

## Solution Brief

# Emulex & Dell Deliver the Missing Link for Enterprise Class iSCSI SANs iSCSI over DCB Helps Network Convergence Deliver on QoS Promises

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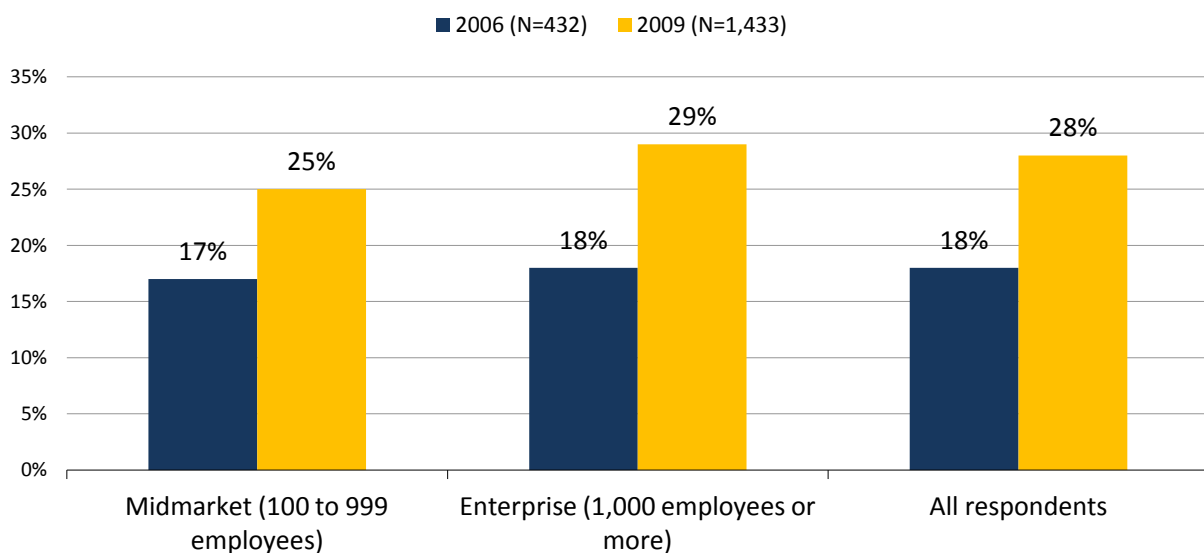
**Abstract:** Emulex and Dell recently announced complete iSCSI over Data Center Bridging solutions targeting virtualized environments in enterprise accounts. While prior efforts to drive adoption of iSCSI have met with success, improvements driven by 10Gb Ethernet, Data Center Bridging, and hardware-based iSCSI offload engines should help accelerate penetration in enterprise accounts. By delivering and validating performance and QoS for mission-critical applications, [Emulex](#) and [Dell](#) are fulfilling the promises of network convergence.

## Overview

Organizations continue to rapidly deploy server virtualization technologies; ESG research indicates that “increasing the use of server virtualization technology” has been the number one priority for the last two years.<sup>1</sup> Equally important in virtualized environments is the use of networked storage environments to enable advanced mobility features and help create highly flexible and agile private cloud environments.

The type of networked storage deployed in a virtualized server environment was typically dictated by performance requirements and available budget. If an application required high performance/high availability, a Fibre Channel (FC) SAN was used. iSCSI initially tried to contend for that spot, but found a home mostly supporting less critical applications. It was hindered by a lack of bandwidth (1 Gb Ethernet vs. 2, 4, and 8 Gb Fibre Channel), and issues with TCP/IP offload and even Ethernet itself (dropped packets, congestion, etc.). Despite those concerns, iSCSI did resonate with many organizations, especially those focused on closely managing operating expenditures. ESG research<sup>2</sup> indicates that from 2006 to 2009, iSCSI managed to attract a substantial customer base and not just in the midmarket, but the enterprise as well. Equally important, this research also indicated that another 24% of organizations were planning to use iSCSI.

Figure 1. iSCSI Adoption by Midmarket and Enterprise, 2006 vs. 2009



Source: Enterprise Strategy Group, 2010.

<sup>1</sup> Source: ESG Research Report, [2011 IT Spending Intentions Survey](#), January 2011.

<sup>2</sup> Source: ESG Research Report, [Enterprise Storage Survey](#), 2009.

