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Open RAN: 2020 and Beyond

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Open RAN has been making news throughout this year and driving constant coverage from all areas: standards organizations, operators, vendors, policymakers, enterprises, industry verticals and more. There is a lot to unpack. This article will dive into the drivers behind the increased momentum, examine whether Open RAN solutions are ready for mainstream deployment, and discuss how Open RAN may impact the future of mobile networks, especially 5G.



As operators solidify their 5G strategies and begin their 5G deployments, they are indicating strong preference for disaggregated and open RAN solutions. While 3GPP standards for 5G specify the architectural options for disaggregation, there is still more work to be done. The [O-RAN Alliance](#) has been leading the initiative to define appropriate open interfaces and standards for end-to-end disaggregated radio access networks.

An emerging RAN landscape

With the available standardization and companies—including commercial off-the-shelf (COTS) hardware providers, processor and chipset vendors, open radio solution cloud infrastructure and orchestrator vendors—focused on providing appropriate hardware and software components, there are more choices to build RAN solutions to suit the various deployment needs and use cases. The disaggregation of the RAN is also creating opportunities for new companies specializing in AI/ML algorithms that can be applied to solving RAN problems, various RAN software product vendors, and smart NIC vendors to make this ecosystem richer than ever.

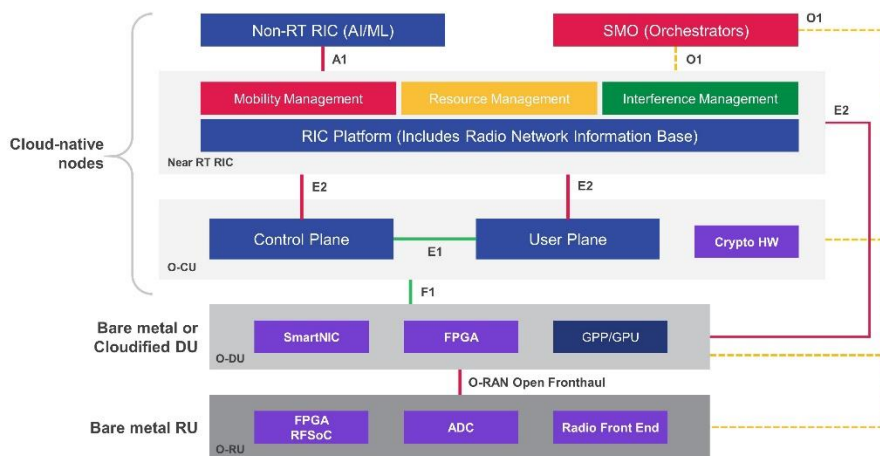


Figure 1: O-RAN network nodes and interfaces enabling multi-vendor solutions
[\[click to enlarge\]](#)

The O-RAN Alliance: focus areas and standardization update

The O-RAN Alliance’s standardization efforts are focused on making the interfaces truly open and multi-vendor interoperable while bringing the benefits of cloud-based implementation to the RAN. The following are the highlights of O-RAN standardization and their advantages for operators.

Multi-vendor open ecosystem in RAN

O-RAN architecture is built on the principles of disaggregation with support for open interfaces. The O-RAN specifications define new open interfaces, including open fronthaul, E2 for intelligent control of RAN nodes, A1 for AI/ML based policies for RAN control, and a uniform and consistent interface O1 for managing RAN nodes. Obviously, the interfaces need to be well defined and fully interoperable for a multi-vendor solution to interwork properly. The O-RAN Alliance working groups focus on providing appropriate interoperability test specifications for these interfaces. Additionally, Radisys was instrumental in forming the Test Integration Focus Group (TIFG) within the alliance to work on end-to-end interoperability testing and to provide additional test cases for validating O-RAN solutions. Test equipment vendors are actively participating in the O-RAN Alliance to realize this goal.

Hardware-software decoupling, open hardware and cloudification

With a clear focus on achieving the benefits of cloud-hosted RAN network nodes, O-RAN has a working group dedicated to the cloudification and orchestration aspects that allow hardware and software decoupling. There is also standardization happening to abstract software implementations from vendor-specific hardware acceleration technologies.

