**3GPP TSG-WG SA6 Meeting #46-e *S6-212xxx***

**e-meeting, November 15 – 23, 2021 (revision of S6-212645)**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **23.289** | **CR** | **0021** | **rev** | **1** | **Current version:** | **17.0.0** |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME | **x** | Radio Access Network |  | Core Network | **X** |

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| ***Title:*** | Multi-server MBS session coordination | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei, HiSilicon | | | | | | | | | |
| ***Source to TSG:*** | S6 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | MCOver5MBS | | | | |  | ***Date:*** | | | 2021-11-05 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-18 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | eMBMS bearer information sharing and re-usage among different MCX server has been supported in TS 23.280.  In 5G MBS, the same gains can be achieved by support this feature. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | 1. Adding general description about how to support 5G MBS coordination among different servers. | | | | | | | | |
|  | |  | | | | | | | | |
| Consequences if not approved: | | Lack of supporting of Multi-server MBS session coordination | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 7.X.2.Y (new), 7.X.2.Z (new), 7.X.3.Z (new), 7.X.2.Z.1 (new), 7.X.2.Z.2 (new), 7.X.2.Z.2.1 (new), 7.X.2.Z.2.2 (new) | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

\* \* \* \* First change \* \* \* \*

#### 7.X.2.Y Discover MBS Session request

The usage of Discover MBS Session request is similar to Discover Bearer request for eMBMS as it defined in 3GPP TS 23.280 [3].

Table 7.X.2.Y-1 describes the information flow discover MBS session request from the MC service server to another MC service server (MBS session control role).

Table 7.X.2.Y -1: Discover MBS session request

|  |  |  |
| --- | --- | --- |
| Information element | Status | Description |
| List of service area identifiers | M | A list of service area identifier for the applicable MBS session service area. |
| Bandwidth | M | Maximum bandwidth required |
| 5QI | O | Desired 5QI |

#### 7.X.2.Z Discover MBS Session response

The usage of Discover MBS Session response is similar to Discover Bearer response for eMBMS as it defined in 3GPP TS 23.280 [3].

Table 7.X.2.Z -1 describes the information flow discover MBS session response from an MC service server (MBS session control role) to the MC service server.

Table 7.X.2.Z -1: Discover MBS session response

|  |  |  |
| --- | --- | --- |
| Information element | Status | Description |
| MBS Session ID(s) | M | List of MBS session IDs and related information |
| List of service area identifiers | M | A list of service area identifiers for the applicable MBS session service areas, corresponding to the listed MBS session IDs, over which the request was successful. |
| Frequency | O | Identification of the frequency if multi-carrier support is provided |
| 5QI | O | 5QI information used by the ProSe UE-Network relay to determine the ProSe per-packet priority value to be applied for the multicast packets relayed to a remote UE over PC5. |

\* \* \* \* Next change \* \* \* \*

#### 7.X.3.Z Multi-server MBS session coordination

##### 7.X.3.Z.1 General

The motivation and principle of supporting Multi-server MBS session coordination is exactly similar to Multi-server MBMS bearers coordination as described in 3GPP TS 23.280 [3].

NOTE: The procedures in clause 7.x.3.z.2 are only used when MBS session sharing between multiple MC service servers is required. It is up to implementation whether MBS session information sharing amongst multiple MC service servers is used.

##### 7.X.3.Z.2 Procedures

###### 7.X.3.Z.2.1 Broadcast MBS Session coordination independent on broadcasted media

The procedure in this sub clause applies to only broadcast MBS session. The principle and pre-condition is similar with MBMS bearer coordination as defined in TS 23.280.

When two or more MC service servers are serving users in the same area and are configured to share 5G MBS broadcast sessions for that specific area. The MC service servers may be of the same kind or different kind. The MC service servers are not participating in the same group call, which means that each MC service server broadcast media independently of each other.

Pre-conditions:

- All MC service servers are configured with the contact information of those MC service servers that are configured to take the MBS session control role.



Figure 7.x.3.z.2.1-1: Multiple server MBS procedure

1. The MC service server 1 evaluates whether multicast is desired for each service area in which MC service group members are located, based upon the locations, affiliation status and other factors.

2. The MC service server 1 determines whether another MC service server has already established a broadcast MBS session with coverage for the MBS service area where service are desired. To do this, the MC service server 1 consults a pre-configured list of MC service servers and sends them a discover MBS session request. This request may be sent to several MC service servers.

NOTE: MC service servers of the same type can be configured to discover MBS sessions from a single server. The single server then becomes a centralized entity for MBS session control for the MC service. Similarly, all MC service servers of all types can be configured to discover MBS sessions from a single server. The single server then becomes a centralized MBS session controller for all MC services.

3. The MC service server 2 (MBS session control role) responds with a discover session response indicating whether there is an MBS session available in the specific MBS service area with the requested bandwidth. The discover session response message includes the MBS session ID of the session that is shared between the MC service servers. If the session of interest has insufficient bandwidth, the polling MC service server 1 may resort to unicast, or may allocate another session for the congested area. If a duplicate session is allocated for the same area, the MBS session should not be shared with other servers and may be torn down as soon as the congestion on the original session clears up, in order to conserve resources.

For any MBS service areas not covered by another MC service server, the MC service server 1 prepares to distribute media to those MBS service areas via multicast by setting up a MBS session. The MBS session set up by the MC service server 1 may then become available for other MC service servers (controlling role) for other MC service groups.

4. The MC service server 1 performs the MBS session announcement and the MBS notification handling according relevant procedures specified in this specification. If the MC service server 2 is authorized to receive MBS related location information from the users utilizing the services from MC service server 1, the MC service server 2 may optionally do the MBS session announcement and handling the notifications on behalf of MC service server 1. MBS session notifications shall in this case be sent to both MC service server 1 and MC service server 2.

