Disaggregate the RAN with VMware and Nokia

Nokia 5G Cloud RAN Validated on VMware Telco Cloud Platform RAN

SOLUTION AT A GLANCE

VMware Telco Cloud Platform RAN™ is powered by field-proven virtualized compute coupled with VMware Telco Cloud Automation™ and VMware Tanzu™ for RAN, a telco-grade Kubernetes distribution. VMware Telco Cloud Platform RAN paves a clear path to RAN modernization by enabling CSPs to evolve from their traditional RAN to a disaggregated vRAN.

Nokia 5G Cloud RAN runs on VMware Telco Cloud Platform RAN to disaggregate the RAN hardware and software. To take full advantage of the cloud-computing model, the functions are built with a cloud-native design. With RAN virtualization, CSPs can use shared edge infrastructure for edge cloud deployments. This architectural evolution is about introducing 5G radio capacity for new services.

SOLUTION BENEFITS

- Increase business agility
- Dynamically allocate resources for efficiency
- Enable high scalability
- Improve end-user experiences
- Build a future-proof ecosystem

Executive Summary

The Nokia 5G Cloud RAN solution runs on VMware Telco Cloud Platform RAN to disaggregate and optimize the RAN into a flexible, high-performance virtualized RAN solution with open APIs.

With Nokia 5G Cloud RAN tested and validated with VMware Telco Cloud Platform RAN, the combined solution gives communication service providers peace of mind with innovative virtualization and consistency in their radio access network.

In addition, the Nokia Airframe Open Edge server has been validated by VMware to support VMware Telco Cloud Platform RAN and the low latency and high-performance requirements for 5G RAN virtualized distributed unit (vDU) workloads.

Key Features

- Nokia 5G Cloud RAN has completed testing with VMware Telco Cloud Platform RAN successfully for both Nokia 5G virtualized distributed units (vDUs) and virtualized central units (vCUs) software
- Nokia Airframe Open Edge server has been validated to support VMware Telco Cloud Platform RAN

The Evolution of Modern Telco Networks

CSPs are seeking new market opportunities to drive their next phase of revenue growth and control the costs of building 5G networks. As the industry is rapidly deploying 5G and expanding into the virtualization of the RAN, flexible and scalable solutions are required to fully deliver on the promise of 5G and vRAN.

CSPs understand 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.

Open RAN is challenging traditional network deployments, but CSPs are finding a suitable balance between openness and solution readiness. Innovative network equipment providers, like Nokia, are embracing cloudification to increase innovation velocity, with RAN functions implemented in software 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, empowering CSPs with the flexibility to modernize and monetize their networks.

At the Leading Edge of 5G with Nokia 5G Cloud RAN

Nokia 5G Cloud RAN embraces the evolution of radio access networks and can be referred to as a virtualized radio access network (vRAN). Cloud RAN hardware and software are disaggregated — to take full advantage of the cloud-computing model,
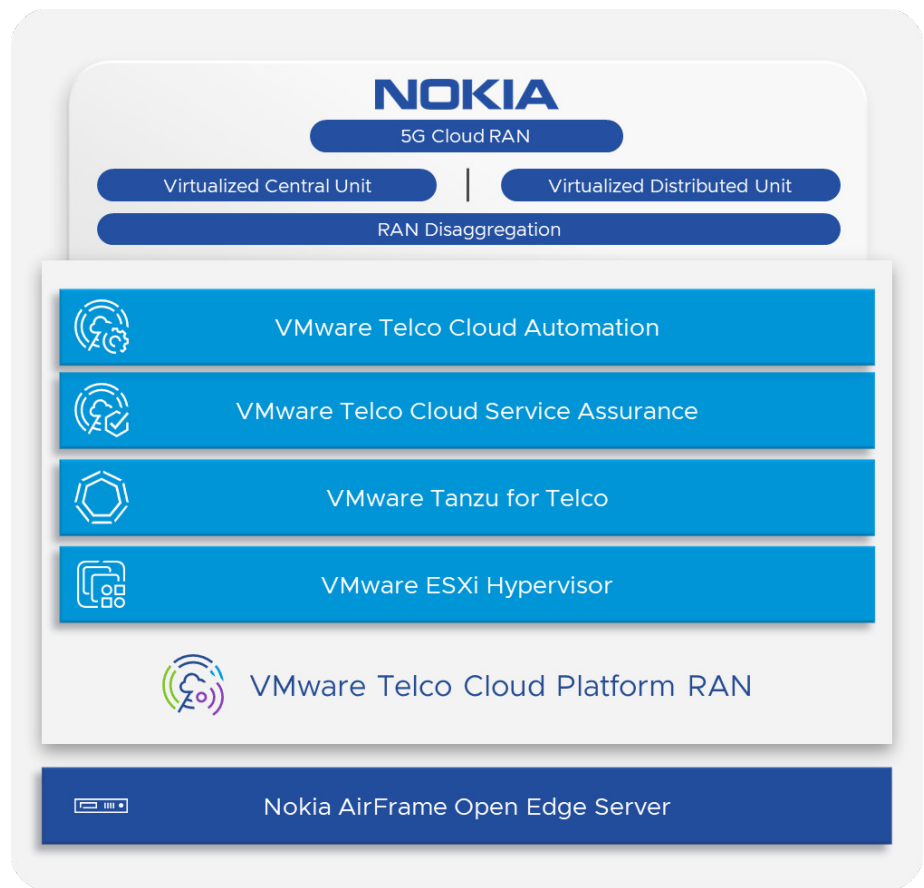
FIGURE 1: Nokia 5G Cloud RAN vCU and vDU software is certified to run on VMware Telco Cloud Platform RAN.

