



René Torres

Director of Marketing,
Software Defined Networking
Communications and Storage
Infrastructure Group (CSIG)

In the IT world, the age of monolithic mainframe computers gave way to server farms at the turn of the century. However, the telecommunications industry is still hanging onto its own mainframes in the form of purpose-built network elements, such as firewalls, base stations and routers. We are on the verge of a dramatic shift where these elements will transform into software functions running on industry-standard servers, as is done in data centers.

Telecom Networks Today

Today's networks are overly complex, partly due to an increasing variety of proprietary, fixed-function appliances that are unable to deliver the agility and economics needed to address constantly changing market requirements. This is because network elements have traditionally been optimized for high packet throughput at the expense of flexibility, thus hampering the development and deployment of new services. Another concern is that rapid advances in technology and services are

An Incredible Networking Transformation is Underway

accelerating the obsolescence of installed hardware; and in turn, hardware isn't keeping up with other modes of feature evolution, which constrains innovation in a more network-centric, connected world.¹

Infrastructure Convergence

In the data center, software is loosely tied to hardware so it possible to run nearly any application on any server. With telecom moving in this direction, there will be an opportunity to seamlessly connect various data centers together, such as those in telecom, enterprise and cloud, over a wide area network (WAN). This higher level of infrastructure convergence will open the door to new services (e.g., big data) and increased efficiency (e.g., software reuse).

Network Transformation

The telecom industry has begun to develop more interoperable solutions per the principles outlined by Software-Defined Networking (SDN) and a complementary initiative, Network Functions Virtualization (NFV). At the heart of these two approaches is the decoupling of network functions from hardware through abstraction. The end result is software workloads will no longer be tied to a particular hardware platform, allowing them to be controlled centrally and deployed dynamically throughout the network as needed.

From Black Boxes to Virtual Appliances

SDN and NFV will help consolidate network functions onto economical, high-volume servers, switches and storage, reducing time to market and costs for network operators. Instead of having a separate black box for each network function (e.g., firewall, switching, intrusion detection and more), they become virtual appliances running on the same server platform.

Impact on Equipment Manufacturers

Two types of equipment manufacturers that will be greatly impacted by this transformation are server vendors and traditional telecommunications equipment manufacturers (TEMs). Server vendors, who normally supply data centers, need to figure out how to become network equipment providers, and TEMs need to convert their proprietary boxes into virtualized, software-based network elements.

A Flexible, Scalable Approach

Intel® architecture provides operators a standard, reusable, shared platform for SDN/NFV that is easy to upgrade and maintain. Recent Intel® microarchitecture improvements have significantly reduced the need for specialized silicon, enabling network operators to take advantage of the proven scalability of modern, virtualized data center technology. Benefits from this approach include a streamlined network, and cost savings through hardware reusability and power reductions.

¹ Source: "Network Functions Virtualisation – Introductory White Paper," published at the October 22-24, 2012 at the "SDN and OpenFlow World Congress", Darmstadt-Germany, pg. 3, 4, 9. <http://portal.etsi.org/portal/server.pt/community/NFV/367>.
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