**3GPP TSG-WG SA2 Meeting #162 *S2-2405315***

**Changsha, China, April 15- April 19, 2024**

**Source: China Mobile**

**Title: Evaluation on KI #2: Enhancement of EAS and local UPF (re)selection**

**Document for: Approval**

**Agenda Item: 19.9**

**Work Item / Release: FS\_eEDGE\_5GC\_ph3 / Rel-19**

*Abstract of the contribution: Propose an evaluation on KI #2: Enhancement of EAS and local UPF (re)selection.*

# 1 Discussion

This paper provides evaluation of KI #2: Enhancement of EAS and local UPF (re)selection.

# 2 Proposal

It is proposed to include the below changes into TR 23.700-49 v0.2.0.

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*FIRST CHANGE (all new text)*

## 7.x Evaluation for KI #2: Enhancement of EAS and local UPF (re)selection

The following solutions are for KI #2: Enhancement of EAS and local UPF (re)selection.

Table 7.x-1: Solutions for KI #2

|  |  |  |
| --- | --- | --- |
| Solution | N6 delay consideration | EAS load consideration |
| #8: Selecting an EAS server leveraging analytics | Yes | No |
| #9: Solution of local UPF and EAS (re)selection jointly considering N6 delay and EAS load | Yes | Yes |
| #10: L-PSA and EAS (re)selection based on N6 one-way and two-way delay measurement | Yes | No |
| #11: Provision weight factor of DNAIs from AF | Yes | Yes |
| #12: NWDAF and SMF-based EAS and local UPF (re)selection | Yes | Yes |
| #13: EAS Discovery taking account of EAS load in EASDF | No | Yes |
| #14: EAS selection considering DNS historical handling records | No | Yes |
| #15: The local EASDF assist for the EAS and local UPF (re)selection based on the AF provided N6 delay and EAS load information | Yes | Yes |
| #16: Local UPF and EAS (re)selection considering access network delay and N6 delay information by 5GC or AF | Yes | Yes |

Solutions proposing **EAS and local UPF (re)selected by SMF**: #8, #9, #10, #11, #12, #14, #16.

**Solution #8:** It is proposed SMF to obtain N6 delay from NWDAF. SMF sends UE location and FQDN or EAS IP list to NWDAF to request for N6 delay between each EAS and PSA.

But it is not clear how the NWDAF get the real-time N6 delay or per QoS flow level N6 delay. What’s more, this selection of UPF/EAS is simple and no need to via network analysis, i.e. NWDAF..

**Solution #9:** It is considered N6 delay and EAS load jointly by SMF converting EAS load to processing delay and performing (re)selection. The N6 delay is calculated by UPF through ICMP.

While it is not clear how the SMF can perform such conversion, and the processing delay is quite related with application traffic type,as well as the hardward configuration.So it is not precise to convert EAS load into processing delay.What’s more, the ICMP can only provide round-trip delay, and not in real time.

**Solution #10** provides a method supporting UL, DL and RT N6 delay measurement. L-PSA sends UL/DL/RT N6 delay measurement to EAS triggered by SMF. The L-PSA receives UL N6 delay from EAS, or calculates DL or RT N6 delay, and reports UL/DL/RT N6 delay to SMF for EAS and local UPF (re)selection.

This solution support UL/DL/RT N6 delay calculation, but need to be updated to show how the SMF use this N6 delay to select the PAS UPF/EAS.

**Solution #11,** The EAS Deployment information is enhanced to include the selection weight factor per DNAI, average delay over N6 interface per DNAI.

In this solution, the N6 delay is average delay, not per QoS flow, not suitable to support the E2E delay when considering the 5GC already can support the per flow level N3/N9 delay calculation.

**Solution #12** proposes SMF obtain N6 delay and EAS load from NWDAF. SMF (re)selects EAS and local UPF based on N6 delay and EAS load.

It is not clear how the NWDAF get the real-time N6 delay or per QoS flow level N6 delay. What’s more, this selection of UPF/EAS is simple and no need to via network analysis, i.e. NWDAF.**Solution#13:** The EAS load information can be known by AF (Application Function), AF can update the EAS load information to EASDF or DNS Server. Then during the EAS discovery procedure, the EASDF can discover and select a suitable EAS by taking account of the EAS load information.

This solution propose the AF(i.e. application itself) knows the EAS load information, providing this information to 5GC support the requirement of this Key Issue.

**Solution #14:** Enhance the EASDF to store the DNS resolution records and provides the information to the SMF, so that the SMF can provide guide for EAS selection considering such information.

EAS load information is dynamic information, the historical record can not predict precisely.**Solution:15: It is** proposed the local EASDF to support EAS and local UPF (re)selection based on the N6 delay and the EAS load information from the AF.

AF itself cannot get the per flow level N6 delay, the real-time calculation between 5GC and AF is needed.

**Solution #16** proposes two cases for network delay and N6 delay measurement: Case 1: AF sends request for 5GC performing QoS monitoring over N3, N9 and N6, and UPF performs N6 delay measurement as the session sender. Case 2: AF performs N6 delay measurements with the assistant from 5GC. AF can additionally consider EAS load information available at compute-site level for DNAI/EAS selection transparently to 5GC.AF performs EAS (re)selection after local UPF (re)selected by 5GC, which cannot guarantee the N6 has shortest delay globally.

In this solution, how the 5GC support the flow level N6 delay is not clear.

In summary for evaluation on EAS and local UPF (re)selected by SMF solutions, it is recommended that:

- N6 delay per flow level, and EAS load should be considered for EAS and local UPF (re)selection.

- N6 delay measurement should be supported based on the cooperation between 5GC and AF.

- EAS load (if considered) should be provided by AF.

- EAS (re)selection and local UPF (re)selection should be performed jointly.

*NEXT CHANGE (all new text)*

## 8.x Conclusion for KI #2: Enhancement of EAS and local UPF (re)selection

The following principles are recommended in normative work for KI #2: Enhancement of EAS and local UPF (re)selection

- SMF selects local PSA UPF considering N6 delay, when available.

Editor’s NOTE: Whether SMF collects N6 delay measurements from the L-PSA UPF or from the AF is FFS

Editor’s NOTE: Whether EAS load can also be used by the SMF/EASDF is FFS.

- N6 delay between L-PSA UPF and EAS is measured by leveraging existing mechanisms (e.g., defined by IETF, PING, TWAMP, OWAMP, etc.)

- Interaction between AF and 5GC may be needed to enable this measurement

Editor’s NOTE: Details of such interaction are FFS.

*End of CHANGES*