the functions are built with a cloud-native design. With RAN virtualization, it is possible to use shared edge infrastructure for edge cloud deployments. This architectural evolution is about introducing 5G radio capacity for new services.

Nokia 5G Cloud RAN enables CSPs to offer new services with shorter software and innovation cycles, resulting in a better mobile experience for their customers with lower latency and higher performance. By utilizing dynamic pooling and elasticity, CSPs can improve hardware capabilities and resilience while embracing efficiency at scale. Nokia 5G Cloud RAN allows for an open ecosystem to encourage new applications and revenue opportunities.

VMware Enhances Nokia 5G Cloud RAN Performance

The Nokia 5G Cloud RAN solution has been validated on VMware Telco Cloud Platform RAN to solve the challenges of traditional RAN deployments and disaggregate the RAN into a flexible, high-performance stack with open interfaces.

VMware Telco Cloud Platform RAN is a cloud-native RAN solution designed for running virtualized baseband functions, vDUs and vCUs, while meeting the stringent performance, latency, and jitter requirements inherent to RAN.

VMware Telco Cloud Platform RAN helps CSPs disaggregate RAN functions and run them on a horizontal platform. VMware Telco Cloud Platform RAN delivers equivalent performance to bare metal solutions. The same platform becomes the foundation for

AUTOMATION AND PROGRAMMABILITY TO OPTIMIZE THE RAN

VMware Telco Cloud Platform RAN delivers the automation and programmability needed for 5G.

- On-demand resource provisioning optimizes where to locate vDUs and vCUs. When onboarding a vRAN function, a network operator can programmatically adjust the underpinning platform availability and resource configuration based on the function's requirements.

- To meet high-performance, low latency and jitter requirements, vDUs can be placed at the far edge near users.

- vCUs, which might not need to meet the same low latency requirements as vDUs, can be automatically placed or dynamically moved to be closer to the core to maximize resource utilization.

The programmable resource optimization capabilities of VMware Telco Cloud Platform RAN, powered by VMware Telco Cloud Automation, enable CSPs to dynamically adjust the underpinning infrastructure resources on demand when instantiating a vDU and vCU, which improves resource utilization and speeds up deployment.

moving to open RAN by giving CSPs the flexibility to evolve toward the future without disrupting their operations or overhauling their network design.

Furthermore, VMware Telco Cloud Platform RAN simplifies operations with consistency across distributed RAN sites, regardless of the vRAN functions each site hosts. Simplified operations are achieved through centralizing cloud-smart automation, which reduces OpEx. VMware Telco Cloud Platform RAN enhances Nokia's scalability and performance, and it is all managed on a consistent, flexible platform.

Key Capabilities and Benefits of VMware Telco Cloud Platform RAN

VMware Telco Cloud Platform RAN provides RAN-specific performance enhancements, including the following:

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

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

- Optimization for enhanced dimensioning to ensure that the maximum VMware ESXi compute resources are available to vRAN 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 operating system 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.

Nokia Open Edge Airframe Validated by VMware

Nokia Open Edge Airframe server has been validated by VMware to support VMware Telco Cloud Platform RAN and the required low latency and high-performance requirement for RAN vDU workload. Nokia's Airframe Open Edge server successfully ran Nokia 5G Cloud RAN, vDU on VMware Telco Cloud Platform RAN with consistency and performance. VMware server validation testing confirmed the Nokia AirFrame Open Edge hardware.

Conclusion: Nokia and VMware Accelerate RAN Disaggregation

VMware Telco Cloud Platform RAN with the Nokia 5G Cloud RAN solution virtualizes, disaggregates, and optimizes the radio access network to improve scalability, flexibility, and agility.

LEARN MORE

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

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