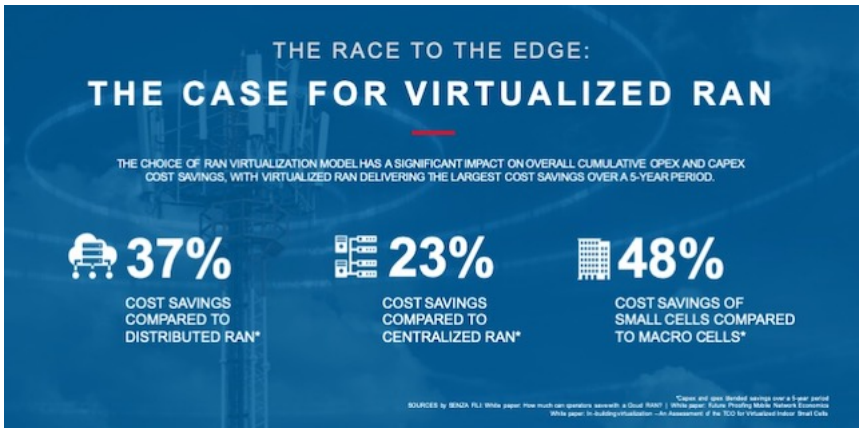
Mavenir's innovative Virtualized RAN solution is designed to address the requirements of pre-5G networks and inexpensive upgrades to 5G (NR)

Virtualized RAN (vRAN)

A flexible Radio Access Network (RAN) is the cornerstone of next-generation mobile network infrastructure. The evolved RAN architecture, designed with cloud-native virtualization techniques, enables the RAN to flex and adapt based on usage and coverage. This flexibility provides expanded and more convenient network location choices for the baseband processing. Therefore, this architecture naturally fits in existing networks' backhaul infrastructure and is future-proof for evolution towards a fully virtualized and cloud RAN architecture. In addition, it offers a strategic differentiation by enabling the Remote Radio Units (RRUs) to interwork with the Virtualized Baseband Unit (vBBU) over a non-ideal fronthaul (i.e. ethernet), overcoming the traditional constraints of CPRI over fiber.

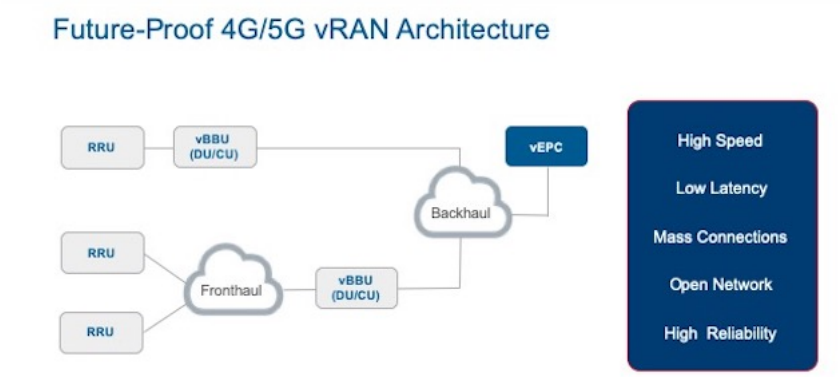
Conventional RAN platforms have been based on proprietary hardware and rely on long life-cycles in development, deployment, and operation. With each generation of radio interface change, these radios are typically replaced with the newer versions at a significant investment and inconvenience to the CSPs. Furthermore, radio infrastructures based on this approach are designed based on the peak capacity without granular power and interference management capabilities. This creates the vendor lock-in and the inability to keep pace with technology and demographic transitions.

