The recipient of the XML ignores any unknown element and any unknown attribute.

D.1.4 IANA registration template

Your Name:

<MCC name>

Your Email Address:

<MCC email address>

Media Type Name:

Application

Subtype name:

vnd.3gpp.mcdata-info+xml

Required parameters:

None

Optional parameters:

"charset" the parameter has identical semantics to the charset parameter of the "application/xml" media type as specified in section 9.1 of IETF RFC 7303.

Encoding considerations:

binary.

Security considerations:

Same as general security considerations for application/xml media type as specified in section 9.1 of IETF RFC 7303. In addition, this media type provides a format for exchanging information in SIP, so the security considerations from IETF RFC 3261 apply.

The information transported in this media type does not include active or executable content.

Mechanisms for privacy and integrity protection of protocol parameters exist. Those mechanisms as well as authentication and further security mechanisms are described in 3GPP TS 24.229.

This media type does not include provisions for directives that institute actions on a recipient's files or other resources.

This media type does not include provisions for directives that institute actions that, while not directly harmful to the recipient, may result in disclosure of information that either facilitates a subsequent attack or else violates a recipient's privacy in any way.

This media type does not employ compression.

Interoperability considerations:

Same as general interoperability considerations for application/xml media type as specified in section 9.1 of IETF RFC 7303. Any unknown XML elements and any unknown XML attributes are to be ignored by recipient of the MIME body.

Published specification:

3GPP TS 24.282 "Mission Critical Data (MCData) signalling control;Protocol specification", available via http://www.3gpp.org/specs/numbering.htm.

Applications Usage:

Applications supporting the mission critical data communications procedures as described in the published specification.

Fragment identifier considerations:

The handling in section 5 of IETF RFC 7303 applies.

Restrictions on usage:

None

Provisional registration? (standards tree only):

N/A

Additional information:

1. Deprecated alias names for this type: none
2. Magic number(s): none
3. File extension(s): none
4. Macintosh File Type Code(s): none
5. Object Identifier(s) or OID(s): none

Intended usage:

Common

Person to contact for further information:

- Name: <MCC name>
- Email: <MCC email address>
- Author/Change controller:
  i) Author: 3GPP CT1 Working Group/3GPP_TSG_CT_WG1@LIST.ETSI.ORG
  ii) Change controller: <MCC name>/<MCC email address>

D.2 Void

D.3 XML schema for MCData (de)-affiliation requests

D.3.1 General

This subclause defines XML schema and MIME type for MCData (de)-affiliation requests.

