3GPP TSG-RAN WG3 Meeting #127 R3-250826

Athens, Greece, 17-21 Feb, 2025

**Agenda item: 10.3.2**

**Source: ZTE Corporation**

**Title: SoD of SONMDT slicing related**

**Document for: Discussion**

# 1 Introduction

This document summarizes the discussion on network slicing.

# 2 For the meeting notes

Slice-based Cell Reselection Enhancement:

User case 1：Optimize the mapping of S-NSSAI to NSAG or optimize the frequency priorities

RAN3 has identified following user cases need to be solved in Rel-19:

1. The UE is unable to find suitable cell in the frequency corresponding to the prioritized NSAG, UE fallback to legacy Cell reselection procedure.
2. UE cannot reselect to the highest priority frequency because the highest priority frequency cannot support highest priority slice that supporting in UE or with low priority.
3. Selects a cell where the needed slice is not supported at all or partially supported.
4. When configure NSAG priorities, the UE still must be redirected at the connection setup.

Whether the identified user cases can be solved in current mechanism or cause heavy UE burden?

User case 2：Optimize the mapping of S-NSSAI to NSAG or optimize the frequency priorities

Benefits in making the OAM aware that the logged MDT reports were collected by a UE using slice-based cell reselection information (and not general cell reselection information).

LS to RAN2?

**Others can be discussed in next meeting.**

# Discussion

# 1. Slice-based Cell Reselection Enhancement

## **User case 1：Optimize the mapping of S-NSSAI to NSAG or optimize the frequency priorities**

### Justification discussion:

In previous RAN3’s meeting, the following has already agreed.

*RAN3 to work on logged MDT enhancement for slice-based cell reselection.*

Because still several companies object to send LS to RAN2 for this user case, then RAN3 should at first discuss whether issues can be identified in RAN3 and whether current mechanism can be re-used to solve these issues.

##### Issues can be identified in RAN3:

* Despite following the NSAG priorities, the UE selects a cell where the needed slice is not supported or not allowed. [1]
  + UE cannot reselect to the highest priority frequency because the highest priority frequency cannot support highest priority slice that supporting in UE or with low priority. Network should try to deploy UE preferred slice in highest priority frequency [4]

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **NSAG1** | **NSAG2** | Priority in UE side:  NSAG1 > NSAG2 F1>F2>F3  7>4>2  “-“ means not support  **Re-order** |  | **NSAG1** | **NSAG2** |
| F1 | - | 7 | F3 | 7 | 2 |  |
| F2 | 2 | 4 | F2 | 2 | 4 |  |
| F3 | 7 | 2 | F1 | -/2 | 7 |  |

* + Highest ranked cell or best cell support none of intended NSAGs[10]
  + Highest ranked cell or best cell not support all intended NSAGs[10]

|  |  |
| --- | --- |
| gNB frequency deployment | Cell ID and supported NSAG |
| Frequency 1 | Cell 1, NSAG C |
| Frequency 2 | Cell 2, NSAG A, B, C |
| Frequency 3 | Cell 3, NSAG B, C |

|  |  |
| --- | --- |
| Comparison | |
| Ideal result of Slice based Cell reselection result | Frequency 2 (NSAG A&B&C) |
| Bad result of Slice based Cell reselection result | Frequency 3 (NSAG B&C) |

* Despite following the NSAG priorities, the UE still must be redirected at the connection setup.[2]
* After following the priorities of the highest priority NSAG of the UE, the UE is forced to revert to lower-priority NSAG config and repeat cell reselection process.[3]
* highest ranked cell or best cell can be reported to the network to adjust the sliceAllowedCellListNR and sliceExcludedCellListNR[9]

**Conclusion: Can we agree above issues?**

**RAN3 has identified following user cases need to be solved in Rel-19:**

1. The UE is unable to find suitable cell in the frequency corresponding to the prioritized NSAG, UE fallback to legacy Cell reselection procedure.
2. UE cannot reselect to the highest priority frequency because the highest priority frequency cannot support highest priority slice that supporting in UE or with low priority.
3. Selects a cell where the needed slice is not supported at all or partially supported.
4. When configure NSAG priorities, the UE still must be redirected at the connection setup.

