## 8.3 Message handling procedures at the MSGin5G Server

### 8.3.1 General

All service endpoints connect to their hosting MSGin5G Server to obtain MSGin5G service. When sending a MSGin5G message, a service endpoint constructs the message and sends it to its hosting MSGin5G Server to be delivered to the recipient. A service endpoint receives a MSGin5G message through its hosting MSGin5G Server.

### 8.3.2 MSGin5G message origination at the MSGin5G Server

Figure 8.3.2-1 shows the procedure for an MSGin5G UE that initiates an MSGin5G message request.



Figure 8.3.2-1: New MSGin5G message request from UE

Figure 8.3.2-2 shows the procedure for an Application Server that initiates an API request specified in clause 9.1.1.1 for sending an MSGin5G message to UE.



Figure 8.3.2-2: Application Server initiates a request for sending an MSGin5G message

Figure 8.3.2-3 shows the procedure for a Legacy 3GPP Message Gateway or a non-3GPP Message Gateway that sends a MSGin5G message request to the MSGin5G Server on behalf of a Legacy 3GPP UE or Non-3GPP UE.



Figure 8.3.2-3: New MSGin5G message request sending from Message Gateway

The following procedure applies to the above figures 8.3.2-1, 8.3.2-2 and 8.3.2-3 with the exception that step 1 only applies to figure 8.3.2-1.

1. The Application Client in the UE sends a request to the MSGin5G Client for invoking the MSGin5G Client to send a new MSGin5G message to a recipient or to multiple recipients.

Editor's note: Whether the APIs provided by the MSGin5G Client to the Application Client is to be specified in another clause of the TS is FFS.

2. As shown in figure 8.3.2-1 or 8.3.2-3, the MSGin5G Client or Message Gateway sends the MSGin5G message request to the MSGin5G Server and includes the IEs as listed in table 8.3.2-1 in the request; or as shown in figure 8.3.2-2, the Application Server sends an API request to the MSGin5G Server for sending an MSGin5G message, the API request includes the IEs as listed in table 8.3.2-1.

NOTE: If the value of the Store and forward flag IE in the MSGin5G message request indicates that store and forward services are requested by the sender, the procedure in 8.3.6 applies instead.

Table 8.3.2-1: Request to MSGin5G Server for sending MSGin5G message

|  |  |  |
| --- | --- | --- |
| Information element | Status | Description |
| Originating UE Service ID/AS Service ID | M | The service identity of the sending MSGin5G Client, Legacy 3GPP UE, Non-3GPP UE or the sending Application Server. |
| Recipient UE Service ID/AS Service ID  (see NOTE 1, NOTE 2) | O | The service identity of the receiving MSGin5G Client, Legacy 3GPP UE, Non-3GPP UE or the receiving Application Server.  This IE is mandatory for Point-to-Point messaging, AS-to-Point messaging, AOMT messaging and MOAT messaging and is not present in other message scenarios. |
| Group Service ID  (see NOTE 1) | O | The service identifier of the target MSGin5G Group.  This IE is mandatory for a Group Message and is not present in other message scenarios. |
| Broadcast Area ID  (see NOTE 1) | O | The service identifier of the Broadcast Service Area where the message needs to be broadcast.  This IE is mandatory in the Broadcast Message and is not present in other message scenarios. |
| Messaging Topic (see NOTE 1) | O | Indicates which Messaging Topic this message is related to.  This IE is mandatory for a message distribution based on topic and is not present in other message scenarios. |
| Application ID | O | Identifies the application(s) for which the payload is intended.  This list of Application IDs IE is required when the message is sent to one or multiple Application Clients served by same MSGin5G Client.  This list of Application IDs IE may be included when the message is sent to an Application Server or to an Application Client.  MSGin5G Server is unaware of the content. |
| Message ID | M | Unique identifier of this message. |
| Delivery status required | O | Indicates if delivery acknowledgement from the recipient is requested. |
| Payload | O | Payload of the message.  MSGin5G Server/Client is unaware of the content.  If the request is sent from MSGin5G Client or Message Gateway to the MSGin5G Server, the maximum size of this IE is a configurable value that shall not exceed 2048 octets. |
| Priority type (see NOTE 3) | O | Application priority level requested for this message. The application priority levels include High, Normal and Low. The default Priority type of an MSGin5G message is Normal. |
| Message is segmented | O | Indicates this message is part of a segmented message. |
| Segmentation set identifier | O | All segmented messages associated within the same set of segmented messages (i.e. associated with the same MSGin5G message) are assigned the same unique identifier.  Mandatory IE to be present in every segmented message. |
| Total number of message segments | O | Indicates the total number of segments for the message.  The Total Segments needs to be included only in the first segment of the message. |
| Message segment number | O | An incrementing message segment number that indicates segmented message number of each segmented message within a set of segmented messages |
| Last segment flag | O | An indicator of whether this segmented message is the last segment in the set of segmented messages or not.  The Last Segment Flag needs to be included only in the last segment of the message. Message segment number of the segment with "Last Segment Flag" set can be considered as total segments. |
| Store and forward flag | M | An indicator of whether store and forward services are requested for this message. If the value indicates that store and forward services are requested by the sender, the store and forward procedure in clause 8.3.6 applies. |
| Store and forward parameters | O | Parameters used by MSGin5G Server for providing store and forward services, as detailed in table 8.3.2-2. This IE shall be included only if the value of the Store and forward flag IE indicates that store and forward services are requested. The MSGin5G store and forward procedure is detailed in clause 8.3.6. |
| NOTE 1: Only one of these IEs shall be included to represent the type of message request. The MSGin5G Client may construct the related IEs based on the information received from Application Client, e.g. adds the MSGin5G service domain.  NOTE 2: When the originator is an Application Server, (i.e. Originating AS Service ID is present), this IE shall be a UE Service ID.  NOTE 3: The MSGin5G message with high priority should not be aggregated. The other usages of the priority level of the message is implementation specific and is out of scope of this document. | | |

