Ignite Innovation and Monetize 5G with an Open Virtual RAN

Run the Altiostar Open vRAN Solution on VMware

AT A GLANCE

VMware Telco Cloud Platform RAN™ is powered by field-proven virtualized compute coupled with VMware Telco Cloud Automation™ and VMware Tanzu Basic for RAN, a telco-grade Kubernetes distribution.

Altiostar's Open vRAN solution runs on VMware Telco Cloud Platform RAN to solve the lingering problems of traditional RAN deployments and disaggregate the RAN into a flexible, high-performance stack with open interfaces.

Altiostar's Open vRAN is integrated and tested with VMware Telco Cloud Platform RAN to form a combined solution that lets you establish the next frontier of virtualization at the RAN.

KEY BENEFITS AND CAPABILITIES

- Meet the requirements of LTE and 5G RAN functions
- Eliminate the rigid architecture and silos of traditional RAN deployments
- Accelerate the deployment of innovative services and applications
- Pave a path to a fully open RAN
- Convert traditional cell sites from cost assets to revenue-generating assets
- Deploy Altiostar's Open RAN network functions according to a co-validated reference architecture
- Use multi-layer automation and orchestration from network function lifecycle management to infrastructure

Evolution of the Mobile Network

As revenue from voice and data services plateau, service providers seek new market opportunities to drive their next phase of revenue growth and control the costs of building 5G networks and support ever-growing data demand. Traditional proprietary solutions for the radio access network (RAN) have been kept in a walled garden, undermining these objectives with slow innovation cycles, limited competition, and complex manual operations. As a result, it has severely impacted the ability of CSPs to compete and deliver new services while increasing the costs of equipment, spectrum, and operations.

A few years ago, CSPs realized the importance of cloud transformation for their infrastructure and operations. With virtualization, automation, software-defined data centers, and cloud-native technology, the cycle time to introduce new features in software and to deploy cloud-based infrastructure takes a fraction of the time.

Complacency is not an option anymore; the RAN domain must be open and evolve to the cloud.

To increase innovation velocity, the RAN is transitioning from a traditional hardware-centric to a software-defined design, with RAN functions implemented in software using open APIs and based on a flexible cloud platform. The result moves the RAN into its next phase of evolution and accelerates the time to market for new services and applications, producing the flexibility to modernize and monetize the RAN.

The Move to Open vRAN

With an open virtualized RAN (vRAN), the next evolution of the RAN is taking place. This framework disaggregates hardware from software and delivers open interfaces. The framework also enables you to use commercial off-the-shelf (COTS) hardware.

In an Open vRAN model, the baseband function becomes an application running on a cloud platform. With this disaggregation, CSPs can choose network components from different vendors, leading to significant capital and operational savings. This new model also allows CSPs to host or deploy software applications, such as xApps, running at the edge of the network, taking full advantage of the RAN control and user proximity to deliver unique experiences. Using open interfaces and deploying new differentiated services help capitalize on 5G's unlocking of new verticals across several industries.

The Next Frontier of Virtualization at the RAN

Altiostar's Open vRAN solution runs on VMware Telco Cloud Platform RAN to solve the lingering problems of traditional RAN deployments and disaggregate the RAN into a flexible, high-performance stack with open interfaces.

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USING THE INTEL FLEXRAN SOFTWARE REFERENCE DESIGN

To support RAN-specific performance enhancements, VMware Telco Cloud Platform RAN virtualizes RAN functions, including Altiostar's Open vRAN solution, on a horizontal platform optimized for the RAN using the Intel FlexRAN software reference design.
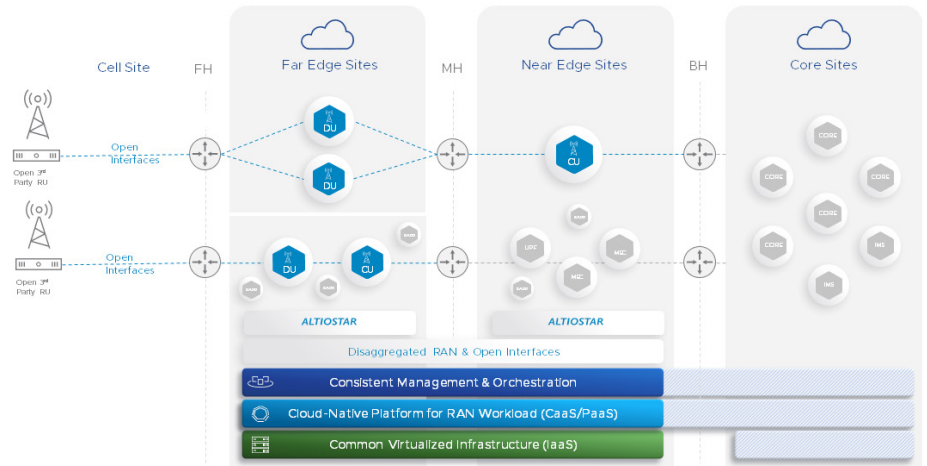

FIGURE 1: Achieving RAN modernization at scale with the Altiostar Open vRAN solution and VMware Telco Cloud Platform RAN.