Much has changed since the inception of iSCSI; many of its legacy performance issues have now been overcome. Traditional 1 Gigabit Ethernet (GbE) is being replaced by 10GbE, offload is accomplished at an ASIC level, and the Ethernet protocol itself has been modified to better accommodate storage traffic by implementing IEEE Data Center Bridging (DCB) standards. Given these advances, it is not surprising to see vendors positioning iSCSI for “enterprise-class” solutions. Recently, Emulex and Dell announced an end-to-end iSCSI over DCB solution which includes:

- **Emulex OneConnect 10GbE iSCSI over DCB adapters.** Emulex's Enterprise iSCSI solution supports IEEE DCB standards that include Priority Flow Control (PFC) and Enhanced Transmission Selection (ETS) to ensure consistent, lossless data transport and manage bandwidth allocation between network and storage traffic groups. Emulex vEngine technology handles the iSCSI offload.
- **Dell EqualLogic PS6010 and PS6510 arrays.** These support IEEE DCB standards including PFC, ETS, DCBX, and iSCSI TLV. With the 5.1 firmware update, Dell EqualLogic PS Series storage arrays support iSCSI over DCB, mixed speed bridging, load balancing enhancements, and VMware thin provisioning awareness for VMware vSphere.
- **Dell DCB-enabled network switches.**

The solution is now generally available through Dell and its channel partners.

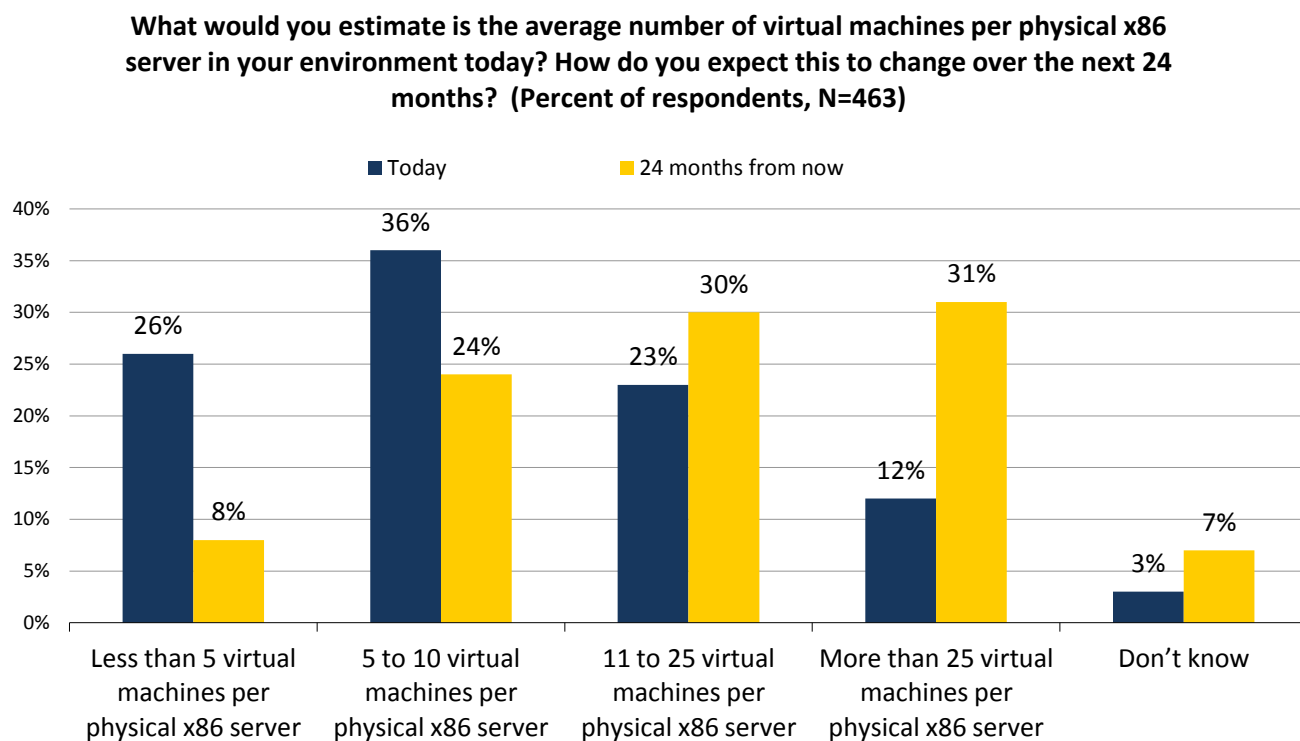
## Analysis

iSCSI has long been championed as an alternative to Fibre Channel for the SAN and while it has gained significant traction in the data center and is a rapidly growing segment, it has lagged behind Fibre Channel in performance. However, given technology advances and enhancements from Emulex and Dell, iSCSI is ready for another shot at those performance-sensitive mission-critical applications. Specifically, this “better together” solution will enable:

