**3GPP TSG-CT WG1 Meeting #136-eC1-223874 r1**

**E-Meeting, 12th – 20th May 2022**

**Source: China Mobile**

**Title: Correction on MSGin5G Message delivery**

**Spec: 3GPP TS 24.538 v1.1.0**

**Agenda item: 17.2.30**

**Document for: Agreement**

**1. Introduction**

This pCR is proposed to correct the procedure of MSGin5G Message delivery.

**2. Reason for Change**

This pCR is proposed to correct the procedure of MSGin5G Message delivery.

**3. Conclusions**

<Conclusion part (optional)>

**4. Proposal**

It is proposed to agree the following changes to 3GPP TS 24.538 v1.1.0.

**\*\*\*\*\*\*\***

**Formatting instructions (remove this section after drafting a pCR)**

This sentence uses 'Normal' style from '3gpp\_70.dot' template, which shall be used for most of the text.

- This sentence uses 'B1' style from '3gpp\_70.dot' template, which shall be used for most of the bullet points.

NOTE: This sentence uses 'NO' style from '3gpp\_70.dot' template, which shall be used for all informative notes.

Editor's note: This sentence uses 'Editor's Note' style from '3gpp\_70.dot' template, which shall be used for all editor's notes.

Table x: This is a caption for a table, which uses 'TH' style from '3gpp\_70.dot' template.

Figure x: This is a caption for a figure, which uses 'TF' style from '3gpp\_70.dot' template.

The text within a Table and a Figure cells shall use either 'TAH', 'TAL' or 'TAC' styles from '3gpp\_70.dot' template.

Styles in 3GPP Specifications

|  |  |
| --- | --- |
| Use this style | For this type of element |
| **Heading 1** | Clause (→ if numbered) |
| **Heading n** | Subclause level n In exceptional cases, for level 6 or beyond, use **Heading 5** if required in contents list or **H6** if not to appear. → |
| **Heading 8** | Annex title for TS |
| **Heading 9** | Annex title for TR |
| **Normal** | Standard paragraph, Definition |
| **EX** | Reference, Example → |
| **EW** | Symbol, Abbreviation, Example continuation in text → |
| **Bn** | List element level n → |
| **FP** | Free paragraph (left justified) |
| **NO** | Note integrated in the text → |
| **NW** | Note continuation in text → |
| **NF** | Note in figure → |
| **TAN** | Note in table → |
| **TH** | Table title, Figures |
| **TAH** | Heading within table |
| **TAC** | Centred text within table |
| **TAL** | Left justified text within table |
| **TAR** | Right justified text within table |
| **TF** | Figure title |
| **TT** | Contents list title |
| **PL** | Programming language |
| **EQ** | Equation |
| **Header** | Header (portrait and landscape pages) |
| → use "tab" between "item/number" and "text".  EXAMPLE: The "tab" is preceding this example text. | |

**Please do not create new styles!**

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\* \* \* First Change \* \* \* \*

## 6.4 MSGin5G Message delivery

### 6.4.1 Procedures between MSGin5G UE and MSGin5G Server

#### 6.4.1.1 Procedure at MSGin5G Client

##### 6.4.1.1.1 General

This clause specifies the procedures for sending and receiving MSGin5G message, aggregated MSGin5G message, MSGin5G message delivery status report and aggregated MSGin5G message delivery status report at MSGin5G Client.

##### 6.4.1.1.2 Sending of an MSGin5G message

In order to send an MSGin5G message, the MSGin5G Client shall compare the size of the received message from the Application Client to the maximum allowed MSGin5G message segmentation size. If the size exceeds, the MSGin5G Client shall segment the MSGin5G message into a set of segmented MSGin5G messages such that each segmented MSGin5G message can fit within the maximum allowed MSGin5G message segmentation size. For each segmented MSGin5G message, the steps listed below shall be processed individually.

The MSGin5G Client shall send the MSGin5G message in a CoAP POST request message according to procedures specified in IETF RFC 7252 [5]. In the CoAP POST request message, The MSGin5G Client:

a) shall set the "T" field in the CoAP header to 0 if delivery status report from the recipient is requested, i.e. indicates that this message is the type of Confirmable, to ensure the application layer delivery status report;

b) shall include the MSGin5G Server address in a CoAP Option, e.g. if the MSGin5G Server address is a URI, includes a Uri-Path Option with the value of the URI;

c) shall set the CoAP Content-Format to "50", i.e. application/json;

d) shall include the information elements specified in 3GPP TS 23.554 [2] in the CoAP payload encoded in JSON format as specified in clause 7.3.4:

