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# Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

3 or greater indicates TSG approved document under change control.

y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z the third digit is incremented when editorial only changes have been incorporated in the document.

In the present document, modal verbs have the following meanings:

**shall** indicates a mandatory requirement to do something

**shall not** indicates an interdiction (prohibition) to do something

The constructions "shall" and "shall not" are confined to the context of normative provisions, and do not appear in Technical Reports.

The constructions "must" and "must not" are not used as substitutes for "shall" and "shall not". Their use is avoided insofar as possible, and they are not used in a normative context except in a direct citation from an external, referenced, non-3GPP document, or so as to maintain continuity of style when extending or modifying the provisions of such a referenced document.

**should** indicates a recommendation to do something

**should not** indicates a recommendation not to do something

**may** indicates permission to do something

**need not** indicates permission not to do something

The construction "may not" is ambiguous and is not used in normative elements. The unambiguous constructions "might not" or "shall not" are used instead, depending upon the meaning intended.

**can** indicates that something is possible

**cannot** indicates that something is impossible

The constructions "can" and "cannot" are not substitutes for "may" and "need not".

**will** indicates that something is certain or expected to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document

**will not** indicates that something is certain or expected not to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document

**might** indicates a likelihood that something will happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

**might not** indicates a likelihood that something will not happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

In addition:

**is** (or any other verb in the indicative mood) indicates a statement of fact

**is not** (or any other negative verb in the indicative mood) indicates a statement of fact

The constructions "is" and "is not" do not indicate requirements.

# 1 Scope

The present document defines an architecture and high-level procedures for User Services conveyed using the 5G multicast–broadcast capabilities of the 5G System defined in TS 23.501 [2], TS 23.502 [3] and TS 23.247 [5].

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 23.501: "System architecture for the 5G System (5GS)".

[3] 3GPP TS 23.502: "Procedures for the 5G System (5GS)".

[4] 3GPP TS 23.503: "Policy and charging control framework for the 5G System (5GS); Stage 2".

[5] 3GPP TS 23.247: "Architectural enhancements for 5G multicast-broadcast services; Stage 2".

[6] 3GPP TS 26.348: "Northbound Application Programming Interface (API) for Multimedia Broadcast/Multicast Service (MBMS) at the xMB reference point".

[7] 3GPP TS 23.246: "Multimedia Broadcast/Multicast Service (MBMS); Architecture and functional description".

# 3 Definitions of terms, symbols and abbreviations

## 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].

**delivery method:** a mechanism used by the MBSTF to deliver data as part of a User Service to the MBS Client.

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

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

**Object delivery 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.

**Transparent delivery method:** the delivery method supporting transparent distribution of Application Data Units to 5MBS Clients as part of an MBS session.

**User Service:** an abstract high-level usage of an MBS session for the purpose of supporting an application that presents a complete service offering to an MBS-Aware Application via a set of APIs that allows the MBS Client to activate and deactivate reception of the MBS session.

## 3.2 Symbols

Void.

## 3.3 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1], TS 23.501 [2], TS 23.502 [3], TS 23.247 [4] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

MBS Multicast–Broadcast Services

MB‑SMF Multicast–Broadcast Session Management Function

MB‑UPF Multicast–Broadcast User Plane Function

MBSF Multicast–Broadcast Service Function

MBSTF Multicast–Broadcast Service Transport Function

PCF Policy and Charging Function

NEF Network Exposure Function

UE User Equipment

# 4 Reference architecture for 5G Multicast–Broadcast User Services

## 4.1 General

This clause defines a reference architecture for 5G Multicast–Broadcast User Services, including the logical functions involved and the logical reference points between them.

## 4.2 System description

Editor’s Note: Explanation of fundamental concepts in the MBS User Services architecture.

### 4.2.1 Network architecture

Editor’s Note: How this specification relates to the SA2 architecture in TS 23.247.

### 4.2.2 User Service architecture

Editor’s Note: Introduction to MBS User Services and how they are manifested in the MBSF and MBSTF.

### 4.2.3 Delivery methods

Editor’s Note: Explanation of what a delivery method is and what delivery methods are for.

## 4.3 Functional entities

Editor’s Note: Reference architecture for MBS User Services, including client functions.

### 4.3.1 General

The MBSF and MBSTF offer service layer functionality for sending data via MBS Sessions. The MBSTF acts as a media anchor and sources the IP multicast traffic. The MBSF offers control plane functionality while the MBSTF offers user plane functionality. A new interface Nmb2 is introduced between the control and user plane functions.

