3GPP TSG-RAN WG3 #110-e R3-206900

Online, 2-12 November 2020

Agenda Item: 15.2

Source: China Unicom

Title: Summary of Offline Discussion on per slice QoE measurement

Document for: Approval

# Introduction

This contribution provides the summary of offline discussion for the following:

**CB: # NRQoE6-Slice**

**- Slice QoE is needed for SLA maintenance and enforcement in OAM, slice service experience analysis and prediction in NWDAF and network slice selection in NSSF ?**

**- How to inform the 5GC the mapping between a QOE report and the specific slice?**

**- Network slice scope information should be added in NR QoE measurement configuration to support slice QoE measurement?**

**- Network slice information should be added in NR QoE report to support slice QoE reporting?**

**- Capture agreements as TP for TR**

(CU - moderator)

Summary of offline disc [R3-206900](file:///C:\Users\pan\AppData\Local\Temp\Temp1_draft_R3-206429_v4.zip\Inbox\R3-206900.zip)

# For the Chairman’s Notes

Propose the following:

Propose to capture the following:

# Discussion

The following contributions are captured in this section.

|  |  |  |
| --- | --- | --- |
| [R3-206036](C:\\Users\\ebarfil\\Desktop\\QoE CBs\\#6 Slice\\Docs\\R3-206036.zip) | Discussion on NR QoE solutions (Samsung) | discussion |
| [R3-206493](C:\\Users\\ebarfil\\Desktop\\QoE CBs\\#6 Slice\\Docs\\R3-206493.zip) | Discussion on requirements and mechanisms for per slice QoE measurement (China Unicom, ZTE) | discussion |
| [R3-206715](C:\\Users\\ebarfil\\Desktop\\QoE CBs\\#6 Slice\\Docs\\R3-206715.zip) | Consideration on slice QoE measurement (ZTE) | discussion |

## Issues to be discussed

According to the above description and related discussion papers [1-3], the issues of per slice QoE measurement can be listed as follows.

1. Whether per slice QoE measurement should be supported
2. If yes, the scenarios of per slice QoE measurement
3. If yes, the mechanism of per slice QoE measurement
   1. configuration
   2. collection and mapping
   3. reporting

## The demand of per slice QoE measurement

### Requirements of slice QoE in NR QoE

Network slicing is a key feature for 5G, it should be considered anywhere in 5G. Regarding NR QoE, collecting QoE per slice is helpful for operators to be aware of actual user experience of a specific slice. The slice QoE is useful no matter for management system (e.g. OAM) or for network functions (e.g. UDM, NWDAF, etc.).

The requirements of slice QoE in 5G are:

* for slice SLA maintenance and enforcement in OAM
* for slice experience analysis and prediction in NWDAF
* for better slice selection decision in NSSF

**Proposal 1: NR QoE should support per slice QoE measurement.**

Moderator’s note: The answer could be agree/not agree, and comments/reasoning of the answer is welcome.

|  |  |  |
| --- | --- | --- |
| Company | Answer | Comment |
| China Unicom | agree | From operators’ point of view, it’s quite essential to confirm that the SLA is fulfilled and to statistics the QoE of services for different users with the same service type running on different slices to show the significantly superiority of customized slice. |
| Huawei | Yes |  |
| Samsung | Agree | On this topic, we should listen to operators, since there are many benefits and it’s the operators really wants, no reason to refuse. |
| CMCC | Yes | Agree with CU. |
| ZTE | Yes | Agree with China Unicom. |
| CATT | Yes | Agree with CU. |
| Ericsson | OK |  |
| Nokia | Partly OK | From SA4 side the QoE reporting is defined per application. The operators' request seems to be to study inclusion of slice as parameter for configuration and/or reporting. |
| Qualcomm | Yes |  |

## The scenarios of per slice QoE measurement

Slice awareness in NG-RAN is introduced at PDU session level, by indicating the S-NSSAI corresponding to the PDU Session. Therefore, gNB can get a one-to-one mapping between the the PDU session and slice.

