**3GPP TSG- SA4 Meeting #119e *S4-220691***

**Electronic Meeting, 11th to 20th May 2022** revision of S4-220532

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| *CR-Form-v12.2* | | | | | | | | |
| **draft CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **26.502** | **CR** |  | **rev** | **-** | **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:*** | [5MBUSA]: Clarification of Nmb8 Protocol stacks wrt Unicast or Multicast usage. | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** |  | | | | | | | | | |
| ***Source to TSG:*** | S4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | 5MBUSA | | | | |  | ***Date:*** | | | <Res\_date> |
|  |  | | | |  | |  | | |  |
| ***Category:*** | F |  | | | | | ***Release:*** | | | *Rel-17* |
|  | *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-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
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| ***Reason for change:*** | | SA2 has identified one issue on the deployment model in Annex A.5, which needed clarification. Questions by CT3 identified the need to clarify and correct the Nbm8 user plane ingest examples. | | | | | | | | |
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| ***Summary of change:*** | | Annex A.5 is corrected by clarifying the “MBSF / MBSTF like” functions. Annex B usage of IP multicast and / or IP unicast at the Nmb8 interface is clarified. It is further clarified, which function is responsible for allocating addresses and ports for the ingest. | | | | | | | | |
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| ***Consequences if not approved:*** | | Ambiguities in specifications lead to implementation and interoperability issues | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | A.5, B.3 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  |  | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  |  | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  |  | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

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

# A.5 MBSF/MBSTF-like functions in External DN

Figure A.5-1 depicts a transport-only deployment in which the MBS Application Provider (AF/AS) hosts an "MBSF-like" function that mimics the MBSF at reference point MBS-5 and an "MBSTF-like" function that mimics the MBSTF at reference point MBS-4-MC. """"""

1. The "MBSF-like" function provisions MBS Services in the MB‑SMF via the Nnef service at reference point N33.

2 The MBS Application Provider (AF/AS) uses an "MBSTF-like" function to produce packet data compliant with reference point MBS‑4‑MC. The packets are injected directly into the MB-UPF at reference point N6mb (not shown).

3. An MBS Application Provider (AF/AS) in an External DN uses an "MBSF-like" function to generate a Service Announcement for MBS User Services.

4. The MBS Application Provider (AF/AS) makes object repair available from an "MBS AS-like" function that is compliant with reference point MBS‑4‑UC.



NOTE: Italic type is used to annotate service-based interfaces.

Figure A.5-1: Deployment with MBSF/MBSTF-like functions in External DN

\*\*\*\* Next Change \*\*\*\*

Annex B (informative):  
Nmb8 User Plane ingest examples

# B.1 General

This annex provides an overview of the different Nmb8 User Plane protocol stacks for the distribution methods defined in clause 6. The distribution method is selected and configured at reference point Nmb2 based on Nmb10 provisioning.

# B.2 Object Distribution Method

## B.2.1 Object Distribution Method with pull-based ingest

Figure B.2.1-1 illustrates a setup in which the MBS Application Provider (AF/AS) provides an object manifest to the MBSF listing the URLs of objects to be ingested and distributed. This is passed to the MBSTF at reference point Nmb2, and the MBSTF then fetches these objects using HTTP. The MBSTF handles all MBS-related complexity, e.g. converting the HTTP message payload into an IP multicast suitable protocol, adding AL-FEC, etc. The AF/AS delegates to the MBSF the delivery of MBS Service Announcement metadata to the MBS Client (i.e. IP multicast protocol details, etc).



Figure B.2.1-1: Object Distribution Method using Pull ingest mode (HTTP GET)

The following Parameters are used by the MBS Application Provider (AF/AS) at reference point Nmb10 to provision this setup:

*- Distribution method* is set to *Object*.

*- Operating mode* is set to *OBJECT\_SINGLE* or *OBJECT\_COLLECTION*or *OBJECT\_CAROUSEL*or *OBJECT\_STREAMING*, as appropriate.

- *OBJECT\_SINGLE*: The *Object acquisition identifiers* refers to a single object.

- *OBJECT\_COLLECTION*: The *Object acquisition identifiers* refers to a manifest here, which describes the set of objects to be distributed once.

- *OBJECT\_CAROUSEL*: The *Object acquisition identifiers* refers to a manifest here, which describes the set of objects and their repetition and update pattern.

- *OBJECT\_STREAMING*: The *Object acquisition identifiers* refers to a presentation manifest here like a DASH MPD. The MBSTF is pulling the objects according to the presentation manifest.

## B.2.2 Object Distribution Method with push-based ingest

Figure B.2.2-1 illustrates a setup in which the MBS Application Provider (AF/AS) pushes objects directly into the MBSTF at Nmb8 using HTTP PUT. The MBSTF handles all MBS-related complexity, e.g. converting the HTTP message payload into an IP multicast suitable protocol, adding AL-FEC, etc. The AF/AS delegates MBS delivery of Service Announcement metadata destined for the MBS Client (i.e. DASH MPD, IP multicast protocol details, etc.) to the MBSTF via MBSF.



