3GPP TSG-RAN WG3 Meeting #127-bis R3-252288

Wuhan, China, 7th – 11st April 2025

Agenda Item: 11.3

Source: NEC (moderator)

Title: Summary of Discussion on CB: # AIRAN2\_CCO

Document for: Discussions & Approval

# Introduction

**CB: # AIRAN2\_CCO**

**- Discuss the open issues above**

**- Capture agreements and open issues**

(moderator - NEC)

Summary of offline disc [R3-252288](Inbox\R3-252288.zip)

# For Chairman’s notes

**To be continued in the next meeting:**

# 3 Discussion

In the online discussion the following was captured in the Chair’s meeting minutes:

|  |
| --- |
| **The maximum value of the Time interval for predicted CCO issue and future CCO state is 60s.**  **Legacy UE performance measurement metrics can be reused for CCO.**  **Evaluate the predicted CCO issue and/or the future CCO state, what’s the difference？**  **Other additional information needed?**  **Timing information for predicted CCO issue is NOT needed to exchange over Xn? Whether the predicted CCO issue and /or future CCO state can be updated over Xn?**  **gNB-CU can also provide to gNB-DU a recommended future CCO state as assistance information?** |

## 3.1 UE performance feedback for CCO

CCO is to optimize the network by adjusting cell coverage due to coverage and capacity problems. For AI/ML based CCO, the predicted CCO issue can be avoided or mitigated by advance CCO action, therefore UE performance should be not (much) impacted due to the future CCO issue or the advance CCO action.

In order to evaluate the AI/ML CCO model, UE performance feedback can be used for UE performance comparation before and after a CCO action that is triggered based on the inference output from AI/ML CCO model.

For reference, we agreed in SI the following feedback can be considered for AI/ML based CCO and captured in TR 38.743:

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4.2.2.4 Feedback of AI/ML based CCO

To optimize the performance of AI/ML-based CCO model, following feedback can be considered to be collected from gNBs:

- Measured radio resource status

- Legacy UE performance feedback for those UEs handed over from the source gNB

- SON Reports (e.g., RLF, CEF, RA)

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**FFS:**

**Evaluate the predicted CCO issue and/or the future CCO state, what’s the difference？**

1. Predicted CCO issue
2. Future CCO state
3. ?

**Other additional information needed?**

In addition to Legacy UE performance measurement metrics, the following other metrics were proposed to be considered:

1. UE location or geographical areas [5] [7]
2. UE radio measurements (cell level RSRP, RSRP, SINR) [15] [22]
3. Node level UE performance [9] [30]

**Proposal:**

## 3.2 Time information for predicted CCO issue over Xn

For AI/ML based CCO, the following two time information were introduced:

* **Time for future coverage state**
  + **The point in time when the future coverage state will be applied.**
  + **A relative time from the time of receiving the gNB-DU Configuration Update message over F1 and NG-RAN node config Update message over Xn.**
* **Time for predicted CCO issue**
  + **The point in time when the CCO issue is predicted to happen.**
  + **A relative time from the time of receiving the gNB-CU Configuration Update message over F1.**

We already agreed and caprtured in BLCR [1] that, in XnAP NG-RAN NODE CONFIGURATION UPDATE message, a *Time for Future Coverage State* IE can be included for each Future Coverage Modification Item. As explained in the semantics description, this time information *indicates the time when the Future Cell Coverage State(s) and/or the Future SSB Coverage State(s) will be applied by the NG-RAN node1 relative to the time of receiving this information*.

**FFS:**

**Timing information for predicted CCO issue is NOT needed to exchange over Xn?**

Below is the summary of proposals to this meeting:

1. No [4] [5] [7] [9] [25] [27] [30]
2. Yes [6] [10] [15] [21] [22] [32]

**Whether the predicted CCO issue and /or future CCO state can be updated over Xn?**

**Proposal:**

## 3.3 Recommended future CCO state from CU to DU

Considering gNB-CU holds the AI/ML-based CCO model and it collects all input data for AI/ML model, it is more knowledgeable on the neighbour node status and UE performance status. Based on the received future CCO state and predicted CCO issue, also together with other information, e.g. current/predicted radio resource status, gNB-CU can take advantage of AI/ML tool and, meanwhile, coordinate all gNB-DUs connected to it to generate a more suitable future CCO state. Therefore, some companies acknowledge the benefits that gNB-CU can generate a recommended future CCO state and send it to gNB-DU as assistance information.

