3GPP TSG SA WG 4 Meeting 118-e TDoc S4-220544

Electronic, 6th–14th April 2022

**Title: Response LS on Clarifications on Nmbstf\_MBCDistributionSession service**

**Response to: S4-220489/C4-222300**

**Release: Rel-17**

**Work Item: 5MBUSA**

**Source:** **3GPP SA4**

**To:** **3GPP CT4**

**Cc: 3GPP SA2**

**Contact person: Richard Bradbury**

**richard dot bradbury at bbc dot co dot uk**

**Send any reply LS to: 3GPP Liaisons Coordinator,** [**mailto:3GPPLiaison@etsi.org**](mailto:3GPPLiaison@etsi.org)

**Attachments:** S4-220xxx [dCR to TS 26.502 V17.0.0]

# 1 Overall description

*SA4 provides responses to clarification questions from CT4 concerning the Nmbstf\_MBSDistributionSession service exposed by the MBSTF to the MBSF at reference on Nmb2, and advises CT4 of a forthcoming Change Request to TS 26.502.*

SA4 thanks CT4 for the careful review of TS 26.502 V17.0.0 and is pleased to provide answers below.

In addition, SA4 would like to advise CT4 that it has agreed a draft Change Request to TS 26.502 during its SA4#118-e meeting. This will be progressed further at SA4#119-e with a view to sending it to SA Plenary in June for agreement. The text of the draft Change Request is included for reference, but should not be considered final.

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| **Background:** Table 4.5.6-3 of TS 26.502 specifies that "MBSF" is the assigner of the *MBSTF tunnel endpoint address*. On the other hand, Annex B.3.1 and B.3.2 specify that the "MBSTF" provides the *MBSTF tunnel endpoint address* to the MBS Application Provider (AF/AS).  It is CT4's understanding that the *MBSTF tunnel endpoint address* is assigned by MBSTF, and hence may be present in the response sent by MBSTF upon receiving the *Nmbstf\_MBSDistributionSession\_Create* request from the MBSF.  **Question 1:** CT4 would like to request SA4 to confirm if CT4's understanding is correct. |

(This question concerns the Packet Distribution Mode only.) SA4 is unable to provide a definitive answer to this question at this time because the stage 3 specification of user plane packet-based ingest at reference point Nmb8 in TS 26.517 is the subject of a newly begun Work Item, 5MBP3. However, SA4 is able to provide the following indicative information that may be helpful.

While clause 6.2 of TS 26.502 requires that the Packet Distribution Method supports two different modes of operation in the MBSTF (*Proxy mode* and *Forward-only mode*), it does not specify the means to ingest packets at reference point Nmb8. Annex B.3 of TS 26.502 provides some informative guidance on how these may eventually be specified at stage 3:

1. In *Forward-only mode*, multicast UDP/IP datagrams are ingested by the MBSTF from a unicast tunnel and are forwarded directly to the MB-STF at reference point Nmb9.

- In this case, the MBSTF needs to be told the IP address and port number of the far end of the tunnel (i.e. the address of the AF/AS end). Hence, this is envisaged as an input parameter to the Nmbstf\_MBSDistributionSession\_Create service operation, rather than a value returned in the response. However, the MBSTF allocates a UDP port to its end of the tunnel, and possibly one of several available IP addresses. This endpoint information should be returned in the response to the service operation.

2. In *Proxy mode*, multicast UDP/IP datagrams are ingested by the MBSTF at Nmb8 and the UDP headers may be restamped by the MBSTF.

- In this case, the MBSTF could, for example, issue an IGMP Join to an external Source-Specific Multicast (SSM) IP address. A tunnel endpoint address is therefore not needed in this case, but rather the SSM IP address of interest.

SA4 acknowledges that this aspect of TS 26.502 is confusing. In order to better support both of the above packet ingest cases, SA4 proposes to generalise the name of the parameter *MBSTF tunnel endpoint address* to *MBSTF ingest endpoint addresses* and to expand its scope to cover either the tunnel endpoint address pair, or a Source-Specific Multicast IP address (source IP address, source port and destination group address), as appropriate to the Packet Distribution Session operating mode.

Hence, for reasons of symmetry between *Forward-only mode* and *Proxy mode*, SA4 prefers this to be an input parameter to the Nmbstf\_MBSDistributionSession\_Create service.

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| **Background:** Table 4.5.6-1 of TS 26.502 specifies that *MB‑UPF tunnel endpoint address* has a cardinality of "*1..1*" for the MBS distribution session, and hence should be mandatorily passed by MBSF while sending *Nmbstf\_MBSDistributionSession\_Create* request to the MBSTF.  It is CT4's understanding that the MB-UPF can do a IGMP Join towards MBSTF if Nmb9 Interface supports multicast. In such case, there is no need to mandatorily provide *MB‑UPF tunnel endpoint address* to the MBSTF.  **Question 2:** CT4 would like to request SA4 to confirm if CT4's understanding is correct. |

It is SA4’s understanding that reference points Nmb9 and N6mb are defined by the protocol stack diagrams in clause 8.2 of TS 22.247. Two alternative packet ingest methods are supported by the MB-UPF:

- Multicast IP packets wrapped in a unicast UDP tunnel (figure 8.2-1) at reference points Nmb9/N6mb.

- Plain IP multicast (figure 8.2-2) at reference point N6mb only.

Because the second method (“Plain IP multicast”) is supported only at reference point N6mb (i.e. when the MBSTF is bypassed) this is not relevant to the design of the Nmbstf\_ service at reference point Nmb2.

