**3GPP TSG-S4 Meeting #117-e *S4-220056***

**Online, , 14th–23rd February 2022** revision of S4aI211271

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| *CR-Form-v12.0* | | | | | | | | |
| **PSEUDO CHANGE REQUEST** | | | | | | | | |
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|  |  | **CR** |  | **rev** |  | **Current version:** |  |  |
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| *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:*** |  | | | | | | | | | |
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| ***Source to WG:*** |  | | | | | | | | | |
| ***Source to TSG:*** |  | | | | | | | | | |
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| ***Work item code:*** |  | | | | |  | ***Date:*** | | |  |
|  |  | | | |  | |  | | |  |
| ***Category:*** |  |  | | | | | ***Release:*** | | |  |
|  | *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). | | | | | | | |  | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Improve documentation of domain model. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | * Text describing the MBS User Services domain model. * Static domain model figure and explanatory text. * Initial attempt to capture baseline parameters for system entities. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The information required to be exchanged in stage 3 interfaces will not be clearly specified. | | | | | | | | |
| ***Q*** | |  | | | | | | | | |
| ***Clauses affected:*** | | 4.5 | | | | | | | | |
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|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | |  | | |
| ***affected:*** | |  | **X** | Test specifications | | | |  | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | |  | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | S4aI211253 -> S4aI211262 -> S4aI211271->S4-220056 | | | | | | | | |

FIRST CHANGE

## 3.1 Terms

For the purposes of the present document, the terms given in 3GPP TR 21.905 [1], TS 23.501 [2], TS 23.502 [3], TS 23.247 [5] 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].

**Broadcast MBS session:** an MBS session to deliver the broadcast communication service, as defined in TS 23.247 [4].

**distribution method:** a mechanism (comprising the Object Distribution Method and Packet Distribution Method) used by the MBSTF to deliver data to the MBS Client as part of a User Service.

**MBS Application Data Session:** time, protocols and protocol state (i.e. parameters) provided by the MBSTF Client to the MBS-Aware Application.

**MBS Application Service**: an end-user service for which parts or all of the data are accessible by activating the reception of an MBS User Service.

**MBS-Aware Application:** a UE-based application that consumes User Services by invoking with MBS Client APIs.

**MBS Client:** the UE function that consumes User Services defined in the present document.

**MBS Distribution Session:** time, protocols and protocol state (i.e. parameters) which define sender and receiver configuration and which use an MBS Session for the delivery of an MBS User Data Ingest Session.

**MBS Session:** a multicast session or a broadcast session, as defined in TS 23.247 [4].

**MBS User Service:** an abstract transport-level service configured by the MBSF and using one or more MBS Distribution Sessions, possibly in combination with unicast, for the purpose of supporting an MBS-Aware Application via a set of APIs that allows the MBS Client to activate and deactivate reception of the MBS Session.

**MBS User Data Ingest Session:** time, protocols and protocol state (i.e. parameters) provided by an MBS Application Provider for distribution over an MBS User Service, and provided to the MBS-Aware Application as an MBS Application Data Session.

**MBS**

**User**control of an MBS User Service by an MBS-Aware Application interacting with an MBSF Client.

**User**provisioning of an MBS User Service in the MBSF by an MBS Application Provider.

**MBS User Service Session:** an instance of an MBS User Service.

**Multicast MBS session:** an MBS session to deliver the multicast communication service, as defined in TS 23.247 [4].

**Object Distribution Method:** the delivery method supporting real-time and non-real-time distribution of discrete binary objects, including media segments, to MBS Clients as part of an MBS Session.

**Packet Distribution Method:** the distribution method supporting transparent delivery of Application Data Units to MBS Clients as part of an MBS Session.

SECOND CHANGE

## 4.5 Domain model

### 4.5.1 User Services domain model

The domain model for MBS User Services addresses different service and session concepts that are established between the different functional entities of the MBS User Services architecture, as shown in figure 4.5.1‑1.



Figure 4.5.1-1: MBS User Services domain model

In the above figure:

1. The MBS Application Provider initiates *MBS User Service Provisioning* with the MBSF to provision an *MBS User Service*.

2. Subsequently, the MBS Application Provider provisions a number of time-bound MBS User Data Ingest Sessions within the scope of the newly provisioned MBS User Service, also by means of MBS User Service Provisioning.

