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"Achieving an O-RAN state is still a long way ahead"

Priyanka Kulkarni, *Manager – Telecom, Media and Technology Sector, Aranca, packs over 11 years of experience in strategy consulting and business advisory. She has supported Fortune 500 corporations, PE and VC firms, family investment offices, and leading technology startups on diverse strategic and tactical initiatives. Interacting with* ***Pratima Harigunani,*** *she dissects what makes Open RAN (O-RAN) a complex landscape even after all the hype and hopes around it. Excerpts:*

How would you describe the Open RAN scenario?
The O-RAN Alliance developed an ecosystem that promotes interoperability between network software and hardware from different vendors. This eliminates reliance on proprietary components, opening the door for smaller players to contribute to the construction of cellular networks, a market traditionally controlled by a handful of major equipment companies.

Considering the existence of single-vendor imperialism, is O-RAN really open?
The current O-RAN landscape is witnessing a rise in vendor acceptance beyond the traditional giants. Companies like Mavenir, NEC, Parallel Wireless, Fujitsu, Altiostar, and Airspan are increasingly gaining traction worldwide. While this could be a potential signal for change in the previously traditional vendor-dominated market, single-vendor solutions are still expected to drive the lion's share of O-RAN revenues, as many operators still rely on traditional vendor solutions.

Single-vendor O-RAN solutions are likely to account for 15–20% of overall RAN revenues in 2028, whereas multi-vendor O-RAN solutions are forecast to represent just 5–10% of the total market. With the advancement in the 5G market, including considerations of 6G, and the current deployment state, achieving an O-RAN state is still a long way ahead.

Do technologies like virtualisation, cloud RAN, etc., help or hamper the cause of openness in RAN?
There are always pros and cons to technology adoption. Within the O-RAN ecosystem, a cloud-native architecture enables network orchestration, centralised processing and flexible scaling, improving network efficiency, service quality and reliability. Virtualisation facilitates the decoupling of hardware and software components, allowing greater flexibility and easier integration between different vendors. While these technologies enable the disaggregation and innovation within O-RAN, they also introduce complexity and pose interoperability challenges that must be carefully managed.

What about Massive MIMO?
Well, mMIMO technology significantly increases network capacity and performance. However, its implementation may require specialised hardware configurations, potentially hindering multi-vendor compatibility.

How tricky is interoperability for O-RAN, especially at the distributed unit and central unit (DU-CU) level and between DU and radio unit (RU)?
While allowing for interoperability is one of the key pillars of O-RAN, it is also a critical challenge to overcome. The three key components of gNodeB are the CU, DU, and RU. Integrating and managing the intricate technicalities of the key components to ensure seamless communication across these interfaces in a multi-vendor ecosystem while simultaneously adapting to changes for a tailored network configuration increases the system's complexity.

How does this complexity pan out at the front-haul level?
The front-haul specifications are another critical aspect of the O-RAN architecture. The new front-haul protocol optimised for mMIMO allows for better performance but continues to be dominated by traditional vendors. Standardising front-haul interfaces while ensuring bandwidth requirements between DU and RU is crucial for interoperability and multi-vendor participation in O-RAN.

While O-RAN specifications strive for simplified system integration, operators rely on skilled personnel to customise and integrate them. The lack of professionals with the expertise to design and implement interoperable O-RAN solutions also poses a major hurdle.

> Single-vendor solutions will drive the lion's share of O-RAN revenues, as many operators still rely on traditional vendor solutions.

Is the lock-in constraint more of a problem of hardware and software?

The relationship between hardware and software in RAN does play a role in the dominance of single vendors. Traditional RAN deployments often result in operators being locked into using hardware and software from a single vendor, making it challenging to switch vendors or alter the network. This vendor lock-in is a form of dominion that the close coupling of hardware and software can perpetuate.

However, the shift towards O-RAN fosters a more open and collaborative environment. O-RAN allows product designers to select the best hardware and software solutions for them, leading to improved product performance, innovation and cost-effectiveness.

Such flexibility is helping operators bring the innovation needed to provide new solutions and services and successfully meet demanding 5G application requirements, such as those for smart cities, industrial IoT, and autonomous vehicles, which have varying network requirements for performance, capacity, and latency.

What would you pick as examples of success and failure in Open RAN?

O-RAN initiatives are witnessing global momentum, with trials and deployments taking place in various continents, including Africa, Europe, Asia (Japan, India, Thailand), and the US. This signifies a growing interest in the technology across diverse markets.

Japan is one of the leading markets where operators have partnered with multiple vendors for O-RAN deployments. For example, Rakuten Mobile has partnered with over 20 vendors like Altiostar, Cisco, Nokia, Intel, Mavenir, Quanta Cloud Technology, Sercomm, Tech Mahindra, Allot, Innoeye, etc. and NTT with more than four vendors. KDDI has also partnered with two vendors and is exploring more options. Similarly, in the US, Dish Network has partnered with over 12 vendors and Inland Cellular with over four vendors. There are examples from European and African markets where operators use multiple vendors to deploy O-RAN networks.

What about India? Where does it stand?

In India, while operators such as Jio and Airtel have taken steps to adopt O-RAN, progress has been slow, mainly due to the perception that it is still maturing. To push adoption, the Indian government has recently developed the US-India Open RAN Acceleration Roadmap in collaboration with the US, aimed at facilitating interoperability and widespread deployment of Open RAN products. This roadmap is also being looked at as another effort to encourage Indian telcos to adopt and deploy the technology.

What is your advice on pushing for the openness of RAN?

When assessing RAN's openness, it is crucial to consider factors beyond technology, such as regulatory frameworks, industry collaborations, and standardisation efforts. Government support for O-RAN, like the legislation in the US encouraging its deployment, plays a vital role in promoting openness. Then, ecosystem maturity is important. The O-RAN ecosystem is still evolving. A critical mass of mature vendors and readily available, interoperable solutions is vital for widespread adoption. Plus, Open RAN requires sustained commitment and collaboration from operators, vendors, standardisation bodies, and policymakers to ensure the development and standardisation of open interfaces and specifications for driving interoperability and innovation.

What about heterogeneity? Will it be good or bad, easy or tricky?

The risk that accompanies any open platform is that of fragmentation. If vendors are not innovating within common frameworks, very few developments will achieve the scale to address cost and performance challenges convincingly. Common interfaces such as O-RAN Alliance's Open Front-haul provide a valuable set of foundations, but considerable innovation must take place to optimise the performance and align the network with each operator's needs. Also, ongoing efforts to address security, energy efficiency, and workforce development are key to consider when evaluating the openness and sustainability of RAN ecosystems.

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