



## 10-GIGABIT ETHERNET – THE NEXT GENERATION NETWORK INFRASTRUCTURE

10-G-Base-T will simplify and reduce the cost of 10-Gigabit Ethernet implementations, resulting in affordable deployments.

Since any opportunity to improve performance is a plus for IT administrators, the dawning of 10-Gigabit Ethernet (10-GigE) is good news. Questions regarding costs, benefits, cabling, and timing are top of mind as administrators try to plan technology upgrades and new network deployments. Rest assured that if you have not already implemented 10-GigE you're not late – while some organizations have begun to use it, cabling upgrades will be required to drive broader deployment.

### THE LATEST AND GREATEST

10-Gigabit Ethernet is the latest, fastest LAN interconnect, the next in a series following Fast Ethernet and Gigabit Ethernet. The 10-GigE standard was ratified in late 2002, and according to industry analysts such as Robert Whitely at Forrester Research, its impact is expected to be profound in the long run as a one-size-fits-all technology for everything from supercomputing to clustering to networked storage.\* Increasing I/O bandwidth with 10-GigE will benefit many of today's IT priorities – things like server virtualization and subsequent application consolidation, backup, and media applications such as streaming video.

Because TCP/IP and 10-GigE is seamlessly interoperable with 1-Gb Ethernet, its adoption will be straight forward as part of normal network upgrades.

10-GigE is available today, and prices are dropping – which they will continue to do as cabling innovations develop. The first 10-GigE cabling choices are fiber optic and CX4, a copper cable similar to that used for InfiniBand. These early cabling methods provide excellent performance, but with costs and restrictions that limit deployments. The opportunity to deploy 10-GigE will expand with the broad deployment of 10G-Base-T, which will allow 10-GigE to run over conventional twisted-pair cables. The 10G-Base-T standard was adopted in 2007, and once power consumption concerns are addressed broad adoption will begin using the standard CAT 6 – simplifying implementation as well as reducing costs.

### 10 Gb Ethernet Connectors



10G-Base-CX4



Fiber Optic



10G-Base-T

Some IT organizations are implementing the technology today to solve specific problems after weighing the cost vs. benefit of waiting for lower costs and expanded cabling choices. Early adopters have implemented 10-GigE in portions of their TCP/IP networks (typically the core and inter-switch links); most IT departments will upgrade to 10-GigE as part of a standard networking upgrade schedule as costs fall and business operations require additional performance. Usually this begins with

the core of the network and proceeds to the core-edge switch connections, followed by the server and storage networks, the client data network, and (for some) WAN links.

### SEAMLESS INTEROPERABILITY

Once 10G-Base-T cabling is fully established 10-GigE is likely to go into hyper-deployment mode, and it will be a standard configuration on servers, switches, and storage. But the beauty of Ethernet is that the 10-GigE and TCP/IP protocol is seamlessly interoperable with 1-Gb Ethernet links, so a network upgrade won't disrupt your scale-out strategies. You'll be able to combine interconnects, so whether your connectors are fiber optic, CX4, or 10G-Base-T you will still be able to leverage Ethernet's benefits – simplicity, lower cost, and technological familiarity for your IT staff.

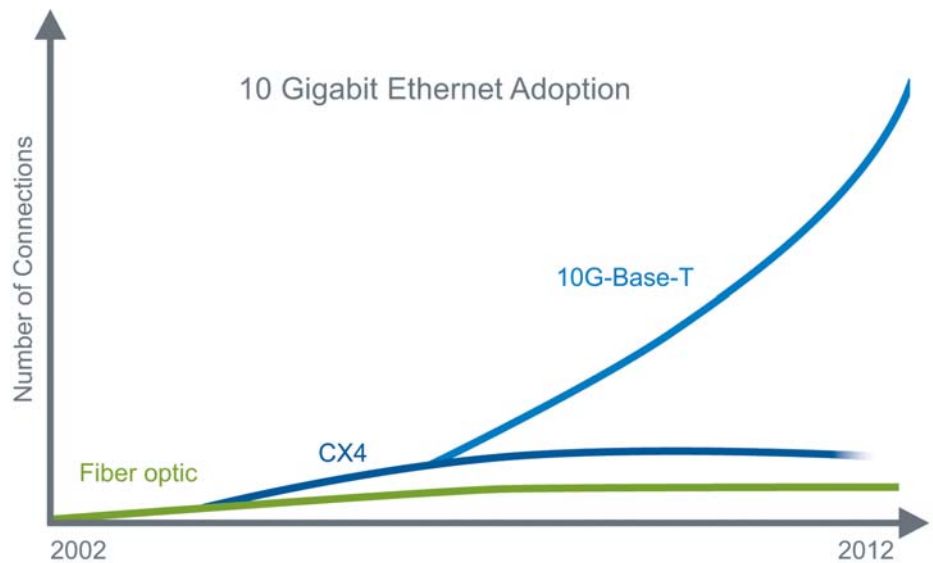
Using multiple network connections continues to be best practice as it improves performance and redundancy, which are critical in enterprise server and storage networks. If you need more server processing power, you deploy more servers; if you want to improve storage performance, you add more storage devices and load balance across available resources. Similarly, additional network links allow you to spread I/O to improve performance and availability – adding 10-GigE will accelerate that improvement. Streaming workloads such as backup, video, or data warehousing that stress both storage and networking resources are prime targets for the increased bandwidth of 10-GigE. (For more about load-balancing see EqualLogic Coffee Break "Automatic Load Balancing Relieves Administrative Burden".)

### READY WHEN YOU ARE

Ethernet's advantages as a data center technology are universally recognized today – even Fibre Channel storage vendors are jumping on the bandwagon. 10-GigE is the latest improvement, and will become broadly deployed as 10G-Base-T interconnects become ubiquitous on servers, switches, and storage devices. While some organizations will implement 10-GigE first to solve core and inter-switch network problems, many will follow their standard network upgrade schedule. Whenever you decide to investigate 10-GigE, remember to evaluate the ability of your switches and operating system to efficiently utilize the increased performance. And, rest assured that TCP/IP's seamless interoperability will make the upgrade relatively easy with limited disruption. The good news is that 10-GigE will be ready when you are.

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\*Kurt Marko "10-Gigabit Ethernet Market Growth & Drivers," Processor, Vol. 29, Issue 12, March 23, 2007.



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