

# Driving down the cost of deploying and operating O-RAN

**RAN Intelligent Controller (RIC)**





# What is the RIC?

The RIC enables the optimization of RAN resources through near real-time analytic processing and provides adaptation recommendations. The RAN intelligent Controller (RIC) is cloud native, and a central component of an open and virtualized RAN network. 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. It helps operators to optimize and launch new services by allowing them to make the most of network resources. It also helps operators to ease network congestion. RIC stands for RAN Intelligent Controller and is an open platform designed to host RAN control applications (called xApps) which will be developed by specialist software developers – sometimes external to the RIC vendor.

There are two types of RIC – a non-real time and a near real time – the main difference between them is the response time they take to effect changes in the RAN. The nRT RIC will turnaround decisions between 10 ms and 1 sec. While the Non-RT RIC feeds data collected from RAN elements into Near-RT RIC and provides element management and reporting. By keeping the RIC open and standard interface fosters innovation and time to market.

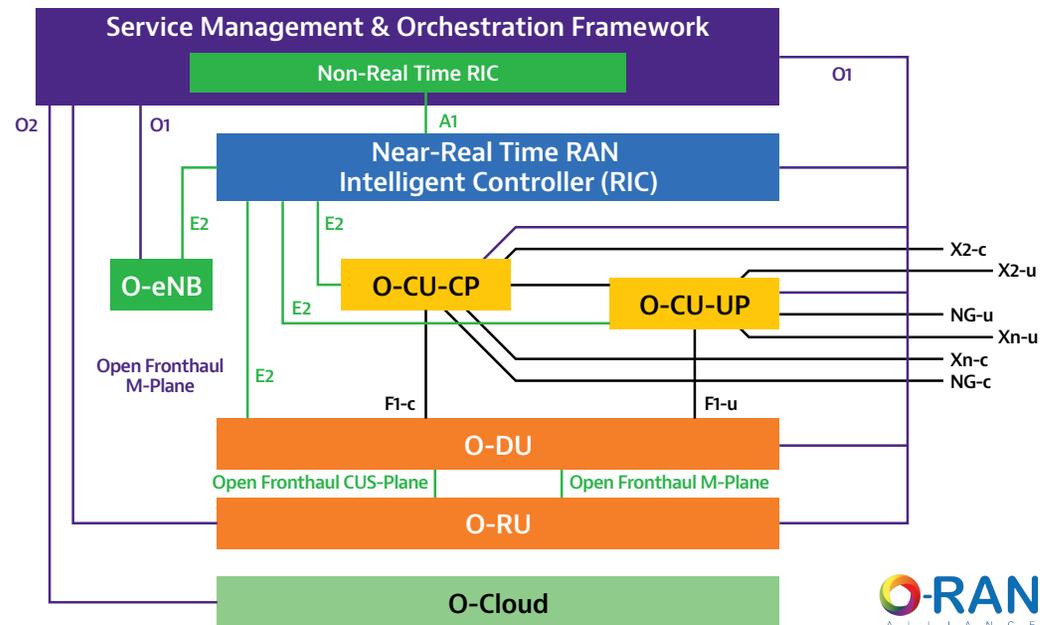
# Optimize Subscriber Experience

The RIC enables interoperability across different hardware (O-RU servers) and software (O-DU/O-CU) components in an O-RAN architecture.

It features a standardized interface – called the E2 – from the O-CU and O-DU to the RIC.

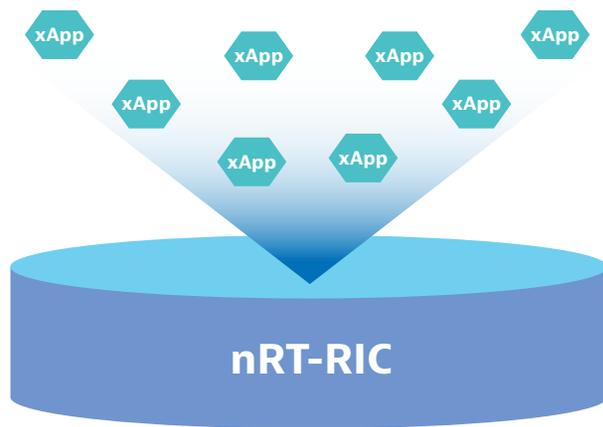
It is along the E2 interface that the RIC receives measurements from the RAN about the performance of the network.