1) shall include an "MSGin5G service identifier" element to indicate that this CoAP POST request message is used for MSGin5G service;

2) shall include a "Message Type" element and set it to "MSG" to indicate that this CoAP POST request message is used for MSGin5G message;

3) shall include an "Originating UE Service ID" element set to the UE which requests the sending of the MSGin5G message;

4) shall include a "Recipient UE Service ID/AS Service ID" element if the recipient is an MSGin5G UE/Non-MSGin5G UE or an Application Server;

5) shall include a "Group Service ID" element if the recipient is an MSGin5G Group;

6) shall include a "Broadcast Area ID" element if the message needs to be broadcast;

7) shall include a "Messaging Topic" element if this message will be distributed based on message topic. This element shall not present in other message scenarios;

NOTE: In an MSGin5G Message request, only one of these IEs listed from step 4) to step 6) shall be included.

8) may include one or more "Application ID" element(s) to indicate the application(s) for which the payload is(are) intended;

9) shall include a "Message ID" which is globally unique within the MSGin5G service to identify this specific MSGin5G message;

10) shall include a "Security credentials" element which is required by the MSGin5G Server;

Editor's note: the Security credentials element is a placeholder for SA3 security information.

11) may include a "Delivery status required" element if delivery acknowledgement from the recipient is requested;

12) may include a "Priority type" element to indicate the application priority level requested for this message;

13) may include a "Message is segmented" element with a "true" value to indicate that this message is part of a segmented message;

14)if "Message is segmented" element with a "true" value is included, shall include a "Segmentation set identifier" element to indicate that this segmented message is associated within a set of segmented messages. All segmented messages associated with the same MSGin5G message shall be assigned the same unique identifier;

15) if "Message is segmented" element with a "true" value is included and this message is the first segment of the set of segmented messages, shall include a "Total number of message segments" element to indicate the total number of segments for the MSGin5G message;

16) if "Message is segmented" element with a "true" value is included, shall include a "Message segment number" element to indicate the number of each segmented message within a set of segmented messages;

17) if "Message is segmented" element with a "true" value is included and this message is the last segment of the set of segmented messages, shall include a "Last segment flag" element to indicate that this segmented message is the last segment in the set of segmented messages;

18) shall include a "Store and forward flag" element to indicate whether store and forward services are requested for this message;

19) if store and forward services are requested, may include a "Store and forward parameters" element to carry the parameters used by MSGin5G Server for providing store and forward services. The "Store and forward parameters":

i) may include a "Message expiration time" element to indicate the message expiration time used for providing store and forward services if the destination is not available for communications; and

ii) may include an "Application specific store and forward information" element to carry the information used by MSGin5G Server for handling store and forward, e.g. a delivery time/date; and

20) may include a "Payload" element which carries the application payload that is transferred by the MSGin5G Service in the CoAP payload and located it after the elements listed from step 1) to 19); The content of "Payload" element is transparent to the MSGin5G Service; and

e) if needed, i.e. a message segment recovery request is received, acts as Message Sender to perform the procedures in clause 6.5.1.1.

##### 6.4.1.1.3 Sending of an aggregated MSGin5G message

Before the sending of an MSGin5G message, the MSGin5G Client shall check if aggregation is allowed for this message, check the message data size, and the priority level to determine if the message can be aggregated. For example, if the MSGin5G Client finds that the messages have small payload size when compared to the maximum segment size that can be transmitted over CoAP and the messages are not high priority messages which could be sent as per scheduling policy towards a selected target, the MSGin5G Client can decide to aggregate messages until optimal use of segment size before sending message towards MSGin5G Server.

If the message can be aggregated, the MSGin5G Client aggregates multiple MSGin5G message requests intended for a selected target and sends the aggregated message in a single CoAP POST request message. The sending of the CoAP POST request message shall follow the procedures specified in clause 6.4.1.1.2 with the clarifications listed below:

a) The MSGin5G Client should not segment the aggregated message, so in step d) of clause 6.4.1.1.2, the "Message is segmented", "Segmentation set identifier", "Total number of message segments", "Message segment number" and "Last segment flag" elements should not be included.

b) In addition to the step d) of clause 6.4.1.1.2, the MSGin5G Client should include a "Number of individual messages" element in this message to indicate the total number of messages which are aggregated into this single message.

c) In addition to the step d) of clause 6.4.1.1.2, the MSGin5G Client should include a "List of individual messages" element in this message. Each child element of this "List of individual messages" element contains information elements listed below:

1) "Message ID" of the individual message;

2) "Payload" which carries the application payload that is transferred by the individual MSGin5G message;

3) one or more optional "Application ID" element(s);

4) an optional "Delivery status required" element; and

5) an optional "Priority type" element.

d) The MSGin5G Client should not include the "Payload" element outside the "List of individual messages" element, i.e. the 19) in step e) of clause 6.4.1.1.2 shall not be processed.

