

### The Evolution of the Data Center LAN

With Arista, Avaya, Brocade, Cisco, Extreme Networks and HP  
The Data Center LAN Evolution Series

Summary – March 2012

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#### • Summary



Dr. Jim Metzler, Moderator, Co-Founder Webtorials Analyst Division

This is a summary of an online discussion that took place during March 2012. The discussion was about a wide variety of challenges that are associated with evolving the data center LAN and it involved Arista, Avaya, Brocade, Cisco and HP. The March discussion was the sixth and last in a series of discussion on data center LANs. A full transcript of each of the discussions can be found at <http://www.webtorials.com/content/tls.html>.

The first question was about the financial impact of having a switch with very low latency. That question was: ***“The trade press talks a lot about the need to flatten the data center in order to reduce latency primarily for east-west applications. Other than for certain well-discussed transactions in the financial industry, can you put a monetary value on cutting data center switch latency by a few microseconds?”***

The general consensus of the sponsors was that it is very difficult to put an absolute dollar figure on the value of reducing switch latency by a few microseconds. There was also general agreement that reducing switch latency would have a beneficial affect on a small number of applications including high frequency trading, high performance computing, data mining and that it would also help to enable IT organizations to converge their LANs and SANs. Cisco also made the observation that while some IT organizations place a value on reducing switch latency, most IT organizations are looking for predictable end-to-end latency across the network and applications

The second question was about the adoption of higher speed Ethernet connections. That question was: ***“What do you see as the primary use cases for either 40 GbE or 100 GbE? How much of the market, if any, will there be over the next two years for these speeds?”***

HP stated that they had just announced a new generation of enterprise servers that feature native 10 GbE on the motherboard. They added that having 10 GbE on the motherboard will drive down the price of 10 GbE which will increase the size of that market and hence drive the need for 40 GbE in the



aggregation layer. While most vendors agreed that the primary driver of the 40 GbE market will be for points of aggregation, some other drivers were mentioned. Avaya stated their belief that storage is the killer application for data centers and that the convergence of the LAN and SAN will be the primary driver of the adoption of 40 GB Ethernet. Cisco added that a data deluge, driven in part by megatrends such as the broad adoption of video, BYOD, cloud virtualization and workload mobility is part of what will drive the adoption of 40 GbE. Arista stated that one of the factors that will give a boost to the 40 GbE market is that Intel should soon be shipping their Romley chips that can enable a lot of high capacity functions, such as VMotion at speeds greater than 10 Gbit/second. Arista added that the real market for 40 GbE will not develop for twenty-four to thirty-six months.

There was general agreement that the current market for 100 GbE was very small and that it was limited to very high-end research centers, some service providers and the Internet exchanges. Brocade stated that it will be two or three years before 100 GbE gains traction with enterprises. HP stated that they expect that it will be at least 2013 before there are significant price reductions for 100 GbE and that those price reductions will be accompanied by a reduction in the power requirement and an increase in the density of 100 GbE solutions.

The third question was about a topic that currently gets a lot of media attention. That question was ***“What impact, if any, do you think that Big Data will have on data center LAN design over the next two years?”*** The responses varied widely. Avaya stated that there is nothing new about Big Data and that they regard it as just another service such as video and SAP. Brocade stated that Big Data has become a catchword like cloud used to be and added that they see many IT organizations that are supporting big data by implementing a converged infrastructure that is optimized for big data.

HP made the comment that one impact that big data is having on data center LAN design is that it creates more server-to-server traffic, which in turn drives the need for a flatter network. Cisco added that the phrase Big Data currently refers primarily just to analyzing large amounts of raw data at rest and applying business intelligence to that analysis. Cisco believes that the concept of Big Data may soon expand to include the need to analyze data in motion such as the real-time analysis of sensor data. Arista stated that they believe that Big Data is transformational for network architectures and gave Hadoop as an example. Hadoop is unique in that it moves the processing to the data. In addition, Hadoop is a topology aware file system that is not very latency sensitive, can be routed and it drives very high levels of buffer utilization.

The next question that was posed to the sponsors was ***“What do you see as either the biggest fallacy either in the press or in analyst reports about how IT organizations are re-designing their data center LANs or the data center LAN technology that is the most over-hyped? Why?”***

Arista stated that one fallacy is that everybody needs a large, flat Layer 2 network to support virtualization in the data center and added that in many cases the proprietary fabrics being pushed by vendors don't actually solve the problems created by virtualization. Arista also said that another huge fallacy is that OpenFlow is the answer to every problem. HP made the comment that the biggest fallacy that they see is that customers must extend Layer 2 across their networks. HP pointed out that while extending Layer 2 across networks has some advantages, a better approach is to implement a protocol such as VXLAN or NVGRE.

