



WHITE PAPER

The State of Play of NFV Today: What Works, What Doesn't and Where to Go Next

In just the last five years, Network Functions Virtualization (NFV) has gained remarkable traction in an industry (**telecommunications**). AT&T, Verizon, BT, Deutsche Telekom, Sprint and many other communications service providers have already made significant commitments to NFV initiatives as they embark on the next phase of their network's journey to 5G. Yet the rapid rise of NFV has come out at the cost of standardized approaches and well-defined strategies among network equipment vendors. Many of the so-called NFV solutions on the market today are, in fact, little more than legacy software loaded onto virtual machines.

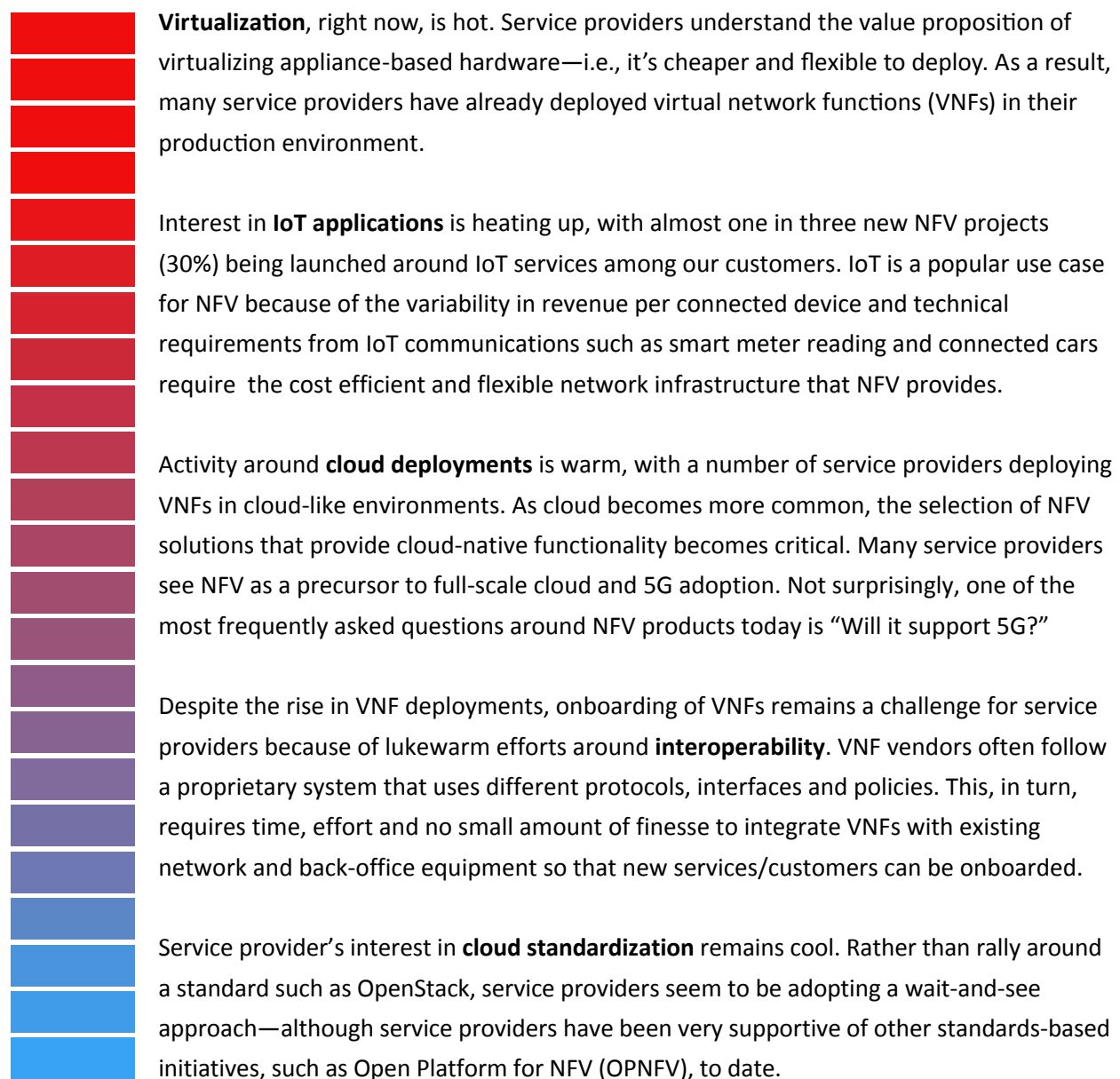
Not surprisingly, service providers have experienced very different results from their NFV efforts. Some have seen modest capex cost reduction, but no significant change in revenue streams. Others have seen a transformative effect in their networks as NFV becomes the catalyst for service innovation. Because network equipment vendors tend to define NFV based on their own solutions, some have narrowed the definition to virtualized network functions (VNFs) of existing network nodes such as firewalls, gateways and session border controllers. These VNFs can reduce capex costs, but deliver little in terms of opex reduction and new service creation.