The MBSF and MBSTF offer MB2 and xMB reference points for legacy support.

### 4.3.2 MBSF

The functionality of the MBSF is defined in clause 5.3.2.11 of TS 23.247 [5]. It receives provisioning and control commands either directly at reference point Nmb10 or (via the NEF) at reference point Nmb5. If the MBSTF is deployed, it is controlled by the MBSF. The MBSF invokes MBS Session operations on the MB-SMF at reference point Nmb1.

The present document further elaborates the control plane functionality to support MBS User Services as follows:

- Generating the Service Announcement for the MBS Session.

- Controlling the Service Announcement delivery if the Service Announcement is delivered by the MBSF (SACH).

- Monitoring the status of ancillary information and controlling the In-band ancillary information delivery if ancillary information is changed and the MBSTF is used.

Editor’s Note: Usage of QoS is FFS

### 4.3.3 MBSTF

#### 4.3.3.1 General

The functionality of the MBSF is defined in clause 5.3.2.12 of TS 23.247 [5]. It receives User Plane traffic at reference point Nmb8 and sends MBS data traffic via reference point Nmb9.

NOTE: The MBSTF may not be present in all deployments of the MBS System.

The present document further elaborates the user plane functionality to support MBS User Services as follows:

- Multicast delivery of input objects for the Object distribution method.

- Multicast delivery of input packet as packets sequencing for the Packet distribution method.

- Multiplexing of in-band ancillary information.

- Carousel delivery control for Object distribution method.

- Sending notification events to the MBSF, i.e. cannot receive the input data, session terminated, delivery started.

#### 4.3.3.2 MBSTF subfunctions to support Object distribution

Details about the MBSTF subfunctions for supporting Object Distribution is given in Figure 4.3.3.2-1.



Figure 4.3.3.2-1 MBSTF architecture overview for Object distribution method

The Object ingest subfunction supports:

- Pull based ingest over Nmb8: The Object Ingest function fetches one or more objects using HTTPS from an AF/AS.

- Push based ingest over Nmb8: The Object Distribution Ingestion function receives one or more objects using HTTPS from an AF/AS.

The Object segmentation subfunction supports the partitioning of an object into suitable payload units for MBS transmission.

The optional Application Level FEC subfunction supports calculation of FEC redundancy.

The Packetization subfunction creates (based input) transmission packets

The Packet Scheduler subfunction supports:

- Encapsulation and transmission of Object distribution PDUs into Nmb9 SDUs.

- Schedules the outgoing data stream according to target bit rate configuration.

The control subfunction offers support for MBSTF service configuration and service notifications.

#### 4.3.3.3 MBSTF subfunctions to support Packet distribution

Details about the MBSTF subfunctions for supporting Packet Distribution is given in Figure 4.3.3.3-1.



Figure 4.3.3.3-1: MBSTF architecture overview for Packet distribution method

The Packet ingest subfunction supports the reception of a packet sequence from authorized sources.

The optional Application Level FEC subfunction supports calculation of FEC redundancy.

The Packetization subfunction creates (based input) transmission packets. Ingested packets may get reformatted suitable for MBS transmission.

The Packet Scheduler subfunction supports

- Encapsulation and transmission of Packet Distribution PDUs into Nmb9 SDUs.

- Schedules the outgoing data stream according to target bit rate configuration.

The control subfunction offers support for MBSTF service configuration and service notifications.

### 4.3.4 MBS AS

The MBS AS performs the following functions to support MBS User Services:

- Providing the byte-range file repair service for the Object distribution method.

- Providing the packet repair service for the Packet distribution method.

Editor’s Note: The Reception Reporting Service is FFS. In principle, the Reception Reporting is used by the Network Operators to analyse the packet loss rate (Block Error Rates - BLER), and the main target is to adjust the FEC redundancy level to leverage the FEC redundancy level and radio frequency usage efficiency.

### 4.3.5 MBS Client

The MBS Client is part of the UE. The functionality of the UE is defined in clause 5.3.2.8 of TS 23.247 [5].

The MBS Client performs the following functions to support MBS:

- Reception of IP multicast data using either MBS Multicast or MBS Broadcast.

- MBS services exposure towards a 5MBS-aware Application.

- Unicast recovery of the application payload data carried in multicast/broadcast packets that are not successfully received via MBS-4, if unicast repair is configured.