D.3.2 XML schema

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="urn:3gpp:ns:affiliationCommand:1.0"
xmlns:mcdataaff="urn:3gpp:ns:affiliationCommand:1.0"
attributeFormDefault="unqualified" elementFormDefault="qualified">
  <xs:complexType name="affiliate-command" id="affil">
    <xs:sequence>
      <xs:element type="xs:anyURI" name="group" minOccurs="1" maxOccurs="unbounded"/>
      <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element name="anyExt" type="mcdataaff:anyExtType" minOccurs="0"/>
    </xs:sequence>
    <xs:anyAttribute namespace="##any" processContents="lax"/>
  </xs:complexType>
  <xs:complexType name="de-affiliate-command">
    <xs:sequence>
      <xs:element type="xs:anyURI" name="group" minOccurs="1" maxOccurs="unbounded"/>
      <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element name="anyExt" type="mcdataaff:anyExtType" minOccurs="0"/>
    </xs:sequence>
    <xs:anyAttribute namespace="##any" processContents="lax"/>
  </xs:complexType>
  <xs:element name="command-list">
    <xs:complexType>
      <xs:sequence>
        <xs:element name="affiliate" type="mcdataaff:affiliate-command" minOccurs="0"
maxOccurs="1"/>
        <xs:element name="de-affiliate" type="mcdataaff:de-affiliate-command" minOccurs="0"
maxOccurs="1"/>
        <xs:element name="anyExt" type="mcdataaff:anyExtType" minOccurs="0"/>
        <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
      </xs:sequence>
    </xs:complexType>
  </xs:element>
  <xs:complexType name="anyExtType">
    <xs:sequence>
      <xs:any namespace="##any" processContents="lax" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:complexType>
</xs:schema>
```

D.3.3 Semantic

The <command-list> element is the root element of the XML document. The <command-list> element may contain <affiliate-command>, or <de-affiliate-command> subelements or both.

If the <command-list> contains the <affiliate-command> element then:

1) the <affiliate-command> element contains a list of <group> subelements having at least one subelement. The recipient shall perform an affiliation for all the MCData groups contained in the list for the clients for which the <command-list> applies.

If the <command-list> contains the <de-affiliate-command> element then:

1) the <de-affiliate-command> element contains a list of <group> subelements having at least one subelement. The recipient shall perform a de-affiliation for all the MCData groups contained in the list for the clients for which the <command-list> applies.

The recipient of the XML ignores any unknown element and any unknown attribute.

D.3.4 IANA registration template

Your Name:

<MCC name>

Your Email Address:

<MCC email address>

Media Type Name:

Application

Subtype name:

vnd.3gpp.mcdata-affiliation-command+xml

Required parameters:

None

Optional parameters:

"charset" the parameter has identical semantics to the charset parameter of the "application/xml" media type as specified in section 9.1 of IETF RFC 7303.

Encoding considerations:

binary.

Security considerations:

Same as general security considerations for application/xml media type as specified in section 9.1 of IETF RFC 7303. In addition, this media type provides a format for exchanging information in SIP, so the security considerations from IETF RFC 3261 apply.

The information transported in this media type does not include active or executable content.

Mechanisms for privacy and integrity protection of protocol parameters exist. Those mechanisms as well as authentication and further security mechanisms are described in 3GPP TS 24.229.

This media type does not include provisions for directives that institute actions on a recipient's files or other resources.

This media type does not include provisions for directives that institute actions that, while not directly harmful to the recipient, may result in disclosure of information that either facilitates a subsequent attack or else violates a recipient's privacy in any way.

This media type does not employ compression.

Interoperability considerations:

Same as general interoperability considerations for application/xml media type as specified in section 9.1 of IETF RFC 7303. Any unknown XML elements and any unknown XML attributes are to be ignored by recipient of the MIME body.

Published specification:

3GPP TS 24.282 "Mission Critical Data (MCData) signalling control" version 14.0.0, available via http://www.3gpp.org/specs/numbering.htm.

Applications which use this media type:

Applications supporting the mission critical data functions as described in the published specification.

Fragment identifier considerations:

The handling in section 5 of IETF RFC 7303 applies.

Restrictions on usage:

None

Provisional registration? (standards tree only):

N/A

Additional information:

1. Deprecated alias names for this type: none
2. Magic number(s): none
3. File extension(s): none
4. Macintosh File Type Code(s): none
5. Object Identifier(s) or OID(s): none

Intended usage:

Common

Person to contact for further information:

- Name: <MCC name>
- Email: <MCC email address>
- Author/Change controller:

  i) Author: 3GPP CT1 Working Group/3GPP_TSG_CT_WG1@LIST.ETSI.ORG

  ii) Change controller: <MCC name>/<MCC email address>

