THE INSIGHT RESEARCH CORPORATION

How's vRAN Doing These Days?

Insight Research Corporation

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1. EXECUTIVE SUMMARY

This chapter presents the key discernible trends in the virtual RAN market along with a high-level view of the market size.

Let us get a few key questions out of the way before we dive into the subject.

1.1 WHAT ABOUT OPEN RAN?

Why are we talking about virtual RAN (vRAN) when the whole world is talking about Open RAN?

Isn't vRAN the same as Open RAN?

vRAN is outdated, aren't companies moving towards container-based RANs?

Let us answer these questions for you, although not necessarily in the same order.

Open RAN has different connotations - depending on whom you ask. We will make it simple for you. Open RAN is essentially disaggregated RAN; wherein the BBU interface with the CU (backhaul); the CU interface with the DU (midhaul) and the DU interface with the RU (fronthaul) are open. Virtual RAN and Open RAN are not necessarily the same. They however work well together. Virtualization of the BBU, CU and DU (the RU is not virtualized) lends flexibility to their respectively architecture, helping them utilize most of the open interfaces. Open interfaces, on the other hand, provide considerable options for virtualized network functions to have multidimensional interfaces with each other. Practically all the vendors covered in this report, with the notable exception of Huawei, support open interfaces.

That brings us to the major geopolitical challenge in quantifying the market for Open RAN. Today, the world appears to be divided among supporters or opponents of Open RAN, not on the basis of technology, but on the basis of geopolitics. As we have evidenced in the past, geopolitics is a fluid entity. The foes of today can be friends tomorrow and vice-versa. We will not hazard to forecast where geopolitics will take us. We will stick to market forecasting of technology-driven trends.

In the absence of the backing of Huawei in particular, the term Open RAN does not appear to be interchangeable with virtual RAN. Virtual RAN, or vRAN is a more universal concept that draws its inheritance from the NFV and includes in its ambit container/microservice technologies as well.

1.2 HAS VRAN CHANGED FORM?

In the past, we have sought to distinguish the VM-based vRAN markets as VNFs and container-based vRAN markets as CNFs. Considering that containers do

technically qualify as VNFs, and most VNF vendors have containerization of network functions on their radars anyway, we had to relook at the earlier characterizations.

This report concentrates on the market for vRAN.

The report now considers two types of vRANs:

- Virtual machine (VM)-based vRANs, whose predecessors in the earlier report were VNFs
- Container-based vRANs, whose predecessors in the earlier report were CNFs

1.2.1 VM-based vRAN

NFV can be defined in the following manner:

"The migration from physical networking hardware to virtualized network functions is termed as Network Functions Virtualization."

While NFV technically includes virtualization in general, its prevalent connotation since inception has been restricted to the usage of virtual machines (VM) in the network function architecture. With the advent of container-based network functions, NFV stakeholders increasingly include this approach as well under their fold. To make the definition explicit, Insight Research refers to the original NFV-based network functions as "VM-based".

1.2.2 Container-based vRAN

CNF is a network function on that employs container-based environment for its realization.

According to the Cloud Native Computing Foundation, "*Cloud native computing uses an open-source software stack to deploy applications as microservices, packaging each part into its own container, and dynamically orchestrating those containers to optimize resource utilization.*"

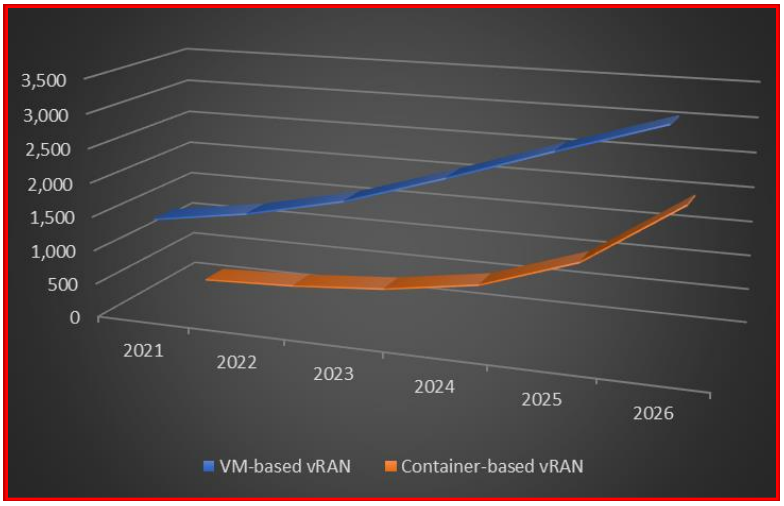
Docker, considered as the creator of containers, defines containers as "*a standard unit of software that packages up code and all its dependencies, so the application runs quickly and reliably from one computing environment to another*".

