HCLTech | Supercharging Progress™

Telco AI Force

Introduction

HCLTech has both a product and services approach focusing on O-RAN RIC/SMO disaggregated architecture. In this solution, our focus is on rApp and related solutions with extensions towards xApp that are being developed to help expedite the maturity of this new technology in the industry.

HCLTech has developed a handful of rApps and xApps towards Traffic Steering, QOE/QOS optimization, NSSI resource allocation, and energy savings use cases and has a healthy roadmap of other use cases aligning with prioritization from operators.

Solution offerings

- Industry-led use cases to address pain points in greenfield and brownfield deployments
- Realizing Hybrid App MVP that integrates rApp and xApp together based on O1, A1, E2, O2
- xApp/rApp Developer Studio that integrates necessary AI PaaS components to accelerate development and management of various rApps/xApps. It supports E2E AI ML pipeline creation components like data, training, validation, deployment and management.
- Customized for ANA SMO SON platform

Solution highlights

- **rApp**
  - **O1 Bouncer:** Benchmark the O1 and R1 interface. Identifying the performance bottlenecks and aiding in providing insight for scaling and dimensioning of SMO and RAN elements.
  - **NSSI:** Control the Slice related behavior of RAN over the O1 interface
  - **Energy Saving:** Switching off one or more carriers or entire cells without impairing the network performance. Decisions made by an AI/ML model
  - **Geo Location:** Forecasts roaming/static location trajectory of all users available in the network based on their movement pattern
  - **Load Prediction:** Predicts the load on the cell for a specific time duration
  - **Mobile load analyzer:** Analyzes load among cells and avoids cell congestion.

Solution highlights

- **xApp**
  - **Quality prediction:** Predicts expected uplink and downlink throughput of serving and neighbor cells
  - **Anomaly Detection:** Detect anomalous UEs on streaming UE data using AIML.KPIMon(xApp): Provides data lake by parsing E2SM KPM info RAN nodes
  - **RAN control(xApp):** Initiates handover request by sending the relevant E2 control request
  - **QoS(xApp):** Change the priority level of the user and trigger RAN control to increase the priority
- **Hybrid App**
  - **Traffic steering:** To perform predictive analysis of network and users' traffic using AI/ML algorithms and improve network performance and user experience in a predictive manner
  - **Super App:** Monitor the overall network and heal it by coordinating of action between apps providing conflict mitigation and avoidance at the app level

Key differentiators

- Rapid rApp/xApp development for a given use case
- Adaptability and portability on RIC vendor platforms
- MVP realization integrating SMO, Non-RT RIC and Nea-RT RIC layers (through A1, O1, E2) developing hybrid RAN control applications
- Prior integration expertise with different RIC implementations, O1, E2 implementations and Digital twins
- Conform to O1 and E2 specifications
- ML Flow/Kubeflow based integration for scaling and efficient model management
- Showcase integrated test scenario with rApp and xApp together
- App testing and validation using VIAVI RIC Test AVE score

Benefits

- Silver badge in TIP Exchange for HCLTech Traffic Steering and Predictive Load Balancing xApp solution
- Developing Apps for DSIT UK funded TIP ARIANE project
- E2E use case execution
- Active participation in industry events like MWC, FYUZ and in Open Source Community (OSC, OAI)
- Varied vendors and operators integration experience via PlugFests

Roadmap

KPI Analyzer

Monitor the KPIs over O1 interface, detect anomalous events across traffic domains and notify them for further action to the subscribed applications

Beam Based MLB

Distribute traffic evenly across cells using the RF for beam formation management

mMIMO Energy Saving

Dynamically configure number of MIMO channels to minimize energy consumption

mMIMO GoB Beam Forming Optimization

Optimization of the multi-cell M-MIMO beamforming performance

Mobility Robustness Optimization

Optimize Handover Control Parameters to address the Mobility Management

Capacity and coverage optimization

Optimize the trade-off between coverage and capacity by jointly optimizing the transmit power and downtilt (elevation tilt) settings across sectors.