Annex E (normative): IANA registration forms

E.1 MIME type for transporting MCData signalling content

Your Name:

<MCC name>

Your Email Address:

<MCC email address>

Media Type Name:

Application

Subtype name:

vnd.3gpp.mcdata-signalling

Required parameters:

None

Optional parameters:

None

Encoding considerations:

binary.

Security considerations:

General mechanisms for privacy and integrity protection of protocol parameters exist. Those mechanisms as well as authentication and further security mechanisms are described in 3GPP TS 24.229.

Security mechanisms specific to this MIME type are dependent upon the business and trust relationship between the mission critical data communications (MCData) operator and the SIP carrier operator. MCData operators may wish to encrypt and integrity protect the content transported by this MIME type indepedently of mechanisms provided by the transport layer. Such mechanisms are being specified in Rel-14 by 3GPP SA3. Security mechanisms applied to MCData signalling content is point-to-point (UE to server, server to server, server to UE).

The information transported in this media type does not include active or executable content.

This media type does not include provisions for directives that institute actions on a recipient's files or other resources.

This media type does not include provisions for directives that institute actions that, while not directly harmful to the recipient, may result in disclosure of information that either facilitates a subsequent attack or else violates a recipient's privacy in any way.

This media type does not employ compression.

Interoperability considerations:

The content transported within this MIME type needs to be interpreted by a server as specific decisions are made based on the signalling content (e.g. store disposition history). The final destination point of the content is the terminating UE. Each UE and server that handles the content transported using this MIME type shall understand the definition of the messages and protocol elements as defined in 3GPP TS 24.282. Any messages and protocol elements not defined by 3GPP TS 24.282 shall be ignored by the recipient UE or server.

Published specification:

3GPP TS 24.282 "Mission Critical Data (MCData) signalling control; Protocol specification", available via http://www.3gpp.org/specs/numbering.htm.

Application Usage:

Applications supporting the mission critical data communications procedures as described in the published specification. This MIME type shall contain signalling content that is related to the payload that is delivered to a terminating user or an application of the terminating user.

Fragment identifier considerations:

None.

Restrictions on usage:

None

Provisional registration? (standards tree only):

N/A

Additional information:

1. Deprecated alias names for this type: none
2. Magic number(s): none
3. File extension(s): none
4. Macintosh File Type Code(s): none
5. Object Identifier(s) or OID(s): none

Intended usage:

Common

Person to contact for further information:

- Name: <MCC name>
- Email: <MCC email address>
- Author/Change controller:
  i) Author: 3GPP CT1 Working Group/3GPP_TSG_CT_WG1@LIST.ETSI.ORG
  ii) Change controller: <MCC name>/<MCC email address>

E.2 MIME type for transporting MCData payload content

Your Name:

<MCC name>

Your Email Address:

<MCC email address>

Media Type Name:

Application

Subtype name:

vnd.3gpp.mcdata-payload

Required parameters:

None

Optional parameters:

None

Encoding considerations:

binary.

Security considerations:

General mechanisms for privacy and integrity protection of protocol parameters exist. Those mechanisms as well as authentication and further security mechanisms are described in 3GPP TS 24.229.

Security mechanisms specific to this MIME type are dependent upon the business and trust relationship between the mission critical data communications (MCData) operator and the SIP carrier operator. MCData operators may wish to encrypt and integrity protect the content transported by this MIME type indepedently of mechanisms provided by the transport layer. Such mechanisms are being specified in Rel-14 by 3GPP SA3. Security mechanisms applied to MCData payload are end-to-end (UE to UE).

The information transported in this media type does not include active or executable content.

This media type does not include provisions for directives that institute actions on a recipient's files or other resources.

This media type does not include provisions for directives that institute actions that, while not directly harmful to the recipient, may result in disclosure of information that either facilitates a subsequent attack or else violates a recipient's privacy in any way.

This media type does not employ compression.

Interoperability considerations:

The content transported within MIME type does not need to be interpreted by a server. It represents the payload that is delivered to the end-user or an application of the end-user. Each UE and server that handles the content transported using this MIME type shall understand the definition of the messages and protocol elements as defined in 3GPP TS 24.282. Any messages and protocol elements not defined by 3GPP TS 24.282 shall be ignored by the recipient UE or server.