It then makes intelligent decisions to improve things like subscriber positioning, handover to a cell, and changing to different frequency. It adapts any variables in order to optimize the subscriber experience and network performance. To affect these improvements, intelligence is then sent back across the E2 interface to the RAN.



Source: O-RAN Alliance

# Outperform your Competition



RIC is an open platform designed to host RAN control applications developed by specialist SW developers external to RIC vendor - xApps.



Fosters innovation and speed.



Differentiates network operators from competition.



Mitigate risk by testing.

The RIC will become a differentiator for Mobile Network Operators to attract new customers by showing how their network is out-performing the competition with real statistics.

As with any new network element, testing is the only way to mitigate risk prior to deployment.

# Fostering Innovation

The nRT RIC is just one of the elements of the Open RAN ecosystem, aimed at driving down the cost of deployment and the operation of Radio Access Networks.

Enabling architecture flexibility lowers the barriers of entry for new vendors and fostering innovation with new companies looking to take a slice of the mobile communications pie.

RIC is specified by O-RAN Alliance as an integral part of the O-RAN architecture but is not yet part of the 3GPP RAN standard.

# Reducing Total Cost of Ownership



Analysys Mason forecasts that the launch of 5G networks will drive growth in mobile data traffic almost 2500 ExaBytes (2,500 Billion Gigabytes) worldwide in 2025

By 2025,  
2500  
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mobile data  
traffic



Traffic growth combined with already exorbitant 5G spectrum costs and declining average revenue per user (ARPU) puts pressure on operator finances, which in turn will put emphasis on significantly reducing the TCO of their networks.

MNOs expect to achieve some TCO reduction by:

- Implementing an Open RAN architecture,
- Move applications off proprietary HW to the cloud
- Rely more on automation
- Use innovative ML/AI network optimization tools to get the maximum user experience from their scarce resource – spectrum

# The Stats

About **35%** of the MNOs are planning to use the RIC to manage all Open RAN operations. A further **20%** are considering specific Open RAN use cases for the RIC.

