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Fibre Channel over Ethernet: Convergence in the Datacenter

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Large and midsize enterprises are consolidating their datacenters through greater use of virtualization, bladed servers, and modular storage. They are deploying IT equipment (server, storage, and network) in modular, repeatable pods. A key question is how this change will affect the diverse network, SAN, and server interconnect environments used in today's datacenters.

The following questions were posed by QLogic to Richard Villars, vice president of IDC's Storage Systems & Executive Strategies, on behalf of QLogic's enterprise customers.

Q. Server virtualization has been a major trend for the past two years, even before the economic downturn. As enterprises consolidate their datacenters, is virtualization enough or should IT teams be doing more?

A. The use of server virtualization to drive real server consolidation was one of the major IT success stories of the past two years in many large and midsize enterprises. IT staffs won major kudos for reducing costs and boosting responsiveness to end-user requests for new and expanded applications. Despite this success, however, extensive use of server virtualization has created a number of challenges for IT departments.

We've spoken to countless IT administrators who report that stress on existing storage provisioning and data protection practices leads to unanticipated spending. In addition, they often mention that connection of virtualized servers to existing relatively low-speed data networks and SANs increases network/cabling complexity while also disrupting network performance and reliability.

The current economic difficulties and IT teams' response to them are exacerbating the network complexity and performance problems. The quickest way to respond to lowered IT budgets is to increase the number of virtual machines running on individual servers. We've spoken to many companies that are increasing virtual machine counts by 25% to 100% as they seek to defer new server purchases. This approach adds considerable operational risk as hardware failures or network bottlenecks now threaten many applications, not just one.

IDC is spending a lot of time right now with enterprises that want to set up datacenters to better support a fully and intensively virtualized environment. We suggest that they deploy their hardware (server, storage, and network) in modular, repeatable pods. Combining servers, storage, and server virtualization technologies in a dense rackmount or blade footprint means that enterprises can deploy hundreds of logical servers (with storage) in a standard rack.

The key to making this "pod" approach a reality is the use of converged network technologies such as lossless 10 Gigabit Ethernet (10GbE) and Fiber Channel over Ethernet (FCoE). They allow companies to dramatically simplify cabling and connectivity and also deliver the guaranteed performance necessary to ensure reliability as workloads grow. The use of 10GbE also increases the mobility of virtual machines between pods, making the use of virtualization across the datacenter for disaster recovery more practical.

Q. If 10GbE and FCoE are important elements in improving datacenter efficiency, how should an enterprise plan for the transition from Fibre Channel?

A. "How does FCoE affect my existing FC investments?" is one of the first questions IT executives ask IDC when we start talking to them about this new technology. The key to answering that question is to understand where converged technologies such as FCoE can deliver the biggest and most immediate benefit. For most companies, the greatest benefit is associated with bladed and virtualized servers that are the foundation platforms for IT consolidation and most new applications. Technologies such as FCoE on copper, for example, can significantly reduce the up-front costs of deploying and managing these systems. It also provides a reliable and scalable 10GbE foundation for any servers that employ IP protocols such as iSCSI, NFS, or CIFS for important server environments.

At the same time, almost all of these companies also have mission-critical systems running on Unix/RISC base servers that have run on FC SANs for over a decade. They also have large investments in SAN-attached storage that supports these mission-critical systems and serves as the foundation for business continuity and backup processes. Companies need to upgrade the SAN connections for these systems, and 8Gb FC (with an eventual transition to 16Gb FC) is the right technology to ensure continued performance improvements in those environments.

Until a wide spectrum of storage systems suppliers start delivering FCoE-ready arrays across most of their midrange and high-end arrays, enterprises will be supporting both FCoE and FC environments. Waiting two or three years until one can make a full transition really means passing up opportunities to reduce costs for virtualized server environments while also exposing installed applications to needless disruptions. The key is to look for solutions that provide consistent management across FC and FCoE environments.

Q. Does the transition to FCoE mean that an enterprise needs to undertake a major network and storage upgrade?

A. The greater deployment of virtualized servers has already forced many enterprises to significantly rearchitect the cores of both SANs and data networks. The rollout of 10GbE support on new-generation servers and NAS systems from most of the major suppliers will trigger the next upgrade cycle, and adopters of FCoE will be able to more effectively take advantage of this transition.

In terms of storage upgrades, it will take several years for all major storage suppliers to deploy FCoE-enabled storage arrays across their full portfolio. Many enterprises will need to deploy solutions that convert FCoE-based server connections to FC-based storage connections, but there is a potential silver lining for IT departments that can link FCoE with storage virtualization solutions from companies such as DataCore, HP, IBM, or NetApp. Combined, organizations can reduce the costs of server connections while increasing effective utilization (often more than doubling effective capacity) and boosting the IOPS performance of installed FC storage. These kinds of improvements can translate into a quick ROI for a network upgrade.

Q. FCoE sounds like a great idea, but is it really ready yet? What should an IT department look for in FCoE solutions today?

A. As is the case with most new technologies, many of the first FCoE products that companies introduced late last year were optimized for the lab, not for production deployments. The focus was on providing a basic hardware foundation while companies worked on the final firmware and standards issues. Reliability and cost optimization were the primary design goals.

Today, IDC sees a number of second-generation FCoE products that will be the foundation of early production deployments. The main characteristic to look for is a more compact chip design, making FCoE products more reliable and cost-effective. IDC expects bladed server system suppliers such as HP, IBM, and, more recently, Cisco to be the first IT suppliers to really take advantage of these new FCoE products. These companies want to help their customers make the transition to more modular pod architectures in their virtualized datacenters, and a reliable FCoE architecture is a key part of such efforts.

ABOUT THIS ANALYST

As the vice president of Storage Systems & Executive Strategies, Richard Villars is a senior member of IDC's Information Infrastructure research team, which assesses the development and adoption of storage solutions for rapidly growing information assets. He develops IDC's viewpoints on the evolution of storage networking infrastructure and next-generation storage technologies. He advises clients on the impact of tiered storage, bladed servers, virtualization, and regulatory compliance on organizations' storage and information management practices. Mr. Villars is a frequent speaker at industry and Wall Street conferences.

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