Altiostar's Open vRAN is integrated and tested with VMware Telco Cloud Platform RAN to deliver a combined solution that lets you establish the next frontier of virtualization at the RAN:

• Meet the functional requirements of LTE and 5G RAN

• Eliminate the rigid architecture and silos of traditional RAN deployments

• Open the RAN interfaces and pave a path to a fully open RAN

• Automate and optimize RAN technologies for deployment and operations

• Accelerate 5G applications and services innovations

• Convert the traditional cell site from a cost center into a revenue-generating asset

With the integrated solution, Altiostar's Open vRAN network functions are deployed on a cloud-native platform following a reference architecture that uses pre-engineered integration packages to streamline deployment and automate operations while meeting stringent RAN performance requirements. The reference architecture validates the onboarding, operation, and functional capabilities of Altiostar network functions on VMware Telco Cloud Platform RAN.

The integrated solution includes multiple layers of automation and orchestration from the RAN network functions down to the site infrastructure.

Combined with Altiostar's Open vRAN solution, VMware Telco Cloud Platform RAN paves a clear and immediate RAN modernization path: CSPs can move safely from the traditional RAN to vRAN and initiate the transition toward O-RAN standards.

About the Altiostar Open vRAN Solution

Altiostar's Open vRAN 5G software solution consists of gNB virtual centralized unit (vCU), gNB virtual distributed unit (vDU), third-party O-RAN compliant radio units (O-RU), and antennas. The vEMS solution, which is called iRMAS (Intelligent RAN Management and Automation System), allows the provisioning and control of the network functions. The vCU for 5G is split into vCU user plane and vCU control plane, according to 3GPP and O-RAN Alliance specifications, to add more flexibility in deployment.

The solutions for 4G and 5G can run on a COTS server on a virtualized platform independent from the underlying hardware. vCU and vDU can interface with a radio according to the O-RAN specifications, which lets you choose the hardware you want for both servers and radio units.

BENEFITS OF RUNNING ALTIOSTAR'S OPEN VRAN SOLUTION ON VMWARE

Running Altiostar's open vRAN solution on VMware Telco Cloud Platform RAN reduces OpEx while powering innovation, openness, flexibility, automation, and monetization. Here is a list of key benefits:

• Accelerated rollout: The reference architecture and design jointly validated by VMware and Altiostar engineering teams means the solution is ready to deploy, eliminating key implementation risks.

• Automated provisioning and configuration of distributed RAN sites and Altiostar network functions.

• Transformed operations: The solution supports RAN operational transformation by embedding cloud-first automation best practices and a consistent management system across domains.

• Reduced OpEx for deploying and managing the RAN while limiting CapEx through disaggregation, control of hardware choices, and maximization of hardware investments.

• Reduced integration risks and costs: The pre-design and testing work avoid potential interoperability gaps and limit the professional services required to deploy a production-ready open vRAN.
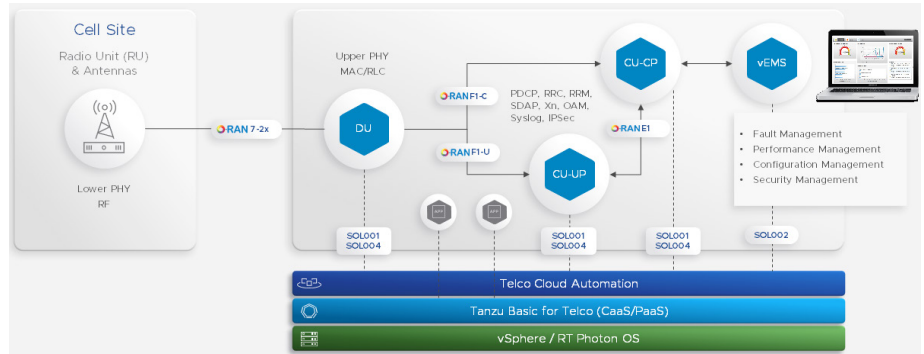

FIGURE 2: The architecture of the Altiostar Open vRAN solution with VMware Telco Cloud Platform RAN.

The implementation of a CUPS architecture allows control plane and user plane traffic on a CU to be scaled independently. Programmability is supported through the support of APIs at vCU and vDU as indicated in the diagram below.