Hence, it is SA4’s understanding that multicast IP packets are always wrapped in a unicast UDP tunnel between the MBSTF and the MB-UPF. Hence, the *MB-UPF tunnel endpoint address* must always be provided in the Nmbstf\_MBSDistributionSession\_Create service operation so that the unicast tunnel can be established between the MBSTF and the MB-UPF at the appropriate time, and that the cardinality of this parameter is correctly expressed as 1..1 in table 4.5.6‑1 TS 26.502 V17.0.0.

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| **Background:** Table 4.5.6-1 of TS 26.502 specifies a parameter *MB‑UPF traffic flow information* which includes the multicast group destination address and port number. Clause 4.5.2 (Step #4) further indicates:  *"….. 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."*  It is CT4's understanding that:   1. If Nmb9 supports multicast, the MBSF needs to provide a multicast address assigned by MBSTF to MB-SMF which further provides it to MB-UPF, and MB-UPF correspondingly performs IGMP Join towards the MBSTF. 2. If Nmb9 supports unicast, the MBSF needs to provide *MB‑UPF tunnel endpoint address* to the MBSTF.   Hence, there is no scenario in which the MB-UPF's "multicast group destination address and port number" needs to be sent to the MBSTF.  **Question 3:** CT4 would like to request SA4 to confirm if the CT4's understanding is correct.  **Question 4:** If the CT4's understanding is not correct, CT4 kindly request SA4 to clarify how this parameter is used by the MBSTF. |

With reference to the answer to question 2 above, SA4 understands direct multicast via IGMP Join is not supported at reference point Nmb9, so point a) above is not correct.

Regarding point b), SA4 agrees that the MBSF needs to provide the *MB‑UPF tunnel endpoint address* to the MBSTF as an input parameter to the Nmbstf\_MBSDistributionSession\_Create service operation, per the response to question 2 above.

Regarding the question about sending the multicast group destination address and port number is the Nmbstf\_MBSDistributionSession\_Create service operation: SA4 believes that this *MB-UPF Traffic Flow Information* still needs to be passed from the MBSF to the MBSTF so that the latter knows which multicast group address and port number to use when generating packets in the case of Object Distribution Method and also Packet Distribution Method in proxy mode. In the case of Packet Distribution Method operating in Forward-only mode, the *MB-UPF Traffic Flow Information* tells the MBSTF which multicast group to subscribe to at Nmb8 and which port to filter.

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| **Background:** It is CT4's understanding that not all the parameters defined in Table 4.5.6-1 need to be sent by the MBSF to the MBSTF as part of *Nmbstf\_MBSDistributionSession\_Create* request and many of these parameters are for the consumption of MBSF on other interfaces (e.g. towards MB-SMF); especially the following parameters:  *MBS Session Context*  *QoS information*  **Question 5:** CT4 would like to request SA4 to confirm if CT4's understanding is correct. |

SA4 confirms CT4’s general understanding. The MBS Distribution Session conceptual entity exists both in the MBSF and in the MBSTF, so not all parameters necessarily need to be passed from the former to the latter across Nmb2.

On the specific parameters mentioned:

- *MBS Session Context.* Figure 4.5.2-1 depicts a link from the MBS Distribution Session entity in the MBSF to the MBS Session Content entity in the MB-UPF which is not present for the MBS Distribution Session entity depicted inside the MBSTF on the right-hand side of the figure. CT4’s understanding that this parameter doesn’t need to be passed in the Nmbstf\_MBSDistributionSession\_Create service operation is therefore correct.

- *QoS information.* SA4 believes that the MBSTF needs this information in order to drive its packet pacing algorithm for the Object Distribution Method. In the case of the Packet Distribution Method, the MBSTF can use this information to apply a packet rate limit that protects the MB-UPF from a misbehaving upstream AS that is sending packets at a rate higher than the provisioned bit rate. In addition, the MBSTF may require information about QoS-related traffic marking (e.g. DSCP code point to be applied to multicast IP packets sent from the MBSTF to the MB-UPF at reference point Nmb9) to be passed in using this parameter.

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| **Background:** Table 4.5.6-3 of TS 26.502 specifies a parameter *MBSTF traffic flow information* and is defined as:  *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*  It is CT4's understanding that this parameter is used by MBSTF to send an IGMP Join towards AF/AS in case Nmb8 supports multicast (in Proxy mode of Packet distribution method).  **Question 6:** CT4 would like to request SA4 to confirm if CT4's understanding is correct. |

SA4 confirms CT4’s understanding that the *MBSTF traffic flow information* is used by the MBSTF to subscribe to a Source-Specific Multicast (SSM) IP address at reference point Nmb8 in the case of the Packet Distribution Method operating in Proxy mode.

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| **Background:** Clause 7.3.2.4 of TS 26.502 defines Nmbstf\_MBSDistribtutionSession\_Destroy service operation:  CT4 has generally used "Delete" keyword for service operations used for deleting a resource in the server.  **Question 7:** CT4 would like to request SA4 if the "Destroy" service operation can be renamed to "Delete"?. |

SA4 prefers the high-level service operation name “Destroy” based on the rationale that this provides a more precise opposite to “Create”.

# 2 Actions

**To CT4**

**ACTION:** SA4 kindly asks SA3 to take into consideration the feedback in section 1 above.

**To SA2**

**ACTION:** SA4 kindly asks SA2 to review SA4’s feedback in section 1 above and confirm whether SA4’s understanding is correct.

# 3 Dates of next TSG SA WG 4 meetings

SA4#119-e 11th–20th May 2022 E-meeting

SA4#120 22nd–26th August 2022 Málaga, ES