After permutation and combination according to different applications, service types and slice, the possible scenarios are as follows:

Table 1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Scenario 1 | APP 1 –service type 1 –slice 1  APP 2 –service type 2 –slice 2 | Scenario 5 | APP 1 | –service type 1 –slice 1  –service type 2 –slice 2 |
| Scenario 2 | APP 1 –service type 1 –slice 1  APP 2 –service type 2 –slice 1 | Scenario 6 | APP 1 | –service type 1–slice 1  –service type 2–slice 1 |
| Scenario 3 | APP 1 –service type 1 –slice 1  APP 2 –service type 1 –slice 2 | Scenario 7 | APP 1 | –service type 1–slice 1  –service type 1–slice 2 |
| Scenario 4 | APP 1 –service type 1 –slice 1  APP 2 –service type 1 –slice 1 | Scenario 8 | APP 1 | –service type 1 –slice 1 |

**Proposal 2: P**er slice QoE measurement should cover all scenarios in table 1.

Moderator’s note: The answer could be a list of scenarios (e.g. scenario 1/2/3 or all), and comments/reasoning of the answer is welcome.

|  |  |  |
| --- | --- | --- |
| Company | Answer | Comment |
| China Unicom | All if possible | For scenario 7, APP1 is allowed to setup PDU sessions correlated to slice 1 and slice 2. During the PDU Session Setup procedure, two PDU sessions are setup and the same service type is served by both slices. In this scenario, the application layer may not be able to create QoE report of service running on specific slice (i.e. slice 1 or slice 2). From our point of view, in actual deployment, one APP will select one single slice according to NSSP (Network slice selection Policy) in URSP (UE Routing Selection Policy).  Thus, the scenario 5 and 7 can be low priority to be considered if they have no feasibility or practical use. |
| Huawei | Yes | We could study these scenarios, and see if some scenarios could be prioritized |
| Samsung | Yes | Agree with the above. |
| CMCC | All | All scenarios can be studied for now. |
| ZTE | Yes | All scenarios can be take into consider. |
| CATT | all | All scenarios can be studied for now. |
| Ericsson |  | Let us start from all of them and, if necessary, downprio some of them |
| Nokia | all | Agree to start from all of them. As mentioned by CU, PDU session establishment is triggered by the application, but we expect that in case of scenario 7 each slice will be used by different application sessions. (Maybe still indeed a not frequent case). |
| Qualcomm | All | Let’s study these. |

**Proposal 2.1:** If there are other scenarios, please describe them below.

|  |  |
| --- | --- |
| Company | Other scenario |
|  |  |
|  |  |
|  |  |
|  |  |

## The mechanism of per slice QoE measurement

### Configuration

In LTE QMC, the QoE can be collected from UEs in a specific area which realized by a parameter in the QoE configuration IEs, the parameter can be either Area Scope (including list of PLMNs, TACs or Cells) out of the QoE configuration file checked by eNB or cell list in the QoE configuration file checked by UE.

For NR, the method of checking Area Scope by the RAN node or checking cell list by UE can be reused in slice QoE. To be specific, identification of slice (i.e. S-NSSAI) can be included in QoE measurement configuration to support mechanism for per slice QoE measurement.

For both management-based and signaling-based solution, the Network Slice Scope can be included in the QoE measurement collection configuration, just the same as Area Scope.

**Proposal 3: RAN3 to consider area scope method for slice QoE measurement . Network slice scope information should be added in NR QoE measurement configuration to support slice QoE measurement.**

Moderator’s note: The answer could be agree/not agree, and comments/reasoning of the answer is welcome.

|  |  |  |
| --- | --- | --- |
| Company | Answer | Comment |
| China Unicom | Agree | This is a similar implementation with the Area Scope |
| Huawei | ok |  |
| Samsung | Agree | Agree with CU. |
| CMCC | Agree | Agree with CU. |
| ZTE | Agree | Agree with China Unicom. |
| CATT | agree |  |
| Ericsson | OK, let us consider this |  |
| Nokia | conditionally agree | with the understanding that the QoE report configuration contains the targeted application, on top of which is added filtering per slice |
| Qualcomm | OK |  |

### Collection and mapping

During the PDU session setup procedures, a PDU session is associated to an S-NSSAI, which identifies a network slice. If the S-NSSAI list is included in QoE measurement configuration to specify the target slice(s), mechanism to realize the mapping between a QoE report and the specific slice should be introduced.