##### 6.4.1.1.4 Sending of an MSGin5G message delivery status report

In order to send a MSGin5G message delivery status report, the MSGin5G Client shall send an CoAP POST request according to procedures specified in IETF RFC 7252 [5]. In the CoAP POST request, the MSGin5G Client:

a) shall sets the "T" field in the CoAP header to 0, i.e. indicates that this message is the type of Confirmable, to ensure that the MSGin5G message delivery status report can be received by the originator of the receiving MSGin5G message;

b) shall include the MSGin5G Server address in an CoAP Option, e.g. if the MSGin5G Server address is a URI, includes a Uri-Path Option with the value of the URI;

c) shall set the CoAP Content-Format to "50", i.e. application/json; and

d) shall include the information elements specified in 3GPP TS 23.554 [2] in the CoAP payload encoded in JSON format as specified in clause 7.3.4.2:

1) shall include an "MSGin5G service identifier" element to indicate that this CoAP POST request message is used for MSGin5G service;

2) shall include an "Message Type" element and set it to "IMDN" to indicate that this CoAP POST request message is used for MSGin5G message delivery status report;

3) shall include an "Originating UE Service ID" element set to the UE which requests the sending of the MSGin5G message delivery status report;

4) shall include a "Recipient UE Service ID/AS Service ID" element if the recipient is an MSGin5G UE/Non-MSGin5G UE or an Application Server. This element indicates the sender of the message that this message delivery status report is for;

5) shall include the "Message ID" element copied from the MSGin5G message that is being acknowledged;

6) may include the "Security credentials" which is required by the MSGin5G Server;

Editor's note: the Security credentials element is a placeholder for SA3 security information.

7) shall include a "Delivery Status" element to carry the delivery status description. The delivery status can be success or failure in delivery; and

8) may include a "Failure Cause" element to indicate the failure reason if the delivery status is failure;

##### 6.4.1.1.5 Sending of a aggregated MSGin5G message delivery status report

The MSGin5G Client can aggregate multiple MSGin5G message delivery status reports into one single message. The MSGin5G Client shall check whether the MSGin5G message delivery status reports can be aggregated as specified in clause 6.4.1.1.3.

If the MSGin5G message delivery status reports can be aggregated, the MSGin5G Client aggregates MSGin5G message delivery status reports intended for a selected target and sends the aggregated MSGin5G message delivery status reports in a single CoAP POST request message. The sending of the CoAP POST request message shall follow the procedures specified in clause 6.4.1.1.4 with the clarifications listed below:

a) In step d) of clause 6.4.1.1.4, the "Delivery Status" element and the "Failure Cause" element should not be included.

b) In addition to the step d) of clause 6.4.1.1.4, the MSGin5G Client should include a "Number of individual messages" element in this message to indicate the total number of MSGin5G message delivery status reports which are aggregated into this single message.

c) In addition to the step d) of clause 6.4.1.1.4, the MSGin5G Client should include a ""List of individual messages" element in this message. Each child element in this "List of individual messages" element contains information elements listed below:

1) "Message ID" of the individual MSGin5G message delivery status reports which is copied from the MSGin5G message that is being acknowledged;

2) "Delivery Status" element; and

3) an optional "Failure Cause" element.

##### 6.4.1.1.6 Reception of an MSGin5G message

Upon receiving an CoAP POST request containing the MSGin5G Service identifier and the "Message Type" with the value "MSG", if the "Number of individual messages" element and "List of individual messages" element are not included, the MSGin5G Client shall handle the CoAP POST request according to procedures specified in IETF RFC 7252 [5] with the clarifications listed below:

a) The MSGin5G Client shall check whether a "Message is segmented" element is included in the CoAP POST request. If this element is included, the MSGin5G Client shall wait until all the segmented messages have been received by checking the "Segmentation set identifier", "Total number of message segments", "Message segment number" and "Last segment flag" elements. The MSGin5G Client shall reassemble all the segmented messages into a single MSGin5G message.

b) The MSGin5G Client shall provide the received information in the "payload" element to the Application Client(s) if one or more "Application ID" element(s) is(are) included. The Application Client(s) is(are) indicated by the "Application ID" element(s):

1) If the Application Client is on the other MSGin5G UE-2 for which this MSGin5G Client is acting as MSGin5G Relay UE or MSGin5G Gateway UE, the MSGin5G Client shall send the received information to the corresponding MSGin5G UE via MSGin5G-6 (if MSGin5G Client is supported by MSGin5G UE-2) as specified in clause 6.4.2.4 or MSGin5G-5 reference point (if MSGin5G Client is not supported by MSGin5G UE-2) as specified in clause 6.4.2.2.