Published specification:

3GPP TS 24.282 "Mission Critical Data (MCData) signalling control; Protocol specification" available via http://www.3gpp.org/specs/numbering.htm.

Application Usage:

Applications supporting the mission critical data communications procedures as described in the published specification. This MIME type shall contain data that is delivered to a terminating user or an application of the terminating user.

Fragment identifier considerations:

None.

Restrictions on usage:

None

Provisional registration? (standards tree only):

N/A

Additional information:

1. Deprecated alias names for this type: none
2. Magic number(s): none
3. File extension(s): none
4. Macintosh File Type Code(s): none
5. Object Identifier(s) or OID(s): none

Intended usage:

Common

Person to contact for further information:

- Name: <MCC name>
- Email: <MCC email address>
- Author/Change controller:
  i) Author: 3GPP CT1 Working Group/3GPP_TSG_CT_WG1@LIST.ETSI.ORG
  ii) Change controller: <MCC name>/<MCC email address>

Annex F (normative): Timers

F.1 General

The following tables give a brief description of the timers used in the present document.

For the on-network timers described in the present document, the following timer families are used:

- TDPx: Timer Data Participating function x; and
- TDCy: Timer Data Controlling function y.

For the off-network timers described in the present document, the following timer families are used:

- TFSz: Timer oFf-network SDS z;

where x, y and z represent numbers.

F.2 On-network timers

F.2.1 Timers in the participating MCData function

Table F.2.1-1: Participating MCData function timers

Timer	Timer value	Cause of start	Normal stop	On expiry
TDP1 (SDS re-delivery timer) (NOTE)	Default value: 60 seconds Configurable.	On reception of a "SIP MESSAGE request for SDS disposition notification for MCData server" containing an SDS disposition notification type set to a value of "UNDELIVERED",	On reception of a "SIP MESSAGE request for SDS disposition notification for MCData server" containing an SDS disposition notification type set to a value of "DELIVERED", "READ" or "DELIVERED AND READ"	Re-deliver the SDS message to the MCData user.
NOTE: More than one instance of this timer can be running in the participating MCData function, each instance associated with a specific SDS message.				

F.2.2 Timers in the controlling MCData function

Table F.2.2-1: Controlling MCData function timers

Timer	Timer value	Cause of start	Normal stop	On expiry
TDC1 (disposition notification timer) (NOTE 1)	Default value: 5 seconds Configurable.	On reception of a "SIP MESSAGE request for SDS disposition notification for MCData server" from a group member and aggregation of dispositions is required.	On reception of a "SIP MESSAGE request for SDS disposition notification for MCData server" from a group member where aggregation of disposition notifications is required and all other disposition notifications have been received from all other group members	Send the aggregated disposition notifications to the MCData user.
TDC2 (file availability timer) (NOTE 2)	(NOTE 3)	On reception of an FD request using HTTP or using media plane.	Not applicable.	Recipients are informed that the file is not available to download any longer as specified in subclause 12.4.2.1
TDC3 (request for extension)	Default value: 15 seconds Configurable.	Upon receiving SIP 200 (OK) from MCData client for the SIP INFO message sent as intent to release communication	Upon receiving request for extension of MCData communication from MCData client.	Release the MCData communication immediately.

NOTE 1: More than one instance of this timer can be running in the controlling MCData function, each instance associated with a specific group SDS message.
NOTE 2: More than one instance of this timer can be running in the controlling MCData function associated with each file. Each timer for the file is associated uniquely to a Conversation ID and Message ID.
NOTE 3: An FD request can contain metadata with "file availability" information. If the FD request contains "file availability", then the controlling MCData function uses this information to derive the timer value. If the FD request does not contain "file availability" information, then the controlling MCData function sets a value for the timer based upon local policy.

F.2.3 Timers in the MCData UE

Table F.2.3-1: MCData UE timers

Timer	Timer value	Cause of start	Normal stop	On expiry
TDU1 (delivery and read) (NOTE)	Default value: 120 milliseconds Configurable.	When the client receives a SDS message with Disposition request type IE set to "DELIVERY AND READ".	When a SDS message display indication is received.	Send a SDS notification with Disposition type IE set to "DELIVERED" and when the MCData client has displayed the message to the MCData user, send a SDS notification with Disposition type IE set to "READ"
TDU2 (FD non-mandatory download timer) (NOTE)	Default value: 60 seconds Configurable.	On reception of an FD request not indicating mandatory download as specified in subclause 10.2.1.2.3	When the MCData user performs the action to accept, reject or defer the FD request as specified in subclause 10.2.1.2.3	No specific action by the MCData UE.