- Using AL-FEC repair to the received packets if FEC is used,

Editor’s Note: Handling the roaming is FFS.

## 4.4 Reference points and interfaces

Editor’s Note: Description of the reference points.

## 4.4 Domain model

Editor’s Note: The static domain model for services and sessions.

## 4.5 Life-cycle model

Editor’s Note: State charts explaining the dynamics of MBS User Services.

## 4.6 QoS model

Editor’s Note: How MBS User Services make use of the network Quality of Service primitives defined by SA2 is TS 23.247.

## 4.7 Security

Editor’s Node: How MBS User Services makes use of the security primitives studied by SA3 in TR 33.850.

# 5 Procedures for 5G Multicast–Broadcast User Services

## 5.1 General

This clause defines the high-level procedures for 5G Multicast–Broadcast User Services.

## 5.2 High-level baseline procedures

## 5.3 Procedures for User Service discovery/announcement

## 5.4 Procedures for User Service initiation/termination

## 5.5 Procedures for User Service data transfer

## 5.6 Associated delivery procedures

# 6 MBS User Services Delivery Methods

## 6.1 Object Delivery Method

## 6.2 [Packet/Transparent] Delivery Method

# 7 MBS User Services Ingest Procedures

## 7.1 General

Editor Notes: for the AF/AS, it is better to hide the 5GC technology (for example TMGI, session, MBS bearer etc.), and just encapsulate them as the service, for example file download service, Live streaming service, Group Communication Service. The AF/CP will just configure the service(s) and service related properties to the MBSF.

## 7.1 Provision a File Delivery service



Figure 7.1-1: File Delivery procedure

## 7.2 Provision a Live Streaming service



Figure 7.2‑1: Live Streaming delivery Procedure

# 8 Network Function Services

## 8.1 General

## 8.2 MBSF Services

### 8.2.1 General

The following table illustrates the MBSF Services for MBS.

Table 8.2-1: NF services provided by MBSF

|  |  |  |  |
| --- | --- | --- | --- |
| Service Name | Service Operations | OperationSemantics | Example Consumer (s) |
| **Nmbsf\_ MBSService** | Create | Request/Response | AF, NEF |
| Get | Request/Response | AF, NEF |
| Update | Request/Response | AF, NEF |
| Delete | Request/Response | AF, NEF |
| **Nmbsf\_ MBSSession** | Create | Request/Response | AF, NEF |
| Get | Request/Response | AF, NEF |
| Update | Request/Response | AF, NEF |
| Delete | Request/Response | AF, NEF |
| StatusSubscribe | Subscribe/Notify | AF, NEF |
| StatusUnsubscribe | AF, NEF |
| StatusNotify | AF, NEF |

Editor’s Note: reuse the legacy xMB-C/MB2-C interface or design a new interface

Editor’s Note: Service exposure to AF is FFS.

### 8.2.2 Nmbsf MBS Service operation

#### 8.2.2.1 Nmbsf\_MBSService\_Create service operation

**Service operation name:** Nmbsf\_MBSService\_Create

**Description:** Create a new multicast service or broadcast service during MBS service configuration.

**Input, Required:** MBS service ID.

**Input, Optional:** Service Name, service language, description, service type, Receive Only Mode, Service Announcement mode, MBS service area, maximum bit rate, Consumption Reporting Configuration.

**Output, Required:** Result Indication.

**Output, Optional:** cause, service properties, Service Announcement fetch URL

#### 8.2.2.2 Nmbsf\_MBSService\_Update service operation

**Service operation name:** Nmbsf\_ MBSService\_Update

**Description:** Update the established multicast service or broadcast service properties.

**Input, Required:** MBS Service ID.

**Input, Optional:** service properties.

**Output, Required:** Result Indication.

**Output, Optional:** Cause.

#### 8.2.2.3 Nmbsf\_MBSService\_Delete service operation

**Service operation name:** Nmbsf\_MBSService\_Delete

**Description:** Release the multicast service or broadcast service.

**Input, Required:** MBS Service ID.

**Input, Optional:** None.

**Output, Required:** Result Indication.

**Output, Optional:** Cause.

#### 8.2.2.4 Nmbsmf\_MBSService\_Get service operation

**Service operation name:** Nmbsf\_MBSService\_Get

**Description:** This service operation is used by the NF/NEF to retrieve the properties of the service.

**Input, Required:** None

**Input, Optional:** MBS Service ID.

**Output, Required:** Result Indication.

**Output, Optional:** Cause, properties of the MBS service(s)

### 8.2.3 Nmbsf MBS Session operation

#### 8.2.3.1 Nmbsf\_MBSSession\_Create service operation

**Service operation name:** Nmbsf\_MBSSession\_Create

**Description:** Create a new multicast session or broadcast session during MBS service configuration. Optionally subscribe to notifications for this MBS session.

