**3GPP TSG-CT WG1 Meeting #125-eC1-20xxxx**

**Electronic meeting, 20-28 August 2020**

**Source: ZTE**

**Title: Impacts of eNS\_Ph2 to CT WGs**

**Agenda item: x.x**

**Document for: DISCUSSION**

# Introduction

SA2 are now studying on Enhancement of Network Slicing Phase 2 (FS\_eNS\_Ph2 WID) within the release 17 version of the 3GPP specifications. It can be expected that the stage 3 work will be developed by CT WGs.

This paper aims to describe the status of eNS\_Ph2 work under SA2 responsibility, and analyse impacts on specifications under CT WGs responsibility.

# 2 Discussion

## 2.1 General

SA2 have worked on the feasibility study on Enhancement of Network Slicing Phase 2, see SP-190931 [1] for the FS\_eNS\_Ph2 WID. Furthermore, SA2 have developed the TR 23.700-40[2], which provides the key issues and the corresponding solutions regarding eNS\_Ph2 within the release 17 version of the 3GPP specifications.

Up to June SA2#139e-meeting, the status of FS\_eNS\_Ph2 is 55% completed. The current stage 2 work is the basis for the present discussion paper and the stage 3 work is expected to be developed by CT WGs.

## 2.2 Work objective and TR work developed

The SID of FS\_eNS\_Ph2 is approved in the SA #84 meeting and focus on identifying the gaps in the currently defined 5GS system procedures to GST(Generic Slice Template) attributes defined in GSMA 5GJA. After study and analysis, there are 7 KIs to be addressed within Rel-17 timeframe listed in TR 23.700-40 as:

* *Key Issue #1: Support of network slice related quota on the maximum number of UEs*
* *Key Issue #2: Support of network slice related quota on the maximum number of PDU Sessions*
* *Key Issue #3: limitation of data rate per network slice in UL and DL per UE*
* *Key Issue #4: Support for network slice quota event notification in a network slice*
* *Key Issue #5: Dynamic adjustment to meet the limitation of data rate per network slice in UL and DL.*
* *Key Issue #6: Constraints on simultaneous use of the network slice*
* *Key Issue #7: Support of 5GC assisted cell selection to access network slice*

Total 31 solutions in TR to address various KIs. SA2#140e (Aug2020) will be the last meeting for any new solution. And then the evaluation and conclusion on each KI will be made. The SID of FS\_eNS\_Ph2 is expected to be complete in Sep., 2020.

## 3 Potential CT WGs impacts

Based on the latest version of 3GPP TR 23.700 [2] from SA2#139e-meeting, the potential stage 3 CT WGs impacts can be evaluated in Table 1.

