China Academy of Telecommunication Technology

3GPP TSG RAN Meeting #102
Edinburgh, Scotland, December 11-15, 2023

RP-233010

Views on reply LS to SA2 on AI/ML Core Network enhancements

CATT

Background

- **SA2 sent an LS to TSG RAN, RAN1, RAN2 and RAN3 on AI/ML Core Network enhancements in S2-2311921**
- **SA2 asked TSG RAN and RAN WGs (in TO above) to provide feedback on whether there is any requirement for SA2 to support AI/ML for air interface and NG-RAN in RAN.**

1. Overall Description:
SA WG2 and TSG SA are discussing, in the context of the draft (not yet approved) rel.19 "SID on Core Network Enhanced Support for Artificial Intelligence (AI)/Machine Learning (ML)", the working task #1 as captured in S2-2310034 (endorsed as the baseline for further work at SA2#158), which is still undergoing discussion in SA2.

The WT contains the following NOTE

"Whether SA2 will study WT1 and the content of WT1 will depend on and follow RAN study and conclusions. WT1 and associated TUs will be revised to align to RAN study conclusions, when RAN reaches such conclusions."

SA WG2 is asking TSG RAN and RAN WGs (in TO above) to provide feedback on whether there is any requirement for SA2 to support AI/ML for air interface and NG-RAN in RAN. SA WG2 would like to ask for an answer at the latest by the December plenary meetings.

- **Details on WT1 (including WT#1.1~WT#1.5) can be found in S2-2310034.**

WT#1.1

- **WT#1.1 is about UE data collection framework**

WT1.1 – Study enhancements to UE data collection framework. Study whether and how to enhance UE data collection framework to meet requirements for RAN AI support for air interface operation (for RAN). This includes identifying what benefit can be achieved from enhanced UE data collection for 5GC, and the potential impacts on the 5G framework, including potential enhancements to policy control. Regarding the radio related data collected from UE or RAN, e.g, channel status information and beam information, the WT will also discuss the data leakage from the operator's domain which should be avoided.

- **RAN2 is the leading WG for data collection. The following agreement was reached in RAN2#124**

Capture the following text:
The following proposals were discussed in RAN2
1. UE collects and directly transfers training data to the OTT server
   1a) OTT (3GPP transparent)
   1b) OTT (non-3GPP transparent)
2. UE collects training data and transfers it to CN. CN transfers the training data to the OTT server.
3. UE collects training data and transfers it to OAM. OAM transfers the needed data to the OTT server.

RAN2 did not study or analyze the proposals and did not agree to requirements or recommendations.

- **It can be concluded that there is no agreed requirements or recommendations for WT#1.1**

- **Proposal 1: Regarding WT#1.1, RAN has no requirements to SA2.**

WT#1.2

- **WT#1.2 is about model transfer/delivery to UE. Related information is also included.**

WT1.2 – Study 5GC support for AI/ML model and information sharing with the UE. Study whether (and how) to support model transfer/delivery to the UE according to RAN1/RAN2 considerations, including potential enhancements to policy control. Whether and what entities or functions transfer the AI/ML model or information to the UE will be studied as part of the work. This WT will also discuss the data leakage from the operator's domain which should be avoided.

- **In RAN2, the following agreement on training entity for UE-side model was made in RAN2#124**

Agreements:
For CN and OAM FFSs, we will remove it and add a NOTE indicating that it was identified but RAN2 didn't study as it is out of scope of RAN2
For the following FFS: LMF and gNB, and CSI compression for UE control, we will remove it and add a NOTE indicating that it was identified but RAN2 didn't study or conclude as it depends on RAN1 progress
Update TP to indicated that CSI prediction use case for the functional mapping is the same as beam management for UE side model

- **In RAN1, benefit and challenge on model transfer/delivery was concluded, but no recommendation was made so far**

- **It can be concluded that there is no agreed requirements or recommendations for WT#1.2**

- **Proposal 2: Regarding WT#1.2, RAN has no requirements to SA2.**

WT#1.3

- **WT#1.3 is on model identification and model management.**

WT1.3: Study whether and how to support the alignment of model identification and model management between SA2 and RAN. Work will be based on the possible requirements defined by RAN1 and RAN2.