The real benefits of NFV are much broader than a simple capex play, including:

- Dramatic reduction in opex costs through centralization and automation;
- Reduced time-to-market;
- A “fail fast” approach to new service creation;
- Exceptional scalability combined with cost efficiency;
- Support for 5G capabilities including cloud services, network slicing and Internet of Things (IoT) applications.

NFV: WHERE IT'S HOT, WHERE IT'S NOT

In a 2016 IHS Markit study, eighty-one percent of telecom service providers said they expected to deploy NFV by the end of 2017. Reading into those numbers, one might assume that the NFV market is uniformly hot. Yet, if we were to create a heat map of NFV adoption, we would discover areas of hot and cold interest that reflect the complicated nature of NFV.



TELUS TELLS ALL: AN INSIDE LOOK AT A REAL-WORLD NFV DEPLOYMENT

While heat maps are helpful in understanding where NFV migrations are today, nothing beats a flesh-and-blood example to understand the real challenges and opportunities. Recently, one of our customers, TELUS, shared their own NFV deployment experiences in [a webinar presented by Light Reading](#). TELUS is one of the top three mobile carriers in Canada, with more than eight million subscribers. Like many mobile service providers, TELUS is keenly interested in NFV and 5G technologies, and is implementing NFV for IoT services.



TELUS' CTO, Ibrahim Gideon

According to TELUS' Chief Technology Officer, Ibrahim Gideon, they saw their NFV project as a three-phase journey:

- *Phase One* involved the decoupling of hardware and software for specific network functions, such as mobile gateways;
- In *Phase Two*, TELUS moved to a virtualized platform that could support multiple VNFs on a single NFVI architecture;
- For *Phase Three*, TELUS plans to virtualize its mobile edge by running

everything in two high-availability locations and distributing network capacity to various regions as needed. This would allow TELUS to centralize operations and reduce costs while providing a consistent user experience regardless of the customer's physical location.

As Gideon explained, TELUS was committed to a "pure" NFV solution rather a hybrid mobile core approach in order to get the maximum benefit from virtualization and avoid carrying over the limitations of legacy hardware into the new solution. After much consideration, TELUS selected Affirmed's virtual Evolved Packet Core (vEPC) solution as well virtual IMS (vIMS) and virtual customer premises equipment (vCPE) from other vendors.

TELUS is able to deliver IoT services much more efficiently than with a legacy core infrastructure. Prior to NFV, TELUS would have been forced to deploy redundant, appliance-based mobile gateways in multiple metropolitan areas throughout Canada just to deliver acceptable levels of performance and latency. Doing so would have cost months and millions of dollars; an expensive proposition for an IoT service, even one with a high upside such as IoT. With NFV, TELUS was able to quickly deploy virtual mobile gateways in key metropolitan areas within Canada, avoiding expensive truck rolls and redundant hardware configurations.

Although Gideon considers their NFV experience a success so far, he admits that it wasn't all smooth sailing. Initially, the service provider was frustrated in its attempts to onboard new IoT customers because of interoperability issues. In order to resolve the issues quickly, TELUS and Affirmed created a joint lab environment where onboarding could be tested and tweaked. Once the issues were identified and resolved, TELUS achieved the seamless onboarding it desired, shrinking their onboarding time from weeks to days which, in turn, reduced both their operational expenses and their cost per new customer.

LESSONS LEARNED ON THE FRONT LINES

For those who would follow the footsteps of TELUS and other NFV adopters, Ibrahim Gideon has some valuable advice:

“Don't stop at capex savings.”