2) If the Application Client is on the same MSGin5G UE with the MSGin5G Client, the MSGin5G Client shall deliver the received information to the Application Client via MSGin5G-5 reference point.

NOTE: when the Application Client and MSGin5G Client are resided on the same MSGin5G UE, the interaction in MSGin5G-5 reference point may implementation specific and is out of scope of the present document.

c) If a "Delivery status required" element is included in the CoAP POST request, the MSGin5G Client shall send an MSGin5G message delivery status report as specified in clause 6.4.1.1.4 or clause 6.4.1.1.5 with the clarifications listed below:

1) if the message delivery status is supported by the Application Client(s), the MSGin5G message delivery status report shall be sent after the delivery status information is received from the Application Client(s), and shall be generated based on this(these) delivery status information; or

2) if the message delivery status is not supported by the Application Client, the MSGin5G message delivery status report shall be sent immediately by the MSGin5G Client on behalf of the Application Client(s).

##### 6.4.1.1.7 Reception of a aggregated MSGin5G message

Upon receiving an CoAP POST request containing the MSGin5G Service identifier and the "Message Type" with the value "MSG", if a "Number of individual messages" and a "List of individual messages" are included, the MSGin5G Client determines that this message is an aggregated MSGin5G message. The MSGin5G Client shall handle the CoAP POST request according to procedures specified in IETF RFC 7252 [5] with the clarifications listed below:

a) The MSGin5G Client shall split the received aggregated message request into multiple individual MSGin5G message, each individual MSGin5G message contains the information elements included in the child element in this "List of individual messages" element.

Editor's note: How the MSGin5G Client splits the aggregated message is FFS.

b) The MSGin5G Client shall handle each individual MSGin5G messages according to step b) and c) specified in clause 6.4.1.1.6.

##### 6.4.1.1.8 Reception of an MSGin5G message delivery status report

Upon receiving an CoAP POST request containing the MSGin5G Service identifier and the "Message Type" with the value "IMDN", if the "Number of individual messages" element and "List of individual messages" element are not be included and a "Delivery Status" element is included, the MSGin5G Client shall handle the CoAP POST request according to procedures specified in IETF RFC 7252 [5] with the clarifications listed below:

a) The MSGin5G Client shall provide the received information in the "Delivery Status" element and the "Failure Cause" element (if applicable) to the Application Client(s) if one or more "Application ID" element(s) is(are) included. The Application Client(s) is(are) indicated by the "Application ID" element(s):

1) If the Application Client on the other MSGin5G UE for which this MSGin5G Client is acting as MSGin5G Relay UE or MSGin5G Gateway UE, the MSGin5G Client shall send the received information to the corresponding MSGin5G UE via MSGin5G-6 (if MSGin5G Client is supported by MSGin5G UE-2) as specified in clause 6.4.2.4 or MSGin5G-5 reference point (if MSGin5G Client is not supported by MSGin5G UE-2) as specified in clause 6.4.2.2.

2) If the Application Client is on the same MSGin5G UE with the MSGin5G Client, the MSGin5G Client shall deliver the received information to the Application Client via MSGin5G-5 reference point;

NOTE: when the Application Client and MSGin5G Client are resided on the same MSGin5G UE, the interaction in MSGin5G-5 reference point may implementation specific and is out of scope of the present document.

##### 6.4.1.1.9 Reception of a aggregated MSGin5G message delivery status report

Upon receiving an CoAP POST request containing the MSGin5G Service identifier and the "Message Type" with the value "IMDN", if a "Number of individual messages" and a "List of individual messages" are included, the MSGin5G Client determines that this message is an aggregated MSGin5G message. The MSGin5G Client shall handle the CoAP POST request according to procedures specified in IETF RFC 7252 [5] with the clarifications listed below:

a) The MSGin5G Client shall split the received aggregated MSGin5G message request into multiple individual MSGin5G messages, each individual MSGin5G message contains the information elements included in the child element in this "List of individual messages" element.