Figure B.2.2-1: Object Distribution Method using Push ingest mode (HTTP PUT)

The following MBS Distribution Session properties are used by the MBS Application Provider (AF/AS) at reference point Nmb10 to provision this setup:

*- Distribution method* is set to *Object*.

*- Operating mode* is set to *OBJECT\_SINGLE* or *OBJECT\_STREAMING*, as appropriate.

- *OBJECT\_SINGLE*: Each pushed object is distributed once.

- *OBJECT\_COLLECTION*: Not used.

- *OBJECT\_CAROUSEL*: Not used.

- *OBJECT\_STREAMING*: Each pushed object is distributed once.

- The *Object acquisition identifiers* containshere the Push base URL, which is used to ingest objects. The MBSF provides the *Push base URL* (property specific to the distribution method) to the MBS Application Provider (AF/AS).*- Distribution base URL* contains the base URL for the objects. The MBSF replaces the Push base URL part of the object ingest URL with the value of the *Distribution base URL* for inclusion in FLUTE FDT instance(s) and (in some cases) in the Service Announcement.

# B.3 Packet Distribution Method

## B.3.1 Proxy mode

Figure B.3.1-1 illustrates a setup in which the MBS Application Provider (AF/AS) injects UDP datagrams directly into the MBSTF at reference point Nmb8. The MBSTF handles all MBS-related functions, e.g. applying the packet distribution methods processing UDP datagram headers and/or the IP packet headers, as required for distribution. The MBSTF is not required to process the UDP payload of packets ingested at reference point Nmb8.



Figure B.3.1-1: Packet Distribution Method using Proxy mode

The following MBS Distribution Session properties are used by the MBS Application Provider (AF/AS) at reference point Nmb10 to provision this setup:

*- Distribution method* is set to *Packet.*

*- Operating mode* is set to *Proxy.*

*- Packet ingest method* is set to *Multicast* or *Unicast*.- When the *Packet ingest method* indicates *Multicast ingest*, then either the MBS Application Provider (AF/AS) nominates the multicast IP address and UDP port(s) to be used for reception at reference point Nmb8, or else the MBSF allocates these values.

- When the *Packet ingest method* indicates *Unicast ingest*, the MBSTF allocates a UDP reception port for use at reference point Nmb8 and provides the reception UDP port together with the reception IP address to the MBS Application Provider (AF/AS) via the MBSF.

A unicast ingest packet delivery protocol is established at reference point Nmb8 that allows the control of the unicast stream.

The MBSTF processes the UDP packet payloads received by the Packet ingest subfunction and creates MBS-4-MC packets as described in clause 4.3.3.3. The MBSTF encapsulates these packets into the Nmb9 tunnel.

- The MBSF nominates the MBS-4-MC multicast group destination IP address and UDP ports to be used inside the Nmb9 unicast tunnel in the *User plane traffic flow information*.

## B.3.2 Forward-only mode

Figure B.3.2-1 illustrates a setup in which the MBS Application Provider (AF/AS) injects multicast IP packets encapsulated in a unicast UDP/IP tunnel directly into the MBSTF. The MBSTF decapsulates the multicast IP packets from the tunnel and forwards them unmodified to the MBS Session at reference point Nmb9.



Figure B.3.2‑1: Packet Distribution Method using Forward-only mode

The following MBS Distribution Session properties are used by the MBS Application Provider (AF/AS) at reference point Nmb10 to provision this setup:

*- Distribution method* is set to *Packet.*

*- Operating mode* is set to *Forward-only.*

*- Packet ingest method* is set to *Unicast*.

- *User plane traffic flow information* is omitted because ingested multicast packets are not modified.

The MBSTF provides the *MBSTF ingest endpoint addresses* via the MBSF to the MBS Application Provider (AF/AS) so that it can establish the UDP/IP tunnel with the MBSTF and start sending tunnelled IP packets.

A unicast ingest packet delivery protocol is established at reference point Nmb8 that allows the control of the unicast stream.

The MBSTF Packet ingest subfunction receives ready-made multicast UDP/IP packets from the MBS Application Provider (AF/AS) at reference point Nmb8.

- When no *FEC configuration* is provided, the MBSTF pushes the packets into the Packet scheduling subfunction (see clause 4.3.3.3). The MBSTF encapsulates these packets into the Nmb9 tunnel for transmission to the MB‑UPF.

- When an *FEC configuration* is provided, the MBSTF parses deep into the UDP payload to create AL-FEC redundancy. Source block marking is appended to source packets and the packet length fields are adjusted in UDP and IP headers. AL-FEC redundancy is inserted into the stream according to the *FEC configuration*. The resulting packets are handled by the Packet scheduling subfunction (see clause 4.3.3.3). The MBSTF encapsulates these packets into the Nmb9 tunnel.

\*\*\*\* Last Change \*\*\*\*