NOTE: Value of timer TDU1 (delivery and read) should be configured such that, when a consolidated "DELIVERED AND READ" notification is not feasible, the MCData client is able to send the "DELIVERED" disposition notification without delay.				

F.3 Off-network timers

F.3.1 Timers in off-network SDS

The table F.3.1-1 lists the timers used in off-network SDS, their start values, their limits, describes the cause of the start, and the action to take on normal stop and on expiry.

Table F.3.1-1: Timers in off-network SDS

Timer	Timer value	Cause of start	Normal stop	On expiry
TFS1 (SDS message retransmission)	Default value: 40 millisecond Configurable.	When the client sends a SDS OFF-NETWORK MESSAGE message.	Associated counter CFS1 (SDS message retransmission) reaches upper limit	Send a SDS OFF-NETWORK MESSAGE message.
TFS2 (SDS notification retransmission)	Default value: 40 millisecond Configurable.	When the client sends a SDS OFF-NETWORK NOTIFICATION message.	Associated counter CFS2 (SDS notification retransmission) reaches upper limit	Send a SDS OFF-NETWORK NOTIFICATION message.
TFS3 (delivery and read)	Default value: 120 millisecond Configurable.	When the client receives a SDS OFF-NETWORK MESSAGE with Disposition request type IE set to "DELIVERY AND READ".	When a SDS message display indication is received.	Send a SDS OFF-NETWORK NOTIFICATION message with Disposition type IE set to "DELIVERED" and when the MCData client has displayed the message to the MCData user, send a SDS OFF-NETWORK NOTIFICATION message with Disposition type IE set to "READ"
NOTE: Value of timer TFS3 (delivery and read) should be configured such that, when a consolidated "DELIVERED AND READ" notification is not feasible, the MCData client is able to send the "DELIVERED" disposition notification without delay.				

Annex G (normative): Counters

G.1 General

The following tables give a brief description of the counters used in the present document.

G.2 On-network counters

None defined.

G.3 Off-network counters

G.3.1 Counters in off-network SDS

The table G.3.1-1 lists the counters used in off-network SDS, their default upper limits and the action to take upon reaching the upper limit. The counters start at 1.

Table G.3.1-1: Counters in off-network SDS

Counter	Upper Limit	Associated timer	Upon reaching the upper limit
CFS1 (SDS message retransmission)	Default value: 5 Configurable.	TFS1	Stop timer TFS1.
CFS2 (SDS notification retransmission)	Default value: 5 Configurable.	TFS2	Stop timer TFS2.

Annex H (informative): INFO packages defined in the present document

H.1 Info package for indication of communication release

H.1.1 Scope

This subclause contains the information required for the IANA registration of info package g.3gpp.mcdata-com-release in accordance with IETF RFC 6086.

H.1.2 g.3gpp.mcdata-com-release info package

H.1.2.1 Overall description

When one of the communication release conditions are met e.g. lack of bearer capacity, limit for the maximum amount of data or time that a participant transmits from a single request to transmit exceeded, the MCData server may decide to release communication. Based on local policy and configuration, MCData server can release the communication without prior notification to MCData user; or it may send a notification to MCData user and allow the user to request for extension if the MCData user wants to. With this notification, MCData server may also request for more information related to ongoing communication like amount of data remainnig to be transmitted. If MCData user requests for extension of the MCData communication, MCData server can accept or reject based on local policy.

H.1.2.2 Applicability

This package is used to:

- send MCData server's intent to release the communication to the MCData client
- send more data from MCData client to MCData server when requested
- request extension of the MCData communication to MCData server.
- send response for extension request from MCData server to MCData client.

H.1.2.3 Appropriateness of INFO Package Usage

A number of solutions were discussed for sending MCData server's intent to release the communication along with request for more data to MCData user. The solutions were:

1) Use of the session related methods (e.g. SIP RE-INVITE 200 (OK) response.
2) Use of the SIP INFO method as described in IETF RFC 6086, by defining a new info package.

The result of the evaluation of the above solutions were:

1) An SIP INVITE request will have three-way handshake, which may not be optimal to transfer the required data.
2) The use of SIP INFO request was found as the most appropriate solution since the SIP INFO request could be sent in the existing SIP session and can carry QUERY response in 200 OK.

H.1.2.4 Info package name

g.3gpp.mcdata-com-release

H.1.2.5 Info package parameters

None defined

H.1.2.6 SIP options tags

None defined

H.1.2.7 INFO message body parts

The MIME type of the message body carrying application/vnd.3gpp.mcdata-signalling and application/vnd.3gpp.mcdata-payload. Both application/vnd.3gpp.mcdata-signalling and application/vnd.3gpp.mcdata-payload MIME type is defined in this specification.

