

NFV and SDN – The Key to Service Delivery Transformation for CSPs

Abstract

As the disintermediation of value chains continues apace in the digital era, communications service providers (CSPs) worldwide confront rising customer churn, increasing pricing pressures, and declining profits. Growing competition from agile over-the-top (OTT) service providers, alongside rapid commercialization of several disruptive technologies, are triggering unprecedented changes in consumer behavior. This has resulted in sharp declines in revenues generated from operator's mainstream offerings – voice and messaging services.

To sustain profitability, and deliver compelling, differentiated customer experiences, CSPs must build comprehensive capabilities to streamline the business processes concerning many of their core functions—including network management, customer care, and marketing. Institutionalizing a flexible network and services management structure, where resources are dynamically allocated based on customer profile, location, time, bandwidth availability, and device type, can be a major enabler in this regard.

Organizations have already started transforming their networks into low-cost, agile, flexible, and scalable setups using software defined networking (SDN) and network function virtualization (NFV).

NFV and SDN: An Overview

SDN separates control plane (network management) from data plane (traffic handling), allowing dynamic bandwidth, provisioned with quality of service levels. NFV replaces hardware with software apps able to operate in a compute environment, eliminating specialty WAN equipment and associated costs.

NFV promises to foster higher profitability through improved network monetization, provisioning of next-generation services, and substantial reduction in capital and operating expenditure through process automation. SDN, meanwhile, can orchestrate programmatic control of application programmable interfaces (APIs) that consume network resources, as well as of network controlling applications used to monitor, manage, and optimize the network. This, in turn, can result in network automation and dynamic service delivery, as CSPs will be able to simplify connectivity to virtualized networks for activating and managing services.

Operators can build proactive, profitable growth strategies built around SDN and NFV technologies by enablement of:

- SDN in the access network

- SDN in the core network
- NFV centralized in the cloud
- NFV in distributed virtual CPE (vCPE)

Imperatives for NFV and SDN adoption

Effective rollout of NFV and SDN can yield tangible business results for CSPs across the board, including increased customer satisfaction and operational efficiency. By enacting a 'ready to operate' model, firms can ensure multi-tenant security, virtually 100% availability, automated installation and upgrade of applications, and robust service and application monitoring. Multi-layer cloud environment management, thanks to NFV and SDN, can pave the way for immediate response to downtime, proactive management of load and network variations, and comprehensive fault tolerance and correction.

Another notable benefit of virtualization, in conjunction with separation of the control and data planes in networking equipment, lies in enhanced network flexibility and scalability.

This will imply optimal accommodation and distribution of virtual network functions (VNFs), and unified management of the same, among other things.

Smooth integration of NFV and SDN can also translate into end-to-end multi-application lifecycle management and single network service orchestration, thus eliminating the complexities involved in service expansion. In tandem, CSPs will also be able to reduce the time to market for new offerings, and simplify operations for faster and flexible onboarding of services.

Synchronizing NFV and SDN performance

The way IT systems of many CSPs are configured presently means their products and services are tied to the underlying infrastructure, thus making dynamic expansion of services nearly impossible. As wireless carriers, cable operators and other companies across the industry become cloud service providers as well as users, the implementation of multiple platforms is making the landscape increasingly complex. As a result, CSPs are finding it challenging to navigate the multi-vendor cloud environment during NFV and SDN adoption.

A unified, end-to-end management platform for NFV and SDN (see Figure 1) can transform service delivery and management, by facilitating frictionless multi-vendor orchestration, accelerated technology adoption, and effective interoperability, at optimized costs.

