# IDC ANALYST CONNECTION

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# NFV is at the Heart of Next-Generation Network Transformation

*March 2018*

*Communication service providers (CSPs) of all size and type and large enterprises are in the midst of a worldwide transformation of communications networks. At the heart of this dramatic change are the twin next-generation technologies of software-defined network (SDN) and network functions virtualization (NFV) next-generation network technologies. SDN and NFV together are precipitating an evolution of networks currently based on proprietary hardware to software implementations. NFV is moving providers toward a fully virtualized managed services environment that will make their networks more cost effective and enable the more efficient provision of new services to increase revenue.*

The following questions were posed to Lawrence Surtees, research vice president, Communications, at IDC Canada.

**Q.** **What are the key business opportunities that network functions virtualization can enable for service providers?**

A.    NFV is a network-based software architecture that provides CSPs greater economy, flexibility, and agility to offer new value-added network services *on demand*. NFV promises to enhance a CSP's customer experience, which will increase loyalty while reducing churn, enable swifter response to over-the-top vendor competitive threats — all potentially boosting revenue. It entails the deployment of software-based virtual network functions on commercial off-the-shelf (COTS) hardware. Service automation across multivendor and multilayer environments as envisaged by NFV is the principal use case.

IDC views NFV as a networking game changer. The impact of NFV will be profound because it not only enables on-demand provisioning, but also more efficient network operations, reducing opex costs. And because NFV is based on open software, it also promises operators network capex savings. IDC perceives several scenarios and use cases for SDN/NFV deployments and capabilities in CSP and their enterprise customer networks, including:

- Faster deployment and optimization of WAN bandwidth with automated self-provisioning providing network programmability and customization

- Maximizing value from server virtualization and providing elastic web scaling

- Supporting video streaming and collaboration applications with new managed unified communication and collaboration (UCC) services

- Providing dynamically segmented networks, such as WiFi and VLANs

- Faster and more efficient deployment of new services, increasing revenue

IDC has observed that both SDN and NFV deployments have become mainstream globally in both CSP and cloud-based enterprise networks, fueling the uptake of NFV technology. The deployment of 5G wireless by 2020 will drive NFV further. Verizon CEO Lowell McAdam told a conference last September the carrier's 5G plans highlight the benefits of virtualization: "We're redesigning the network to be from the cloud through high-speed fiber infrastructure to edge computing to 5G. So, the beauty of a 5G intelligent edge network is you can design a network to meet whatever your specific application needs."

**Q.** **How does NFV transform or impact the competitive position of a service provider?**

A. NFV's synergistic partner technology, SDN, evolved from "policy-based networking" in the late 1990s. It enables applications to "talk" to the network to request appropriate service levels such as quality of service (QoS), class of service (CoS), and bandwidth. SDN with NFV goes further by moving network control into the cloud, using a software-based approach that enables dynamic provisioning of network resources to support real-time applications.

Most of the world's largest CSPs are reinventing their networks with NFV on their SDN core, including NTT Docomo, Korea Telecom, China Unicom, Deutsche Telekom, Telefónica, Telecom Italia, BT, Orange, AT&T, Verizon, Bell Canada, TELUS, Rogers, and Cogeco Peer 1. Dynamic networking provides more robust and scalable architecture for smaller tier 2 and tier 3 CSPs, enabling these smaller carriers to provide next-generation services, such as cloud-based SD-WAN service. Adopting NFV is not only essential to ensuring the competitive position of a CSP, but to support the demands of enterprise customers. NFV makes it possible for a CSP's business customers to select, manage, and provision WAN services. *Service providers that continue to hold off on NFV deployment are at a significant competitive disadvantage.*

NFV will enable a new disruptive economic model based on deploying a network control plane on a public cloud with automated cloud-based analytics. A recent example is the India RailTel WiFi project — a large implementation of WiFi services servicing 400 railway stations. The project has demonstrated the viability of a cloud-based virtualized control plane implementation of carrier-grade NFV services with real-time analytics. Global availability of public cloud will break down geographic barriers and drive collaboration among CSPs and large-scale public cloud providers, such as Amazon and Google, to enable wider availability and scalability of NFV services.

