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How to ensure a successful Open RAN deployment

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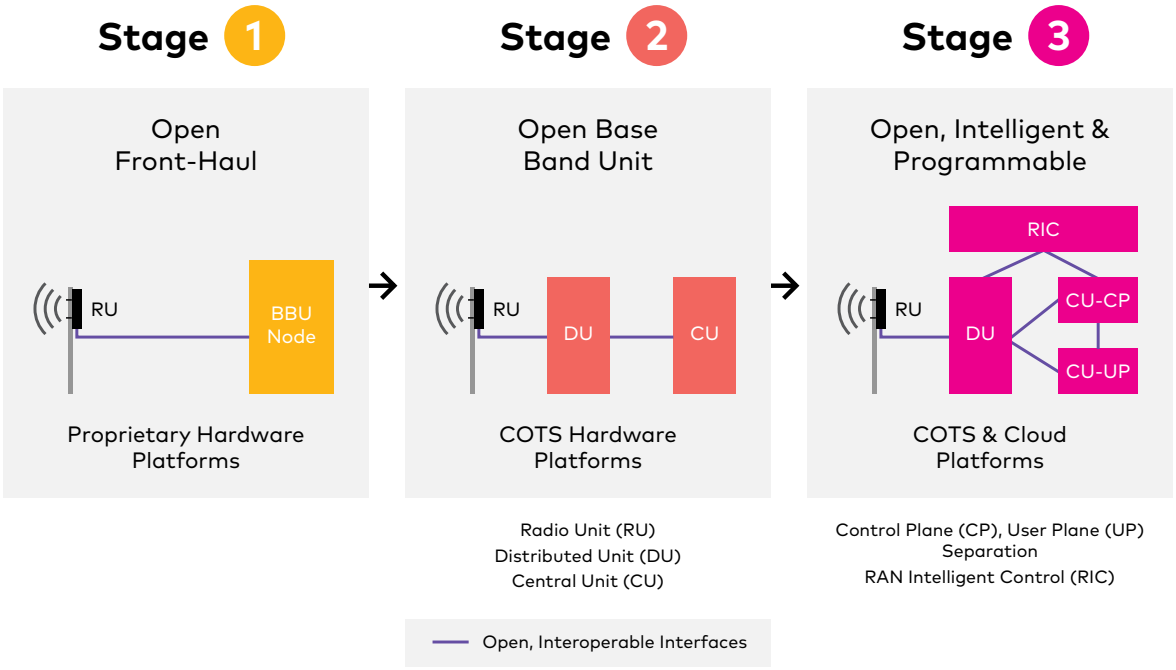
Open RAN initiatives have come a long way. Since the inception of the xRAN Forum in 2016, and its subsequent merger with C-RAN alliance two years later to form the O-RAN alliance, the industry and ecosystem have made significant progress in defining Open RAN architecture and deploying initial use cases. Starting with the adoption of the O-RAN alliance's open fronthaul specifications (a.k.a. 7-2x split), the industry subsequently evolved its focus to making open Centralized Unit (CU), open Distributed Unit (DU) and RAN Intelligent Controller (RIC) a reality.

Today, many operators – both new and incumbent – based on their understanding that adopting a fully O-RAN compliant architecture would enable them to deploy new and innovative use cases cost-effectively, are in the process of rolling out Open RAN technology and products.

The Telecom Infrastructure Project (TIP), adopting O-RAN alliance's specifications, has also been driving Open RAN initiatives with focus on enabling testing and real-world Open RAN deployments by bringing operators, vendors, and systems integrators together.

The 3 stages of Open RAN deployment evolution

Open RAN deployments are evolving. The figure below highlights the three major stages of evolution, with each stage increasing in disaggregation and openness.



Stage 1 (where the industry is now)

Opening the interface between the radio unit (RU) and distributed unit (DU). This interface is referred to as fronthaul interface (7-2x split) in the O-RAN parlance. Supporting an open fronthaul interface requires RU and DU vendors to support this functionality.

Stage 2

Opening the interface between DU and central unit (CU) following the 3GPP higher layer split. This interface is referred to as open F1 in the O-RAN parlance. DU and CU vendors must support open versions of this interface to achieve multi-vendor interoperability. This phase also includes transitioning from proprietary hardware to GPP / COTS hardware platforms for DU, CU.

Stage 3

Disaggregating the CU further, into control plane and user plane components. This change is augmented by the introduction of RAN Intelligent Controller (RIC) to host real-time, analytics, SON, & RRM applications, while the CU and the RIC are deployed in edge clouds.

Underpinning the Open RAN deployment evolution is the development of open management interfaces for all Open RAN components. Here, open, standardized operations and management models are necessary to truly realize the operational benefits of Open RAN. With the potential to deploy extreme automation, this enables operators to drive unprecedented scalability and efficiency into their future Open RAN operations.