5. The MC service server 1 sends a media distribution request to the MC service server 2 (MBS session control role). The media distribution request is sent to reserve the specified capacity in the MBS session.

6. MC service server 2 (MBS session control role) sends a media distribution response to the MC service server 1 indicating whether the request can be supported and supplies details about the session.

7. The MC service server 1 establishes a group communication session via the session, informing MBS session connected MC service clients 1 and 2 that a group communication session is about to start on the MBS session. This step is equivalent to MapGroupToSession in MCPTT.

8. MC service client 2 sends media on the uplink to the MC service server 1

9. The MC service server 1 forwards the media to MC service server 2 (MBS session control role).

10. The MC service server 2 (MBS session control role) distributes the media to MBS session served MC service client 1 via multicast.

11. The MC service server 1 sends a media distribution release request, informing the MC service server 2 (MBS session control role) to request the MC service server 2 (MBS session control role) to release the capacity that was reserved in step 5.

12. The MC service server 2 (MBS session control role) respond to the request by sending a media distribution release request.

###### 7.X.3.Z.2.2 MBS session coordination within one group call

The procedure in this sub clause applies to both multicast MBS session and broad MBS session.

The principle is similar to MBMS bearer coordination within one group call as the following:

- It may be used when two MC service servers are serving users in the same area and are configured to share MBS sessions for that specific area. The MC service servers are of the same kind, and the MC service servers may participate in the same group call, and by that have a need to deliver the same content.

Pre-conditions:

- All MC service servers are configured with the contact information of those MC service servers that are configured to take the MBS session control role.



Figure7.X.3.Z.2.2: Multiple server MBS procedure

1. The MC service server 1 evaluates whether multicast is desired for each service area in which MC service group members are located, based upon the locations, affiliation status and other factors.

2. The MC service server 1 determines whether another MC service server has already established a MBS session with coverage for the MBS service area where multicast is desired. To do this, the MC service server 1 consults a pre-configured list of MC service servers and sends them a discover MBS session request. This request may be sent to several MC service servers.

NOTE 1: MC service servers of the same type can be configured to discover MBS sessions from a single server. The single server then becomes a centralized entity for MBS session control for the MC service. Similarly, all MC service servers of all types can be configured to discover sessions from a single server. The single server then becomes a centralized MBS session controller for all MC services.

3. The MC service server 2 (MBS session control role) responds with a discover session response indicating whether there is an MBS session available in the specific MBS service area with the requested bandwidth. The discover session response message includes the ID of the session that is shared between the MC service servers. If the session of interest has insufficient bandwidth, the polling MC service server 1 may resort to unicast, or may allocate another session for the congested area. If a duplicate session is allocated for the same area, the session should not be shared with other servers and may be torn down as soon as the congestion on the original session clears up, in order to conserve resources.

For any MBS service areas not covered by another MC service server, the MC service server 1 prepares to distribute media to those MBS service areas via multicast by setting up a session. The session set up by the MC service server 1 may then become available for other MC service servers (controlling role) for other MC service groups.

4. The MC service server 1 performs the MBS session announcement and the MBS listening reporting according relevant procedures specified in this specification. If the MC service server 2 is authorized to receive MBS related location information from the users utilizing the services from MC service server 1, the MC service server 2 may optionally do the MBS session announcement and handling the listening reports on behalf of MC service server 1. Listening reports shall in this case be sent to both MC service server 1 and MC service server 2.

NOTE 2: Step 1-4 is also performed by MC service server 3, but is not shown in the procedure to make it easier to read.

5. The MC service client 2 initiate a group call that is subject for multicast transmission. In this scenario there are more than one MC service server (i.e. MC service server 1 and MC service server 3) that serves MC service clients that are affiliated to the group, and by that should receive the media in the group call.

6a. The MC service server 1 sends a media distribution request to the MC service server 2 (MBS session control role). The media distribution request includes the MC group identifier. This indicates that the media distribution request is used for this specific group call.

6b. The MC service server 3 sends a media distribution request to the MC service server 2 (MBS session control role). The media distribution request includes the MC group identifier. This indicates that the media distribution request is used for this specific group call.

7a. The MC service server 2 (MBS session control role) sends a media distribution response to the MC service server 1 indicating whether the request can be supported and supplies details about the session. This also includes details on which media stream that should be used for broadcasting the media on the MBS session. This information is used in the MapGroupToSession message sent by the MC service server when setting up the group call.

7b. The MC service server 2 (MBS session control role) sends a media distribution response to the MC service server 3 indicating that the group call is already transmitted on the MBS session by another MC service server. Based on the information, the MC service server 3 could decide to not broadcast media if media is already being broadcasted.

8a. The media is sent from the MC service client 2 to MC service server 1, which is the participating server for the MC service group of the group call.

8b. The media is forwarded to all MC service servers that are serving users that takes part in the group call.

NOTE 3: The figure above does not visualize the participating server for the MC service group and controlling server for the MC service group. The media is sent to all participating servers for the MC service group which are the servers that decide on unicast or multicast transmission.

9. The MC service server 1 forwards the media to MC service server 2 (MBS session control role).

10. The MC service server 2 (MBS session control role) distributes the media to MBS served MC service client 1 via multicast.

11. The MC service server 1 sends a media distribution release request, informing the MC service server 2 (MBS session control role) to request the MC service server 2 (MBS session control role) to release the capacity that was reserved in step 5. The media distribution release request shall only be sent when the group call is terminated.

12. The MC service server 2 (MBS session control role) respond to the request by sending a media distribution release request.

\* \* \* \* End of changes \* \* \* \*