Pipeline
Technology for Service Providers.
www.pipelinepub.com Volume 12, Issue 7

NFV = New Revenue Opportunities

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A growing share of Communication service providers (CSPs) have embarked on strategic network transformation projects, whether it involves transitioning from legacy TDM networks to IP, undertaking an all IP network transformation, or evolving to IMS. Today, CSPs are looking to Network Function Virtualization (NFV), an industry standard that defines the architecture for virtualization of network functions to create and deliver communications services in a cloud environment.

But CSPs need to rethink their approach to Network Function Virtualization or NFV. In particular, many service providers see NFV primarily as a means to reduce costs via improved operating efficiencies and reduced capital investments. This approach would make sense at first glance. Consider how the European Telecommunications Standards Institute (ETSI) defines NFV, with its objective "to consolidate many network equipment types onto industry standard high volume servers, switches, and storage, which could be located in datacenters, network nodes, and end-user premises."

A deeper look at NFV reveals not only cost savings benefits but also the larger opportunity to increase revenue. New sources of revenue are derived via 1) the introduction of new services, 2) enhancing existing services and 3) opening entirely new markets. In addition, for many CSPs who operate facilities-based networks, NFV may represent the most important means to leverage their existing network assets and differentiate from cloud and Over The Top (OTT) providers.

Imagine New Services via NFV

Identifying new revenue opportunities starts with understanding that NFV is more than virtualization and operating virtualizing systems. One can think of NFV as having the following building blocks: 1) virtualization, 2) orchestration, and 3) elasticity.

1. Virtualization: the ability to run discrete functions or building blocks of an application within a virtual machine.

2. Orchestration: the ability to manage the lifecycle of an application including installation, deployment, configuration, and termination in an automated, repeatable manner. It includes the ability to manage the underlying infrastructure comprised of the compute, storage, and networking resources required for the application.

3. Elasticity: the ability to dynamically scale an application in or out via its individual discrete network functions.

	Hardware	NFV
Virtualization	• Capital Intensive	• Incremental procurement
Orchestration	• BSS/OSS intensive • Time-consuming customer turn-up	• Rapid commercialization • Automated customer activation / turn-up
Elasticity	• Localized hardware to support & scale specific geo / region	• Rapid / instant support for new geos and regions • Scale on-demand

The most powerful new services can be developed through the combination of virtualization, orchestration, and elasticity. These may work like building blocks with elastic network functions built in an orchestrated provisioning environment. New services are provisioned and managed more quickly and easily and can scale more dynamically and repeatedly.

Enhancing Existing Services using NFV

A good example of this process can be illustrated with video conferencing. Most good examples will need to start with services where offer construction and delivery parameters are built around hardware constraints. Video conferencing works as these services are typically built on custom/DSP-intensive hardware.

Hardware constraints have led to video conferencing providers to sell "virtual n-way port bridges" on extended term contracts.

These offer strategies evolved from 1) the provider's need to recoup substantial investment in video mixing hardware, 2) the lengthy time to stand up and support new equipment, and 3) the overhead required to sign up, provision, and bill a new customer account.

Through NFV, a series of new and enhanced video conferencing services are possible. Note how these services bring value by targeting the limitations of hardware-dependent service offerings:

- Geographically-targeted bridges: offer video bridging services with localized video mixing where participants enjoy lower latency audio and video;
- Bridge burst capacity: offer instant access to a) increased per-bridge capacity, and b) number of bridges available to handle traffic peaks associated with seasonal or unexpected hikes; and
- Specialized industry vertical applications: offer video bridges embedded in 3rd party applications in industries such as healthcare. In this example, a "one-time" video bridge could be provisioned and activated within the workflow of specific doctor-patient communications procedures to ensure certain regulatory or privacy requirements.

Building Entirely New Services With NFV

Elements of NFV can also be applied in the construction of entirely new services. The benefits and value brought via virtualization, orchestration, and elasticity can be metered and delivered via discrete service tiers. Take the case of a wireless service provider planning a service to manage the data flow from a growing base of internet accessible devices, often referred to as the "Internet of Things" or IoT.