State of current Open RAN deployments and trials

While some pioneer greenfield operators such as Rakuten in Japan and DISH network in the USA are fully embracing Open RAN, brownfield operators too are now beginning to trial and deploy the standard. The recent developments in North America (US FCC's Open RAN NOI, US Secure and Trusted Communications Networks Act), Europe (MoU among major operator groups), Latin America and Asia highlight the growing interest in testing and deploying Open RAN. Some brownfield operators are evaluating Open RAN solutions proposition for deploying RAN at an affordable cost. Yet at the same time, for operators and vendors alike, there is an understanding that there is more work to be done in the areas of developing, testing, deploying and commercializing fully O-RAN standards compliant solutions.

Open RAN is also garnering interest for private networking needs. Private enterprises are seeking virtualized, cloud-native, future-proof solutions for their private networking needs. Open RAN architecture offers them a compelling option, allowing them to start with 4G and subsequently upgrade to 5G software without swapping any hardware. Specifically, the deployment of cloud-native RAN components on edge stacks (e.g. MSFT Azure, AWS, GCP) combined with core network software and IT applications make this deployment scenario an attractive proposition.

Key imperatives for operators

To accelerate the adoption of Open RAN and realize the benefits, operators must first develop a full understanding of the following:

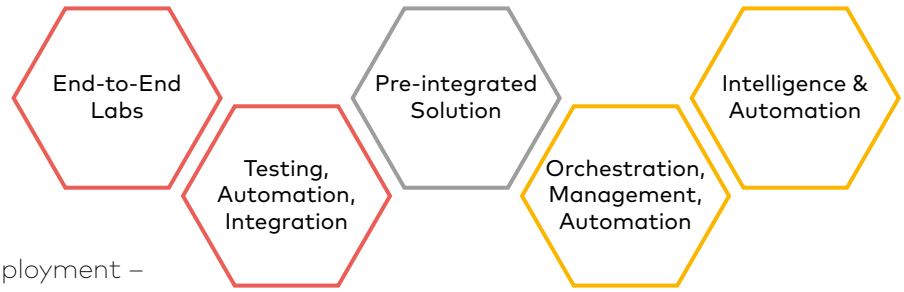
- Interoperability and performance of a multi-vendor Open RAN
- Total cost of ownership of Open RAN
- The tradeoff between the benefits of disaggregation and systems integration costs
- Level of automation, including the use of ML and AI technologies, to drive performance and efficiency
- Range of use cases and applications, notably at the network edge, that benefit from disaggregated Open RAN
- How Open RAN can co-exist with traditional RAN

To gain these understandings, operators must undertake the following initiatives:

- Test and integrate various disaggregated sub-systems (RU, CU, DU, RIC, xApps, SMO, rApps)
- Evolve to multi-vendor, end-to-end system testing to create a completely deployable Open RAN solution
- Deploy and test architecture and open interfaces in the areas of cloud management, network orchestration, software management, zero-touch provisioning, CI/CD, FCAPS and assurance
- Deploy and test architectures and interfaces to ML/AI to enhance analytics and closed-loop optimization to drive higher network performance and efficiency
- Conduct field trials incorporating potential open ecosystem software components (e.g. ONF SD-RAN, O-RAN OSC, ONAP) with open RU, open CU and open DU subsystems
- Develop benchmarks, a playbook and business cases for various deployment use cases and scenarios

Leveraging the open network ecosystem

Amdocs Open Ecosystem Accelerator for Open RAN provides access to open ecosystem partners, as well as open-source-based solutions and services to help operators test, deploy and launch Open RAN networks.



Amdocs' capabilities span all phases of the Open RAN lifecycle, including pre-deployment – testing & integration, deployment – orchestration & management, and operations – intelligence & automation.

Open RAN end-to-end lab services

Services include managing the program, developing end-to-end network design (IP RAN, IP CORE), preparing the bill of material, liaising with equipment vendors, procuring all equipment, as well as integrating and installing the RAN, core and transport elements. It also includes infrastructure automation, which enables the provision of lab infrastructure as a service for on-premise, hybrid and cloud environments.

Open RAN testing, automation, and integration services

Services include creating test object lists, assembling test plans, executing test plans, performance validation, benchmarking, reporting results, deploying automation for testing, providing lab infrastructure as a service, and reporting to augment CI/CD pipelines as per O-RAN alliance testing specifications and methodologies.

Open-source-based RAN orchestration, management, and automation

This solution utilizes open-source software (e.g. ONAP components) to support multi-vendor Open RAN to orchestrate, configure, deploy (support CI/CD), as well as manage PNFs, VNFs and CNFs in a multi-cloud environment. Capabilities include service designer, O-cloud management, support FCAPs, non-RT RIC and rApps. Supported use cases include network slicing and assurance.

Multi-vendor RAN intelligence and automation applications

xApps and rApps utilizing ML/AI driven analytics including near real-time geo-analytics, coverage capacity optimization, massive MIMO/beamforming optimization.

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