When the current time enters the time window of a provisioned MBS User Data Ingest Session:

3. The MBSF establishes an *MBS User Service Session* of the parent MBS User Service by establishing an MBS Session in the MBS System. The reception parameters of the MBS Session are advertised in an MBS User Service Announcement, as defined in clause 4.5.2 below. The MBS User Service Announcement is optionally passed back to the MBS Application Provider by means of MBS User Service Provisioning (see step 7bis).

4. The MBSTF establishes an *MBS User Data Ingest Session* between itself and the MBS Application Provider for the purpose of ingesting objects or packets, according to the type of distribution method provisioned.

5. The MBSTF establishes an *MBS Distribution Session* and begins to transmit objects or packets on it according to the configured distribution method as and when they are available from the MBS User Data Ingest Session.

When an MBS User Service is established:

6: The MBS-Aware Application instructs the MBSF Client to activate an MBS User Service by means of *MBS User Service Control*.

7. The MBSF Client may acquire the MBS User Service Announcement from the MBSF via the MBS User Service [or via the MBS Distribution Session] and pass selected application-facing parameters (such as the service class and service names) up to the MBS-Aware Application by means of *MBS User Service Control*.

7bis. Alternatively, the MBS User Service Announcement may be made available to the MBS Application Provider, in which case the MBS-Aware Application obtains it via an application-private *MBS Application Service* and then provides it to the MBSF Client by means of MBS User Service Control.

8. The MBS-Aware Application selects the announced MBS User Service via MBS User Service Control and, as a result, the MBSF Client activates reception of the corresponding MBS Distribution Session in the MBSTF Client.

9- An *MBS Application Data Session* is established between the MBSTF Client and the MBS-Aware Application to supply the latter with received (and possibly repaired) user data.

### 4.5.2 Static information model

Figure 4.5.2‑1 shows how the different service and session concepts depicted in figure 4.5.1‑1 above relate to each other. In this figure:

1. The MBS Application Provider provisions the parameters of a new MBS User Service by invoking the Nmbsf service either directly, or via the NEF.

2. The MBS Application Provider provisions a number of time-bound MBS User Data Ingest Sessions within the scope of the MBS User Service by invoking the Nmbsf service either directly, or via an equivalent service provided by the NEF. Each MBS User Data Ingest Session includes the details of one or more MBS Distribution Sessions. The MBSF provisions additional MBS Distribution Session parameters (denoted in table 4.5.6‑1 as assigned by the MBSF) and exposes some of them back to the MBS Application Provider (as indicated by the NOTE to table 4.5.6‑1).

[3. The MBS Application Provider may additionally provision an MBS Consumption Reporting Configuration within the scope of the MBS User Service by invoking the Nmbsf service either directly, or via the NEF.]

Shortly before the current time enters the time window of a provisioned MBS User Data Ingest Session:

4. The MBSF provisions an MBS Session in the MBS System by invoking the Nmbsmf service on the MB‑SMF (see clause 9 of TS 23.247 [5]) to allocate a TMGI (if one has not already been allocated) for each MBS Distribution Session and to create an MBS Session Context for each one. In response, the MB-SMF provides the MB-UPF ingest information (specifically, the MB‑UPF tunnel endpoint address and traffic flow information to be used by the MBSTF) to the MBSF.

5. The MBSF provisions an MBS Distribution Session in the MBSTF by invoking the Nmbstf service at reference point Nmb2 using the parameters from the newly created MBS Session Context.

6. Using the parameters from the MBS Distribution Session and from the newly created MBS Session Context, the MBSF compiles an MBS User Service Announcement to advertise the availability of the MBS User Service.



NOTE: Parameters not exposed to the MBS Application Provider via the Nmbsf service at reference point Nmb10 are annotated with the dagger symbol †.