The use of vEMS iRMAS with open APIs in network functions virtualization (NFV) reduces OpEx through operational automation, including auto-provisioning and resiliency against failures. Because baseband functions are deployed as cloud-native network functions, you can further reduce OpEx by automating various operational tasks, such as new cell site integration (auto-commissioning) and detection or automated recovery from failures.

Altiostar has a proven track record of successfully deploying 4G and 5G open vRAN at scale: mmWave, mMIMO, macros, and indoor-outdoor small cells.

The Altiostar open vRAN software has been tested and integrated with VMware Telco Cloud Platform RAN to produce a deployment-ready solution that ensures new levels of programmability and automation for joint customers.

About VMware Telco Cloud Platform RAN

VMware Telco Cloud Platform RAN is powered by a field-proven virtualized compute solution coupled with Tanzu Basic for RAN, a telco-grade Kubernetes distribution, and VMware Telco Cloud Automation. The platform is designed specifically for running virtualized baseband functions, virtualized distributed units (vDUs) and virtualized central units (vCUs) while meeting or exceeding the stringent performance and latency requirements inherent to RAN.

The platform provides RAN-specific performance enhancements, such as the following:

• Real-time optimization of VMware ESXi to meet the Precision Time Protocol (PTP) accuracy and latency requirements of virtualized baseband functions, including DUs and CUs.

• Optimization of the real-time Linux container host operating system, called Photon OS, and the Kubernetes worker node by supporting various plugins, such as BIOS CNF, CPU manager, NUMA topology manager, Calico, Multus, Macvlan, DPDK modules, and SR-IOV.

• Intel FlexRAN optimization for enhanced dimensioning to ensure that the maximum VMware ESXi compute resources are available to RAN functions.

In addition, each vRAN function is isolated with multiple layers to protect functions from unauthorized access. The multi-layer isolation includes the following:

• The guest OS has its own process protections and permission models

• The VM runtime isolates the guest VM

• Separation between the guest and the rest of the hypervisor

The management of the virtualization plane is separated from other systems to safeguard vRAN functions.

VMware Telco Cloud Platform RAN is capable of automatically provisioning and maintaining thousands of platform instances across distributed RAN sites. For example, mass patching, upgrades, and configuration changes can be performed remotely from a centralized location. Furthermore, by gauging the requirements, such as latency and bandwidth, of each vRAN function intended to be instantiated, the platform programmatically configures the underpinning resources for better utilization. This intelligence enables you to dynamically adjust where the functions should be deployed with cloud-first lifecycle management, simplifying Day 0, Day 1, and Day 2 operations while providing telco-grade resiliency and service availability.

In addition, the CI/CD libraries provided through VMware Telco Cloud Automation let you integrate with your existing CI/CD pipelines for onboarding, deploying, and updating the Altiostar vRAN functions quickly and reliably, thereby removing time-consuming and complex integration work.

The platform provides RAN-specific automation, such as the following:

• Automatically discover, register, and create Kubernetes clusters from a centralized location to manage thousands of distributed components with ease.

• Reduce RAN sites time-to-deploy by automating the provisioning of RAN sites software based on site standardized templates.

• Simplify the onboarding of vRAN functions with validated and standards-compliant packages optimized for the platform.

• Programmatically adjust the underpinning platform availability and resource configuration, based on the requirements of vRAN functions at the time of instantiation.

• Manage the lifecycle of network functions.

These capabilities deliver end-to-end operational consistency to radically simplify how you provision and manage your network.

VMware Telco Cloud Platform RAN also transforms the RAN into a 5G multi-services hub. In addition to supporting vRAN functions, the horizontal design of VMware Telco Cloud Platform RAN provides the flexibility and adaptability to develop and deploy custom 5G applications on the same platform — a capability further advanced by the Altiostar open vRAN solution.

Conclusion: Modernize to Innovate and Monetize the RAN

VMware Telco Cloud Platform RAN with Altiostar's Open vRAN solution virtualizes the radio access network to blaze a trail of modernization that leads to open vRAN.

By meeting stringent RAN performance requirements and by limiting the risks and costs of implementation with pre-engineered integrations and validated functional RAN capabilities, the combined solution enables the future of RAN — open vRAN.

A consistent cloud-native infrastructure and operational model across all domains lays the foundation to automate operational tasks and increase efficiency. Consistent cloud infrastructure and operations let you host 5G applications at any site, including the RAN, which turns into a multi-services hub and opens the way to RAN monetization.

LEARN MORE

For more information about the VMware Telco Cloud, call 1-877-VMWARE (outside North America, dial +1-650-427-5000) or visit *https://telco.vmware.com/*

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