3GPP TSG RAN Meeting #102
Edinburgh, Scotland, December 11-15, 2023
Agenda item: 9.1.3.1 AI/ML for NG-RAN

RP-232889

AI/ML for NG-RAN enhancement

NEC

© NEC Corporation 2023

RAN AI/ML for NG-RAN

- In Rel_18, the WI of AI/ML for NG-RAN is completed.
  It is specifying data collection enhancements and signaling support within existing NG-RAN interfaces and architecture (including only non-split architecture) for AI/ML-based Network Energy Saving, Load Balancing and Mobility Optimization.

- For Rel-19 it is worth considering to expand RAN AI/ML utilization:
  - Rel-18 left over issues
  - Supporting new use case(s) to expand AI/ML utilization
  - Considering on architecture aspect

© NEC Corporation 2023

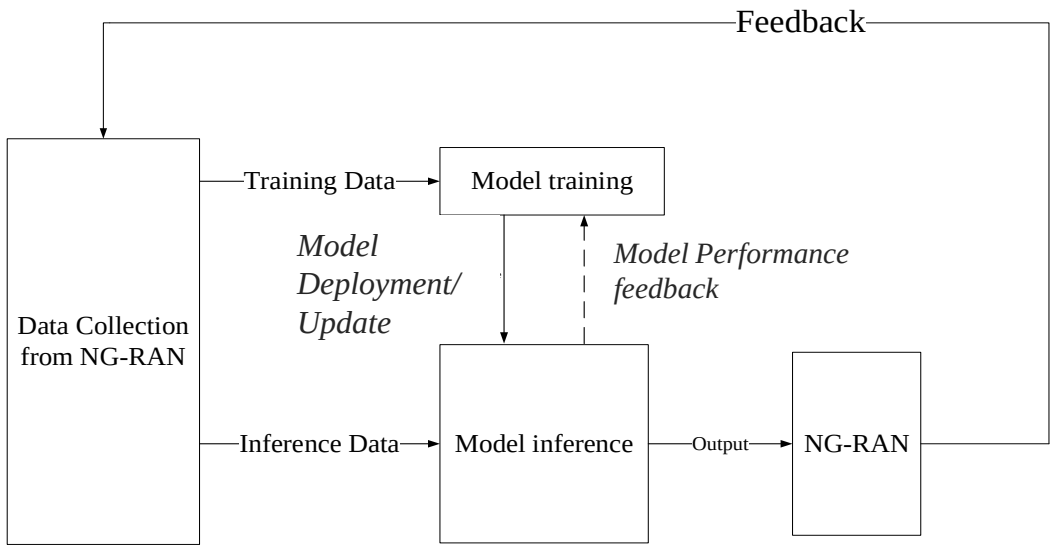
Rel-19 AI/ML for NG-RAN enhancement

- Rel-19 to consider Rel-18 left over issues
  - Mobility Optimization use case, UE Trajectory Prediction and Measured UE Trajectory in Rel-18 is limited to cells within one hop, further enhancement to multi-hop trajectory prediction is benefit for target gNB to allocate appropriate resources and measurement configuration
  - Supporting RAN AI/ML over split architecture
    - For energy cost and mobility optimization, gNB-DU can be the place to also collecting measured energy cost, and for LTM(L1/L2 Triggered Mobility) in gNB-DU, predicted UE trajectory will help gNB-DU to have better configuration of measurement report configuration.
    - For load balancing, gNB-CU-UP may be the better place for collecting of traffic information, therefore to support standardized function in E1 interface for transferring of UE performance feedback (Average UE Throughput, Average Packet Loss, Average Packet Delay).
- Rel-19 to consider possible new use case(s), e.g.
  - Network Slicing:
    - Optimize the network slicing policy and resources by reinforcement learning, using for selecting/allocating appropriate resources to serve the UE in a slice
    - Reduce the high computational complexity of manually policy-based methods for network slicing resource management.

© NEC Corporation 2023

Study for Additional separated network node/function

- Introduce additional separated network node or function to implement the AI model training and model inference:
  - To be Multi-vendor capable induction.
  - To realize higher layer management across multi-vendor and large area network optimization co-operation.
  - In additional to gNB-DU and gNB-CU-UP, introduce addition network node or function to implement the AI model training and model inference, with standard interfaces which are interpretable for multi-vendor support, including integration and collaboration of OAM AI/ML, 5GC AI/ML, Distributed NG-RAN AI/ML if identified.
  - This can have a study phase to discuss its feasibilities



© NEC Corporation 2023
\Orchestrating a brighter world NEC

Summary of proposals to include in Rel-19

- **Proposal 1**: Further enhancement to consider Mobility Optimization to include multi-hop trajectory prediction
- **Proposal 2**: Further enhancement to support standardized function in F1 interface to collect measured energy cost in gNB-DU, and predicted UE Trajectory from gNB-CU to gNB-DU for mobility optimization
- **Proposal 3**: Further enhancement to support standardized function in E1 interface to collect measured traffic information of UE performance feedback (Average UE Throughput, Average Packet Loss, Average Packet Delay).
- **Proposal 4**: Further consideration of use cases e.g. network slicing.
- **Proposal 5**: It is worth introducing study phase to consider additional separated network node or function to implement the AI model training and model inference for multi-vendor network deployment, including integration and collaboration of OAM AI/ML, 5GC AI/ML, Distributed NG-RAN AI/ML

© NEC Corporation 2023

\Orchestrating a brighter world

NEC