Table 8.3.2-2: Store and forward parameters

|  |  |  |
| --- | --- | --- |
| **Value** | **Status** | **Description** |
| Message expiration time | O | Indicates message expiration time used for providing store and forward services if the destination is not available for communications, The MSGin5GServer attempts delivery at or before the message expiration time, or when the recipient becomes available. |
| Application specific store and forward information | O | Application specific information about store and forward handling, e.g. a delivery time/date. |

3. The MSGin5G Server verifies that the sender is authorized to send the message and checks the integrity of the message.

4. The MSGin5G Server may send a Message response to the originating entity if the message is rejected or stored and includes the IEs as listed in table 8.3.2-3 in the response.

Table 8.3.2-3: Message Response

|  |  |  |
| --- | --- | --- |
| Information element | Status | Description |
| Originating UE Service ID/AS Service ID | M | The identity of the MSGin5G Client, Legacy 3GPP UE, Non-3GPP UE or the identity of the Application Server that initiated the previous Request. |
| Message ID | M | Identifier of the initiating Request. |
| Delivery Status | O | Indicates if delivery is a failure, or if the message is stored for deferred delivery. |
| Failure Cause | O | The reason for failure |

### 8.3.3 MSGin5G message delivery at the MSGin5G Server

Figure 8.3.3-1 shows the procedure for the MSGin5G Server that delivers an MSGin5G message.



Figure 8.3.3-1: MSGin5G message towards UE

Figure 8.3.3-2 shows the same procedure (step 1 only), however for the MSGin5G Server that delivers the message to an Application Server by application request.



Figure 8.3.3-2: Message towards an Application Server

Figure 8.3.3-3 shows the procedure for the MSGin5G Server that delivers an MSGin5G message to a Legacy 3GPP Message Gateway, a Non-3GPP Message Gateway, or a Broadcast Message Gateway.



Figure 8.3.3-3: MSGin5G message towards a Message Gateway

The following procedure applies to the above figures 8.3.3-1, 8.3.3-2 and 8.3.3-3 with the exception that step 2 only applies to figure 8.3.3-1.