**Input, Required:** MBS Service ID, MBS Session ID

**Input, Optional:** session start time, session stop time, MBS service area, maximum bit rate, max delay, Session Type, object delivery session, files, application session, packet delivery proxy mode session, packet delivery forward-only mode session, GC session.

**Output, Required:** Result Indication.

**Output, Optional:** cause, webdavUrl for push mode in object delivery session, webdavUrl for push mode in application session, MBSTF IP address for packet delivery method.

#### 8.2.2.2 Nmbsf\_MBSSession\_Update service operation

**Service operation name:** Nmbsf\_MBSSession\_Update

**Description:** Update the established multicast session or broadcast session, e.g. prolong the MBS session duration, change files, change the MBS service area.

**Input, Required:** MBS Service ID, MBS Session ID

**Input, Optional:** Session properties

**Output, Required:** Result Indication.

**Output, Optional:** Cause.

#### 8.2.2.3 Nmbsf\_MBSSession\_Delete service operation

**Service operation name:** Nmbsf\_MBSSession\_Delete

**Description:** Release the multicast session or broadcast session.

**Input, Required:** MBS Service ID, MBS Session ID

**Input, Optional:** None.

**Output, Required:** Result Indication.

**Output, Optional:** Cause.

#### 8.2.2.4 Nmbsf\_MBSSession\_Get service operation

**Service operation name:** Nmbsf\_MBSSession\_Get

**Description:** This service operation is used by the AF/NEF to retrieve the properties of the session(s).

**Input, Required:** MBS Service ID

**Input, Optional:** MBS Session ID

**Output, Required:** Result Indication.

**Output, Optional:** Cause, properties of the MBS Session(s)

#### 8.2.2.5 Nmbsf\_MBSSession\_StatusSubscribe operation

The Service Operation is used by AF/NEF to subscribe to a status(s) of one service, session, and/or files.

**Service operation name:** Nmb2\_MBSSession StatusSubscribe

**Description:** The Subscribe service operation is invoked by AF/NEF, towards the MBSF, when it needs to create a subscription to monitor at least one event relevant to the service, session and/or file(s). The AF may subscribe to multiple events in a subscription.

**Input, Required:** MBS Service ID, Event ID(s), notification target address.

**Input, Optional:** MBS Session ID

**Output, Required:** When the subscription is accepted: Subscription Correlation ID.

#### 8.2.2.6 Nmbsf\_MBSSession\_StatusUnsubscribe operation

The Unsubscribe service operation is invoked by MBSF, towards the MBSTF, to remove an existing subscription previously created by itself at the MBSTF.

**Service operation name:** Nmb2\_MBSSession StatusUnsubscribe

**Description:** The Unsubscribe service operation is to remove an existing subscription.

**Input, Required:** Subscription Correlation ID.

**Output, Required:** Result Indication.

#### 8.2.2.7 Nmbsf\_MBSSession\_StatusNotify operation

The Notify service operation is invoked by the MBSTF, to send a event notification, towards the notification URI, when certain event included in the subscription has taken place.

**Service operation name:** Nmb2\_MBSSession\_StatusNotify

**Description:** This service operation is used by the MBSTF to notify MBSF about the status change of the session or the status of the file.

**Input, Required:** MBS Service ID, Event ID(s).

**Input, Optional:** MBS Session ID, fileUrl, Status information.

**Output, Required:** Result Indication.

## 8.3 MBSTF Services

### 8.3.1 General

The following table illustrates the MBSTF Services for MBS.

