MARKET NOTE

VMware Extends Telco Cloud Platform to Address vRAN, Cloud RAN, and ORAN Workloads

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EXECUTIVE SNAPSHOT

FIGURE 1

Executive Snapshot: VMware Telco Cloud Platform Seeks to Address Multiple Telco Cloud Pain Points

As comm. SPs earmark plans to run virtual and cloud-native network functions (e.g., vRAN, 5G core) at core, carrier MEC, and even enterprise edge sites, they are exploring ways to build a broader telco cloud that can onboard, distribute, and operationalize virtualized network functions as part of new services. For example, many comm. SPs are beginning to explore the use of cloud-native network functions in conjunction with 5G core and 5G vRAN deployments. In focus, VMware's recent Telco Cloud Platform enhancements position the company to play a key role in these buildouts, particularly at the NFVI and operational layers.

Key Takeaways

- Comm. SPs are ever gradually virtualizing network functions, with an early focus on mobile core, vIMS, and vRAN.
- With 5G coming to the fore, virtualization is shifting to cloud-native solutions, including the potential use of container-based infrastructure and the broader application of NFVI.
- VMware's Telco Cloud Platform represents a leading effort to bridge network silos and operationalize the telco cloud across core, RAN, and other network domains. Its most recent enhancements target RAN evolution, including comm. SPs with plans to deploy vRAN or ORAN solutions.

Source: IDC, 2021

June 2021, IDC #US47999121

IN THIS MARKET NOTE

In this IDC Market Note, we discuss VMware's announced plans to extend the company's Telco Cloud Platform offering, from the core to the radio access network (RAN), to support virtualized radio access network (vRAN) workloads. The platform provides advanced features to run cloud-native RAN functions (cloud radio access network [C-RAN]) and ORAN workloads as well. For the purposes of this document, we differentiate between vRAN, cloud RAN, and ORAN. There are some further technical considerations, but for this document's intent, following are some common definitions for each:

- **vRAN:** vRAN is already seen in LTE networks, whereby the baseband unit (BBU) is virtualized and hosted in a centralized location (e.g., baseband pooling or baseband hotels). vRAN is largely a cost-savings exercise.
- **Cloud RAN:** The Cloud radio access network is a centralized and cloud computing-based architecture for RAN that facilitates real-time virtualization capabilities, large-scale deployment, and collaborative radio technology support.
- **ORAN:** This involves the use of standardized interfaces between the baseband and the radio to enable multiple vendor scenarios, as opposed to a singular vendor for both the radio and the baseband. In addition, ORAN incorporates the use of the RAN Intelligent Controller (RIC). RIC provides advanced control functionality that delivers increased efficiency and better radio resource management. Applications like mobility management, admission control, and interference management (also called xAPPS) are available as apps on the controller, which enforces network policies via a southbound interface toward the radios.

  ORAN can invoke both vRAN and cloud RAN architectures, but the main impact could be that comm. SPs can mix and match vendors more easily than in the past. The idea is to drive the RAN cost curve down by making RAN procurement more competitive.

  In addition, as noted, the inclusion of the RIC can help drive more RAN programmability and agility, enabling comm. SPs to customize services for a particular use case or vertical.

IDC'S POINT OF VIEW

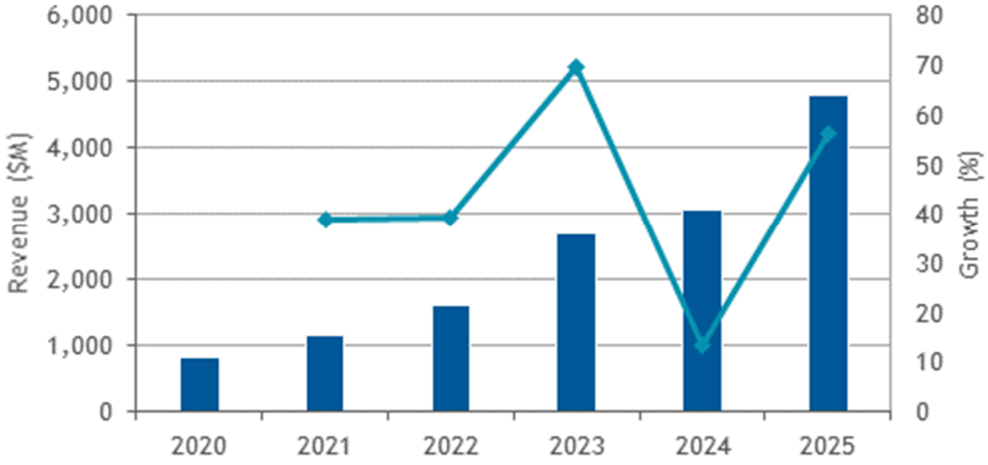
VMware's decision to engineer the company's Telco Cloud Platform solution for vRAN/cloud RAN and ORAN is both timely and important. For years, comm. SPs have experimented and slowly deployed virtualized infrastructure as a means to both deliver cost savings and improve service agility. While those initiatives can generally be described as slow and methodical, there has been progress in proving the value in NFV and carrier SDN, across both parameters.

For example, mobile core virtualization, which began in the mid-2010s in LTE networks, is now mainstream, with comm. SPs more or less deploying a virtualized or cloud-based EPC (e.g., vEPC/cloud core). Those deployments have delivered TCO improvements, as a means to reduce spending on proprietary hardware, as well as the ability to mix and match core network functions as needed. However, with the advent of 5G, the mobile core leverages the microservices-based architecture, which leverages cloud-native network functions from the outset. With the 5G spending cycle representing a new opportunity to take advantage of virtualization elsewhere, we expect comm. SPs to target RAN virtualization as well.