1.3 Market Overview

The movement towards virtualization of network functions has a universal endorsement, as evidenced in the healthy growth rates.

The following figure presents the global market for VM and container-based vRAN.

Figure 1-1: Global Market for VM and Container-based vRAN 2021-2026 ($ million)



Source: Insight Research

The following table presents the global market for VM and container-based vRAN.

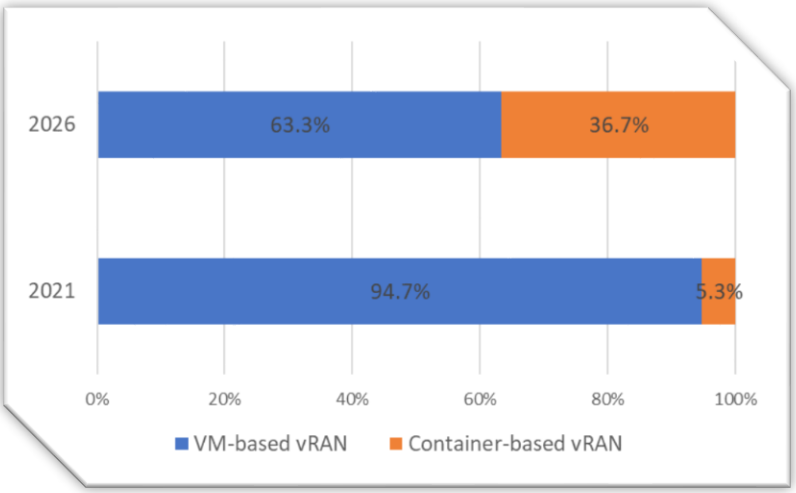
Table 1-1: Global Market for VM and Container-based vRAN 2021-2026 ($ million)

	2021	2022	2023	2024	2025	2026	CAGR 2021-2026
VM-based vRAN	1,419	1,632	1,942	2,389	2,866	3,325	18.6%
Container-based vRAN	79	137	246	467	958	1,925	89.4%
Total	**1,498**	**1,769**	**2,188**	**2,856**	**3,824**	**5,250**	**28.5%**

Source: Insight Research

The following figure presents the market share for VM and container-based vRAN.

Figure 1-2: Market Share for VM and Container-based vRAN 2021-2026



Source: Insight Research

The progression towards containerization will happen faster than anticipated. Practically every vendor covered in this report has begun or is planning to offer container-based vRAN.

The absence of the hypervisor reduces overheads in terms of computing, storage and memory resources. Containers are therefore lighter than VMs. Containers facilitate the packaging of an application with its dependencies by which the package can be ported like a single entity. The 5G-PPP terms microservices as loosely coupled, but highly cohesive. The cohesiveness helps in quickly establishing connections with other microservices, while the loose coupling allows for independence and autonomy in the development cycles of individual microservices. Containers can elegantly address the vexing issue of VNF orchestration. The underlying simplicity in directly accessing the kernel of the host OS and fewer design overheads as compared to hypervisor based VMs helps in quicker container orchestration.

And then, there is Kubernetes, which is a clear winner in the battle of orchestrators! The availability of an effective and versatile orchestrator in form of Kubernetes is the game-changer for container-based vRANs.

Container-based vRAN will rapidly gain market share in the battle of virtualization technologies. The advantages that containers and microservices bring to the table as compared to VMs have been amply demonstrated and explained in the report.