**Proposal 4: RAN3 to study how to realize the mapping between a QoE report and the specific slice?**

Moderator’s note: The answer is whether the suggested potential solution is valid for all the considered scenarios in 3.3.

|  |  |  |
| --- | --- | --- |
| Company | Potential solution | Answer |
| China Unicom | The procedure can be as follows:  1. OAM/CN transmit the QoE measurement configuration to NG-RAN, which includes the target slice list;  2. NG-RAN can map the target slice list to PDU session list and attach the PDU session list with the QoE measurement configuration to UE;  3. UE will check the PDU session list and map the PDU session to APP according NSSP and collect the QoE measurement based on the configuration;  4. UE will feedback the QoE measurement report with the corresponding PDU session ID;  5. NG-RAN can remap the PDU session ID back to slice ID and attach it in the QoE report. | scenario 7 need FFS if supported |
| Huawei | The procedures described above could be taken as a starting point, not sure if this is a common scenario that one service type would be cross-slice. |  |
| Samsung | Agree with CU’s solution.  An alternative solution could be:   1. OAM/CN transmits the QoE measurement configuration to gNB, including network slice scope (i.e. an S-NSSAI or S-NSSAI List). 2. gNB checks the slice scope with all of the ongoing PDU sessions, and sends QoE measurement configuration to UE with qualified PDU session, including network slice scope. 3. UE receives the QoE measurement configuration and sends it to the corresponding application layer according to the network slice scope. 4. UE sends the QoE report with optional slice ID to gNB, then gNB forwards it to QoE server. | All of them |
| CMCC | CU’s solution can be regarded as a starting point. |  |
| ZTE | The approaches provided by China Unicom can be good start for study. |  |
| CATT | CU’s solution can be regarded as a starting point. |  |
| Ericsson | Let us start from this, but not preclude additional alternatives |  |
| Nokia | Whether the UE reports PDU session ID or slice ID seems equivalent from a functional point of view. But considering that there is no application layer in the gNB, from a protocol point of view the UE's application layer should directly include the slice ID (hence avoiding that the gNB must add information to the QoE report container). |  |
| Qualcomm | Agree to use CU solution as baseline. |  |

### Reporting

**Proposal 5: Network slice information should be added in NR QoE report to support slice QoE reporting?**

Moderator’s note: The answer could be yes/no, and comments/reasoning of the answer is welcome.

|  |  |  |
| --- | --- | --- |
| Company | Answer | Comment |
| China Unicom | Yes | See Proposal 4 |
| Huawei | Yes |  |
| Samsung | Yes | Network slice information is used to indicate this QoE report is related to which slice, could be S-NSSAI or PDU session ID depending on the solution. |
| CMCC | Yes | Agree in principle, and FFS on where to put. |
| ZTE | Yes | When OMC server receive NR QoE report with NW slicing information, it will help server do better analysis. |
| CATT | Yes |  |
| Ericsson | What is the point with this proposal, if we have proposal 1 and proposal 4 already? | If we configure measurements per slice, of course slice indication should be included in the report, but let us consider later where exactly this should be placed and how. |
| Nokia | Yes |  |
| Qualcomm | Yes |  |

## TP to be captured in TR

If the conclusion of the above discussion is in support of per slice QoE measurement, what should be captured in the TR? According to the discussion pagers, there are two options as follows.

* Introducing a separate section that describes the per slice QoE measurement
* Capture the description related to slice in the corresponding procedures, e.g. configuration, reporting

**Proposal 6: To introduce separate section for QoE slice is necessary in TR .**

Moderator’s note: The answer could be yes/no, and comments/reasoning of the answer is welcome.

|  |  |  |
| --- | --- | --- |
| Company | Answer | Comment |
| China Unicom | yes | A separate section to specify the scenario and mechanism is necessary. |
| Huawei | yes |  |
| Samsung | Yes | Agree with CU |
| CMCC | Yes |  |
| ZTE | Yes |  |
| CATT | Yes |  |
| Ericsson |  | The slice-related agreements should of course be captured in the TR, but let use consider whether this be in a separate section or as a part of some other, more general, section (e.g. on measurement configuration enhancements). |
| Nokia |  | Agree with Ericsson. Slice ID seems to be an additional parameter for configuration and reporting. |
| Qualcomm | Yes |  |

## Others

Anything else needs to be discussed, please list here.

# Conclusion, Recommendations

# References

1. R3-206036: Discussion on NR QoE solutions (Samsung) discussion
2. R3-206493: Discussion on requirements and mechanisms for per slice QoE measurement (China Unicom, ZTE) discussion
3. R3-206715: Consideration on slice QoE measurement (ZTE) discussion