Uniform and consistent management plane across all nodes

A main pain point for operators is dealing with network management systems and interfaces that are proprietary and vendor specific. O-RAN solves this problem by providing a common and

unified management system approach and a common management interface (named O1) to manage RAN elements. The Alliance defines data models that all vendors can adhere to in order to make life a lot simpler for operators and ensure visibility and consistency in network management aspects.

Intelligence, customization and automation in RAN operations

O-RAN architecture makes it possible to centralize, monitor and control RAN operations and provides for applying operator-specific policies and tailor-made algorithms. This is done using the RAN Intelligent Controller (RIC) nodes, providing a new degree of freedom. Previously, operators had to use hard-coded logic embedded in closed proprietary implementations and had limited control through configuration settings. The approach of using RICs is a sea change and is a powerful tool for operators to control RAN operations in a fine-grained manner.

The O-RAN Alliance standardization work is going full steam ahead with the view to enable vendors to create and update their Open RAN products in the market and to ensure end-to-end deployment readiness. So far in 2020, there have been 20 specifications released from the O-RAN Alliance, with many more planned for the remainder of this year.

Enabling a smart network

The role of the RAN Intelligent Controller (RIC) is central to O-RAN-based architecture. Both real-time and non-real-time RICs constitute an intelligence layer, operating at the network layer, to optimize each service and use case supported by the operator. With the metrics generated within the radio access network, RICs can apply AI/ML techniques and sophisticated algorithms to achieve automated network monitoring and control. In addition, the network management and orchestration layer make it possible to achieve a level of automation that was impossible before. A recent Forbes [article](#) explored the interesting possibilities of how the smart networks of the future will serve various advanced use cases ranging from movie streaming to automated vehicles. Operators across the world are preparing their network infrastructure and operations personnel to deliver high-end services that can be monetized by leveraging the increased automation and intelligence built into the network using O-RAN based architecture.

Open RAN policy development and impact

As the specifications are established and Open RAN is enjoying broader adoption, policy makers are also taking note of the developments in the Open RAN space. The [Open RAN Policy Coalition](#), formed in May 2020, aims to promote policies that advance the adoption of open and interoperable solutions in the RAN and that create a marketplace conducive to Open RAN solutions. The Open RAN Policy Coalition is comprised of a broad coalition of operators and vendors including Radisys that are working with policymakers to ensure interoperability and expand the supply chain for 5G. With many national governments expected to promote new players in the RAN market and become self-dependent in their telecom network needs, the global environment has become very conducive for Open RAN players.

Industry adoption and deployments

The adoption of the O-RAN Alliance specifications has been very encouraging in the space of fronthaul and radios. Many vendors have released O-RAN compliant radio (O-RU) products and

have been showcasing these products in trade shows and interop events. The second O-RAN Plugfest event scheduled in September 2020 is one such industry event during which vendors can demonstrate compliance and interoperability to the O-RAN standards. Radisys served as the systems integrator for the 5G Standalone track for the first O-RAN Plugfest held in December 2019. In the meantime, a couple of major RAN vendors have made public announcements about their O-RAN compliant and virtualized RAN products.

Operators have moved fast to adopt Open RAN solutions this year. There are many active trials and early deployments of Open RAN in 4G networks, and operators across the globe have floated RFPs to build their 5G networks based on Open RAN principles. This no doubt has led to a frenzy in the RAN market about Open RAN solutions. [DISH](#) is building a nationwide greenfield 5G network adopting the O-RAN architecture. [Vodafone](#) has started deploying Open RAN LTE solutions in different markets and recently announced the first live Open RAN 4G site in the UK.

What lies ahead

Open RAN has gained significant momentum with operators across the globe and this trend will continue unabated. The ecosystem of vendors is already acknowledging this shift and many vendors are fast aligning product portfolios to provide Open RAN solutions. With favorable winds of policymaking and emerging ecosystem, 5G network rollout across many countries will have a distinct Open RAN flavor. Standards organizations have aligned well to provide all the required standards. With initiatives like the TIP (Telecom Infra Project) Forum's RAN Intelligence & Automation ([RIA](#)), the focus on AI/ML driven networks is definitely a space to watch for the next several years.

Open RAN is here to stay and will continue to grow and mature as operators, vendors and policymakers continue efforts to establish open interfaces and standards that ensure multi-vendor interoperability for end-to-end disaggregated radio access networks. The momentum gained this year is just the beginning.