Editor's note: How the MSGin5G Client splits the aggregated message is FFS.

b) If "Delivery Status" element is included in the individual MSGin5G message, the MSGin5G Client determines that the individual MSGin5G messages are MSGin5G delivery status reports. The MSGin5G Client shall handle each individual MSGin5G delivery status report according to step a) specified in clause 6.4.1.1.8.

#### 6.4.1.2 Procedure at MSGin5G Server

##### 6.4.1.2.1 General

An MSGin5G Server provides server-side functionality of messages delivery among MSGin5G UE, Application Server and Message Gateway. A messages delivery procedure in the MSGin5G Server can be divided to reception and sending procedures.

The reception procedure consists:

a) the messages arrival at the MSGin5G Server;

b) the related authentication and authorization of the message on the MSGin5G Server; and

c) the possible message response to the sender.

The sending procedure consists the outbound messages from the MSGin5G Server.

When the MSGin5G Server receives message from MSGin5G UE, the reception procedure is specified in clause 6.4.1.2.2, 6.4.1.2.3, 6.4.1.2.4 and 6.4.1.2.5. When the MSGin5G Server receives message from Application Server or Message Gateway, the reception procedure is specified in 3GPP TS 29.538 [7].

Upon reception of a message, the MSGin5G Server shall analysis the communication model of the message by analysis the Service ID of the recipient in the message, then generates a new message based on the received message and send it to the recipient:

a) if a "Recipient UE Service ID" element is included, this message is a Point-to-Point message or a Application-to-Point message. The MSGin5G Server analyzes the URI:

1) if the URI points to an MSGin5G Client, the MSGin5G Server sends the MSGin5G message to the MSGin5G Client via MSGin5G-1 reference point as specified in clause 6.4.1.2.6, 6.4.1.2.7, 6.4.1.2.8 or 6.4.1.2.9;

2) if the URI points to a Message Gateway, the MSGin5G Server sends the message to the Message Gateway via MSGin5G-2 or MSGin5G-4 reference point as specified in 3GPP TS 29.538 [7];

NOTE: The analysis procedure is implementation specific, e.g. by querying the DNS or local database, and is out of scope of the present document.

b) if a "Recipient AS Service ID" element is included, this message is a Point-to-Application message. The MSGin5G Server analysis the URI and send the message to the Application Server via MSGin5G-3 reference point as specified in 3GPP TS 29.538 [7];

c) if a "Group Service ID" element is included, this message is a Group message. The MSGin5G Server obtains the group members by checking the group profile with the "Group Service ID". For each group member, the MSGin5G Server analyzes its UE Service ID and sends the message to it as specified in step a);

d) if a "Broadcast Area ID" element is included, this message is a Broadcast message;

Editor's note: The procedure of Broadcast message is FFS.

e) if a "Messaging Topic" element is included, this message is needed to be distributed based on message topic. The MSGin5G Server obtains the subscribers of the Messaging Topic by checking the related subscriptions. The subscriber of the Messaging Topic can be MSGin5G UE, Application Server or Message Gateway (on behalf of non-MSGin5G UE). For each subscriber, the MSGin5G Server analyzes its Service ID and sends the message to it as specified in step a) or b).

##### 6.4.1.2.2 Reception of an MSGin5G message

Upon receiving an CoAP POST request containing the MSGin5G Service identifier and the "Message Type" with the value "MSG", i.e. the request is for sending a MSGin5G message, if the "Number of individual messages" element and "List of individual messages" element are not be included, the MSGin5G Server shall handle the CoAP POST request according to procedures specified in IETF RFC 7252 [5] with the clarifications listed below:

a) The MSGin5G Server shall authenticate the message and shall verify that the sending UE is authorized to send the message by checking the registration status of the MSGin5G Client and the "Security credentials" element in the CoAP payload. If message is needed to be rejected, the MSGin5G Server shall send a message response in a new CoAP POST request to the originating entity as specified in step e) and skips the rest steps in this clause.

b) The MSGin5G Server executes the message segment related procedures as specified in clause 6.5.3 if needed.

c) The MSGin5G Server shall determine the communication model of the message as specified in clause 6.4.1.2.1:

d) If the message is stored for deferred delivery as specified in clause 6.4.1.2.6 or 6.4.1.2.7, the MSGin5G Server shall send a message response in a new CoAP POST request to the originating entity as specified in step e),

e) The MSGin5G Server shall send a message response in a new CoAP POST request to the originating entity as specified in IETF RFC 7252 [5] with the clarifications listed below:

1) may set the "T" field in the CoAP header to 0 or 1;

2) shall include the originating MSGin5G Client's address in an CoAP Option, e.g. if the originating MSGin5G Client address is a URI, includes a Uri-Path Option with the value of the URI;