**FFS: gNB-CU can also provide to gNB-DU a recommended future CCO state as assistance information?**

Below is the summary of proposals to this meeting:

1. Yes [5] [7] [22] [27]

**Proposal:**

## 3.4 TP to BLCR

**Moderate proposes to agree the TP for the XnAP BLCR and F1AP BLCR respectively in the draft folder reflecting the following agreements.**

|  |
| --- |
| **The maximum value of the Time interval for predicted CCO issue and future CCO state is 60s.**  **??** |

**Proposal: Agree the following TPs reflecting the agreements from the online session.**

* **TP for the XnAP BLCR in R3-25xxxx**
* **TP for the F1AP BLCR in R3-25xxxx**
* **Stage 2?**

# 4 References

1. R3-250924 (BL CR to TS 38.423) Support of enhancements on AI/ML for NG-RAN
2. R3-250925 (BL CR to TS 38.473) Support of enhancements on AI/ML for NG-RAN
3. R3-251648 (TP for BLCR to TS 38.473) Further discussion on energy efficient AI/ML-based CCO issue prediction in split architecture Nokia, FiberCop, Jio Platforms (JPL)
4. R3-251649 (TP for BLCR to TS 38.473) Further discussion on signalling for AI/ML-based CCO Nokia
5. R3-251678 Open issues for AI/ML-based CCO NEC
6. R3-251787 Discussion on remaining issues in AI/ML enabled CCO Qualcomm Incorporated
7. R3-251794 Discussion on AI/ML enabled CCO Samsung
8. R3-251825 (TP on 38.473) Open issues on the CCO use case CATT
9. R3-251826 Open issues on the CCO use case CATT
10. R3-251869 Discussion on AI/ML based Coverage and Capacity Optimization China Telecom
11. R3-251870 (TP for BLCR to TS38.423) Support of AI/ML based Coverage and Capacity Optimization China Telecom
12. R3-251871 (TP for BLCR to TS38.473) Support of AI/ML based Coverage and Capacity Optimization China Telecom
13. R3-251911 AIML enabled CCO - Single predicted CCO issue resolution Ericsson, InterDigital, Jio Platforms, Deutsche Telekom
14. R3-251912 (TP to 38.473) - AIML enabled CCO - Single predicted CCO issue resolution Ericsson, InterDigital, Jio Platforms, Deutsche Telekom
15. R3-251913 AIML enabled CCO - Prediction validation and timing issues Ericsson, InterDigital, Jio Platforms, Deutsche Telekom, FiberCop
16. R3-251914 (TP to 38.473) - AIML enabled CCO - Prediction validation and timing issues Ericsson, InterDigital, Jio Platforms, Deutsche Telekom, FiberCop
17. R3-251915 (TP to 38.423) - AIML enabled CCO - Prediction validation and timing issues Ericsson, InterDigital, Jio Platforms, Deutsche Telekom, FiberCop
18. R3-251916 AIML enabled CCO - Multiple CCO issues Ericsson, InterDigital, Jio Platforms, Deutsche Telekom
19. R3-251917 (TP to 38.473) – AIML enabled CCO - Multiple CCO issues Ericsson, InterDigital, Jio Platforms, Deutsche Telekom
20. R3-251918 (TP to 38.423) - AIML enabled CCO – Multiple CCO issues Ericsson, InterDigital, Jio Platforms, Deutsche Telekom
21. R3-251936 Discussion on AIML based CCO Lenovo
22. R3-251994 Discussion on AI/ML-based Coverage and Capacity Optimization Huawei, Jio Platforms, Orange, Deutsche Telekom, FiberCop
23. R3-251995 (TP for AIML BLCR to TS 38.423) XnAP enhancements for AIML-based Coverage and Capacity Optimization Huawei, Jio Platforms, Deutsche Telekom, FiberCop
24. R3-251996 (TP for AIML BLCR to TS 38.473) F1AP enhancements for AIML-based Coverage and Capacity Optimization Huawei, Jio Platforms, Deutsche Telekom, FiberCop
25. R3-252090 Discussion on issues for AI/ML-based CCO LG Electronics Inc.
26. R3-252091 (TP for NR\_AIML\_NGRAN\_enh-Core for TS 38.473) Discussion on issues for AIML-based CCO LG Electronics Inc.
27. R3-252155 Discussion on AI/ML assisted Coverage and Capacity Optimization ZTE Corporation
28. R3-252156 [TP to 38.401] Support of AI/ML assisted CCO ZTE Corporation, Lenovo, China Unicom, China Telecom
29. R3-252157 [TP to 38.423 and 38.473] Support of AI/ML assisted Coverage and Capacity Optimization ZTE Corporation
30. R3-252174 Discussion on AI/ML-based CCO CMCC
31. R3-252204 Coexistence of multiple CCO issues Rakuten Mobile, Inc
32. R3-252205 Timing Information for AIML based CCO Rakuten Mobile, Inc
33. R3-252237 [TP to BLCR to TS 38.300] Support of AI/ML assisted CCO ZTE Corporation, Lenovo, China Unicom