



DATA CENTER

Brocade FCoE Solutions for Server I/O Convergence

Converged Enhanced Ethernet (CEE) infrastructures support FCoE solutions to provide greater choice and flexibility for data center environments.

BROCADE

For several years, Fibre Channel networks have been providing organizations with exceptional reliability, performance, and network intelligence for low-latency, high-bandwidth Storage Area Network (SAN) applications. Now, organizations are looking to leverage a new lossless and deterministic transport—Converged Enhanced Ethernet (CEE)—that enables them to consolidate Fibre Channel SANs and networking transport layers into a single physical interconnect.

CEE enables the Fibre Channel over Ethernet (FCoE) protocol that provides additional deployment options while extending the reliability and services benefits of Fibre Channel to environments that have traditionally relied exclusively on Ethernet. FCoE is a powerful new technology that will be initially deployed at the server edge to enable access layer server I/O consolidation. As advanced Link layer (Layer 2) multipathing standards become available, FCoE and CEE deployment will likely expand into larger configurations and eventually move into the core of the data center.

This paper describes how Brocade® is actively involved in developing FCoE standards and providing the foundation for building CEE networks.

A NEW ARCHITECTURE OPTION

To help IT organizations realize the benefits of server edge I/O consolidation, Brocade and other leading vendors are driving the development of FCoE, a new protocol that extends the Fibre Channel standard to CEE networks. FCoE encapsulates Fibre Channel frames into Ethernet (CEE) frames so they can be transported over lossless CEE networks. In this way, FCoE extends the reliability benefits and services inherent in Fibre Channel to LANs or networks that utilize Ethernet. This approach enables flexible, powerful, scalable, and simplified data center fabrics that support increasingly powerful applications and growing amounts of data.

Through the development of CEE networks, organizations will be able to share a single physical transport layer for multiple protocols, including TCP/IP, InfiniBand, and Fibre Channel. This consolidation will help provide the flexibility needed for building virtualized server and storage environments capable of supporting tomorrow's low-latency, high-bandwidth applications.

Consolidating server I/O over a common transport layer helps organizations reduce their initial cost of acquisition (CapEx) by reducing the amount of server adapters, cabling, and switch ports needed for building data centers. These organizations will also be able to realize operating cost savings (OpEx) due to the reduced power consumption and cooling costs. In addition to these direct costs, organizations will be able to realize significant savings due to simplified configurations, the reduced potential for human errors, and faster problem diagnosis and resolution.

THE BROCADE CEE/FCOE DEPLOYMENT STRATEGY

By providing forward and backward interoperability in its data center networking solutions, Brocade allows organizations to deploy new technologies on their own schedule without having to go through a costly and disruptive rip and replacement. This is the case for Brocade FCoE solutions, which are designed to preserve Fibre Channel constructs and services.

As a result, organizations can introduce FCoE into their Fibre Channel environments without disruption and can continue using their existing management tools. With the introduction of FCoE into their data centers, organizations will be better prepared to transform their IT infrastructures into more flexible environments capable of supporting new business requirements. Brocade envisions organizations initially implementing CEE/FCoE on the server edge for server I/O consolidation while laying the foundation to extend deployments into the data center core in the future.

Brocade plans to offer a wide choice of flexible solutions for introducing CEE/FCoE into current infrastructures or new data center deployments. These solutions are designed to provide the ability to consolidate server I/O for a wide variety of server types, including:

- Rack server I/O consolidation with top-of-rack CEE/FCoE switches
- Blade server I/O consolidation with mezzanine adapters
- Rack servers with standup CNA adapters
- Pedestal servers with standup CNA adapters
- Blade server I/O consolidation with blade server CEE/FCoE switch modules
- High-end server I/O consolidation with CEE/FCoE blades for Brocade DCX® Backbones

Today, the unified Brocade FCoE solution includes the Brocade 8000 Switch, Brocade 1010/1020 CNAs, and Brocade Data Center Fabric Manager (DCFMTM)—enabling organizations to consolidate server I/O in the data center.

CONTINUED STANDARDS DEVELOPMENT

Brocade continues to work with leading storage and networking vendors through several standards bodies—including the IEEE, IETF, and T11—to develop the open standards needed to build a new network infrastructure on CEE/FCoE so that TCP/IP applications can share data center infrastructure with Fibre Channel and other high-performance computing applications. The CEE standards work is expected to be completed in late 2009, while the IETF work on Transparent Interconnection of Lots of Links (TRILL) will extend into early 2010.

DYNAMIC DATA CENTER INFRASTRUCTURES

CEE/FCoE is a promising new technology combination that organizations will be able to leverage in order to extend lossless and deterministic Fibre Channel-like reliability, network services, and performance to their traditional Ethernet networks. A key component of the Brocade architecture strategy, CEE/FCoE will ultimately enable organizations to build reliable, powerful, and dynamic infrastructures that support holistic data center consolidation and virtualization solutions.

It is likely that organizations will take a practical approach to deploying CEE/FCoE, starting with access layer server I/O consolidation using top-of-rack switches. The next steps will be the use of end-of-row server I/O consolidation using backbone blades such as FCoE blades in the Brocade DCX Backbone family. Eventually, more organizations will consider CEE/FCoE for deployment in larger configurations and in the network core once Layer 2 multipathing standards are available.

To learn more about how Brocade Extraordinary Networks provide greater choice and flexibility for a wide range of IT environments, visit www.brocade.com/extraordinary.

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