As a Network Software Provider, Mavenir's approach is radically different from traditional proprietary approaches. With a comprehensive portfolio of fully virtualized VNFs, cloud native virtualization of the baseband processing is extended to the edge of the network. vRAN brings increased business agility with network elasticity, flexibility, and dynamic RAN optimization. The baseband processing centralization enables dynamic RAN adaptation through hierarchical mobility, SON, CoMP, centralized scheduling, policy enforcement, and interference control. In addition, Mavenir's vBBU is designed to support multiple Fronthaul splits simultaneously – making the vRAN solution an ideal choice for a vendor-agnostic and future-proof strategy for the CSPs



Mavenir's innovative vRAN solution (vBBU and RRU) is designed to address the requirements of pre-5G networks with design and programming capabilities that enable simple and inexpensive upgrades to 5G (NR) – providing investment protection and deployment flexibility. This approach is an attractive and clear pathway for CSPs that circumvents sequential investment in expensive, legacy traditional radio infrastructure expansion that will require expensive physical replacement in 5G evolution.

Mavenir's industry-leading vRAN solutions consist of vBBU, RRU, and Centralized Element Manager.



vBBU – Virtualized Baseband Unit

The vBBU implements the future-proof architecture of Distributed Unit (DU) and Central Unit (CU).

The vBBU architecture enables:

- **Flexible Networking**
  - Designing the DU and CU locations flexibly based on network backhaul infrastructure to achieve the optimal pooling gain and cost savings
  - With zero change of existing infrastructure, achieving cost reduction by aggregating/pooling CUs at centralized locations. With sufficient backhaul bandwidth today or in the future, achieving further reduced cost by aggregation DUs at centralized locations
- **Resource Sharing and Pooling**
  - Reducing hardware footprint and the actual number of units, with no need to deploy hardware at each site for peak capacity
  - Sharing, optimizing, and scaling in and out radio resources and computing resources dynamically among base stations in an efficient and in real time fashion, maximizing the capacity, coverage, and ensuring the quality of services with low cost and without redeploying network hardware
- **Hardware flexibility and lower cost, higher availability, reliability, and scalability**
  - Implement on Commercially Off the Shelf (COTS) hardware, and high-performance computing, storage, networking processors
- **Future-proofed Network Performance**
  - The BBU function centralization enables dynamic RAN resource allocation, centralized scheduling, policy enforcement, and interference control, SON, CoMP
- **Ultra-deployable RRU**
  - Supporting a variety of radio designs to cater to different use cases, advanced receivers, and beamforming
- **Capex and Opex Savings**
  - Achieving 43% capex savings and 31% annual opex savings resulted from less equipment, the flexibility of equipment location, faster deployment, less maintenance cost, less power, and backhaul / fronthaul cost.

The vBBU features:

- FDD LTE, TDD LTE, 5G NR
- Carrier Aggregation
- 256 QAM
- SON
- CoMP
- 4x4 MIMO, Massive MIMO, Beamforming, MU-MIMO, and more

RRU – Remote Radio Unit

Mavenir provides a full range of RRU product portfolio to support operators' needs. The common vBBU software manages all types of RRUs. The RRU supports:

- Multiple Technologies: FDD LTE, TDD LTE, 5GNR
- Carrier Aggregation
- High Power: range from 20W to 80W per port
- MIMO: 2T2R, 4T4R, as well as massive MIMO
- All major LTE bands: 850(B5), 1900(B2), AWS(B4), 600(B71), 2500(B41), 3500(B42, 43), CBRS(B48), 700(B28), 1800(B3), 800(B20) and more, as well as 5G bands at 3.5Ghz, 28Ghz

CEM – Centralized Element Manager

Mavenir's Centralized Element Manager (CEM) and Centralized Analytics Server (CAS) are the comprehensive, user-friendly, and intelligent network configuration, operation, and management tools. It builds on a virtualized and open platform and supports:

- Cloud Architecture for automated scaling
- Web GUI
- Network topology, Configuration, Fault, and Performance Management
- Dashboard
- Real-Time KPIs
- OSS integration through SNMP, Netconf
- Collection and analysis of Call Detail Record (CDR), Transition Log (TRL), Performance Counters for business intelligence and network diagnostics

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