Avaya stated that Fibre Channel over Ethernet (FCoE) has been over-hyped for years, that FCoE is still an immature technology and that as a result, the amount of true FCoE that has been deployed is really

very small. Brocade added to the discussion of FCoE and said that one of the biggest areas of hyperbole that they have seen for the last few years is that it will be common to have an end-to-end FCoE infrastructure in data centers.

Cisco stated that while there is sometimes short-lived hype around some technologies, that they don't find very much sustained hype around technologies. Cisco gave SDN and OpenFlow as examples of technologies that are currently being over hyped in the short term. Cisco added that they do often find sustained hype around some of the business aspects of networking. They gave as an example what they believe to be the myth that if an IT organization buys a switch that costs less, the total cost of ownership (TCO) of the network is less.

The next question was ***“With all of the emerging data center LAN technologies, is a multi-vendor data center LAN desirable? Possible?”*** Avaya made the comment that they believe that it is important that when IT organizations redesign their data center LANs that they implement standards-based solutions because this approach makes it easier for the IT organization to implement a multi-vendor solution if that is one of their goals. HP added that they see customers that are concerned about implementing proprietary technologies because if they implement one of these technologies they are locked in for a very long time. Arista made the statement that a lot of vendors are pushing proprietary fabrics or technologies that enable a proprietary fabric and that the primary value of those fabrics has nothing to do with technology, but that they give the vendors an excuse to go back and talk to their customers and try to sell them something.

Brocade stated that there is a binary decision that customers make whether to implement a best-of-breed solution in their data centers or to go with a one-stop-shopping approach whereby they implement products from just one company. Brocade added that in the long run, companies are better off with a best-of-breed approach because networking, storage and computing have different technology cycles and a best-of-breed approach enables them to be on the cutting edge with all three technologies. Cisco stated that if you take a close look at today's data center LAN environment it is usually multi-vendor. Whether or not it is desirable to have the data center LAN be multi-vendor is a business decision. Cisco added that what most customers find is that while having a multi-vendor environment may reduce CAPEX it will usually increase OPEX by a greater amount.

The next question was ***“What do you see as the biggest mistake being made by enterprise IT organizations as they re-design their data center LANs?”***

Cisco added that they see many IT organizations focus just on bandwidth and not on understanding the demands of both physical and virtual workloads. A related mistake is that many IT organizations overestimate the required capacity because they don't leverage the intelligence that is in their operating systems.

Brocade commented that over the last several years that there has been somewhat of a cookie cutter approach to data center design and they see a lot of IT organizations that are resistant to move away from that traditional approach to designing data center LANs.

Avaya agreed with that sentiment and said that the biggest mistake they see is that some IT organizations are not receptive to implementing a new architecture because they are used to doing things the way they always have done them and because they are risk adverse.

HP stated that they see that too many IT organizations just pick a solution without looking at all of the impact. In some cases IT organizations regard their role as merely implementing a solution that is designed and architected by their vendor. Arista commented that IT organizations are making a mistake if they don't talk to multiple vendors when they are redesigning their data center LANs. Arista added that if they do talk to multiple vendors they will get a lower price from their chosen vendor and they are more likely to get a solution which is right for them.

In closing out the March discussion, the sponsors were asked, ***“Any last pieces of advice for IT organizations that are contemplating re-designing their data center LANs?”***

Avaya commented that when IT organizations are re-designing their data center LANs, that they should not underestimate the importance of network management. HP stated that now is the time for IT organizations to look at the different data center LAN architectural options, and that in many cases once an IT organization makes a choice of architecture, it will be very difficult to make changes. Arista commented that IT organizations need to identify the problem they are trying to solve and make sure that the organization and the organization's stakeholders are lined up behind that problem statement. Arista added that as part of the design process that IT organizations should bring in at least three or four vendors.

Brocade stated that they believe that when IT organizations think about building the next generation data center that they need to think about agility in a very different way and that IT organizations need to put the agility of provisioning at the front and center of their design philosophy. Brocade added that in order to obtain this agility, new technologies must be used and the data center LAN has to be more fabric-based and it must allow for multiple paths between any two points in the network.

Cisco commented that in most cases, a data center is not just a cost center but it is also a strategic asset and that IT organizations should recognize that and should map IT decisions to the business impact. Cisco added that they encourage IT organizations to look at implementing a design that can evolve as their requirements evolve. For example, a LAN switch that is purpose built for low latency may not be the best solution for convergence in the data center or virtualization requirements like workload mobility. \*\*\*