1. The MSGin5G Server sends the MSGin5G message request and includes the IEs as listed in table 8.3.3-1.

Table 8.3.3-1: MSGin5G message request from MSGin5G Server

|  |  |  |
| --- | --- | --- |
| Information element | Status | Description |
| Originating UE Service ID/AS Service ID | M | The service identity of the originating MSGin5G Client, Legacy 3GPP UE, Non-3GPP UE or the originating Application Server. |
| Recipient UE Service ID/AS Service ID  (see NOTE1, NOTE 2) | O | The service identity of the receiving entity.  This IE is present in case the recipient is an individual UE or Application Server  For Group messaging, this IE is the Recipient UE Service ID.  For message delivery based on Messaging Topic subscription, this IE is the UE Service ID/AS Service ID of the Messaging Topic subscriber. |
| Broadcast Area ID  (see NOTE 1) | O | The identifier of the Service Area where the message needs to be broadcast.  This IE is mandatory in the Broadcast Message and is not present in other message scenarios.  . |
| Application ID | O | Identifies the application for which the payload is intended.  This list of Application ID(s) IE is required when the message is sent to one or multiple Application Clients served by same MSGin5G Client. This list of Application ID(s) IE may be included when the message is sent to an Application Server or to an Application Client. |
| Message ID | M | Unique identifier of this message. |
| Delivery status required | O | Indicates if delivery acknowledgement from the recipient is requested. |
| Payload | O | Payload of the message. |
| Message is segmented | O | Indicates this message is part of a segmented message. |
| Group Service ID | O | The service identifier of a Group.  This IE is included if message delivery is based on Group messaging. |
| Messaging Topic | O | Indicates which Messaging Topic this message is related to.  This IE is included if message delivery is based on a Messaging Topic subscription. |
| Segmentation Set Identifier | O | All segmented messages associated within the same set of segmented messages (i.e. associated with the same MSGin5G message) are assigned the same unique identifier. |
| Total number of message segments | O | Indicates the total number of segments for the message.  The Total Segments needs to be included only in the first segment of the message. |
| Message segment number | O | An incrementing message segment number that indicates segmented message number of each segmented message within a set of segmented messages. |
| Last Segment Flag | O | An indicator of whether this segmented message is the last segment in the set of segmented messages or not.  The Last Segment Flag needs to be included only in the last segment of the message. Message segment number of the segment with "Last Segment Flag" set can be considered as total segments. |
| Priority type | O | Application priority level requested by the message originator for this message. |
| NOTE 1: Only one of these IEs shall be included to represent the type of message request. The MSGin5G Client may construct the IEs specified in table 8.11.5-1 based on the IEs above in the received MSGin5G message, e.g. removes the MSGin5G service domain, if the Payload is sent to Application Client.  NOTE 2: When the originator is an Application Server, (i.e. Originating AS Service ID is present), this IE shall be a UE Service ID. | | |

If the received MSGin5G message request is for Group Message, the MSGin5G Server shall, in addition to the Recipient Group Service ID IE, add the Recipient UE Service ID of each individual group member, excluding the message originator.

If the received MSGin5G message request is for a Topic Message, the MSGin5G Server shall, in addition to the Messaging Topic IE, add the Recipient UE Service ID/AS Service ID of each individual Topic subscriber, excluding the message originator.

### 8.3.4 MSGin5G message delivery status report into the MSGin5G Server

Figure 8.3.4-1 shows the procedure for an MSGin5G UE that initiates an MSGin5G message delivery status report.



Figure 8.3.4-1: Message delivery status report from MSGin5G UE

Figure 8.3.4-2 shows the procedure for an Application Server that initiates an API request for MSGin5G message delivery status report specified in clause 9.1.1.4 to UE.



Figure 8.3.4-2: Message delivery status report from Application Server

Figure 8.3.2-3 shows the procedure for a Legacy 3GPP Message Gateway or a Non-3GPP Message Gateway that sends an MSGin5G message delivery status report to the MSGin5G Server on behalf of a Legacy 3GPP UE or Non-3GPP UE.



Figure 8.3.4-3: Message delivery status report from Message Gateway (on behalf of Non-MSGin5G UE)

Pre-conditions:

1. The sender of an MSGin5G message has asked for a message delivery status report.

Procedures:

The following procedure applies to the above figures 8.3.4-1, 8.3.4-2 and 8.3.4-3 with the exception that step 1 only applies to figure 8.3.4-1.

1. The Application Client in the MSGin5G UE sends a request to the MSGin5G Client for invoking the MSGin5G Client to send an MSGin5G message delivery status report to a recipient.

Editor's note: Whether the APIs provided by the MSGin5G Client to the Application Client is to be specified in another clause of the TS is FFS.

2. As shown in figure 8.3.4-1 or 8.3.4-3, the MSGin5G Client or Message Gateway sends the MSGin5G message delivery status report to the MSGin5G Server and includes the IEs as listed in table 8.3.4-1, or as shown in figure 8.3.4-2, the Application Server sends an API request to the MSGin5G Server for sending an MSGin5G message, the API request includes the IEs as listed in table 8.3.4-1.

Table 8.3.4-1: Message delivery status report to MSGin5G Server

|  |  |  |
| --- | --- | --- |
| Information element | Status | Description |
| Originating UE Service ID/AS Service ID | M | The service identity of the sending MSGin5G Client, Legacy 3GPP UE, Non-3GPP UE or the sending Application Server. |
| Recipient UE Service ID/AS Service ID (NOTE) | M | The service identity of the receiving MSGin5G Client, Legacy 3GPP UE, Non-3GPP UE or the receiving Application Server.  This is the sender of the message that this message delivery status report is for. |
| Message ID | M | Unique identifier of message delivery status report.  The message ID of the MSGin5G message that is being acknowledged is included in this IE. |
| Failure Cause | O | The Failure Cause indicates the failure reason, if applicable. |
| Delivery Status | M | The delivery status description, including success or failure in delivery |
| NOTE: When the originator is an Application Server, (i.e. Originating AS Service ID is present), this IE shall be a UE Service ID. | | |

3. The MSGin5G Server verifies that the sender is authorized to send the message delivery status report.

4. The MSGin5G Server may send a response to the originating entity if the message delivery status report is rejected and includes the IEs as listed in table 8.3.2-3 in the response.

