

# vRAN WITH ETHERNET FRONTHAUL

REDUCE COST | IMPROVE SPECTRAL EFFICIENCY  
| PREPARE FOR 5G





## BUSINESS CHALLENGE

Increasing traffic demand, limited spectrum availability and mass adoption of mobile broadband are challenging traditional ways of building cellular networks. Mobile operators are continuously seeking ways to increase network capacity and coverage while reducing time to market for new services and have a lower total cost of ownership (TCO). To achieve this, cellular infrastructure must be flexible and support simplified deployment and management of increasingly heterogeneous radio access networks (RANs). Additionally, the bulk of the cost of a mobile network lies in the large number of distributed base station and antenna sites, as well as in the last-mile transport network links. Consequently, the costs associated both with the central parts of the network and its distributed elements must be taken into account for a cost-effective network evolution.

Virtualized RAN (vRAN) or Cloud-RAN (C-RAN) offers a better user experience by addressing capacity as well as coverage issues, while supporting mobile xHaul (Front haul and Backhaul) solutions as well as network self-optimization, self-configuration, self-adaptation with software control and management through SDN and NFV. vRAN also provides great benefits in controlling ongoing operational costs, improving spectral efficiency, network security, network controllability, network agility and flexibility.

## OUR SOLUTION

3GPP has finalized specifications for LTE-Advanced (LTE-A) features such as Co-ordinated multipoint (CoMP), Carrier Aggregation (CA), etc. These features are expected to yield better capacity per MHz of spectrum and better cell edge performance for the operators. It can only be achieved by using software-intensive function to bring application intelligence at the eNodeB for smart LTE scheduling and through LTE-Advanced features such as CoMP and inter-site Carrier Aggregation using the vRAN architecture. Incumbent wireless equipment vendors have developed C-RAN based on CPRI front haul transport, which requires dark fiber for its connectivity. Dark fiber is not widely available in most part of the world and it is prohibitively expensive and disruptive to install. Even If dark fiber is employed for C-RAN, changes in network topologies, e.g. relocation of a RRH or deployment of HetNet are not possible without more expense and disruption.

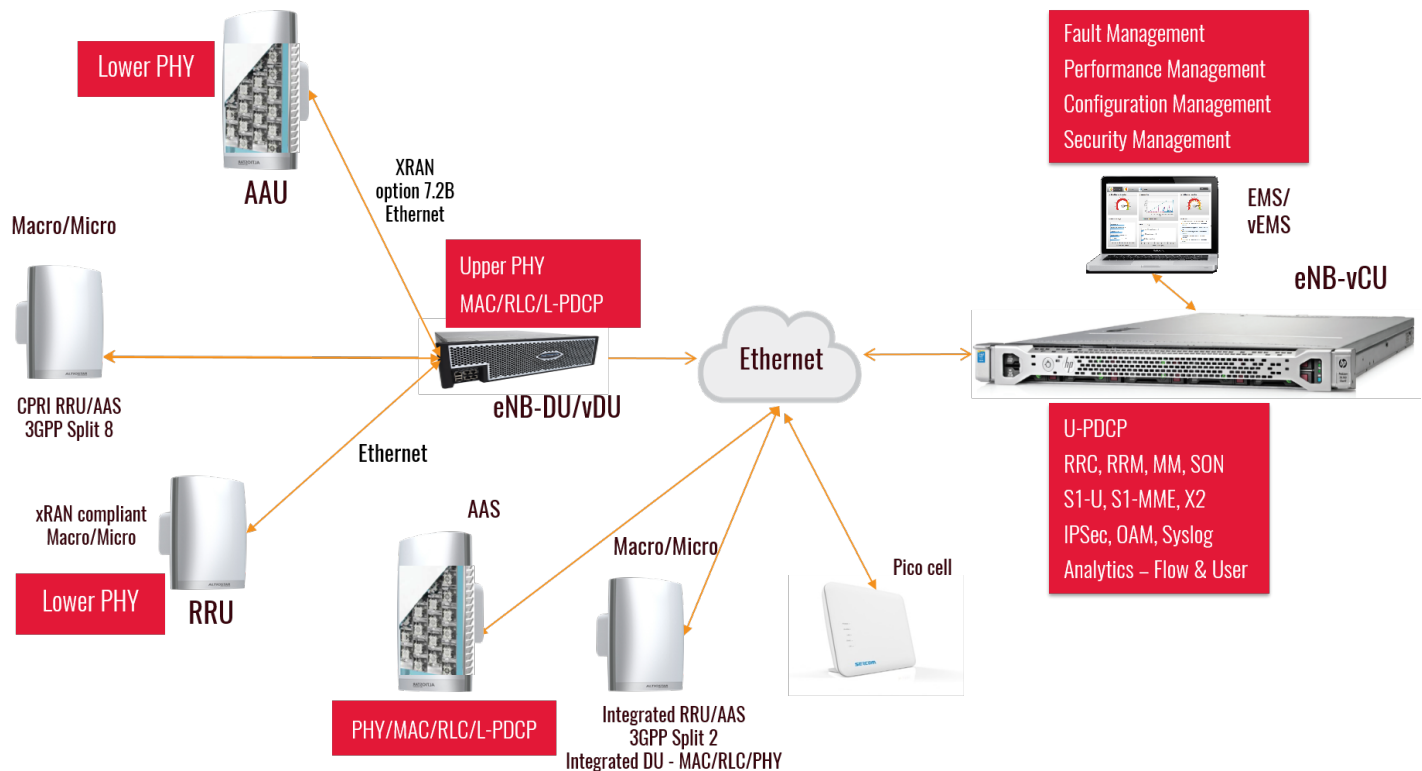
Tech Mahindra has collaborated with a pioneer in vRAN technology, for industry leading vRAN solution. AltioStar's LTE-Advanced capable NFVC-RAN solution makes use of Ethernet for front haul transport, which is ubiquitous and economical. This unique architecture gives wireless network operators the capability to provide LTE-Advanced features flexibly and rapidly with much lower cost compared to CPRI-based C-RAN solution.