**Q.** **What about deploying NFV in enterprise networks?**

A. The redesign of WAN networks made possible by SD-WAN also presents an opportunity for enterprises to deploy virtualized network functions–based infrastructure spanning the WAN edge, provider edge, and data centre. Implementation of NFV promises to drive simplicity, flexibility, and efficiency at the WAN edge. Implementation of a VNF (virtualized network functions) based architecture at the network edge will enable consolidation of several network appliances at the branch edge onto a single white-box CPE with attendant benefits of lower acquisition costs and, most importantly, greater operational simplicity for IT. Long term, NFV orchestration will provide the ability to automate deployment of VNFs on demand and allow an IT department to move to an on-demand delivery model.

While DIY NFV in the enterprise is still early in its evolution, respondents in IDC surveys show a strong inclination toward deploying security and WAN acceleration/optimization in particular as VNFs on commodity hardware in preference to traditional appliances. The desire of enterprises to move virtualized network functions onto the same platform as SD-WAN is high. More than two-thirds (70%) of enterprise respondents to IDC's 2017 U.S. Enterprise Communication Survey say they would consider integrating VNFs as part of an SD-WAN platform.

In developing a comprehensive WAN strategy, IT leaders should consider incorporating virtualization of network functions at the branch edge. While evaluating vendors and service providers for their WAN network, enterprises should also evaluate their capability and roadmap to deliver the long-term strategy of not just SD-WAN but also vCPE.

**Q.    What does the implementation roadmap look like?**

A.    There is no universal roadmap for NFV adoption, in part because every network is different. And as with all software, NFV is still evolving and will remain a continual "work in progress." Global network standards groups want to make the NFV ecosystem as open as possible to ensure that their underlying functions are interoperable with independently developed management systems and hardware.

Orchestration is key to the promise of NFV to deliver a flexible and real-time environment for onboarding of new services and enabling pay-per-use pricing models. It can also provide service customization at the user level and enhance customer experience. But global communications bodies must still embrace common API (application programming interface) and service definitions to mitigate fragmentation.

NFV also has a critical role to play in 5G — the next generation of wireless. 5G together with NFV will make possible "network slicing" that will enable distinct APIs to more efficiently share common network resources.

Ultimately, adoption of NFV and SDN is a journey for any CSP or enterprise, and is not a single technology deployment. And adoption of these next-generation network technologies is not just about hardware and software or network transformation. It is also about people and business process change, which is just as critical to recognize and master. The next-gen Telecom Infra Project (TIP), a global future network initiative spearheaded by Facebook, Nokia, and Intel, has formed a People and Process group to help CSPs transform their culture to better align with a software-centric environment and the agility that requires.

**Q.    NFV solutions are complex, so what is critical for successful deployments?**

A.    Key lessons learned from ongoing deployments relate to integration, security, open source software, orchestration, interoperability, cloud-native NFV, and white box.

Decoupling network hardware and software creates a new systems integration challenge. Open source network technology has also pushed the market away from bespoke solutions, making integration a more problematic and complex environment.

Moving from appliances to virtual network functions also creates new security challenges, making it even more essential that security should be built in at the architecture level and not as an afterthought.

Many other issues remain relating to the commercialization of virtualized services, including new pricing methodologies such as pay-per-use models, multivendor service-level agreement (SLA) responsibilities, billing systems to handle dynamic introduction of new services, and quality-of-service benchmarks.

NFV is powerful but involves complex systems requiring deep expertise and in-depth knowledge. Yet many enterprises and CSPs, especially smaller players, lack the very specialized tools and skills to manage the new technologies and processes required to effectively implement next-gen NFV solutions. Working with a knowledgeable and experienced third-party partner with deep industry expertise and understanding of the CSP environment, as well as the NFV and SDN ecosystem, is essential, especially for smaller tier 2 and 3 CSPs and many enterprises.

A B O U T   T H I S   A N A L Y S T

Lawrence Surtees manages IDC Canada's communications research agenda and is IDC's lead analyst covering the Canadian communications services sector, including the wireline, wireless and internet segments, and the CRTC. He also works on related IDC consulting projects. *Widely regarded as one of Canada's foremost communications experts, Surtees has covered the communications sector for more than 37 years.*