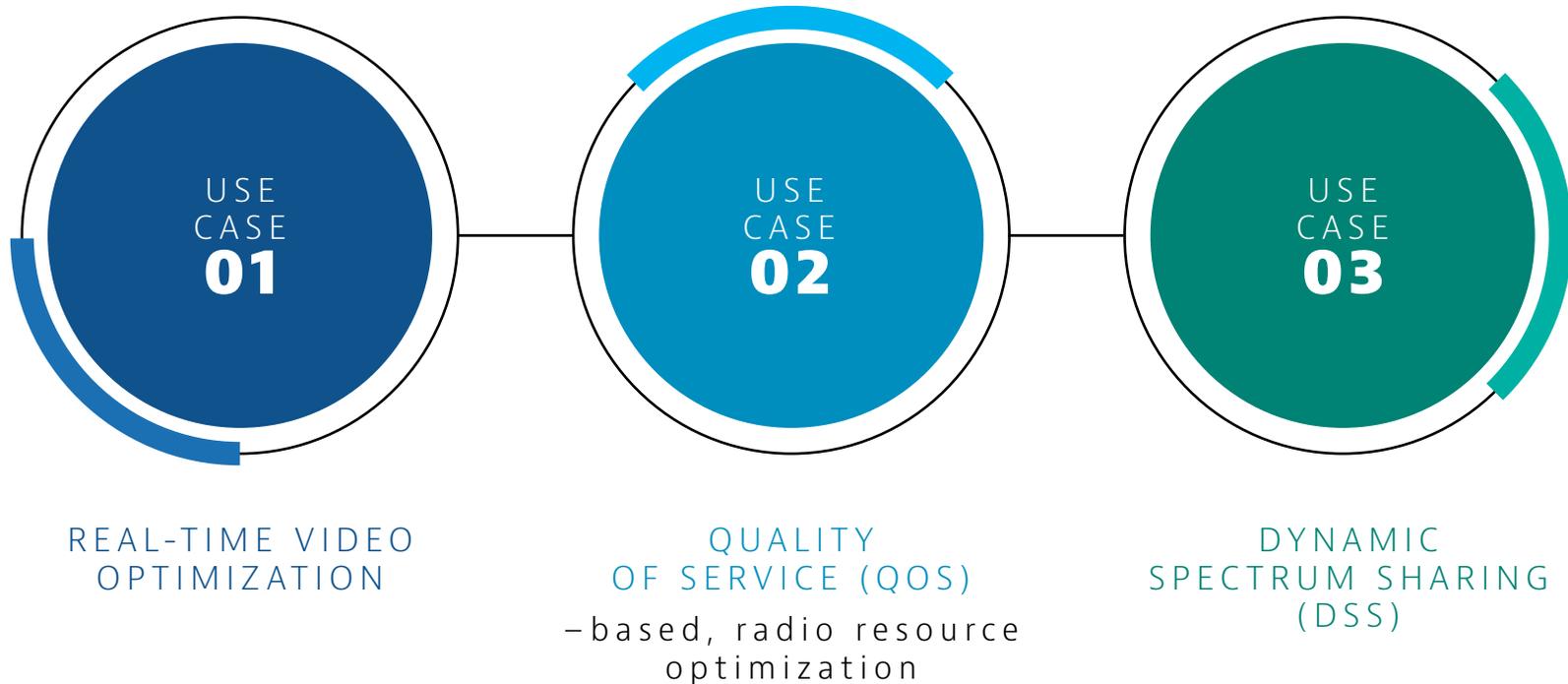
Top reported commercial driver for deploying the RIC was: RAN total cost of operation (TCO) reduction.

About 74% of the MNOs expect to increase asset use efficiency by **10 - 30%** by deploying the RIC.

Source: Analysys Mason

# Top 3 Use Cases for nRT RIC

Predictively allocating and optimizing RAN resources in real-time:



Source: Analysys Mason

# Three Objectives of RIC



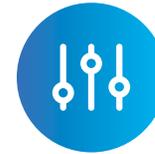
## Performance Data

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, prioritization to change RAN operations



## RAN Balance and Harmony

Ensure RAN efficiency when many users are battling for scarce resources

# Top Challenges in Deploying the RIC



**Complexity of deployment** - A new element, new interface, new applications, new vendors, the RIC has the very important job of managing the RAN. For example will 1 xApp undo another xApp, will outcome of 1 xApp invoke a reverse action by another xApp?



**Technology immaturity** – The standards are still being being defined. There will be new start-up companies joining the ecosystem, many with a lack of mobile communications experience.



**Integration with legacy systems** – don't forget the RIC needs to work across different generations of mobile with 3G, 4G and 5G traffic mixed in a cell.

**These 3 challenges justify why test is vital for success!**



VIAVI is enabling operators to test the RIC and in doing so is helping to expedite the roll-out of open RAN networks and architectures. We've developed a means of testing the E2 interface itself, creating the volume and scale of messages that would go across E2 interface in a real-world network scenario. We can also emulate the O-CU and O-DU, as well as the output from the RIC. This is thanks to our developments of TeraVM, which can provide the emulated RAN (the measurements) to the RIC under test and then receive the outputs/decisions from the RIC and modify according to the proposed changes from the RIC. This makes it easy to see if changes improve the RAN efficiency.

Extending the capabilities of TeraVM is just one way that we're supporting the evolution of networks, and working with operators to ensure easy, cost-effective ways of testing and readying their networks for their subscribers.

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