Does SDN Entry into the Enterprise in 2013 Signal a Maturing Market?

Posted by Sue Hares on August 16, 2013 at 10:08am View Blog

Software Define Networking (SDN) in 2013 has begun to seize portions of the $42.4 billion dollar Enterprise market with products for data centers, branch offices, and mobile android phones. The key trend to watch in 2013 is how much of SDN's market comes from these enterprise devices. Adoption by the enterprise often signals a technology has crossed the chasm from early market to main stream markets, as pragmatic buyers of technology begin to purchase new technology causing explosive market growth . IDC predicts tremendous growth in the SDN market, from $360 million in 2013 to $3.7 billion in 2016 at a yearly growth rate of 151% (GAGR). Is this prediction hype or are there substantial technology trends that undergird this transition?

Vint Cerf (Google), at the 2013 ONS forum, stated "SDN is a substantial technology shift on a par with the development of the Internet." In fact, Cerf hopes SDN will fix the problems in the current Internet. As an Internet technology pioneer, Cerf may recognize some of the same transitions that occurred in 1995; the Internet transitioned from an academic network (NSFNet, 1987-1995) to the modern Internet. As a member of the team helping NSFNet transition to a commercial Internet, I witnessed the following four trends in 1995:

1. The Internet addressed the urgent business needs for affordable email and data transfer.
2. Adopters of Internet technology fixed Enterprise's islands of networking problem.
3. Technology creators were first to move to new technology.
4. The transition occurred as a mass migration and unleashed the wave of new business.

Today, these same technology trends are occurring with SDN.

Trend 1: Addresses Urgent Business Needs -– The 30/30/3 problem

Today's Carriers and Enterprise networks are facing what some are calling the 30/30/3 problem. Enterprises are experiencing a 30% in growth in data which is driving up IT costs (up to 30%), while Enterprise incomes grow at an average rate of 3.3%. Even carriers are seeing only 3-4% new revenue growth. Infonetics found Enterprises spent an average of $2 million on IT in 2012. The top priority for 2013 Enterprise expenditures are direct cost reduction, virtual network technologies (cloud and virtualization), and security.

Traffic within and to/from data centers and mobile devices is growing at a rate of 30% per year. Global Data Center traffic in 2013 is 3,251 exabytes (1018) and expected grow yearly at 31% to 6,649 exabytes. 76% of this data center traffic flows within data centers and 4% flows between data centers, while 17% of this traffic flows between users and the data center. While mobile traffic is only 3.2 exabytes in 2013, it is expected to grow 70% (CAGR) to 134.4 exabytes per year in 2016. This data center traffic places stress on the IT resources of enterprises and carriers the enterprises utilize for connectivity. Mobile traffic also places strain on IT resources as one third of LTE traffic is to offload to wired or wireless.

Trend 2: Adopters of SDN are Fixing Problems in Enterprises

Enterprises are adopting SDN to fix scaling issues with end-to-end services for users utilizing applications in data centers or cloud services. The SDN enterprise market consists of public cloud, private cloud, wide area network (WAN), network management, network security, network slicing, and low-latency networks running these services. SDN is fixing issues that prevent data center network efficiency, low-latency networking in financial markets, and content filtering for homes and businesses.

In 2012, Google announced that the Google internal network (g-network) had transitioned to SDN to provision and manage their internal data center networks. Google stated that the SDN handled the bursty nature of its internal data center traffic and improved network utilization and efficiency while providing better monitoring and centralized management. Google's hopes are to reach 100% utilization

of their internal infrastructure, reducing storage, compute, and networking costs. Google moved from initial implementations in 2010 to deployment in 2012. Google's use of SDN is being replicated by other public cloud providers such as Facebook, Zynga, NTT, Rackspace, eBay, and Amazon and private cloud providers.

SDN technologies fix scaling problems in WANs by optimizing traffic to/from the data centers based on business policy. Financial markets often utilize ultra-low-latency wide area networks to run trading applications. SDN is being deployed to reduce latency within data centers, between data centers, and between data centers and customers.

Latency occurs when applications wait for compute cycles, storage retrieval cycles, or bytes to transmit through the network. Research from UT Dallas, Telefonica, and other researchers found that applications only utilize 65% of the bandwidth and compute cycles because of waits for compute cycles, storage retrieval, and networking.

End-to-end SDN orchestrates the application's data and network transmission to bring this closer to 95% percent. Early products have shown this end-to-end approach works across all network technologies, such as optical switches8 to network edge devices, or LTE Cloud RAN devices.

SDN Technologies are also providing the content filtering that schools, homes, and businesses require. At ONS 2012, Verizon and HP in collaboration with ADARA demonstrated SDN's ability to provide parental controls and global content filtering. At ONS 2013, HP described how SDN content filtering was deployed at boarding schools to aid student's studies by removing distractions from social media and chatting during class. Enterprises have deployed content filter to improve security.

Trend 3: Technology Creators are the First to Move to New Technology

The Pioneers of the Internet technology in 1980-1995 are today's SDN pioneers. The Internet today uses IP and Internet transport protocols (UDP, TCP, and STCP) to pass traffic across networks built on routing protocols: EIGRP, OSPF, ISIS, BGP, and MPLS. The experts include: Vint Cerf (Google) who help create IP and UDP/TCP, Randall Stewart (ADARA) who helped create STCP, J.J. Garcia-Luna-Aceves, creator of EIGRP, David Ward (Cisco) and Ross Callon (Juniper) who helped create ISIS for IP networks. Susan Hares (ADARA) created BGP along with Yakov Rekhter (Juniper). These Internet creators are joined by a new generation of academics in the Open Network Foundation, and SDN Open Source projects such as OpenStack and Daylight.

Trend 4: The Transition Unleashes Mass Migration and Waves of New Commercial Business

Vint Cerf's hope is that SDN will transition the network to new technologies that seamlessly interoperate without ever stopping the Internet. Google's Facebook, Zynga, NTT, Rackspace, eBay and Amazon and private cloud providers have done this in the last 2 years. NTT did this while becoming the leader in carrier revenues in 2012. At least 8 of the top 10 leaders in Carrier revenue (such as AT&T, Verizon, China Mobile, DT, Comcast and FT) have announced public SDN trials. Vint Cerf's vision is a reality in many networks. SDN seems to be opening the way for a flood of new businesses.

These four technology trends and pragmatic adoption by enterprises shows that in 2013 SDN is entering a phase similar to Internet growth of 1995 when enterprise customers adopted Internet technology. If Cerf and the top Internet technologists are right, SDN will unleash powerful unparalleled technology innovation even greater than the Internet did in 1995.

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