NFV strategies can benefit IoT applications in the areas of collecting, processing, and delivering IoT data and information. The baseline IoT service could use NFV to provision nodes for device data inspection and processing. Higher tiers of IoT services could provision virtual nodes closer to data collection points and offer data processing: 1) more quickly or more frequently, 2) with added processing capabilities or analytics, and 3) with added localized ancillary data that could enhance the value of resulting information output.

NFV strategies can benefit IoT applications in collecting, processing, and delivering data

Evolution of Circuit Switched Voice via NFV

One of the biggest challenges facing many CSPs is the migration of voice services from traditional circuit switched systems to next-generation networks. Many major CSPs are in the midst of shuttering circuit switched networks. Swisscom is on course to a 2017 shutdown of both fixed and mobile circuit networks. U.S. operators ATT and Verizon target a 2020 shutdown of fixed circuit networks. BT is currently targeting a 2025 shutdown. Many CSPs are evaluating how to best take advantage of NFV capabilities to facilitate the migration of users from circuit switched services to next-generation services.

Some CSPs are looking at targeting specific areas to apply NFV to facilitate this migration. Discrete NFV projects are implemented in concert with network migration plans. The highest impact NFV projects are prioritized and applied in a fashion to 1) speed migration, 2) reduce impact on customers, and/or 3) accelerate the next-generation services.

CenturyLink, for example, is actively applying NFV as a part of their network migration strategy. In October of 2015, CenturyLink **reported** that they have deployed SDN and NFV in 36 network locations. As a part of this deployment, one of the enhancements has been the acceleration of managed Ethernet delivery. By accelerating the delivery of high quality broadband, CenturyLink removes one of its largest obstacles to circuit switch turndown: the availability of high-quality IP access.

Partnering with Cloud Service Providers Using NFV

Many CSPs may be interested in taking advantage of NFV without necessarily upgrading their infrastructure. One option is to partner with a cloud services provider. While cloud services providers may not enable the flexibility of in-house NFV-enabled infrastructure, cloud services providers can speed time-to-market, address capital constraints, and reduce risk.

We have seen a number of customers the past year realize NFV benefits by deploying our VoIP Application Server with OpenStack and in Amazon Web Services Elastic Compute clouds. One customer has deployed a very large BroadSoft-powered system for unified communications (UC) to tens of thousands of end users around the world, all from the Amazon cloud. This system is comprised of more than fifty virtual machines with elements clustered in four major regions, including North America, Europe, Africa, and South America.

This customer shared with us that the cost of deploying in the Amazon cloud is about 15% of the cost of deploying on bare metal servers in a regular data center. A rack of space and power in a data center is roughly $3,000 a year – not including server hardware and networking. For that same $3,000 a year, this customer could receive ten complete virtual machines in the Amazon cloud, enough to run one of our small systems.

Equally, or possibly more important than these cost savings, are the time-to-market savings. Leveraging virtualization and NFV in the cloud, UC deployments can be realized in a matter of minutes with precise configuration as compared to significantly longer and with potential configuration errors when manually installing a communications platform.

Rethinking NFV to Target New Revenue

Perhaps one of the reasons many CSPs approach NFV from a cost-savings standpoint is a result of dramatic examples as mentioned above involving the Amazon cloud. Another reason is because NFV is often managed and contained within CSP Network Operations and Engineering teams. These technical organizations certainly need to “own” and manage NFV projects. However, as long as NFV is contained within these organizations, the bulk of the focus of NFV projects will be on cost containment and operational streamlining. The key to unlocking the myriad revenue-enhancing and new market opportunities with NFV is to connect and manage projects with Product and Marketing teams. The first step for Network Operations and Engineering teams

The bulk of the focus of NFV projects will be on cost containment and operational streamlining

is to educate Product and Marketing managers on NFV potential capabilities. The resulting exchange of dialogue around what NFV can do relative to what customers need and how this impacts existing development activity presents the environment where new value added services are born.

NFV and Cloud Applications

As cloud applications thrive, CSPs will increasingly need to leverage their network assets to build, deliver, and complement cloud services. CSPs may want to consider incremental migration strategies, initially focusing on applications with limited dependency on decomposing virtual machines. In the case of an application such as Unified Communications as a Service, CSPs may target NFV initially at the signaling layer (for UC applications) and in a later phase, target NFV at the media layer (for transcoding and media mixing). Through this approach, CSPs can more quickly bring NFV enhancements to their UCaaS offering, more quickly building sustainable differentiation.