H.1.2.8 Info package usage restrictions

None defined.

H.1.2.9 Rate of INFO Requests

Single INFO request generated after MCData server decides to release communication with prior notification to MCData client and not requesting for more data.

Two INFO requests generated after MCData server decides to release communication with prior notification to MCData client and requesting more data.

Two INFO requests generated after MCData client requests for extension of communication.

H.1.2.10 Info package security considerations

The security is based on the generic security mechanism provided for the underlying SIP signalling. No additional security mechanism is defined.

H.1.2.11 Implementation details and examples

UAC generation of INFO requests: See 3GPP TS 24.282: "Mission Critical Data (MCData) signalling control; Protocol specification".

UAS processing of INFO requests: See 3GPP TS 24.282: "Mission Critical Data (MCData) signalling control; Protocol specification".

Annex I (informative): Change history

Change history						
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**New**
2017-01					Initial version.	0.0.0
2017-01					Implementing the following P-CRs after CT1#101-bis: C1-170189, C1-170438, C1-170439, C1-170440, C1-170442, C1-170480.	0.1.0
2017-02					Implementing editorials spotted in v0.1.0 and implementing the following P-CRs after CT1#102: C1-171057, C1-171058, C1-171119.	0.2.0
2017-04					Implementing the following P-CRs after CT1#103: C1-171420, C1-171423, C1-171428, C1-171728, C1-171732, C1-171737; C1-171739; C1-171740; C1-171741; C1-171742; C1-171744; C1-171745; C1-171778; C1-171806; C1-171814; C1-171815; C1-171816; C1-171817; C1-171819.	0.3.0
2017-05					Implementing the following P-CRs after CT1#104: C1-172166; C1-172167; C1-172168; C1-172218; C1-172224; C1-172225; C1-172247; C1-172283; C1-172371; C1-172372; C1-172373; C1-172374; C1-172375; C1-172377; C1-172537; C1-172538; C1-172541; C1-172542; C1-172544; C1-172545; C1-172546; C1-172548; C1-172736; C1-172737; C1-172739; C1-172742; C1-172752.	0.4.0
2017-06	CT-76	CP-171110			Version 1.0.0 created for presentation at CT for information	1.0.0
2017-06	CT-76				Version 14.0.0 created after approval at CT	14.0.0
2017-06	CT-76				Addition of missing XSD files	14.0.1
2017-09	CT-77	CP-172102	0001	1	Completing affiliation check for MCData	14.1.0
2017-09	CT-77	CP-172102	0002	1	Fixing auto-send and auto-receive	14.1.0
2017-09	CT-77	CP-172102	0003	1	Adding warnings for MCData	14.1.0
2017-09	CT-77	CP-172102	0004	1	SDS Session Late entry	14.1.0
2017-09	CT-77	CP-172102	0005		mcdata-mcdata-id	14.1.0
2017-09	CT-77	CP-172102	0006	1	Services configuration	14.1.0
2017-09	CT-77	CP-172102	0007		Location information	14.1.0
2017-09	CT-77	CP-172102	0008	1	Security clause 4.7	14.1.0
2017-09	CT-77	CP-172102	0009	2	Confidentiality and Integrity Protection of TLV messages	14.1.0
2017-09	CT-77	CP-172102	0010		Timers and counters	14.1.0
2017-09	CT-77	CP-172102	0012	1	Off-network SDS	14.1.0
2017-09	CT-77	CP-172102	0013		Redundant editor's notes	14.1.0
2017-12	CT-78	CP-173064	0015	1	MCData Overview	14.2.0
2017-12	CT-78	CP-173064	0016	3	Authentication and key distribution	14.2.0
2017-12	CT-78	CP-173064	0017		Corrections to deferred download	14.2.0
2017-12	CT-78	CP-173064	0018		Redundant Editor's Notes	14.2.0
2017-12	CT-78	CP-173064	0019		Enhanced Status	14.2.0
2017-12	CT-78	CP-173064	0020		File availability parameters	14.2.0
2017-12	CT-78	CP-173064	0021		EN on security	14.2.0
2017-12	CT-78	CP-173064	0022	2	Corrections on FD Disposition Notification	14.2.0
2017-12	CT-78	CP-173064	0023	2	Remove mcdata-signed+xml	14.2.0
2018-03	CT-79	CP-180073	0024	1	Correction to mcdatainfo schema	14.3.0
2018-06	CT-80	CP-181054	0033	2	MCData Cplane SDS procedure selection criterion	14.4.0
2018-06	CT-80	CP-181054	0042	2	Protected payload message types	14.4.0

Change history							
Date	**Meeting**	**TDoc**	**CR**	**Rev**	**Cat**	**Subject/Comment**	**New version**
2018-09	CT#81	CP-182125	0047	1	F	Completed IANA registrations for MCData	14.5.0
2018-09	CT#81	CP-182125	0049		F	Fix issues with encoding of IEs in MONP messages for MCData	14.5.0
2018-09	CT#81	CP-182125	0052		F	Addition of Registration without Auth Token	14.5.0
2018-12	CT#82	CP-183059	0057		F	Correct root element in presence event package	14.6.0
2018-12	CT#82	CP-183059	0059		F	Correction of the "prefix" attribute handling	14.6.0
2018-12	CT#82	CP-183059	0061		F	Rel-14 completed IANA registrations for MCData	14.6.0
2019-06	CT#84	CP-191118	0064		F	Removing IP Address from media-level section in SDP body for MCData Standalone SDS using media plan, SDS Session and FD using media plane	14.7.0
2019-06	CT#84	CP-191118	0069	1	F	Corrections in MCData SDS Session	14.7.0
2019-09	CT#85	CP-192042	0074	1	F	Fix for plugtest reported issue on mcdata notification	14.8.0

History

Document history		
V14.0.1	July 2017	Publication
V14.1.0	October 2017	Publication
V14.2.0	January 2018	Publication
V14.3.0	April 2018	Publication
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V14.5.0	October 2018	Publication
V14.6.0	January 2019	Publication
V14.7.0	July 2019	Publication
V14.8.0	October 2019	Publication