VIAVI Solutions

Case Study

RAN Intelligence

RIC Traffic Steering

Improving the User Experience

- **RAN Intelligent Controller (RIC)** – The RIC enables the optimization of RAN resources through near real-time analytic processing and provides adaption recommendations. The RAN Intelligent Controller (RIC) is cloud native, and a central component of an open and virtualized RAN network.
- **xApps** – on xApp is a software tool used by a RAN Intelligent Controller (RIC) to manage network functions in near-real time. xApps are part of a RIC — a central software component of the Open RAN architecture. It is responsible for controlling and optimizing RAN functions and resources.

The RIC is an O-RAN Alliance defined network component that aligns with 3GPP Release 15 and beyond. It supports network slicing, mobile broadband, mission critical communications etc.

Some of the most important features of the RIC are:

- It supports network slicing, mobile broadband, mission critical communications etc.
- It helps operators to optimize and launch new services by allowing them to make the most of network resources
- It can ease network congestion by continually looking at the best use of resources
- It enables energy saving by turning off radios when not needed

The RAN Intelligent Controller and is an open platform designed to host RAN control applications (called xApps) developed by specialist software developers – sometimes external to the RIC vendor

Three Objectives of the RIC

Performance Data

- RIC receives a stream of RAN data (counters, KPIs, measurements) which can be analyzed by xApps and AI/ML engines to make RAN optimization decisions

Resource Assurance

- Ensure services attain required performance – using handover, modulation changes, prioritisation of RAN resources

Balance and Harmony

- Ensure RAN efficiency when many users are battling for scarce resources

Complexity of Deployment

As cellular network complexity increases, the need for network intelligence becomes more important. Huge amounts of network decisions need to made in very short timeframes to ensure subscribers are getting the consistent service they expect. Network intelligence means mission-critical information generated by xApps can tell the RIC (in this case) to steer subcribers to another cell if their QoE is compromised, therefore helping to enable a consistent experience for subscribers.

But how can you tell if the xApps are set-up to make the right decision all the time? If one xApp overrides another xApp, will the outcome invoke a reverse action?

Steering Away from the Problem

So how can you ensure trust in this new network component? The simple answer is through testing. You have to create a repeatable environment where the RIC together with xApps can be trained and validated in different scenarios.

In this use case, we use one RAN Intelligent Controller with three xApps in a traffic steering scenario. We will verify if the xApps work together effectively to improve user experience of a UE, when the UE encounters an anomaly in the cell, negatively affecting its data throughput.

Solution

To ensure the xApps are working optimally, you can use a RAN emulator. In this case the VIAVI solution will emulate the UE or UEs whether they are static, moving at speed (i.e. in a vehicle), running data calls. The RAN emulator can then also recreate an anomaly in the cell to purposely cause degradation to throughput, testing if the xApps resolve the issue effectively.

VIAVI RIC Test continuously sends statistics, KPIs and counters across the E2 interface to the RIC, which is housing the three xApps to test them. This allows the user to gather full data on how the RIC and xApps perform against target KPIs.

1. Anomaly Detection

The first xApp – Anomaly detection has the task of monitoring the KPIs from each UE and based on historical data capturing when a UE suffers and anomaly/degradation. This is all it does. Once it confirms that there is an anomaly/degradation to a UE, it passes on a message to the next xApp – Quality Predictor to perform the next task.