3) shall set the CoAP Content-Format to "50", i.e. application/json; and

4) shall include the information elements specified in 3GPP TS 23.554 [2] in the CoAP payload encoded in JSON format as specified in clause 7.3.4.3:

i) shall include an "MSGin5G service identifier" element to indicate that this CoAP POST request is used for MSGin5G service;

ii) shall include an "Originating UE Service ID" element set to the UE which sends the previous MSGin5G message;

iii) shall include the "Message ID" copied from the received MSGin5G message which this Message response is responded to;

iv) may include a "Delivery Status" element to indicate that the delivery status of this MSGin5G message is a failure, or is stored for deferred delivery;

v) may include a "Failure Cause" element to indicate the reason for failure; and

vi) in addition to the information elements specified in 3GPP TS 23.554 [2], shall also include a "Message Type" element set to "MSGRESP" to indicate that this message is a message response.

##### 6.4.1.2.3 Reception of an aggregated MSGin5G message

Upon receiving an CoAP POST request containing the MSGin5G Service identifier and the "Message Type" with the value "MSG", if a "Number of individual messages" and a "List of individual messages" are included, the MSGin5G Server determines that this message is an aggregated MSGin5G message.

The MSGin5G Server shall handle the whole aggregated MSGin5G message according to procedures specified in clause 6.4.1.2.2.

##### 6.4.1.2.4 Reception of an MSGin5G delivery status report

Upon receiving an CoAP POST request containing the MSGin5G Service identifier and the "Message Type" with the value "IMDN", if the "Number of individual messages" element and "List of individual messages" element are not be included and a "Delivery Status" element is included, the MSGin5G Server shall handle the CoAP POST request according to procedures specified in IETF RFC 7252 [5] with no additional requirement.

##### 6.4.1.2.5 Reception of an aggregated MSGin5G delivery status report

Upon receiving an CoAP POST request containing the MSGin5G Service identifier and the "Message Type" with the value "IMDN", if a "Number of individual messages" and a "List of individual messages" are included, the MSGin5G Server determines that this message is an aggregated MSGin5G message. The MSGin5G Server shall handle the whole aggregated MSGin5G delivery status report according to procedures specified in clause 6.4.1.2.4.

##### 6.4.1.2.6 Sending of an MSGin5G message

In order to deliver the MSGin5G message to an MSGin5G UE, the MSGin5G Server shall send the MSGin5G message in an new CoAP message according to procedures specified in IETF RFC 7252 [5] via MSGin5G-1 reference point. The sending of the CoAP message shall follow the procedures below:

a) The MSGin5G Server shall set the "T" field in the CoAP header to 0 if delivery status report from the recipient is requested, i.e. indicates that this message is the type of Confirmable, to ensure the application layer delivery status report.

b) The MSGin5G Server shall set the CoAP Content-Format to "50", i.e. application/json.

c) The MSGin5G Server shall remove any "Security credentials" element, "Priority type" element, "Store and forward flag" and related "Store and forward parameters" elements from the CoAP payload of the received message. If "Message is segmented" and related elements is included in the received message, the MSGin5G Server shall handle the message as specified in clause 6.5.3.

d) The MSGin5G Server shall determine the communication model of the message by checking the recipient of the message as specified in clause 6.4.1.2.1 and generate the new CoAP message:

1) if the Service ID of the recipient points to an MSGin5G Client, the MSGin5G Server:

i) shall include the recipient MSGin5G Client address in an CoAP Option, e.g. if the MSGin5G Client address is a URI, includes a Uri-Path Option with the value of the URI; and

ii) shall copy other elements in the CoAP payload of the received message to the new CoAP POST request;

2) if the Service ID of the recipient points to an Application Server or a Message Gateway, the MSGin5G Server shall follow the procedures specified in 3GPP TS 29.538 [7];

3) if the MSGin5G message is a Group message, the MSGin5G Server:

i) shall obtain the group members by checking the group profile with the "Group Service ID" element included in the received MSGin5G message;

ii) for each group member which is an MSGin5G UE, include its CoAP address got from the recipient MSGin5G UE registration specified in clause 6.3.1.2 in an CoAP Option, e.g. if the recipient client's address is a URI, includes a Uri-Path Option with the value of the URI. The MSGin5G Server shall add the "Recipient UE Service ID" element and set the value of it to the UE Service ID. The MSGin5G Server shall also copy other elements in the CoAP payload of the received message to the new CoAP POST request; and

Editor's note: The procedure of Broadcast message is FFS.