- **For model identification,**
  - RAN1 has studied various model identification Types and their use cases.
  - RAN2 has studied model identification procedures and signaling, including e.g. content of metadata.
  - To avoid redundant identification/test, it is often assumed that model identification and corresponding ID is global unique. SA2 involvement is expected to achieve global design.
  - Yet it is true that whether model identification is supported in Rel-19 WI of AI/ML in air interface has not decided so far
- **For model management, there should be no requirement to SA2**

- **Proposal 3: Regarding WT#1.3,**
  - **For model identification, if it is supported in Rel-19 WI of AI/ML in air interface, RAN has requirement to SA2 to align model identification and to achieve global unique design;**
  - **For model management, there is no requirement to SA2.**

WT#1.4

- **WT#1.4 is related to interaction/coordination between NG-RAN and SA2 for Rel-18 AI/ML in NG-RAN.**

WT1.4: Study whether and how to support interaction/coordination with RAN3 to support the AI enabled NG-RAN framework (i.e. AI/ML for NG-RAN in Rel-18). Work will be based on possible requirements from RAN3.

- **As indicated in RP-232728 (RAN3 reply LS to SA2), for Rel-18 AI/ML in NG-RAN, RAN3 has no requirement to SA2**

- **Observation: Regarding WT#1.4, for Rel-18 AI/ML in NG-RAN, RAN has no requirement to SA2.**

- **Note that some potential objects in Rel-19 AI/ML in NG-RAN need coordination with SA2, yet the scope is to be confirmed in RAN#102, for example:**
  - Study the benefits and potential coordination/interaction between CN and NG-RAN for support of AI/ML function.

- **Proposal 4: Regarding WT#1.4, for Rel-19 AI/ML in NG-RAN, coordination with SA2 is expected for some potential objects, e.g. for those related to NWDAF assistance. Eventually, whether there will be requirement to SA2 depends on the scope of Rel-19 AI/ML in NG-RAN.**

WT#1.5

- **WT#1.5 is dedicated for location service (LCS) enhancement to support AI/ML based positioning.**

WT1.5: Study whether and how to consider enhancements to LCS to support AI/ML based Positioning.

- **For WT#1.5, several aspects are considered as follows:**
  - For UE data collection, similar to WT#1.1, there is no requirement;
  - For model transfer/delivery (e.g. from CN to UE), similar to WT#1.2, there is no requirement;
  - For model identification, if supported, can be considered together within WT#1.3;
  - For training, inference, performance monitoring of model at LMF-side, LMF is involved, in which RAN has requirement to SA2;
  - For AI/ML-assisted positioning with UE-side or gNB-side model, when monitoring is based on provided ground truth label (or its approximation), the performance may be monitored at LMF-side, which may have requirement to SA2;
  - Other LCM procedures like activation/deactivation/switching do not have requirement to SA2.
- **Proposal 5: Regarding WT#1.5,**
  - **RAN has requirement to SA2 on training, inference, performance monitoring of model at LMF-side;**
  - **RAN has requirement to SA2 on performance monitoring of model at UE-side or gNB-side, by LMF;**
  - **RAN has no requirement to SA2 on other aspects, e.g. UE data collection, model transfer/delivery (from CN to UE), model management, etc.**

Conclusion

Observation: Regarding WT#1.4, for Rel-18 AI/ML in NG-RAN, RAN has no requirement to SA2.

Proposal 1: Regarding WT#1.1, RAN has no requirements to SA2.

Proposal 2: Regarding WT#1.2, RAN has no requirements to SA2.

Proposal 3: Regarding WT#1.3,

- **For model identification, if it is supported in Rel-19 WI of AI/ML in air interface, RAN has requirement to SA2 to align model identification and to achieve global unique design;**
- **For model management, there is no requirement to SA2.**

Proposal 4: Regarding WT#1.4, for Rel-19 AI/ML in NG-RAN, coordination with SA2 is expected for some potential objects, e.g. for those related to NWDAF assistance. Eventually, whether there will be requirement to SA2 depends on the scope of Rel-19 AI/ML in NG-RAN.

Proposal 5: Regarding WT#1.5,

- **RAN has requirement to SA2 on training, inference, performance monitoring of <u>model at LMF-side</u>;**
- **RAN has requirement to SA2 on performance monitoring of <u>model at UE-side or gNB-side</u>, by LMF;**
- **RAN has no requirement to SA2 on other aspects, e.g. UE data collection, model transfer/delivery (from CN to UE), model management, etc.**

THANK YOU