More than Hype, NFV is Here
By Jesse Cryderman

When it comes to acronyms du jour and telecom, healthy skepticism is warranted. For every acronym that lives in the industry lexicon for a decade, there are several with extremely short lifespans.

In 2013 the conversation regarding network evolution was being dominated by two acronyms: software defined networking (SDN) and network functions virtualization (NFV). By applying the concepts of virtualization to the network itself, both acronyms promise to change the way networks are designed and controlled and how services are instantiated, monitored, and managed.

In a nutshell, SDN delaminates the data and control planes of the network and NFV virtualizes the functional elements of the network—routers, switches, firewalls—and expresses these functions as programs that run on commercial off-the-shelf (COTS) IT hardware. While they are distinct technologies, the two work together in concert to turn the network into an infinitely programmable dynamic mesh, versus a hardware-based static map. Where SDN is the network admin gone virtual; NFV is the gear gone virtual.

Together, SDN and NFV promise to deliver a whole new world of networking, but both are in their infancy. SDN lacks open and broadly adopted standards, although standards development work is being performed by the Internet Engineering Task Force (IETF) and the Open Networking Foundation (ONF). Since October 2012, NFV standardization has been driven by the European Telecommunications Standards Institute (ETSI). In October, 2013, ETSI published the first round of NFV specifications as well as an extensive survey of potential NFV use cases that is required reading.

Somewhat surprisingly, communications service providers (CSPs) themselves, not vendors, are driving the development of network virtualization technologies. The potential to dramatically accelerate new service delivery, lower operating costs, and eliminate vendor lock-in has CSPs salivating and network equipment vendors scrambling. Vendors who sell proprietary network gear don’t exactly welcome the thought of their intellectual property being replaced by standardized software running on commodity hardware. This has pushed the timeline for SDN and NFV further out, and prompted more than a few analysts to pull the hype card.

Is it just hype? Let’s examine NFV, since it has been standardized to a degree and has been deployed by several CSPs. Like any technology at the front of its arc, NFV and hype are certainly related—search Google for the words NFV and Hype and more than 1 million results pop up. However, after attending the Digital Disruption conference in October and hearing first-hand how CSPs are investing in NFV, I believe NFV is much more than hype. A quick read of 2014 predictions from leading analysts confirms that this is not an eccentric perspective. Forget the hype: NFV is here.

Virtualizing network functions

ETSI has developed an architectural framework that outlines NFV. While the scope of this framework is not exhaustive, and leaves many elements out, it represents the first step in an evolutionary process. Figure 1 below illustrates the NFV network architecture compared to legacy architecture.

Source: ETSI 2012
Extreme performance increases and cost reductions can be realized by virtualizing functions that once required physical hardware and manual programming. Using commoditized computer hardware, not specialized, vendor-controlled equipment, network functions such as firewalls, DPI (deep packet inspection) appliances, tunneling gateways, and more can be programmed automatically and instantiated in numerous locations. A telecom server could host a router one day and a session border controller the next, depending on demand, latency, and other network conditions; in the past, this would require new equipment, a truck roll, and a network engineer.

Early deployments

As previously mentioned, several CSPs are already executing on NFV plans in limited stages. In September, 2013, AT&T launched its Supplier Domain Program 2.0, an aggressive push into network virtualization. In a press release the company called the program a “transformative initiative” that employs NFV and SDN and is “integrated through AT&T’s Wide Area Network (WAN).”

At Digital Disruption, James Feger, VP network strategy and development, CenturyLink, spoke of his company’s NFV initiatives. “I am a huge believer in NFV; I have a team of architects dedicated to NFV, in a group I created specifically for that,” said Feger. “We have a live NFV deployment in production.”

In November, 2013, SK Telecom and Nokia Solutions and Networks (NSN) announced successful trials of NFV in the mobile network. “We have now completed proof-of-concept projects for voice as well as packet core network functions virtualization,” said Reino Tammela, Vice President Packet Core, NSN. “We proved that handling both control and user plane traffic in the cloud is feasible and a viable option to meet the performance requirements of data traffic growth.”

Where to virtualize?

According to a survey conducted by Infonetics Research and published in July, 2013, CSPs are deploying NFV in contained domains as they test the waters; but there is strong momentum behind the technology. The participants of the study ranked the following domains as the top applications for NFV:

- Content delivery networks (CDNs)
- IP Multimedia Subsystems (IMSs)
- Routers/security gateways

Although NFV can be implemented across nearly all network elements, it makes both practical and economic sense to start with limited domains. Yuri Gittik, head of strategic marketing at RAD, spoke with Pipeline about which domains are best primed for virtualization. “Virtualize from functionality that is already centralized and exists in dedicated hardware,” said Gittik. “PCRF [policy and charging rules function], gateways, IMS, and EPC [evolved packet core].”

Analyst perspective

Research into NFV performed by leading analysts firms confirms the development of NFV and reveals major market potential. In November, Mind Commerce estimated that the NFV market in 2014 will be worth $203 million, and will grow at 46 percent annually until 2019, when it reaches $1.3 billion. The research firm states that the chief domains targeted by early NFV deployments will be IMS services and the EPC.

Last August ABI Research predicted a similar growth curve, with a potential $6 billion market for virtual networking by 2018. “Software Defined Networking and Network Functions Virtualization are shaping up to fundamentally change the nature of the telecom industry,” said Joe Hoffman, Practice Director at ABI Research, in a news release. “The changes in business practices will enhance both top line and bottom line financial results much more than just cost reductions. In the long run, operators embracing SDN/NFV will outrun their competitors with a much faster service velocity.” ABI positioned NSN and Cisco ahead of the pack for NFV.

Recommendations

NFV may be more than hype, but how far off is large-scale implementation?

“I would imagine that every carrier is considering NFV--there is no way to avoid it,” said Yuri Gittik. “However, to be clear, for most of the carriers, this technology is still in the lab, CTO office. Pretty far from being implements, productized, and monetized.”

James Feger, CenturyLink, is actively pursuing NFV, but the reality of a wholesale network transformation must be considered. “You’re talking about thousands of routers and switches,” he said at TIA 2013 last October in Washington, D.C. “We’re several years away.”

Still, now is the time to lay the foundation for a platform evolution. Start small with one service domain or one region, like Deutsche Telekom is doing with TeraStream. Begin with functions that are already centralized, and chose vendors that enable growth into new services and support a multi-vendor framework. Pay close attention to publications from the ETSI NFV workgroup, as they will progressively reveal the challenges and solutions operators face during migration to NFV-driven networks.
NFV, in essence, applies a cloud model to the network itself, and will undoubtedly shape the future. It is more than hype—it is here, and it’s time to start designing the network to accommodate multi-vendor interoperability and wholesale virtualization.