SNIA Ethernet Storage Forum

# Are we there, yet?

Will 2012 be the year of 10GbE?

**Asks Jason Blosil, Co-Chair SNIA's ESF iSCSI SIG, NetApp.**

10 Gigabit Ethernet (10GbE) network technologies has been shipping for about a decade now, but use cases and economic conditions have not been compelling enough to justify broad adoption. But, requirements and conditions continue to change. Several drivers, both technical and economic, are creating a data center environment now prime for 10GbE adoption. So, will 2012 be the year for 10GbE?

## Technical Drivers

Virtualization: For many years, and for many organizations today, Gigabit Ethernet (1GbE) has offered enough bandwidth to satisfy the performance requirements of most business applications. Basic file serving and support for more mission critical applications like email and databases can be supported with Gigabit Ethernet.

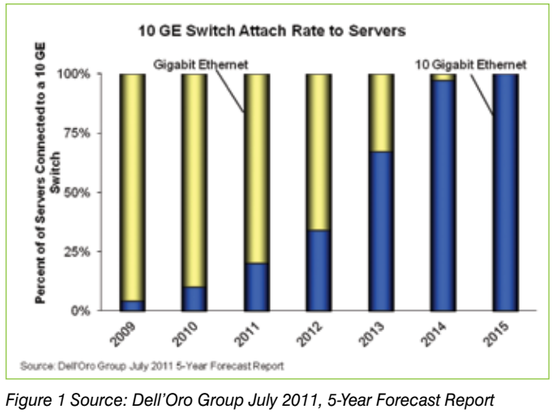


*Figure 1 Source: Dell'Oro Group July 2011, 5-Year Forecast Report*

Today, server virtualization is changing the requirements for networking, and more importantly, storage networking. More and more servers are being deployed running virtual operating systems, or virtual machines (VM), with Ethernet storage protocols, whether network file system (NFS), internet small computer system interface (iSCSI), or Fibre Channel over Ethernet (FCoE). These physical servers previously running only one application are now hosting tens of applications, effectively increasing the I/O bandwidth required by a factor of 10 or more. This increase in VM density is clearly fueling the need for increased I/O capacity at each server and storage device.

As virtual machine density continues to increase on the server, the more attractive 10GbE becomes. Virtual machine adoption is growing rapidly, with estimates as high as 40%, according to at least one source[1]. Whatever the real number is, it is safe to say that adoption of server virtualization has reached the mainstream market. And these servers supporting virtual machines require the increases in bandwidth to satisfy the incremental I/O necessary to support multiple hosted applications.

Convergence: Another complimentary trend in the data center is the consolidation of resources. The open computing era introduced a decentralization of compute resources. Mainframes were replaced with independent file servers with direct attached storage. Networked storage, such as SANs and NAS, introduced the first new wave of resource consolidation. We have seen the second wave introduced with server virtualization. The third wave of consolidation seems focused on network convergence.

Traditional SANs run on a dedicated network. As this network continues to grow, the costs to deploy and manage begin to compete for costs and resources from the rest of the IT organization. And LANs aren't going away. So, as Ethernet continues to increase in capability to support not only iSCSI, but now Fibre Channel traffic with FCoE, the opportunity to consolidate both the LAN and the traditional storage network is a reality.

But this isn't available with 1GbE. The incremental investment in Ethernet by technology vendors to support converged network traffic is being made with 10GbE and faster speeds. 10GbE offers the required bandwidth for converged traffic while also introducing some significant economic benefits.

## Economic Drivers

Hardware Cost: The economic challenges over the last two years have raised the priority of cost reduction and increased efficiency for IT organizations. Solutions that can both increase business performance as well as reduce cost are in high demand. 10GbE delivers both increased performance and economic value. Fewer adapters, fewer cables, and fewer switch ports are required to support the same data traffic of previous generation products. And for some, the reduction in cabling alone is reason to deploy 10GbE. Not only is the added bandwidth essential to address the new requirements of server virtualization, but with that increased bandwidth comes greater economic efficiency. Price reductions for 10GbE are now at the point where the cost/Gigabit of bandwidth is less for 10GbE versus 1GbE.

Go Green: Environmental considerations are becoming a more prominent consideration in IT decision making. Not only is social responsibility a part of the equation, but there are some significant economic advantages to deploying new "greener" technologies. Servers have historically been the largest consumers of energy in the data center[2] and server virtualization has helped to reduce the number of physical servers drawing power and cooling. But, the added application density comes with increased I/O requirements. Consolidating onto 10GbE from 1GbE reduces the number of adapters, cables and switch ports required to support the same I/O requirements. Reductions in equipment translate into less power and cooling requirements in additional to the reduction in equipment costs. Fewer cables mean improved air flow and less chance of human error during setup and maintenance.

## Is 2012 the year for 10GbE?

With all of these reasons to deploy 10GbE in the data center, should we expect to see rapid adoption in 2012? If you were to ask most technology vendors, the answer would be a pretty strong "yes". However, we have said this before. Many of the reasons to deploy 10GbE have existed for at least a year or more. However, the rate of adoption has lagged most expectations. But that may be changing.

The expectations are that 2012 will see broad availability for additional technologies to further reduce the cost of deploying 10GbE. With the upcoming new server refresh cycle (Intel Romley), 10GbE LAN on Motherboard (LOM) server designs are entering the market and are expected to be common by the end of 2012. These LOM designs mean that deploying 10GbE in the data center will come with a much lower price tag at the host, where the majority of ports are deployed. Adapter sales will continue for added bandwidth and redundancy. But, the introductory price and core infrastructure will come standard with most if not all new server deployments.

In addition, deployment costs will continue to decline as we begin to see broader availability of 10GBaseT cabling. Up until now, cabling of 10GbE networks has required more expensive SFP+ or optical cables. The introduction of 10GBaseT allows for the use of less expensive copper cables that are commonly installed in the market today. Ultimately, the added volume of ports on servers and lower cost cables will do a lot to reduce deployment costs of 10GbE in 2012.

Although most accept that adoption will increase in 2012, not everyone thinks 2012 will be the break out year. Depending how you interpret the data, recent research from Dell'Oro Group suggests that 2013 may in fact be the great year for 10GbE. However, in order to hit the market share numbers for 2013, adoption rates better be pretty brisk before exiting 2012. So, perhaps both the vendor community and the analyst community are right? Regardless, whether we declare 2012 or 2013 as "the year for 10GbE", the requirements and benefits are clear today and all of the pieces are quickly falling into place to enable rapid adoption of 10GbE moving forward.

For more information about the Ethernet Storage Forum and its work around iSCSI, visit http://www.snia-europe.org/en/technology-topics/ethernet-storage/index.cfm

### Benefits of a 10GbE Network

By moving away from the traditional model of separate storage and local area networks (SANs and LANs) to a converged 10GbE network infrastructure, you can remove inefficiencies from your infrastructure while increasing flexibility, Benefits include:

- Cutting the number of ports, cables, and switches by up to half
- Reducing the physical footprint
- Simplifying management
- Cutting operational and capital costs
- Eliminating underused and stranded bandwidth

1 Source: Veeam Software, July 18, 2011
2 Source: U.S. Environmental Protection Agency "Report to Congress on Server and Data Center Energy Efficiency"