



Open-RAN Architecture

For Prelims: Open-RAN Architecture, 5G.

For Mains: Advantages of Open-RAN Architecture.

Why in News?

The Ministry of Communications has signed a Memorandum of Understanding (MoU) with M/s VVDN Technologies Private Limited to facilitate registered startups, innovators and MSMEs working in the field of [Open RAN \(Radio Access Network\)](#) to get their product tested at the existing lab of M/s VVDN.

- Such testing certification shall **accelerate the research innovation in domestic design and manufacturing**. It is aimed that India shall be emerging as a design leader in [5G/O-RAN](#). This test certification eco system will make India as design testing and certification hub of Asia.

What is O-RAN?

▪ About:

- Open-RAN is not a technology, **but rather an ongoing shift in mobile network architecture** that allows networks to be built **using subcomponents from a variety of vendors**.
 - O-RAN has **an open, multi-vendor architecture** for deploying mobile networks, as opposed to the single-vendor proprietary architecture.
 - O-RAN **uses software to make hardware manufactured by different companies** work together.
- The key concept of Open RAN is **“opening” the protocols and interfaces between the various subcomponents (radios, hardware and software) in the RAN**.
 - **Radio Access Network (RAN):**
 - It is the part of a telecommunications system that connects individual devices to other parts of a network through radio connections.
 - A RAN resides between user equipment, such as a mobile phone, a computer or any remotely controlled machine, and provides the connection with its core network.
 - As a technical matter this is what the industry refers to as a disaggregated RAN.

▪ Elements of RAN:

- The Radio Unit (RU) is where the radio frequency signals are transmitted, received, amplified and digitized. The RU is located near, or integrated into, the antenna.
- The Distributed Unit (DU) is where the real-time, baseband processing functions reside. The DU can be centralized or located near the cell site.
- The Centralized Unit (CU) is where the less time-sensitive packet processing functions typically reside.

▪ Functioning of Open RAN:

- It is the interface between the RU, DU and the CU that are the main focus of Open RAN.
- By opening and standardizing these interfaces (among others in the network), and

incentivizing implementation of the same, networks can be deployed with a more modular design without being dependent upon a single vendor.

- Making these changes can also allow the DU and CU to be run as virtualized software functions on vendor-neutral hardware.

▪ **Traditional RAN:**

- In a traditional RAN system, the radio, hardware and software are proprietary.
 - This means that nearly all of the equipment comes from one supplier and that operators are unable to, for example, deploy a network using radios from one vendor with hardware and software from another vendor.
- **Problems:**
 - Mixing and matching cell sites from different providers typically leads to a performance reduction.
 - The result is that most network operators, while supporting multiple RAN vendors, will deploy networks using a single vendor in a geographic region which can create vendor lock-in with high barriers to entry for new innovators.

What are the Advantages of O-RAN?

▪ **Innovation and Options:**

- An open environment expands the ecosystem, and with more vendors providing the building blocks, there is more innovation and more options for the Operators. They can also add new services.

▪ **New Opportunities:**

- It will open new opportunities for Indian entities to enter into the network equipment market.

▪ **Cost Saving:**

- The benefits of this approach also include increased network agility and flexibility, and cost savings.
- It's expected to make **5G** more flexible and cost efficient.

[Source: PIB](#)

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