In focus, we forecast spending on vRAN (including cloud RAN) to grow to roughly $4.8 billion by 2025 (see Figure 2).

FIGURE 2

Worldwide vRAN (Including Cloud RAN) Revenue and Growth, 2020–2025



Note: See *Worldwide Telecom Network Functions Virtualization Software (VNF and NFVI) Forecast, 2021-2025* (IDC #US47662821, May 2021)

Source: IDC, 2021

This may seem like a relatively large number, but considering the broader spending on RAN equipment globally, we estimate spending on vRAN will represent approximately 8–10% of the total RAN market by 2025, with the remaining market continuing to deploy alternative RAN architectures, as needed. Where the RAN workloads largely differentiate themselves from other functions is the stringent real-time requirement for processing. This is one of the reasons traditional distributed RAN hosts all RAN components at the cell site. vRAN attempts to abstract the baseband portion of the solution into a central or regional datacenter, providing mass management of antennas and eventually distributed RAN functions at the edge/cell site.

However, to support cloud RAN, particularly in the context of 5G cloud RAN applications, comm. SPs will need to simultaneously invest in telco cloud infrastructure (e.g., NFVI or cloud-native infrastructure) for optimal outcomes.

VMware Telco Cloud Platform RAN

In light of these trends, VMware's decision to extend the company's existing Telco Cloud Platform offering for the cloud-native core to the edge of the 5G networks to encompass RAN workloads makes sense from both a timing and an opportunity perspective. Telco Cloud Platform RAN represents VMware's RAN-optimized platform designed to act as the common horizontal platform for cloud-native RAN functions from multiple RAN vendors. Overall, Telco Cloud Platform RAN is an extension of VMware's existing service provider cloud and edge portfolio, enabling comm. SPs to securely deploy RAN CNFs at scale.

To tackle the demanding real-time sensitivity of RAN functions, VMware applies the following solutions and technologies to address RAN-specific challenges:

- **vSphere:** Real-time optimization of vSphere ESXi to meet the PTP accuracy and latency requirements of virtualized baseband functions that include vDUs and vCUs
- **Intel FlexRAN optimization for enhanced dimensioning:** Ensures that the maximum compute resources are available to RAN workloads by keeping the resources required for VMware components to a minimum
- **Tanzu for Telco:** Real-time optimization of Photon OS Tanzu Worker Node with the following plug-ins: BIOS CNF, CPU Mgr, NUMA Topo Mg, Calico, Antrea, Multus, macvlan, DPDK modules, and SRIOV plug-in
- **Telco Cloud Automation:** Automate infrastructure provisioning and RAN functions life-cycle management

In addition, VMware incorporates Telco Cloud Operations (e.g., assurance) to ensure the service level remains on track.

In focus, Telco Cloud Platform RAN addresses several key vRAN/cloud RAN considerations:

- Drives operational scale and uniformity across a myriad of distributed vRAN sites leveraging centralized, cloud-based automation to deliver TCO improvements over legacy proprietary hardware-based implementations
- Addresses functional vDU/vCU split (baseband split) for optimal performance, particularly when deploying the vDU at a far edge site
- Has the ability to onboard multivendor RAN functions from the open ecosystem partners to ensure interoperability between the platform and network functions
- Supports 5G modernization and monetization with virtualization and container-based infrastructure, supporting both cloud-native RAN functions and 5G service applications on the same horizontal platform (This could include running vRAN edge functions [e.g., vDU] alongside 5G core edge functions [e.g., 5G UPF] on the same edge site for greater efficiency and service agility.)

Overall, extending the telco cloud to the RAN can help comm. SPs shift away from a vertical, stack-based approach to a more unified horizontal model that can drive operational improvements and the ability to react to market demands faster. Similar to hyperscale cloud provider (HCP) architectures, Telco Cloud Platform seeks to simplify the telco cloud for ease of management and upgrades.

In Closing

With leading RAN vendors just now starting to offer cloud-native RAN apps, and ORAN still a couple of years away from broad adoption across the mobile network, today's focus remains on vRAN and traditional RAN implementations. However, what is clear is that comm. SPs are likely to deploy a mix of these architectures, particularly as the 5G coverage phase shifts to densification and as small cells come to the fore.

Leveraging a common horizontal NFVI platform that can simplify RAN deployments, as well as tie in adjacent network domains (such as the mobile core), is the vision NFV and NFVI have been striving to execute on all along – namely, a common virtual or cloud-native infrastructure running VNFs and CNFs that can drive operational synergies, enhance service agility, and reduce costs. In addition, given Dell's recent telecom-related hardware announcements, we expect Dell and VMware to increasingly target dual go-to-market opportunities that enable a comm. SP to simplify telco cloud enablement from both a hardware and a software perspective, even in light of Dell's decision to spin off VMware.

As such, we expect VMware's Telco Cloud Platform RAN offering to resonate with comm. SPs looking to accelerate the shift to vRAN, cloud RAN, and eventually ORAN and continue to scale out the telco cloud overall.

LEARN MORE

Related Research

- *Worldwide Telecom Network Functions Virtualization Software (VNF and NFVI) Forecast, 2021-2025* (IDC #US47662821, May 2021)
- *DISH Bets on AWS to Expedite Buildout of Cloud-Native 5G Network* (IDC #IcUS47663021, May 2021)
- *Five Key Carrier Network Infrastructure Trends to Watch in 2021* (IDC #US47479421, May 2021)

Synopsis

This IDC Market Note provides an overview of VMware's Telco Cloud Platform (TCP) RAN solution as it relates to ongoing trends related to RAN evolution. This document also explores VMware's opportunities for growth as a result of this new offering.

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