## SOLUTION ARCHITECTURE

AltioStar has been a firm proponent and pioneer in developing and deploying a split LTE protocol stack solution with Ethernet fronthaul. As part of continued product and engineering vision, AltioStar has built on these principles to develop a fully x86 based vRAN solution leveraging flexible eNB-DU options to enable vRAN deployment suitable for any operator's transport network and operational capabilities.

A high level overview of the AltioStar solution is provided in the following solution diagram. AltioStar architecture supports a pure Option 2 High Level Split (HLS) with DU embedded in RRU, and two cascaded split options, consisting of Option 2 Split between DU at Site or DU at a secondary aggregation point, leveraging Low level Split (LLS) options 7 and 8 between DU and RRU.





AltioStar has aligned its solution architecture nomenclature for its split eNB/gNB solution with 3GPP TR 38.801 in the following way

- AltioStar eNB-CU: Centralized Unit Running PDCP and Above.
- AltioStar eNB-DU: Distributed Unit Running PHY/MAC/RLC.

We have partnered with CoTS server manufacturers for class-leading, flexible x86-based server options for both eNB-DU and eNB-CU elements. For RRU hardware solutions, we are building a partner Ecosystem of "Whitebox" RRU manufacturers. AltioStar DU solutions interface to these radios via CPRI or eCPRI, depending on the specific customer use case requirement. Our partner ecosystem, referred to as OpenRAN Ecosystem, provides engineering capabilities for many different radio bands and configurations.







AltioStar's Open vRAN business model enables RRU agnostic software, open interfaces based on 3GPP/xRAN standards for the benefits of agility, flexibility, innovation velocity, time-to-service-monetization, lower cost-per-user, all with full architectural support for 5G NR.

## SOLUTION BENEFITS

<b>FRONTHAUL ON ANY TRANSPORT</b>	<b>CARRIER GRADE NFV PLATFORM</b>	<b>APPLICATION INTELLIGENCE</b>	<b>GAIN CAPACITY AND PERFORMANCE</b>	<b>BETTER VIDEO STREAMING EXPERIENCE</b>	<b>CONNECTING PEOPLE WITH VIDEO CALLS</b>
Full scale deployment on all parts of network	High availability and ultra low-latency  Massive scalability	Improved user QoE	Implement LTE-A features	Integrated MEC  Detect user's streaming flows  Improved video quality	Adapt to video flows according to radio conditions over LTE

## OUR VALUE PROPOSITION

Tech Mahindra provides an industry leading product offering and ensures a high interoperability with other components by the virtue of our VNF-Xchange platform ([www.VNFXchange.org](http://www.VNFXchange.org)) which provides pre-integrated and certified solutions for functional and performance measures. In addition, our vRAN solution also ensures the following benefits:

INTER-SITE LTE –A ON IP TRANSPORT	MOBILE EDGE COMPUTING	NFV+SDN BASED RAN	FOUNDATION FOR 5G
 <b>40% CAPACITY</b>  <b>3X LTE-A COVERAGE</b>	 <b>10% CAPACITY</b>  <b>20% DATA RATE</b>  <b>30% FASTER</b>	 <b>38% TCO</b>	NO FORKLIFT REQUIRED FOR 5G

## OUR OFFERING

With 30+ years of extensive RF experience and pioneering virtualized solutions with SDN/NFV for RAN, EPC, Tech Mahindra's vRAN offerings include the full spectrum of Systems Integration (SI) services from Planning and design to Testing and Implementation to Managed services and operations.



### PLANNING & DESIGN

- vRAN Readiness Audit – RAN and Transport
- Capacity Planning
- Radio Network Design
- Fronthaul Design
- SDN/NFV Orchestration model design



### TESTING

- Interoperability testing
- Use case realization
- E2E testing



### IMPLEMENTATION

- vBBU, RRH
- COTS, Openstack
- VNF Orchestration
- Integration with SDN controller
- E2E System Integration
- Testing



### OPERATIONS

- VNF lifecycle management
- Versioning
- Release Management
- Upgrade / Change Management
- Network Monitoring
- Fault Management
- Field Support
- Root Cause Analysis
- Optimization
- Network Analytics
- Consulting Services

### MANAGED SERVICES

### TURNKEY SERVICES



## SUCCESS STORIES

### TRIALS



### COMMERCIAL DEPLOYMENTS



### SUMMARY

- More than 22 lab and field trials (14 complete) with operators across the world
  - Including commercial traffic including live events
- Commercial engagements with five operators
- Macro, micro, massive MIMO and AAS products across different bands
- Upcoming 30,000+-site deployment – FDD & TDD

### CONTACT

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