Figure 4.5.2-1: MBS User Services static information model

### 4.5.3 Parameters for MBS User Service

This entity models an MBS User Service, as provisioned by the MBS Application Provider and as managed by the MBSF. The baseline parameters of an MBS User Service are listed in table 4.5.3‑1 below:

Table 4.5.3‑1: Baseline parameters for MBS User Service

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Cardinality | Assigner | Description |
| User Service Identifier | 1..1 | MBSF | A unique identifier for this MBS User Service in the MBSF. |
| External service identifiers | 1..\* | MBS Application Provider | A unique identifier for this MBS User Service that is also present in the MBS User Service Announcement.  If assigned in a globally unique manner, this identifier may be useful in correlating this MBS User Service with the same service delivered by a different system. |
| Service class | 1..1 | The class of this MBS User Service, expressed as a term identifier from a controlled vocabulary. |
| Service announcement modes | 1..\* | Determines whether the MBS User Service Announcement compiled by the MBSF is advertised to the MBSF Client at reference point MBS‑5[, or advertised to the MBSF Client via the MBS Session] or passed back to the MBS Application Provider. |
| Target service areas | 0..\* | The service areas in which this MBS User Service is to be made available. |
| Service names | 1..\* | A set of distinguishing names for this MBS User Service, one per language. |
| Service descriptions | 1..\* | A set of descriptions of this MBS User Service, one per language. |
| Service language | 0..1 | The main language of this MBS User Service. |

MBS User Data Ingest Sessions (see clause 4.5.5) are separately provisioned within the scope of an MBS User Service. It is valid for an MBS User Service to have no MBS User Data Ingest Sessions currently provisioned.

[An MBS Consumption Reporting Configuration (see clause 4.5.4 below) may be separately provisioned within the scope of an MBS User Service.]

### 4.5.4 Parameters for MBS Consumption Reporting Configuration

Editor’s Note: Consumption reporting for MBS User Services is for future study.

### 4.5.5 Parameters for MBS User Data Ingest Session

This entity models an MBS User Data Ingest Session, as provisioned by the MBS Application Provider and as managed by the MBSF. The baseline parameters for an MBS User Data Ingest Session are listed in table 4.5.5‑1 below:

Table 4.5.5‑1: Baseline parameters for MBS User Data Ingest Session

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Cardinality | Assigner | Description |
| Data Ingest Session Identifier | 1..1 | MBSF | An identifier for this MBS User Data Ingest Session that is unique in the scope of the parent MBS User Service (see clause 4.5.3). |
| Start date–time | 0..1 | MBS Application Provider | The point in time at which this MBS User Data Ingest Session begins.  If omitted, the session is assumed to have already begun. |
| End date–time | 0..1 | The point in time at which this MBS User Data Ingest Session ends.  If omitted, the session is assumed to continue indefinitely. |

The MBS User Data Ingest Session is composed of one or more MBS Distribution Sessions (see clause 4.5.6 below) and these shall be provisioned in the same operation as the enclosing MBS User Data Ingest Session. It is not valid for an MBS User Data Ingest Session to have no MBS Distribution Sessions defined.

### 4.5.6 Parameters for MBS Distribution Session

This entity models an MBS Distribution Session, as provisioned by the MBS Application Provider and as managed by the MBSF. This MBSF subsequently uses this information to provision a corresponding MBS Distribution Session in the MBSTF.

The baseline parameters for an MBS Distribution Session that are common to all distribution methods are listed in table 4.5.6‑1 below. All parameters are exposed to the MBS Application Provider except where noted otherwise.

Table 4.5.6‑1: Baseline parameters for MBS Distribution Session

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Cardinality | Assigner | Description |
| Distribution Session Identifier | 1..1 | MBSF | An identifier for this MBS Distribution Session that is unique within the scope of the MBS User Service (see clause 4.5.3). |
| State | 1..1 | The current state of the MBS Distribution Session: INACTIVE, ESTABLISHED, ACTIVE or DEACTIVATING. |
| MBS Session Context | 1..1 | As defined in clause 6.9 of TS 23.247 [5] (see NOTE). |
| MB‑UPF tunnel endpoint address | 1..1 | The tunnel endpoint address of the MB‑UPF that supports this MBS Distribution Session at reference point Nmb9 (see NOTE). |
| MB‑UPF traffic flow information | 1..1 | Details of the traffic flow to be used by the MBSTF for this MBS Distribution Session, including the multicast group destination address and port number (see NOTE). |
| QoS information | 1..1 | MBS Application Provider | A 5G QoS Identifier (5QI) [?] to be applied to the traffic flow for this MBS Distribution Session. |
| Maximum bit rate | 1..1 | The maximum bit rate for this MBS Distribution Session. |
| Maximum delay | 0..1 | The maximum end-to-end distribution delay that is tolerated for this MBS Distribution Session by the MBS Application Provider. |
| Distribution method | 1..1 | The distribution method for this MBS Distribution Session, as defined in clause 6. |
| Distribution operating mode | 0..1 | The operating mode in the case where multiple modes are defined in clause 6 for the indicated distribution method. |
| FEC configuration | 0..1 | Configuration for FEC information added by the MBSTF to protect this MBS Distribution Session. |
| NOTE: Internal parameter not exposed to the MBS Application Provider. | | | |