Table 8.3-1: NF services provided by MBSTF

|  |  |  |  |
| --- | --- | --- | --- |
| Service Name | Service Operations | OperationSemantics | Example Consumer (s) |
| **Nmb2\_MBSSession** | Create | Request/Response | MBSF |
| Get | Request/Response | MBSF |
| Update | Request/Response | MBSF |
| Delete | Request/Response | MBSF |
| StatusSubscribe | *Subscribe/Notify* | *MBSF* |
| StatusUnsubscribe | *MBSF* |
| StatusNotify | *MBSF* |

### 8.3.2 Nmb2\_MBSSession service

#### 8.3.2.1 Nmb2\_MBSSession\_Create service operation

**Service operation name:** Nmb2\_MBSSession\_Create

**Description:** Create a new multicast session or broadcast session during MBS session configuration.

**Input, Required:** MBS Session ID

**Input, Optional:** MBS activation time, MBS termination time, QoS flow information, Bandwidth, unicast Address of MB-UPF, TSI if object delivery object is used, IP multicast address is sourced by MBSTF,

**Output, Required:** Result Indication.

**Output, Optional:** Cause, Sourcing of IP Multicast if multicast is used,

#### 8.3.2.2 Nmb2\_MBSSession\_Update service operation

**Service operation name:** Nmb2\_MBSSession\_Update

**Description:** Update a multicast session or broadcast session during MBS session configuration, for example session stop time, object delivery session, application session, packets delivery session, files, and ancillary info of the session.

**Input, Required:** MBS Session ID.

**Input, Optional:** MBS termination time, unicast Address of MB-UPF list, object delivery session, application session, packetsdelivery session, ancillary info of the session.

**Output, Required:** Result Indication.

**Output, Optional:** Cause, additional info (input parameters)

#### 8.3.2.3 Nmb2\_MBSSession\_Delete service operation

**Service operation name:** Nmb2\_MBSSession\_Update

**Description:** delete a multicast session or broadcast session during MBS session configuration

**Input, Required:** MBS Session ID.

**Output, Required:** Result Indication.

**Output, Optional:** Cause.

#### 8.3.2.4 Nmb2\_MBSSession\_get service operation

**Service operation name:** Nmb2\_MBSSession\_Get

**Description:** get a multicast session or broadcast session during MBS session configuration

**Input, Required:** None

**Input, Required:** MBS Session ID

**Output, Required:** Result Indication.

**Output, Optional:** Cause, the properties of MBS session(s)

#### 8.3.2.5 Nmb2\_MBSSession\_StatusSubscribe operation

The Service Operation is used by MBSF to subscribe to a status(s) of one session, and/or files.

**Service operation name:** Nmb2\_MBSSession\_StatusSubscribe

**Description:** The Subscribe service operation is invoked by MBSF, towards the MBSTF, when it needs to create a subscription to monitor at least one event relevant to the delivery session and/or file(s). The MBSF may subscribe to multiple events in a subscription.

**Input, Required:** MBS Session ID, Event ID(s), notification target address.

**Output, Required:** When the subscription is accepted: Subscription Correlation ID.

#### 8.3.2.6 Nmb2\_MBSSession\_StatusUnsubscribe operation

The Unsubscribe service operation is invoked by MBSF, towards the MBSTF, to remove an existing subscription previously created by itself at the MBSTF.

**Service operation name:** Nmb2\_MBSSession\_StatusUnsubscribe

**Description:** The Unsubscribe service operation is to remove an existing subscription.

**Input, Required:** Subscription Correlation ID.

**Output, Required:** Result Indication.

#### 8.3.2.7 Nmb2\_MBSSession\_StatusNotify operation

The Notify service operation is invoked by the MBSTF, to send a event notification, towards the notification URI, when certain event included in the subscription has taken place.

**Service operation name:** Nmb2\_MBSSession\_StatusNotify

**Description:** This service operation is used by the MBSTF to notify MBSF about the status change of the session or the status of the file.

**Input, Required:** MBS Session ID, Event ID(s).

**Input, Optional:** Status information.

**Output, Required:** Result Indication.

Annex A (informative):
Deployment and Collaboration Models

# A.1 Group Communication

Editor’s Note: This section should contain a deployment model for Group Communication.

# A.2 AF/AS in Trusted DN

Figure A.2-1 depicts a deployment with AF/AS within the Trusted DN. The AF/AS uses the Nmbsf API directly. The MBSTF uses the Nmb9 Reference Point for ingesting data into the MB-UPF.



Figure A.2-1: Deployment with AF / AS in Trusted DN

# A.3 AF/AS in external DN

Figure A.3-1 depicts a deployment with AF/AS within the external DN. The AF/AS uses the Nnef (N33) API for accessing MBSF services. The MBSTF uses the Nmb9 Reference Point for ingesting data into the MB-UPF.



Figure A.3-1: Deployment with AF / AS in External DN

# A.4 MBSF/MBSTF-like functions in external DN

Figure A.4-1 depicts a transport-only deployment. Here, an external AF/AS uses an MBSF/MBSTF-like function for producing delivery method data. The MBSF-like function uses Nnef (N33) for accessing MB-SMF services. The MBSTF-like function uses the N6mb Reference Point for ingesting data into the MB-UPF.