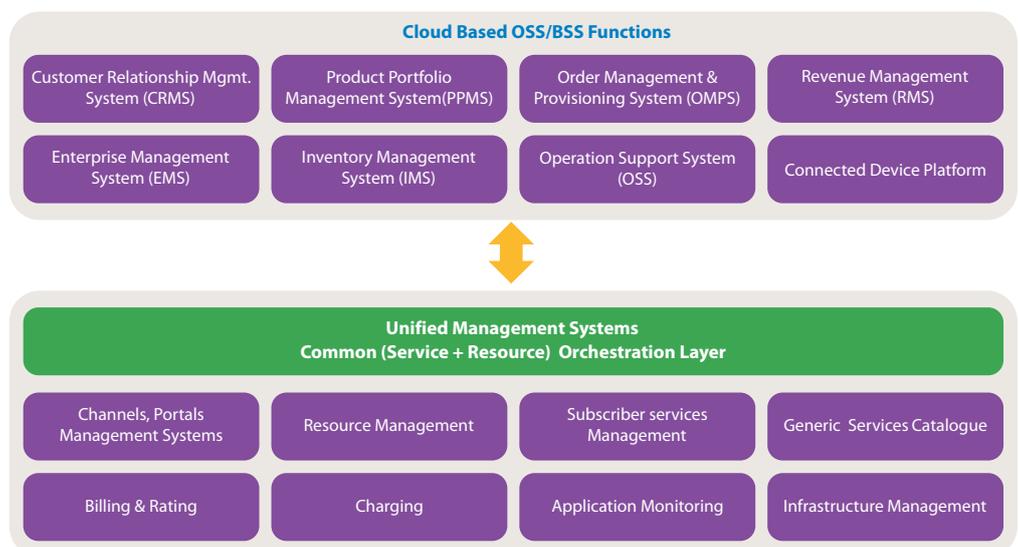


Figure 1: SDN and NFV Enabled OSS/BSS Platform for CSPs

Specifically, such a platform can facilitate effective portal management, domain and service orchestration, automation, provisioning, analytics, and integration and optimization of cloud services between various networks. Also, CSPs can harness this framework to integrate their diverse data center resource pools, and generate a singular, one-stop view of the same.

Moreover, the platform can allow companies to smoothly orchestrate multiple NFV applications including VNFs and element management systems (EMS). The framework's cloud APIs will foster robust integration of different cloud elements, as well as linking of the same to the VNF or EMS layer, with a virtualized infrastructure management (VIM) system ensuring unified resource handling.

CSPs can leverage the framework to integrate their multiple IT functions, including those pertaining to policy control mechanisms, operational and business support systems (OSS/BSS), and data analytics. This will enable companies to institute device- and application-agnostic platforms that can support the launch and removal of services in line with the dynamic market demand. Adoption of cost-effective networks, built around shared cloud resources and services, can also help firms rationalize their operating expenditure.

An intermediate central probing and response layer should be incorporated into this framework, for effective service orchestration and management through end-to-end control and visibility. Such a layer can help companies make 'performance aware' orchestration and control decisions—mainly related to automation and service assurance—in a multi-vendor and multi-technology network environment.

Major application areas

By synchronizing NFV and SDN implementation for simplified multi-vendor, multi-cloud, multi-system, and multi-service environment management, CSPs can ensure the following:

- **Virtual network functions** – Provision functions like firewall, application performance management, virtual network, platform as a service, and load balancing in the app store as a network hosted function.

- **Virtual Customer Premises Equipment (v-CPE)** – Deliver an integrated standalone server, which performs various functions including routing, switching, WAN optimization, visibility, and control, to help customers consolidate multiple devices into one.
- **On-demand cloud services** – Enable functions such as connecting to CSPs' cloud services on demand over a private network, bandwidth on demand (video optimization), virtual edge routing functionality, and energy saving network (green network).
- **Software defined virtual private network** – Augment capacity, lower costs, and make hybrid network secure, simple, and optimized for enterprise and cloud apps. Make sure the network can dynamically combine the use of software defined hybrid WAN with analytics, security and other network functions—all easily accessible from the app store.

Building future-ready networks

Virtualization can be a potential game changer for the communication industry, allowing companies to reimagine service assurance, drastically reduce overheads, accelerate innovation, and reduce turnaround times for dynamic product rollouts.

As CSPs seek to reinvent themselves by offering a broad spectrum of services beyond connectivity, the underlying architecture of traditional networks—wherein functions are embedded into the infrastructure—needs a revamp. In this context, network virtualization should be aggressively harnessed for orchestrating the requisite shift from vertical silos to horizontal planes.

About The Author

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