An MBS User Service Announcement (see clause 4.5.7 below) shall be associated with an MBS Distribution Session when the latter is in the ESTABLISHED or ACTIVE state.

The following MBS Distribution Session parameters are additionally relevant when the distribution method is the Object Distribution Method:

Table 4.5.6‑2: Additional MBS Distribution Session parameters for Object Distribution Method

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Cardinality | Assigner | Description |
| Object acquisition method | 1..1 | MBS Application Provider | Indicates whether the objects(s) are to be pushed into the MBSTF by the MBS Application Provider or whether they are to be pulled from the MBS Application Provider by the MBSTF. |
| Object acquisition identifiers | 1..1 | Identifies the object(s) to be ingested and distributed by the MBSTF during this MBS Distribution Session.  This could be the ingest URL of the object, or the ingest URL of a manifest describing a set of objects, or a reference into a manifest describing a set of objects. |
| Content ingest base URL | 0..1 |  |
| Content distribution base URL | 0..1 |  |

The following parameters are additionally relevant when the distribution method is the Packet Distribution Method:

Table 4.5.6‑3: Additional MBS Distribution Session parameters for Packet Distribution Method

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Cardinality | Assigner | Description |
| MBSTF tunnel endpoint address | 1..1 | MBSF | An endpoint address to which an MBS Application Provider establishes a unicast tunnel at reference point Nmb8 prior to the commencement of this MBS User Data Ingest Session. |
| MBSTF traffic flow information | 1..1 | Details of the User Plane data traffic flow to be used by the MBS Application Provider for this MBS Distribution Session, including the multicast group destination address and port number. |

### 4.5.7 Parameters for MBS User Service Announcement

This entity models an MBS User Service Announcement, which is compiled by the MBSF and used to advertise the current or imminent availability of an MBS User Service in the MBS System. The baseline parameters for an MBS User Service Announcement are listed in table 4.5.7‑1 below:

Table 4.5.7‑1: Baseline parameters for MBS User Service Announcement

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Cardinality | Assigner | Description |
| Temporary Mobile Group Identifier | 1..1 | MB‑SMF | The Temporary Mobile Group Identifier (TMGI) of the MBS Session supporting this MBS User Service. |
| External service identifiers | 1..\* | MBS Application Provider | A unique identifier used by the MBSF Client to distinguish between MBS User Services.  If assigned in a globally unique manner, this identifier may be useful to the MBSF Client in correlating the MBS User Service with the same service delivered by a different system. |
| Service class | 1..1 | The class of the MBS User Service, expressed as a term identifier from a controlled vocabulary. |
| Start date–time | 0..1 | The point in time from which this MBS User Service Announcement is valid.  If not present, the announcement is already valid. |
| End date–time | 0..1 | The point in time after which this MBS User Service Announcement is no longer valid.  If not present, the announcement is valid indefinitely. |
| Service names | 1..\* | A set of distinguishing names for the MBS User Service, one per language. |
| Service descriptions | 1..\* | A set of descriptions of the MBS User Service, one per language. |
| Service language | 0..1 | The main language of the MBS User Service. |
| Distribution method | 1..1 | The distribution method for this MBS User Service, as defined in clause 6. |
| Distribution operating mode | 0..1 | The operating mode in the case where multiple modes are defined in clause 6 for the indicated distribution method. |
| Session Description parameters[ ] | 1..1 | MBSF | Additional parameters needed to receive the MBS Session supporting this MBS User Service, including relevant User Plane traffic flow parameters. |

END OF CHANGES