##### Whether the identified issues can be solved in current mechanism or cause heavy UE burden?

###### Object view 1: [8]

**It is possible to determine the following using the existing logged MDT framework**

1. **Whether legacy cell reselection is used or NSAG based cell reselection is used**
2. **The NSAG(s) used for the NSAG based cell reselection**
3. **Whether the UE has reselected to an optimal cell supporting the NSAG(s) triggering the NSAG based cell reselection.**

Moderator’s question 1: How could RAN aware UE’s NSAG priorities?

Moderator’s question 2: How could RAN aware UE’s request Slice is not on the current frequency, because UE may not request resource of all request Slice.

Moderator’s question 3: How could RAN aware UE’s fall back to legacy cell-reselection?

Any more clarification?

**Conclusion: Identified issues can be solved in current mechanism?**

###### Object view 2: [2]

**Requiring the UE to log the NSAGs or frequency priorities in the logged MDT report adds burden for UE to store these configurations in RRC\_IDLE and adds to Uu overhead in logged MDT report. gNB should be able to store this information if needed.**

Moderator’s question 1: Logged MDT measurements are sent on Signalling Radio Bearer SRB2 in RRC\_CONNECTED state. Whether information for optimizing Slice based Cell-reselection priorities really add burden in UU interface.

Moderator’s question 2: The log only collected when sub-optimal event happen,weather the data would affect the maximum 64k byte capacity in a UE?

Moderator ‘s question 3: How many company support this user case? And how many companies objects this user case?

**Conclusion: Identified issues cause heavy UE burden?**

### Assistant information need provided from the UE?

1：New logging trigger for slice-based cell reselection measurements;

2：Logging slice groups used for identifying reselection priorities;

3：Used frequency priorities;

4：Logging problems to connect to needed slice;

5：Logging measurements in relation to frequency priorities

6：Slice specific cell reselection information received from NAS

7：Slice specific cell reselection information received from SIB16 or from Dedicated RRC message

8：Cell ID of Highest ranked cell or best cell

9: Include a flag whether the UE is able to do slice-based cell reselection during the measurement period   
This means we can differentiate behaviour for different UE, i.e. differentiate UEs not supporting this functionality at all

10: Include a flag for each cell reselection, to indicate the cell reslection was made using slice-based cell reselection  
Similar to above, and in addition to this we can analyse the coverage of the configured NSAG. On the other hand, we cannot know which NSAG was configured to the UE and which NSAG the UE was able to camp on.

11: Include the NSAG indicating the NSAG used for each slice-based cell reslection (empty if no configured NSAG was found)  
This means we can analyse which NSAG the UE is able to follow, but we cannot know which NSAG was not possible to follow

12: Include the NSAG configuration currently used by the UE  
This information together with information on the configuration of the network will give information about both which NSAG that was possible to use and also which NSAG was not possible to use (e.g. in case a higher priority NSAG was not possible to be used)

**Conclusion: Which information need to provide from UE?**

## **User case 2：Optimize the mapping of S-NSSAI to NSAG or optimize the frequency priorities**

### Justification discussion:

There are benefits in making the OAM aware that the logged MDT reports were collected by a UE using slice-based cell reselection information (and not general cell reselection information) [2] [10]

Enhancement of logged MDT for slice based cell reselection is not needed [8]

**Conclusion: Do we support this user case?**

## LS to RAN2 needed?

**Conclusion:**

# 2. Other MDT Enhancements for Network Slicing

* **Description**:
  + Discussions on optimizing MDT (Minimization of Drive Test) to improve performance monitoring for network slicing.
  + monitoring slice load and whether MDT should collect data conditionally based on high slice utilization (R3-250409).

## Slice unavailability for logged MDT

Justification:

**Support to report the failure of slice initiation inside the UE, when the higher layer triggers a slice but is rejected by UE’s NAS layer due to NSSAI not within the allowed NSSAI list in current registration area [9]**

**Enhancement of logged MDT for slice unavailability is not needed [8].**

**Conclusion: Do we supports above proposal?**

## Slice performance observability [5]

**Enhancements to Management-based Immediate MDT measurements, where the MDT measurement collection/reporting is conditional on node-level or slice-level utilization to be considered for further normative work.**

**Enhancements to Signalling-based Immediate MDT measurements, where the MDT measurement collection/reporting is conditional on node-level and/or slice-level utilization and only while the UE is actively using a given slice(s) to be considered for further normative work.**

**To increase slice performance observability under different load conditions and reduce amount of data sent to OAM, RAN3 to discuss the presented enhancements for MDT configurations**

**Conclusion: Do we supports above proposal?**

# 3. Slice-aware MRO Optimization

* + This issue primarily concerns mobility management in the context of network slicing, including:
    - Slice discontinuity causing PDU session rejection or handover failures (R3-250327).
    - How the network can optimize handover thresholds to reduce unnecessary handover failures (R3-250247).