4) if the MSGin5G message is needed to be distributed based on message topic, the MSGin5G Server:

i) shall obtain the UE Service ID/AS Service ID of the subscribers by checking the subscription with this Messaging Topic;

ii) for each subscriber which is an MSGin5G UE, include its CoAP address got from the recipient MSGin5G UE registration specified in clause 6.3.1.2 in an CoAP Option, e.g. if the recipient client's address is a URI, includes a Uri-Path Option with the value of the URI. The MSGin5G Server shall add the "Recipient UE Service ID" element and set the value of it to the UE Service ID. The MSGin5G Server shall also copy other elements in the payload of the received message to the new CoAP 2.05 response.

e) Before sending the new CoAP message generated in step d), the MSGin5G Server shall compare the size of the new CoAP message to the maximum allowed MSGin5G message segmentation size. If the size exceeds, the MSGin5G Server shall segment the MSGin5G message into a set of segmented MSGin5G messages such that each segmented MSGin5G message can fit within the maximum allowed MSGin5G message segmentation size. For each segmented MSGin5G message, the MSGin5G Server:

1) shall include a "Message is segmented" element with a "true" value to indicate that this message is part of a segmented message;

2) shall include a "Segmentation set identifier" element to indicate that this segmented message is associated within a set of segmented messages., All segmented messages associated with the same MSGin5G message are assigned the same unique identifier;

3) shall include a "Total number of message segments" element in the first segment of the MSGin5G message to indicate the total number of segments for the MSGin5G message;

4) shall include a "Message segment number" element to indicate segmented message number of each segmented message within the set of segmented messages; and

5) shall include a "Last segment flag" element in the last segment in the set of segmented messages; and

f) The MSGin5G Server checks the availability of recipient by checking the UE registration status. The MSGin5G Server can also use e.g. UE reachability status monitoring specified in 3GPP TS 29.538 [7] to determine whether the recipient is available. If the recipient is available, the MSGin5G Server sends the new CoAP message generated as above to the recipient. If the recipient is unavailable, the MSGin5G Server checks whether a "Store and forward flag" element is included in the received MSGin5G message:

1) if the "Store and forward flag" element is not included, MSGin5G Server discards this message and may send a message response as specified in clause 6.4.1.2.2 which includes delivery status information in the "Delivery Status" element, e.g., that the message was discarded; and

2) if the "Store and forward flag" element is included:

i) the MSGin5G Server stores the message and uses the information obtained from the "Store and forward parameters" element to determine the forwarding. The MSGin5G Server may send a message response as specified in clause 6.4.1.2.2 which includes store and forward status information in the "Delivery Status" element, e.g. the delivery had been deferred; and

ii) when the recipient UE becomes available, the MSGin5G Server attempts the delivery of the new CoAP message to the recipient. If the UE does not become available prior to the time included in the "Message expiration time" element, the MSGin5G Server attempts delivery of the new CoAP message at the message expiration time and the stored message is discarded afterwards. The MSGin5G Server may send a message response as specified in clause 6.4.1.2.2 which includes store and forward status information the "Delivery Status" element, e.g., that the message was discarded.

##### 6.4.1.2.7 Sending of an aggregated MSGin5G message

If the MSGin5G Server receives an aggregated MSGin5G message as specified in clause 6.4.1.2.3, and the received aggregated MSGin5G message is smaller than the supported message segment size of the recipient, it shall send it as specified in clause 6.4.1.2.6 without splitting the received aggregated message request into multiple individual MSGin5G message.

If the received aggregated MSGin5G message is larger than the supported message segment size of the recipient, the MSGin5G Server should remove the last individual message in the List of individual messages element from the aggregated message until the aggregated message is smaller than the maximum segmentation size that can be transmitted over available transport, and then send the remaining aggregated MSGin5G message as specified in clause 6.4.1.2.6. The MSGin5G messages removed from the aggregated message may be sent individually or aggregated again by the MSGin5G Server according to service configuration.

NOTE: Aggregated MSGin5G message is supported by all MSGin5G Clients and Application Servers. MSGin5G message and MSGin5G delivery status report cannot be aggregated in the same aggregated MSGin5G message.

If the MSGin5G Server receives an MSGin5G message as specified in clause 6.4.1.2.2, it may send multiple MSGin5G messages toward the same recipient in an aggregated MSGin5G message. Before the sending of an MSGin5G message, the MSGin5G Server shall check if aggregation is allowed for this message, MSGin5G Server shall also check the message data size, and the priority level to determine if the message can be aggregated. For example, if the MSGin5G Server finds that the received messages have small payload size when compared to the maximum segment size that can be transmitted over CoAP and the messages are not high priority messages, which could be sent as per scheduling policy towards a selected target, the MSGin5G Server can decide to aggregate messages until optimal use of segment size before sending message towards MSGin5G Client.