Initially, TELUS saved about 15% by replacing appliance-based nodes with VNFs. At that point, some people within the company were ready to declare a victory for NFV, but not Gideon. As he sees it, the service provider would have saved nearly as much money by upgrading their hardware. The real victory, he believes, is in the opex savings and new service revenues that follow in the later phases of NFV deployment.

“Expect interoperability issues—and fix them quickly.”

Virtualization has been around for years, but telecommunications networks are significantly more complex than enterprise networks. There are dozens of different protocols in play that make it daunting to integrate new VNFs with legacy routers and switches, back-office systems and subscriber equipment. Gideon's advice? Expect to hit some walls along the way, and stand on the shoulders of an experienced partner to get over those walls.

“You don't need to be implementing 5G to be thinking about it.”

IoT is one of the primary use cases for 5G, but service providers don't need a 5G network to offer 5G-styled services. Instead, Gideon recommends that service providers pick and choose the right projects for NFV, while keeping an eye toward 5G as the inevitable future. As he explained, “For us, VNFs need to work in both 4G and 5G environments. We didn't want a legacy product that had been virtualized, since that would bring all the old baggage along with it. We wanted a solution that was built to take advantage of the scalability and flexibility of 5G/cloud.”

SIX TIPS FOR A SUCCESSFUL NFV DEPLOYMENT



*Affirmed's Founder and CEO,
Dr. Hassan Ahmed*

Affirmed Networks is the leader in NFV solutions for communications service providers, with more than 65 customers worldwide. As one of the industry's few "pure" NFV vendors, Affirmed deals with virtualization challenges on a daily basis. For service providers that are thinking about taking their first step into NFV or expanding their virtualization footprint, Affirmed's Founder and CEO, Dr. Hassan Ahmed, shares these best practices from the company's many own engagements.

1. **Go all in.** Dipping your toe into the NFV waters doesn't work. Partial virtualization can double your operational costs, because you're now managing virtual and legacy equipment. To experience the best results, commit to NFV and don't look back.
2. **Don't get hung up on capex.** The hardware savings is a small part of the overall benefit of NFV. It's a good early incentive, yes, but don't be satisfied; the real benefits materialize as you cut down on opex and start rolling out new, revenue-generating services.
3. **Changing the paradigm doesn't matter unless you change the processes.** One of the biggest mistakes service providers make is in underestimating the need to retrain their network teams around the new NFV paradigm. It's not unusual to see service providers transform their networks, and then apply the same old business logic to them. The result is that service providers don't see the benefits they should, because they're using outmoded processes that fail to leverage NFV's flexibility and agility.
4. **Demand automation.** If your VNF vendor can't take you past virtualization to service automation, you'll never realize the full benefits of NFV. Make sure you have a clearly defined path to service automation and orchestration, with proven references.
5. **Do your homework.** Just because vendors use the same terminology (e.g., vEPC) doesn't mean their products do the same thing. Capabilities, scalability and interoperability are just some of the features that can determine whether your NFV investment will carry you through the future, or whether you'll be upgrading/changing it in the next three to five years.
6. **Don't postpone your future for 5G.** Many of the anticipated benefits of 5G—e.g., network slicing, service automation, self-intelligent networks—can be achieved today with NFV. The key is to select a robust NFV architecture that aligns with industry standards and supports 5G-ready network services that will continue to function seamlessly when your 5G network transformation is complete.

ABOUT AFFIRMED NETWORKS

Affirmed Networks' NFV solution has become the standard for the world's top mobile operators, who are embracing new business models and building new revenue streams by making the transition to virtualized architectures. The company's technology portfolio includes the Affirmed Mobile Content Cloud (vEPC), the Affirmed Wi-Fi Gateway (serving as a TWAG/TWAP and an ePDG), Affirmed Service Automation Platform (ASAP), Affirmed Virtual Probe and Analytics Solution, and the Affirmed Virtual Slice Selection Function (vSSF). These virtualized solutions have come to represent the present and the future of virtualized mobile networks with extreme scalability, remarkable flexibility, comprehensive network orchestration, and future-proof solutions for a 5G-ready architecture.

Please find more information at www.affirmednetworks.com.