- **High performance connectivity.** Connectivity is enhanced with three critical functions: 10GbE, DCB, and iSCSI hardware adapters. For several years, iSCSI has supported 10GbE throughput from server to storage, which is a big improvement over 1GbE and put it above the current 8Gb/s Fibre Channel. What makes this more interesting, however, is Ethernet will next advance to 40Gb and 100Gb while Fibre Channel is slated for 16Gb and 32Gb. Equally important, DCB addresses some fundamental issues with Ethernet pertaining to priority flow control and lossless transport. Keep in mind: these are the key changes that also enable Fibre Channel to run over Ethernet. iSCSI hardware adapters also provide more efficient I/O processing than software initiators with NICs, and protocol offload enables servers to dedicate processing power to serving more virtual machines. Emulex claims its OneConnect iSCSI adapters enable I/O for up to 50% more virtual machines (VMs) per server than NICs with software initiators.
- **Quality of service.** The ability to segment bandwidth and assign priorities to applications will be more critical as production environments are virtualized. This is especially true for mixed workload environments. For advanced virtualization users deploying highly flexible and agile cloud environments, this is must-have technology given that production applications could be relocated within a resource pool, but still need to provide the same high level of service. This capability is enabled via DCB and managed via Emulex OneCommand software and EqualLogic's Group Manager. OneCommand and Group Manager are tightly integrated into VMware vCenter, enabling VM administrators to assign QoS quickly and easily.
- **Greater optimization of virtualized server environments.** As organizations continue to increase their use of virtualization and drive higher VM densities, these capabilities will become critical to ensure service levels are met. According to ESG research, the number of VMs per physical server will dramatically increase over the next two years. Figure 2 illustrates that the majority of organizations will go from having ten or fewer VMs to 11 or more, with almost a third reporting they will have 25 or more VMs per physical server. This will have a significant impact on I/O bandwidth requirements, driving the need for 10GbE or higher throughput and the ability to deliver QoS in mixed workload environments. Hardware offload capabilities will also minimize overhead for protocol processing and maximize VM densities.
- **Simplified Server Virtualization Operations with vCenter:** Both OneCommand Manager and EqualLogic Group Manager plug-ins for VMware vCenter let users manage Emulex adapters and EqualLogic PS series storage arrays directly from the vCenter console for reduced complexity. Emulex is the only adapter that

integrates with VMware management tools. Emulex and Dell claim this integration delivers greater levels of functionality and requires less time to manage versus solutions that have to be managed separately.

Figure 2. VM Density Now and 24 Months from Now



Source: Enterprise Strategy Group, 2010.

Figure 2 shows how the number of VMs per server is expected to grow from under 10 to over 25 in the next 24 months. The increase in VMs will create and aggregate I/O demands on servers. Adding 10GbE iSCSI over DCB will help IT managers meet this growing I/O need with the increased bandwidth on the iSCSI cards (up to 20Gb/sec), QoS features, and centralized single-pane-of-glass management. By combining industry advances and technology from Emulex and Dell, organizations will have a new option for deploying performance-sensitive production applications. So what applications are organizations deploying on iSCSI solutions? ESG research respondents indicated that they are deploying iSCSI SANs for database applications, Microsoft Exchange, desktop virtualization, Microsoft SharePoint, and other business applications.

## Market Dynamics

This end-to-end solution from Emulex and Dell appears to be a suitable solution to champion iSCSI for the enterprise. It delivers a high performance to cost ratio, accelerates the consolidation of the SAN to IP, and leverages best of breed technology. However, there is still work to be done. FC holds an entrenched position in most enterprise data centers. Emulex and Dell still need to make potential clients aware of the improvements that have been made to iSCSI and validate performance claims with reference customers.

The current macro economy can also have a dramatic impact on iSCSI adoption due to its lower overall cost. While always an advantage, cost effective solutions tend to be rapidly adopted when budgets are under pressure.

## The Bigger Truth

Enterprise organizations have been undertaking convergence and consolidation efforts in the data center for a number of years to help reduce costs, deliver higher levels of service, and mitigate risk. Server virtualization and networked storage environments play a significant role in these initiatives. And while FC SANs have proven to be effective, especially in high performance environments, they can be costly to deploy and maintain and require specialized skill sets.

The new Enterprise iSCSI solution from Emulex and Dell will not only provide performance commensurate with FC, it will do so leveraging industry standard 10GbE. This will help accelerate deployment of not only virtualized server environments, but also of converged networks—without specialized skill sets. This is typical of Dell’s “better together” strategy for delivering enterprise class solutions. Emulex brings its innovative OneCommand UCNA and its ability to not only handle the I/O blender created by mixed workload VM environments, but also enterprise class manageability, QoS, and hardware offload features to ensure reliable, consistent performance. Dell brings its servers, storage, and industry standard 10GbE switches.

Organizations looking to increase their virtualized server environments and create private clouds to handle production and other high performance applications should definitely place an iSCSI over DCB solution on their short lists, as recent developments have enabled iSCSI to deliver enterprise class performance at an attractive price with standards-based converged 10GbE networking.