### 8.3.5 MSGin5G message delivery status report from the MSGin5G Server

Figure 8.3.5-1 shows the procedure for the MSGin5G Server that forwards an MSGin5G message delivery status report to an MSGin5G UE.



Figure 8.3.5-1: Message delivery status report towards an MSGin5G UE

Figure 8.3.5-2 shows the procedure for the MSGin5G Server that forwards an MSGin5G message delivery status report to an Application Server.



Figure 8.3.5-2: Message delivery status report towards an Application Server

Figure 8.3.5-3 shows the procedure for the MSGin5G Server that forwards an MSGin5G message delivery status report to a Legacy 3GPP Message Gateway or a Non-3GPP Message Gateway.



Figure 8.3.5-3: Message delivery status report towards a Message Gateway

The following procedure applies to the above figures 8.3.5-1, 8.3.5-2 and 8.3.5-3 with the exception that step 2 only applies to figure 8.3.5-1.

1. the MSGin5G Server sends the MSGin5G message delivery status report to the MSGin5G UE or Message Gateway and includes the IEs as listed in table 8.3.5-1, or as shown in figure 8.3.5-2 and figure 8.3.5-3, the MSGin5G Server sends an API request to the Application Server for sending an MSGin5G message, the API request includes the IEs as listed in table 8.3.5-1.

Table 8.3.5-1: Message delivery status report to MSGin5G Server

|  |  |  |
| --- | --- | --- |
| Information element | Status | Description |
| Originating UE Service ID/AS Service ID | M | The service identity of the sending MSGin5G Client, Legacy 3GPP UE, Non-3GPP UE or the sending Application Server. |
| Recipient UE Service ID/AS Service ID (see NOTE) | M | The service identity of the receiving MSGin5G Client, Legacy 3GPP UE, Non-3GPP UE or the receiving Application Server.  This is the sender of the message that this message delivery status report is for. |
| Message ID | M | Unique identifier of message delivery status report.  The message ID of the MSGin5G message that is being acknowledged is included in this IE. |
| Failure Cause | O | The Failure Cause indicates the failure reason, if applicable. |
| Delivery Status | M | The delivery status description, including success or failure in delivery. |
| NOTE: When the originator is an Application Server, (i.e. Originating AS Service ID is present), this IE shall be a UE Service ID. | | |

2. The MSGin5G Client sends the MSGin5G message delivery status report to Application Client.

### 8.3.6 MSGin5G Store and Forward

Figure 8.3.6-1 shows the procedure for providing store and forward services for MSGin5G message requests.

This procedure applies when an MSGin5G message is received at the MSGin5G Server for delivery and the recipient UE is not available; otherwise, the procedure detailed in clause 8.3.2 applies.

Pre-conditions:

1. The MSGin5G Client or Application Server has registered to the MSGin5G Server.

2. The MSGin5G Server has determined that the recipient UE is not available.

NOTE: In addition to UE registration status, the MSGin5G Server can use e.g, UE reachability status monitoring specified in clause 8.9.2 or the recipient's Communication Availability information specified in clause 8.2 to determine whether the recipient is available, i.e. reachable for message delivery.



Figure 8.3.6-1: Store and forward procedure

1. MSGin5G message origination handling, see steps 1-3 in clause 8.3.2. The value of the Store and forward flag IE (see Table 8.3.2-1) in the MSGin5G message indicates that store and forward services are requested by the sender.

2. The MSGin5G Server checks the registration information of the recipient UE. If the Store and forward option IE (see Table 8.2.1-3) indicates that the recipient UE opts out of store and forward services, the message is discarded and the procedure ends. If the Store and forward flag IE (see Table 8.3.2-1) in the received message indicates that store and forward services are not requested by the sender, the message is discarded and the procedure ends.

If store and forward processing is required, the MSGin5G Server uses the Application specific store and forward information IE (see Table 8.3.2-2) to determine storage and forwarding.

3. Before the Message expiration time is expired, the MSGin5G Server may trigger the Recipient UE based on the MSGin5G device triggering procedure in clause 8.9.3.

4. The MSGin5G Server may send a message response as defined in table 8.3.2-3 which includes store and forward status information in the Delivery Status IE, e.g., that the delivery had been deferred.

5. The recipient UE becomes available.

6. When the recipient UE becomes available, the MSGin5G Server attempts delivery of the request using the procedure specified in clause 8.3.3.

If the UE does not become available prior to the expiration time, the MSGin5G Server attempts delivery of the request at the message expiration time and the stored message is discarded afterwards.

7. The MSGin5G Server may send a message response as defined in table 8.3.2-3 which includes store and forward status information in the Delivery Status IE, e.g., that the message was discarded.