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Executive Viewpoint 2014 Prediction: ADARA - Top Ways SDN will Transform IT in 2014

By Eric Johnson (Profile)   Tuesday, December 3rd 2013

1. SDN will Addresses Urgent IT Cost Issues – 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 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% to 70% 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 connect to. Mobile traffic also places strain on IT resources as one third of LTE traffic is to offload to wired or wireless.

2. SDN will make Cloud IT Applications Scale

Enterprises are adopting SDN to fix scaling issues with end-to-end services for users utilizing applications in data centers or cloud services. Cloud providers such as Google, Facebook, Zyna, NTT, Rackspace, eBay, Amazon and Terremark are using SDN to scale their services within their Data Centers, between Data Centers, and between the user and Data Centers.

SDN Technologies are fixing 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 the 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 others 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 switches to network edge devices, or LTE Cloud RAN devices.

3. SDN will fix Existing Internet Issues with IT Network Security

The biggest question to ask yourself is "Do you want your money in the Cloud?" Internet experts cannot really answer "yes" to that question, and they are looking to change their "no" to a yes. Do you want to put your deepest secrets on IMS that travels across smart phones 4G network to the IP Network? Celebrities find phone hacking is the next paparazzi attack.

Vint Cerf indicated at ONS 2013 that he expects SDN will enable Internet pioneers to fix the problems with Internet security. Security is one of the Internet technologies which is added on after the fact. Today's Internet security operates at the think waist of the Internet protocols (IP/TCP) with IP using IPSec or Transport with DTLS or TLS/TCP. The overlays are often heavy (E.g. IPSec) or involve embedded key schemes. Authentication based security (lots of Access-List-Controls) provides the physical access points with a high level security. 4G phone systems utilize AAA (Authentication, Authorization and Accounting) infrastructure using Diameter and Radius to pass ACLs per user.

Tomorrow's security will operate at the point of service where application services will authorize just the data, compute, or networking that the application needs. If you want to bank in the Cloud, the security systems will only allow the minimal amount of data regarding your money to float in the cloud. New security processes by the IETF and OASIS in HTTP 1.0 and non-Web protocols (IETF's ABFAB working group) will provide this type of Authorized-based Authentication (ZABC) instead of the authentication based authorization.

Better network security can help protect data sent to mobile phones and to Cloud applications.

4. SDN will Enable IT Machine to Machine Technologies

The Machine-to-Machine infrastructure for home security or manufacturing will need light weight security (see item 3), massive configuration, and easy monitoring. SDN will aid the IT department to utilize machine-to-machine technologies in the office building, the manufacturing center, and mobile/home office.

5. SDN will Enable IT to Handle New Instant Communication over Web to Web

Northbound APIs being the most attractive thing about SDN, lots of network product vendors will open up their configuration and monitoring interfaces as restful web services and open APIs begging for community adoptions to create cool network management solutions. Android and Apple's iOS created lots of great programmers who are looking to create cool different apps. When these two forces collide IT administrators can expect lots of cool new tools to manage their IT infrastructures in near future.

Combined with a new level of network visibility to the application developers, we will see quick vendor equipment deployments. TCP's ancient packet drops based 'congestion detection' will eventually make way for the new Open API based global network/infrastructure state aware application development methodologies. Applications wont treat the network as the unlimited and unconstrained supply of connectivity resources.

New technologies such as the web-to-web communication (webrtc) will be able to track, monitor, and account for these forms of communication.

6. SDN + SDN Cool Tools will Enable IT to Scale to 10**20 of Devices

Mike O'Dell (early Internet Pioneer) said "If the Internet scales, nothing else matters." SDN will scale IT and Internet scales until each person on the planet has multiple devices, and the silicon devices (sensors, car door openers, light switches, stoves) all communicate. SDN products that cannot scale to 10**20 will be required.

7. SDN will Make the Network Equipment Vendor Certifications Obsolete

CLIs may be around for debugging, but manual configurations may become a flashback situation of IT folks. Many vendors restful web interfaces are basically a wrapper around their CLIs today, but eventually web services will become more granular and deep to the extent to program at merchant silicon policy level.

8. SDN will Make the Legacy Network Equipment Vendor Obsolete

SDN will cause the existing legacy Network Vendors Products to become obsolete. We have already seen this with Cisco losing a $1 Billion sale to Amazon of legacy Cisco product; Amazon realized it could utilize SDN and $11 Million of white box switches and reduce costs by $990 Million at Cisco's expense. Amazon needs to create the northbound programming to link its proprietary applications to the Controller and infrastructure, and just a few enterprises have the skill, budget or inclination to do this, but there are SDN companies with product that can will provide this capability for the 5 million + enterprises that are not Amazon, Google or Facebook, and do not have proprietary applications which require custom programming to link them to commodity switches and routers. Cisco's John Chambers own internal analysis projected that if SDN were adopted by Cisco (proving that Insiemi and Cisco Application Centric Infrastructure is not SDN), Cisco would go from a $40 Billion+ annual revenue company to a $20 Billion annual revenue company overnight. A similar story emerged regarding VMware. Cisco is on the wrong side of history, however their analysis is right. Similar developments have emerged for Juniper, Extreme, VMware, Citrix, F5, Riverbed and others; it reinforces a trend SDN has created for legacy technology vendors on proprietary platforms.
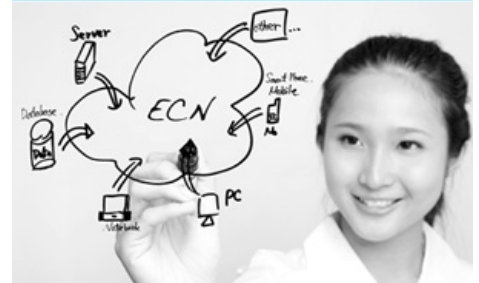
9. SDN will Start the End of the Proprietary Operating System in Network Products

SDN will progress quickly to compress the layers in the network; not just to make the network "flatter" in terms of architecture such as optical and Ethernet everywhere. SDN will soon link applications directly to Control Plane intelligence that operates in user space and interacts directly through APIs to merchant silicon; managing at the driver level will become the standard for those SDN companies whose products are sufficiently intelligent, scalable and high performing to accomplish this. Java based programmers will be able to manage network infrastructure directly. Already open source zero-copy flexible packet processing user space mechanisms' such as Libzero and NetMap are enabling processes previously done in kernel to be mapped and executed in user land by non-operating system programmers, increasing throughputs to 10Gbps, 40Gbps, and coming soon: 100Gbps. Arista who claims the position of 2nd to Cisco in manual switching; now officially a legacy business, admits on their own Wikipedia page that their Extensible Operating System consists of processes running on an unmodified Linux kernel operating in Fedroa based userland; managing the same white box switches that the rest of the market has adopted with the pace of technological change, making their prior hardware development obsolete. In essence, Broadcom and Intel ($60 Billion+ vs. Cisco's $40 Billion) have implemented the standards Cisco and others used to sell, directly onto the chips, and by doing so they have empowered SDN companies with open architectures to compete more than evenly with incumbents. Look at indeed.com to see the trend for kernel programmers in the market; it is clear. In 2014, SDN makes proprietary Operating Systems not required.

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