If the message can be aggregated, the MSGin5G Server aggregates multiple MSGin5G messages, and sends the aggregated message in a single CoAP POST request message. The sending of the CoAP POST request message shall follow the procedures specified in clause 6.4.1.2.6 with the clarifications listed below:

a) The MSGin5G Server should not segment the aggregated message, so the MSGin5G Server should ensure that the new aggregated MSGin5G message is smaller than the maximum allowed MSGin5G message segmentation size and skips the step e) in clause 6.4.1.2.6. The "Message is segmented", "Segmentation set identifier", "Total number of message segments", "Message segment number" and "Last segment flag" elements should not be included in the aggregated MSGin5G message.

b) In addition to the elements specified in clause 6.4.1.2.6, the MSGin5G Server should include a "Number of individual messages" element in this message to indicate the total number of messages which are aggregated into this single message.

c) In addition to the elements specified in clause 6.4.1.2.6, the MSGin5G Server should include a "List of individual messages" element in this message. Each child element of this "List of individual messages" element contains information elements listed below:

1) "Message ID" of the individual message;

2) "Payload" which carries the application payload that is transferred by the individual MSGin5G message;

3) one or more optional "Application ID" element(s);

4) an optional "Delivery status required" element; and

5) an optional "Priority type" element.

##### 6.4.1.2.8 Sending of an MSGin5G delivery status report

Upon receiving an MSGin5G delivery status report as specified in clause 6.4.1.2.4, the MSGin5G Server may generate a new CoAP POST request containing the MSGin5G delivery status report if the MSGin5G Server decides not to aggregate the delivery status report. The new CoAP POST request is sent to the recipient obtained from the "Recipient UE Service ID" element in the payload of the received CoAP POST request. The MSGin5G Server:

a) shall set the "T" field in the CoAP header to 0;

b) shall include the recipient address in the Option header of the CoAP message and set the Option header to a corresponding value, e.g. if the MSGin5G Client address is a URI, includes a Uri-Path Option with the value of the URI; and

c) shall copy other elements in the payload of the received message to the new CoAP POST request.

##### 6.4.1.2.9 Sending of a aggregated MSGin5G delivery status report

If the MSGin5G Server receives an aggregated MSGin5G delivery status report as specified in clause 6.4.1.2.5, it shall generate a new CoAP POST request containing the aggregated MSGin5G delivery status report and sends it to the recipient obtained from the "Recipient UE Service ID" element in the payload of the received CoAP POST request. The MSGin5G Server:

a) shall set the "T" field in the CoAP header to 0;

b) shall include the recipient address in the Option header of the CoAP message and set the Option header to a corresponding value, e.g. if the MSGin5G Client address is a URI, includes a Uri-Path Option with the value of the URI; and

c) shall copy other elements in the payload of the received message to the new CoAP POST request.

If the MSGin5G Server receives MSGin5G delivery status report as specified in clause 6.4.1.2.4, it may aggregate multiple MSGin5G message delivery status reports into one single message. The MSGin5G Server shall check whether the MSGin5G message delivery status reports can be aggregated as specified in clause 6.4.1.2.7.

If the MSGin5G message delivery status reports can be aggregated, the MSGin5G Server aggregates MSGin5G message delivery status reports intended for a selected target and sends the aggregated MSGin5G message delivery status reports in a single CoAP POST request message. The sending of the CoAP POST request message shall follow the procedures specified in clause 6.4.1.2.6 with the clarifications listed below:

a) In step d) of clause 6.4.1.2.6, the "Delivery Status" element and the "Failure Cause" element in payload of every individual MSGin5G message should not be copied to the payload of the new CoAP POST request message.

b) In addition to the step d) of clause 6.4.1.2.6, the MSGin5G Server should include a "Number of individual messages" element in this message to indicate the total number of MSGin5G message delivery status reports which are aggregated into this single message.

c) In addition to the step d) of clause 6.4.1.2.6, the MSGin5G Server should include a "List of individual messages" element in this message. Each child element of this "List of individual messages" element contains information elements listed below:

1) "Message ID" of the individual MSGin5G message delivery status reports which is copied from the MSGin5G message that is being acknowledged;

2) "Delivery Status" element copied from the individual MSGin5G message delivery status report; and

3) an optional "Failure Cause" element copied from the individual MSGin5G message delivery status report.