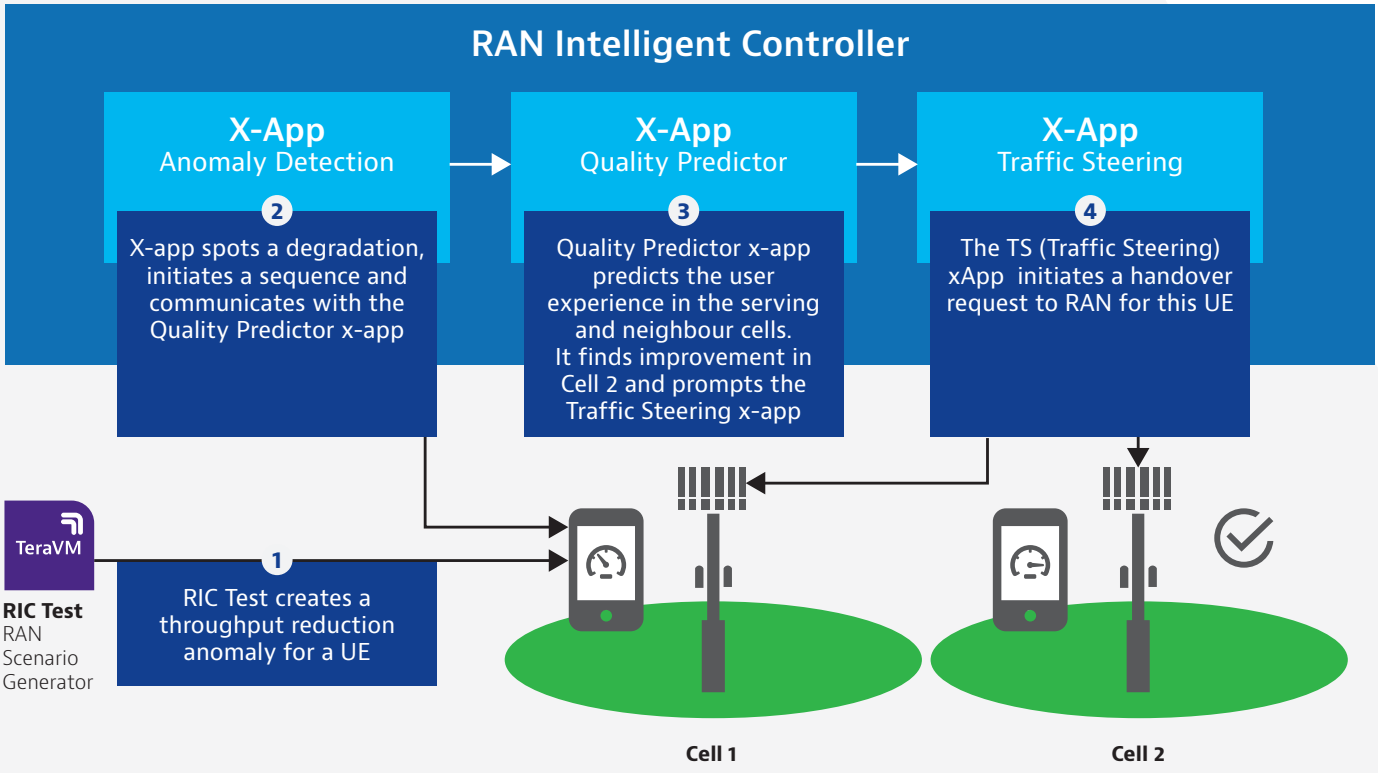
2. Quality Predictor

Quality Predictor xApp has the task of looking at alternative ways of improving the quality of this ailing UE.

It can assign the UE to a different frequency or to a different cell. It uses KPIs from the emulated RAN and runs algorithms to assess the UE performance impact if moved, and also any performance impact for existing UEs in the target cell. All of this in near real time. If it decides that a handover is the best course of action, it will trigger the 3rd xApp.

3. Traffic Steering

The Quality Predictor xApp prompts the Traffic Steering xApp to instigate a UE handover from one cell/sector/frequency to another. It does this by sending a handover command across the E2 interface to the RAN emulator, which in turn effects the handover.



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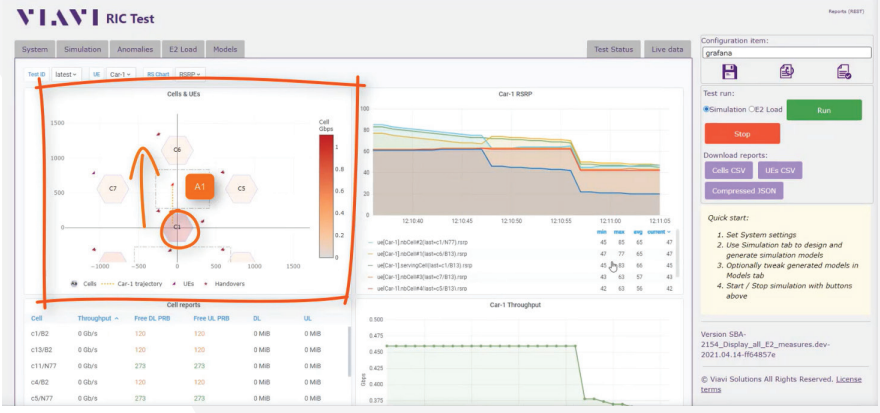
The key elements are: the RAN emulator, traffic generator, KPI generation, anomaly creator and handover function – ALL run by the VIAVI RIC Tester.



The overall GUI counters can be observed throughout the process, showing firstly how the UE achieves good data throughput, then low throughput when the anomaly is triggered, and finally good throughput again when the handover occurs.

Summary

RAN intelligence optimization and test is key to get new revenue streams from 5G and Open RAN.

VIAVI enables operators to test the RIC and helps to expedite the roll-out of Open RAN networks and architectures. This makes it easy to understand if changes improve the RAN efficiency.

VIAVI RIC Test supports network evolution, and provides easy, cost-effective ways of testing and ensuring quality service for subscribers.

Find out more about VIAVI RIC Test:
viavisolutions.com/RIC

VIAVI Solutions

Contact Us **+1 844 GO VIAVI**
(+1 844 468 4284)

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visit viavisolutions.com/contact

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