

Building a Telco cloud

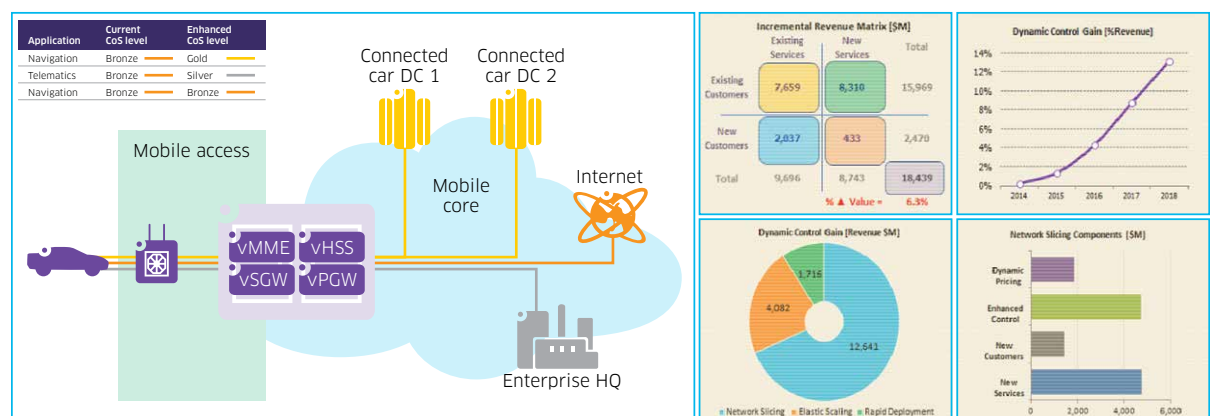
Realizing the benefits from virtualization

Network Function Virtualization (NFV) and Software Defined Networking (SDN) increasingly form the centerpiece of the network evolution strategy of leading network operators worldwide. By introducing network programmability and virtualizing/“cloudifying” network functions (such as CPE, BBU, EPC, IMS, DNS, AAA, or Route Reflectors) that can run over commercial off-the-shelf (COTS) hardware typically deployed in enterprise data centers, NFV and SDN are invariably portrayed as the key instruments to lower network capital expenditures (CAPEX) and serve network traffic growth profitably. However, what is likely to be more significant is their ability to generate new revenue streams for network operators. NFV and SDN enable dynamic programming of network resources according to the real-time needs of the customer, their application and devices, and the current usage level of the network components. The resulting network agility and flexibility positions the network operator to roll out a variety of new context-specific services and penetrate new market segments with customized, granular offerings. It also creates additional value for their existing services and current customers by enabling policy-driven traffic differentiation, on-demand access to network bandwidth and valued-added services, and hence, enhanced usage-based control. Such new revenue streams make a more compelling case for the faster and wider market adoption of NFV and SDN.

Understanding the new value created by NFV and SDN is critical to many network operators technology adoption and deployment strategy. To this end, we have created a framework that identifies the various sources of new revenue resulting from NFV and SDN and quantifies the resulting benefits drawing upon insights developed from analysis of analogous revenue streams from other relevant industries. As an example, under the context of new mobile services enabled by a virtualized Evolved Packet Core (vEPC), analysis for a Tier 1 operator showed that annual revenues can be increased by as much as 14 percent within 5 years of the initial deployment. Here are a few statistics:

- 52 percent of revenue increases result from network slicing — the ability to partition network resources dynamically — and provides real-time quality of service (QoS) control
- 30 percent of the gains are due to increased elasticity and faster deployment
- 18 percent of the revenue increase results from improved ability to attract new customers and offer dynamic pricing

Figure 1. New revenue potential for mobile core connectivity services and vEPC



Capturing the value potential

Three significant sources of new revenue for operators supported by NFV and SDN enablers are:

- **Elastic scaling:** Operators can scale virtual network function capacity in line with the demand and requirements of specific use cases. The ability to provision existing services dynamically on demand should lead to a price premium relative to that of a statically provisioned service. It also enables addressing customers for which a rigidly defined service offer is not cost effective.
- **Faster deployment:** A virtualized network function provides operators with the ability to rapidly and inexpensively deploy, configure, launch and upgrade services, leading to a time-to-market advantage. It also reduces the business risk associated with new service introductions. This agility allows operators to offer trials of new service offerings on a much larger scale (and to rapidly modify such trials as needed), leading to acceleration of new revenue generation. This should result in higher near-term sales as well as long-term market share gains.

- **Domain-specific network slicing:** With virtualized network functions, operators can also create network “slices” — instances of the network connectivity service — that are dynamically reconfigurable and tailored through service policies to specific customer types, use cases and traffic models. Such “network slicing” can in turn create four streams of new revenue:
 - **New customers:** The ability to provide network connectivity services at granular levels consistent with current demand enables operators to attract smaller customers (for example, xVNOs, small rural operators, M2M providers and enterprises) who cannot afford to invest in the full-scale traditional architecture for these functions.
 - **Dynamic pricing:** Creating customized slices on demand will permit operators to price services in line with the current network utilization levels. Pricing of such services could be analogous to utilities with pricing dependent on the time of day, months and seasonal peaks, and hence, should allow for revenue optimization.
 - **New services:** Granular network slices allow operators to provide new and customized applications to different users, potentially creating a larger portfolio of enhanced and highly customizable digital delivery services, and associated revenue opportunities.
 - **Enhanced network control:** Flexible network programmability allows operators to provide tighter control of end-to-end network resource usage. This enables granular service level agreement (SLA) offerings (beyond best effort/bronze and gold class of service [CoS]), dynamic mapping of apps to CoS, with higher network utilization and thus, higher revenues per unit of network capacity.

Bottom line

By utilizing our NFV/SDN business analysis framework to model new revenue creation opportunities, we show that network function virtualization in conjunction with software-defined VPNs and dynamic network control can result in significant revenue growth. EPC for smartphones, M2M or connected car services provide just a few specific examples. For operators willing to act as aggressive market developers, virtualization of other network functions, such as CPE, RAN, EPC, IMS, CDN, or related network services DNS/DHCP and BGP Route Reflector, can also lead to significant bottom line improvements in associated revenue increase.

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