Table 1. Potential stage 3 CT WGs impacts of eNS\_Ph2

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Key issues | Available solutions | Potential CT1 impacts | Potential CT3 impacts | Potential CT4 impacts |
| Key issue#1:  Support of network slice related quota on the maximum number of UEs | Solution#1, #2, #3, #4, #8, #9, #15, #18, #19   * 1 solution PCF-based, * 1 solution AMF/NSSF based, * 3 solutions are new NF(s) (e.g. NSQ, SQM, QEF, QCF etc.) based, * 2 solutions are NWDAF based and 1 solution is AMF and O&M based | Access restriction:  AMF/UE: back-off timer and new MM Cause to UE. | Quota provision and counting: new NF or PCF /NWDA.  Depending on the solutions, PCF /NWDA /NEF /AF may be involved.  New NF may be defined in CT3. | Quota provision and counting: new NF or /NSSF UDM/UDR.  Quota enforcement: AMF (in most solution).  Quota usage report: AMF.  PCF/NWDAF may request information collection from AMF. |
| Key issue#2:  Support of network slice related quota on the maximum number of PDU Sessions | Solution#5, #6, #7, #8, #9, #10, #11, #18, #19   * 2 solutions are PCF-based (to be merged), * 1 solution is NRF based, * 3 solutions are new NF(s) (e.g. NSQ, SQM, QEF, QCF etc.) based, * 2 solutions are NWDAF based and 1 solution is AMF and O&M based | Access restriction:  SMF/UE: back-off time and new Cause. | Quota provision and counting: in new NF or PCF /NWDA /UDR /NRF.  Depending on the concluded solution, PCF /NWDA /AF may be involved. | Quota provision and counting: by new NF, or by UDR /NRF.  Quota enforcement: SMF (most solutions) or AMF (some solutions). |
| Key issue#3:  Limitation of data rate per network slice in UL and DL per UE | Solution #13, #20, #21, #22   * 2 solutions are PCF-based (to be merged), * 1 solution is NRF based, 3 solutions are new NF(s) (e.g. NSQ, SQM, QEF, QCF etc.) based, * 2 solutions are NWDAF based and 1 solution is AMF and O&M based | Slice-AMBR provision to UE: AMF (or SMF). | Slice-AMBR provision: new NF or PCF /NWDA /UDM /UDR.  \* Sol#20 reuses existing QoS mechanism and PCF calculates UE-/Session-AMBR taking in account of Slice-AMBR. | Slice-AMBR provision: new NF or PCF/UDM /UDR.  Slice-AMBR enforcement: SMF and UPF may be involved depending on concluded solution. In some solutions, RAN performs the restriction of Slice-AMBR.  Depending on concluded solution, UDM /UDR may be involved to store the accumulated Session-AMBR. |
| Key issue#4:  Support for network slice quota event notification in a network slice | Solution #8, #9, #18, #19, #23   * 1 solution is NWDAF based, * 1 solution is AMF and O&M based, * 3 solutions leverage new NF(s) (e.g. NSQ, SQM, QEF/QCF etc.). | Not seen. | Quota usage collecting event report: new NF or NWDA;  Depending on the concluded solution, NWDA /NEF /AF may be involved.  New NF for collecting event report may be defined in CT3. | AMF is involved in collecting slice quota usage.  Depending on the concluded solution, UDM may be involved. |
| Key issue#5:  Dynamic adjustment to meet the limitation of data rate per network slice in UL and DL | Solution #12, #14, #16, #18, #19, #20, #24, #25   * 1 solution is PCF based with NWDAF support, * 1 solution is PCF based, * 1 solution is based on two new logic NFs (i.e. QEF, QCF), * 1 solution is based on new NF (NSQ), * 2 solutions are NWDAF based and 1 solution is AMF and O&M based | Not seen. | Slice-AMBR adjustment: new NF or PCF /NWDA.  Depending on the concluded solution, PCF /NWDA /AF may be involved in Slice-AMBR adjustment. | Slice-AMBR enforcement: SMF and UPF.  SMF and UPF are involved re-enforce adjusted Slice-AMBR.  Depending on the solution, AMF may be involved in Slice-AMBR adjustment. |
| Key issue#6:  Constraints on simultaneous use of the network slice | Solution #26, #27, #28   * 1 solution is based one network enforcement and UE preference of slice prioritization, * 1 solution based on network’s indication to UE on the group of co-existed slices to select, and another solution has similar concept but defining them in classes of slices. | Simultaneous use restriction:  AMF/UE: slice info and capability indication exchange and new Cause. | Not seen. | Simultaneous use restriction provision: AMF /NSSF /UDM.  Depending on the solution, NSSF /UDM may be involved. |
| Key issue#7:  Support of 5GC assisted cell selection to access network slice | Solution #17, #29, #30, #31   * 1 solution restricts no simultaneously registration of slices that are not all accessible on the same operating bands. * 1 solution assumed that the UE is provided with preferred frequency band(s) information per network slice (e.g. target carrier frequencies per S-NSSAI) in the Configured NSSAI. * 1 solution assumes that UE is allocated with Allowed NSSAI which can contain S-NSSAIs supported in different frequency bands, however all S-NSSAIs are supported in all Tracking Areas or the Registration Area. * 1 solution assumes that if the network cannot accept the Requested NSSAI due to it is not allowed within current TAI, the 5GC provides the Requested NSSAI and corresponding RFSP to NG-RAN for NG-RAN to select a suitable Radio Spectrum for the UE | Frequency band info provision: AMF. | Frequency band info provision: new NF and PCF.  Depending on the solution, PCF may be involved. | Frequency bands info provision: AMF /NSSF.  Depending on concluded solution, AMF/NSSF may be involved. |

# 4 Conclusion

This paper has provided early information to CT WGs about the SA2 work on eNS\_Ph2 within the Rel-17 version of 3GPP specifications in section 2 and analysed the potential stage 3 CT WGs impacts for stage 2 eNS\_Ph2 work in section 3.

Based on the analysis and evaluation, CT1#126E, CT3#112E and CT4#99E in October are probably appropriate meetings to introduce eNS\_Ph2 WID to CT groups. CT1 is expected to be the leadership WG for eNS\_Ph2 CT work.

ZTE volunteers to be responsible for Rel-17 eNS\_Ph2 CT work as rapporteur.

# References

[1] SP-190931: "Feasibility Study on Enhancement of Network Slicing Phase 2".

[2] 3GPP TR 23.700 v0.4.0 (2020-06): " Study on Enhancement of Network Slicing: Phase 2".

[3] GSMA 5GJA NG.116: "Generic Network Slice Template".

[4] S2-2004757: "FS\_eNS\_Ph2 WG2 Status Report".