**3GPP TSG-WG SA2 Meeting #139E e-meeting *S2-200xxxx***

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**Source: Huawei, HiSilicon**

**Title: Analysis of architectures for 5MBS**

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**Agenda Item: 8.9**

**Work Item / Release: FS\_5MBS / Rel-17**

*Abstract: This contribution introduces the architectural way forward of 5MBS study.*

# 1. Introduction

Currently two architecture alternatives exist in TR 23.757. One is the unicast-based architecture (i.e., Baseline architecture #1), in which the unicast 5GC is enhanced to support multicast requirement. On the other hand, the essence of the other alternative (i.e., Baseline architecture #2) is to use new dedicated NFs for accommodating multicast/broadcast services.

The differences between the two architecture options include:

* **Dedicated NFs**. For Baseline architecture #1, the AMF, SMF, UPF, NEF and other NFs are enhanced to enable multicast/broadcast processing while for Baseline architecture #2, except for AMF, the MB-SMF, MB-UPF, MBSF and MBSU are the new NFs dedicated for multicast/broadcast usage;
* **Service Layer Functionalities**. In Baseline architecture #1, functionalities related to service level (e.g., encryption, codec handling) will be realized in by service layer (e.g., AF inside/outside the PLMN), and some other NFs (e.g., SMF, PCF) can also be enhanced to fulfil part of the functionalities (e.g., group management). On the other hand, in baseline architecture #2 the dedicated Core Network NFs such as MBSF/MBSU are used to realize the service-level functionalities.

# 2. Analysis

Irrespective of whether we decide to enhance existing unicast NFs or to have new dedicated NFs, SA2 will anyway need to define new functionality(-ies). New functionalities could be combined with existing NFs, or deployed as the new separate Network Function(s). From the perspectives of call-flow and the functionalities of the NF defined in the procedure, in fact both of the two architecture options apply to all of the solutions documented in the TR. Therefore, it is proposed that currently we use unicast terms (i.e., SMF, UPF etc.), and whether one needs to separate such enhancements from current unicast NFs or not is left up to implementation.

Currently it is clear what a basic set of functionalities for the Basic Service Level are. The definition of functionalities for the Enhanced Service Level is still ongoing. If the UP function for the service level (i.e., MSF-U in Baseline architecture #1 and MBSU in Baseline architecture #2) is only for the usage of Enhanced Service Level, it is an optional NF in the architecture if PLMN determines to deploy Basic Service Level only. In addition, both of the architecture options consider the interface between the UPF and MSF-U/MBSU is N6, we could consider it is an AF-like functionalities and we could revisit add MBSU later when we have a clear view on the exact functionalities of it (e.g., the definition of the Enhanced Service Level is determined and whether such enhanced services require the involvement of MSF-U/MBSU).

Proposal 1: Therefore, for the sake of clarity, it is proposed to remove the MSF-U/MBSU for the time being, and SA2 could revisit it later when there is a clear view on the exact requirement of Enhanced Service Level and associating functionalities of MSF-U/MBSU.

Last but not the least, the CP function for the service level (i.e., MSF-C in Baseline architecture #1 and MBSF in Baseline architecture #2) could be continuously studied. Since both of the architecture options consider MSF-C/MBSF would connect the 5GC CP NFs via service-based interface (e.g., Nnef/Npcf/N6mb\_C), it equals the role of the AF in 5GC (and that does not conflict the essences of the two candidate options). Additionally, by checking current solutions on hand, the functionalities of MSF-C/MBSF include: 1) Participating the interaction between MB-SMF/AS on N6 tunneling establishment (i.e., the entry point of the MBS data), 2) Allocating TMGI, 3) Participating the interactions between MB-SMF and AS. SA2 could continuously study the exact CP functionalities of the service level (it seems that some of the functionalities of MBSF in current solutions could be realized in other functionalities e.g., NEF and SMF).

Proposal 2: Based on the documented solutions, it is proposed that the MSF-C/MBSF could be put in the CP as an AF.

Given the analysis above it is proposed to:

**Proposal 3: Focus on the Basic Service Level and select Baseline Architecture 1 for it. In the meanwhile further study is needed for defining the functionalities of the Enhanced Service Level and which additional network entities are needed for it.**

# 3. Text Proposal

It is proposed to capture the following changes vs. TR 23.757.

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

# 8 Conclusions

It is concluded that the following paradigms are used as the baseline to define the architecture:

- Except for MSF-C/MSF-U and MBSU/MBSF, the unicast terminologies (i.e., SMF, UPF etc.) shall be reused, and whether it is needed to separate such enhancements from the current unicast NFs or not is by implementation.

- Remove MSF-U/MBSU in the architectures, to allow SA2 to revisit MSF-U/MBSU later when there is a clear understanding on the exact requirement of Enhanced Service Level and whether such requirement needs the involvement of MSF-U/MBSU.

- The CP function for the service level (i.e., MSF-C in Baseline architecture #1 and MBSF in Baseline architecture #2) will be put in the CP as an AF.

- Baseline Architecture 1 is selected for Basic Service Level multicast support.

Editor's Note: whether a MSF-C/MSF-U entities are needed for Enhanced Service Level if FFS.