The MBSTF-like function produces a data stream, which is compliant with this specification. The 5MBS Client in the UE follows procedures as defined in this specification.



Figure A.4-1: Deployment with AF / AS in External DN

# A.2 5G Media Streaming

Editor’s Note: Reference to TS 26.501.

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 defined distribution methods. (The Nmb2 Control Plane is used to select the distribution method.)

## B.2 Object Distribution Method

### B.2.1 Object Distribtuion Method ingestion with Pull

The AF provides the file URLs to the MBSTF via MBSF and the MBSTF fetches the files 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 delegates the delivery of MBS of Service Announcement Metadata to the MBS Client (i.e. IP multicast protocol details, etc) to the MBSF.

Figure B.2.1-1 illustrates a setup, where the MBSTF pulls files from a File Server. Nmb2 is used to provide the file URLs to the MBSTF.



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

The following Session Properties allow the configuration of thisNmb8 mode:

*- Session type* is set by the AF to Objects.

*- Ingest mode* (property specific to the Session type) is set by the AF to Pull.

- The *Object manifest* (property specific to the Session type) is updated by the AF with object URLs to be fetched and transmitted by the MBSTF. The MBSF updates the Service Announcement according to the Object manifest information.

### B.2.2 Object ingest with Push

The AF pushes the objects into the MBSTF using HTTP. The MBSTF handles all MBMS-related complexity, e.g. converting the HTTP message payload into an IP multicast suitable protocol, adding AL-FEC, etc. The AF delegates the delivery of MBMS of Service Announcement metadata to the MBS Client (i.e. DASH MPD, IP multicast protocol details, etc.) to the MBSTF via MBSF.

Figure B.2.2-1 illustrates a setup in which an AF pushes objects into the MBSTF using HTTP PUT.



Figure B.2.2-1: File Delivery using Push Mode (HTTP PUT)

The following Session Properties allow the configuration of this Nmb8 mode:

*- Session type* is set by the AF to Objects.

*- Ingest mode* (property specific to the Session type) is set by the AF to Push.

- The MBSTF provides the *Push URL* (Session Type specific property) to the AF.

*- Display base URL* contains the base URL for the objects. The MBSF replaces the Push URL part of the URL with the value of the *Display base URL* for inclusion in the FLUTE FDT instance and (in some cases) in the Service Announcement.

## B.3 Packet Distribution Method

### B.3.1 RTP Streaming mode

### B.3.2 Proxy mode

This clause illustrates the various Nmb8 options for Packets Delivery Mode. The MBSTF handles the streams in a proxy mode.

Figure B.3.2-1 illustrates a setup of Packets Delivery Method with Proxy. The Nmb2 is used to provide the necessary information to the MBSTF via MBSF.



Figure B.3.2-1: Packets Delivery Method with Proxy mode

The following Session Properties allow the configuration of this Nmb9 mode:

*- Session type* is set by the AF to *Packet distribution method.*

*- Delivery mode configuration for User Plane* (property specific to Session type) is set by the AF to *Proxy.*

*- Session Description Parameters for User Plane* (property specific to Session type) is set by the AF and contains the UDP flow mapping descriptions.

### B.3.3 Forward-only mode

Figure B.3.3-1 illustrates a setup of Packet distribution method with Forward-Only. Nmb2 is used to provide the necessary information to the MBSTF via MBSF.



Figure B.3.3‑1: Packets Delivery Method with Forward-Only

The following Session Properties allow the configuration of this Nmb9 mode:

*- Session Type* is set by the AF to *Object distribution method.*

*- Delivery mode configuration for User Plane* (property specific to Session type) is set by the AF to *Forward only.*

*- Session Description Parameters for User Plane* (property specific to Session type) is set by the AF and contains the UDP flow mapping descriptions.

Annex <X> (informative):
Change history

|  |
| --- |
| **Change history** |
| **Date** | **Meeting** | **TDoc** | **CR** | **Rev** | **Cat** | **Subject/Comment** | **New version** |
| 2021-07 | Post-SA4#114-e ad hoc | S4aI211206 |  |  |  | Initial skeleton document. | 0.0.1 |
| 2021-09 | SA4#115-e | S4-211270 |  |  |  | Implemented agreements at SA4#115-e | 0.1.0 |