Native Software Solutions for NFV and SDN

Driving to Native Software Solutions for NFV and SDN

The quest for new network economics

The launch and migration towards NFV signify a recognition among leading network operators that their legacy business models are not sustainable and that they need to change their cost-per-bit assumptions and revenue generation capabilities. Five years on, the quest for new network economics is more urgent as the costs of keeping up with traffic demand outpaces service revenue growth. Wireless operators have been let down by their traditional suppliers whose legacy business models are not aligned with their goals.

This looming market reality is one catalyst for implementing Network Functions Virtualization (NFV) and Software-Defined Networking (SDN).

To prosper in the 5G era, wireless operators must build cost-efficient, flexible, and agile networks to deliver innovative services and grow the top and bottom lines. The new model for wireless network economics is founded on dramatic savings in capital and operating expenditures through the deployment of distributed cloud-native architectures that foster new service models, standard open interfaces and rapid innovation – each of which is imminently achievable. The technology shift marks a distinct departure from a traditional telco mindset to web-scale deployments and speeds, including fundamental changes in how operators engage with suppliers as they adopt new and innovative software licensing models.

The Need for NFV and SDN-Cloud Native Software

The vision for Network Functions Virtualization (NFV) was established by 13 of the world's largest telecom network operators in a white paper published in 2012. It proposed a radical transformation in the way that networks are built, and services are delivered to achieve cost savings in capex and opex as well as accelerate service development and time to market.

Virtualization enables CSPs to deploy software-based network functions on general-purpose hardware, rather than install proprietary appliances every time they need a new network function, service or application. As originally envisioned, the benefits of NFV all boil down to cost savings, deployment flexibility and service agility.

While substantive progress has been made in a relatively short time, the promised cost savings and agility have not yet materialized for most CSPs. In a recent Heavy Reading survey that tracked virtualization deployments, 64% of the CSPs surveyed said they did not expect capex related to virtualization to level off or decline until 2020 or later, and most CSPs said they expected to see opex savings in the next three to five years.

There are many reasons for NFV's as-yet unfulfilled promise: inadequate support for automation, complex integration with legacy systems, immature Management and Orchestration (MANO) systems, not enough incorporation of SDN programmability principles, just to name a few. The fundamental issue is that for the most part, the Virtual Network Functions (VNFs) themselves are not natively designed for high-performance cloud environments. Early VNFs were simply proprietary software that previously ran on customized appliances. The software wasn't rearchitected for virtualized environments.

Today, most VNFs are built upon existing software code and modified to run in virtual machines (VMs) on general-purpose hardware. But VMs have serious limitations in terms of scalability and resource utilization. VNFs

that are designed for cloud environments overcome the operational challenges of VMs, which require significant manual intervention. Cloud-native software design leverages containerization, stateless processing, and microservices to create VNFs that use compute resources efficiently and reliably.

> **"Rather than just scaling up or down, native VNFs scale out to spread the capacity load across available compute resources." - John Baker**

Native VNFs allow dynamic service chaining and can be instantiated rapidly, reducing the time it takes to launch new services and applications. Native VNFs achieve the flexibility, scalability and operational efficiency promised by NFV. Ultimately NFV will transform mobile networks to achieve web-scale, full-service automation and enable Platform-as-a-Service (PaaS) offerings. The result will be programmable mobile networks that leverage telemetry and analytics, automatically scale and self-heal, as well as deliver the highest service assurance.

These capabilities can change the economic equation for mobile operators, significantly lowering the overall cost-per-bit and leveling the playing field to compete with web-scale cloud rivals Facebook, Amazon, Netflix, and Google (FANG).