1: Successful Handovers with Slice Discontinuity [1]

**The SHR mechanism is enhanced to enable recording the SHR in case when some of the used slices are not supported in the target cell and that a slice-related cause value is added.**

**Conclusion: Do we supports this proposal?**

2: Optimize handover thresholds to reduce unnecessary handover failures[4]

**UE reports slice related information e.g., ongoing slice ID list during handover in SHR. Send LS to RAN2**

**Conclusion: Do we supports this proposal?**

3: Slice user-plane interruption times [7]

**Proposal 1: RAN3 to discuss network-based solutions for improving observability of per slice user-plane interruption times into network slicing**

**Proposal 2: RAN3 to further discuss network-based approaches to collect per slice user-plane interruption times during handovers.**

**Proposal 3: RAN3 to discuss and agree to extending the Data Collection Reporting Initiation and the Data Collection Reporting procedure to obtain slice-level user-plane interruption times.**

**Conclusion: Do we supports these proposal?**

4: Observability of slice access request at the gNB[7]

**Proposal 4: RAN3 to discuss mechanisms to enable the gNB to obtain from the AMF per-UE-level information on allowed and rejected slice requests.**

**Conclusion: Do we supports this proposal?**

Object views:

**1:There are no enhancements needed from UE in SON reports to assist the gNB to optimize handovers with slice service discontinuity (e.g., due to target cell not supporting UE’s ongoing slice). gNB already has sufficient knowledge to identify such scenarios[2]**

**2:The Slice aware MRO can be supported without any standards impact[3]**

**3: No need to enhance the successful case for MRO[3]**

**Conclusion:**

# 4 UHI/MHI for slice [4]

**Record ongoing slicing in UHI for following track decision and resource optimization.**

**UE records NSAG and corresponding priority received from NAS in MHI**

**Conclusion: Do we supports these proposals?**

# References

1. [R3-250078](file:///D:\会议硬盘\TSGR3_127\Docs\R3-250078.zip) [TP to BL CR to 38.300, MDT] MDT solution for slice support and slice-related mobility enhancements (Nokia)
2. [R3-250100](file:///D:\会议硬盘\TSGR3_127\Docs\R3-250100.zip) SON MDT for network slicing (Qualcomm Incorporated)
3. [R3-250247](file:///D:\会议硬盘\TSGR3_127\Docs\R3-250247.zip) SON and MDT for Network Slicing (Huawei)
4. [R3-250327](file:///D:\会议硬盘\TSGR3_127\Docs\R3-250327.zip) Network slicing for SONMDT (CATT)
5. [R3-250409](file:///D:\会议硬盘\TSGR3_127\Docs\R3-250409.zip) On MDT enhancements for Network Slicing (Ericsson, Jio Platforms (JPL), Interdigital, FiberCop)
6. [R3-250410](file:///D:\会议硬盘\TSGR3_127\Docs\R3-250410.zip) (TP for BL CR to 38.413 for MDT) Addition of MDT enhancements [TP on deferred MDT] (Ericsson, Jio Platforms (JPL), Interdigital, FiberCop)
7. [R3-250411](file:///D:\会议硬盘\TSGR3_127\Docs\R3-250411.zip) On SON enhancements for Network Slicing (Ericsson)
8. [R3-250613](file:///D:\会议硬盘\TSGR3_127\Docs\R3-250613.zip) Discussion on MDT for Network Slicing (Samsung, Lenovo, Cybercore)
9. [R3-250683](file:///D:\会议硬盘\TSGR3_127\Docs\R3-250683.zip) Discussion on SON/MDT for network slicing (CMCC)
10. [R3-250725](file:///D:\会议硬盘\TSGR3_127\Docs\R3-250725.zip) Further consideration on SON/MDT for Slicing (ZTE Corporation)
11. [R3-250737](file:///D:\会议硬盘\TSGR3_127\Docs\R3-250737.zip) Discussion on SONMDT enhancements for network slicing (China Unicom)