

## Fibre Channel over Ethernet (FCoE) adoption: A vendor survey

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Upcoming and present Fibre Channel over Ethernet (FCoE) converged network adapters (CNAs) and switch implementations are driving the adoption of converged Fibre Channel and Ethernet networks among enterprise users. In 2010, users are going to be evaluating and testing the CNAs that Brocade, Emulex and QLogic offer and pairing them with top-of-the rack switches from Brocade and Cisco and with end-of-row switches from Brocade. In late 2010, these same enterprise users will start implementing the CNAs and FCoE-ready switches in their networks, especially as they refresh their aging server population with Nehalem EX-based servers or as they install new servers.

Let's look at each vendor's CNA and switch offerings:

**Brocade:** Brocade offers both single-port model 1010 and dual-port 1020 FCoE to PCIe CNAs. They have a power dissipation of 8.5 watts (optical CNA) and an operating voltage of 3.3V. Brocade has its CNA qualified for use on the host side with NetApp. The FCoE CNAs, which are available now from select OEMs, have an MSRP of \$2,999 (from IBM) and a street price ranging from \$1,576 to \$2,532 for the dual-port 1020. Brocade also offers two FCoE-ready switches – the 8000 top-of-rack multiprotocol switch and the FCOE10-24 blade for Brocade DCX and DCX-4S, which enables either Converged Enhanced Ethernet (CEE) or FCoE. Brocade's CNAs are also qualified with EMC's latest Symmetrix, the V-Max, and is available from resale from EMC Select. In addition, Brocade has design wins with NetApp, EMC and IBM.

**Cisco:** Cisco offers the Nexus 5000 Series, which has been shipping since May 2008. The Nexus 5000 is a 2U top-of-the-rack switch that has 10 Gigabit Ethernet and FCoE connectivity and delivers 1.04 Tbits/sec. of throughput. It provides 40 fixed ports and can be configured with two expansion module slots to support up to 12 additional 10Gbit Ethernet or FCoE ports, up to 16 Fibre Channel ports, or a combination of both. Cisco also plans to support FCoE on its MDS 9500 Series Multilayer Director switches. The company has inked deals with IBM for use of an FCoE-enabled Nexus 4000 blade in IBM's BladeCenter servers.

While Cisco does not offer its own CNAs, it has inked an agreement to 'promote' QLogic's QLE8152 CNA worldwide. Cisco will also market Emulex's OneConnect UCNAs. The company is also offering Emulex's first-generation UCS M71KR-E Emulex Converged Network Adapter, as well as QLogic's first-generation 8000 Series CNAs with its Cisco UCS B-Series Blade Servers.

**Emulex:** Emulex has just announced the general availability to the channel of its OneConnect Universal Converged Network Adapter (UCNA) in October of this year. Since this is the newest entrant in the CNA field, we'll detail it more than the others, which have been covered in previous research. The OneConnect UCNA is initially a 10Gbit/sec. Ethernet adapter, which with a 'fee-based' hardware license key and new driver can be upgraded with either iSCSI or FCoE capability. iSCSI capability is available now; FCoE capability is expected to follow by the end of the year, at a premium of \$526. The OneConnect UCNA is the result of a technology collaboration between Emulex and ServerEngines.

Based on Emulex's FAQ (<http://www.emulex.com/solutions/convergenomics/resources-and-tools.html>), the company can support only one block-mode protocol per adapter, either iSCSI or FCoE. Emulex's UCNA also currently offers limited driver support – Windows, Linux and VMware ESX3.5. Emulex's UCNA will not support VMware vSphere (ESX 4.0) support until the first half of 2010 and Solaris until the middle of 2010. Lastly, Emulex offers only dual-port adapters.

Since the Emulex OCe10102-F UCNA was just introduced on October 27 and will not be available until the end of the year, no street prices are available. The MSRP of the FCoE-enabled OCe10102-F is \$2,799. Emulex claims four design wins for its FCoE implementation, although the company names none. The company has a partnership with Cisco for the distribution of its OCe10102 UCNAs.

**QLogic:** QLogic's QLE8152 and QLE8142 Converged Network Adapters, which support FCoE and consume 7.4 (optical QLE8142) watts, have been generally available since May. The dual-ported copper-based adapter (QLE8152) is available through design wins with IBM, EMC and NetApp and through distribution at CDW, PC Mall and Tech Data, among others. At IBM, QLogic is the exclusive CNA in the new Power Systems servers, and the CNA IBM chose along with Brocade for System x and BladeCenter Servers. At NetApp, QLogic CNAs are the exclusive CNA embedded across NetApp's broad unified storage systems portfolio. QLogic is also qualified with EMC's latest Symmetrix, the V-Max, and is available from resale from EMC Select.

The company also counts on a partnership with Cisco for the distribution of the QLE8154. The MSRP for the QLE8152 is \$2,795 and available at street prices of \$929-\$997. QLogic also offers the QLogic 10Gb Ethernet Pass-thru Module for IBM BladeCenter.

**Figure 1. Copper-based CNA Pricing**

Manufacturer and Model		MSRP	Street
<b>Brocade</b>	1020	\$2,999	\$1,576-\$2,532
<b>Emulex</b>	OCe10102-FX	\$1,935	Not available yet
<b>QLogic</b>	QLE8152	\$2,795	\$898-1,571

**Figure 2. Power consumption**

Manufacturer and Model	Power Consumption
Brocade <b>1020 (optical)</b>	8.5 watts
Emulex <b>UCNA</b>	14.5 watts
QLogic <b>QLE8142 (optical)</b>	7.4 watts

#### SSG-NOW Assessment

FCoE is an evolutionary process – a view that SSG-NOW shares with QLogic, Brocade and Cisco. SSG-NOW believes that enterprises will move to FCoE in a phased approach by deploying top-of-the-rack switches and single-chip converged network adapters that bridge existing Fibre Channel and Ethernet networks.

These vendors’ – Brocade, Cisco and QLogic -- approaches to FCoE make perfect sense. Brocade provides FCoE-ready CNAs and switches for users to adopt. Cisco in partnership with QLogic and Emulex is also able to offer both CNAs and FCoE switches to its customers. QLogic was first to market with a second-generation single-ASIC adapter.

All these vendors have adopted an evolutionary approach to FCoE in which CNAs will replace Gigabit Ethernet adapters and Fibre Channel host bus adapters when servers are refreshed, and will be paired with top-of-the-rack switches that can be dropped into the network, preserving investments in existing Fibre Channel and Ethernet switch gear and infrastructure.

Only Emulex’s approach to FCoE differs. Emulex believes that FCoE will start with initial wide-scale Gigabit Ethernet adoption. Those users who use Emulex’s OneConnect UCNAs may choose to upgrade to FCoE when it is available or use the OneConnect UCNAs to only support network-attached storage, file server or iSCSI environments. Those users that upgrade to FCoE will be faced with a disruptive upgrade when the FCoE driver code is available since it will require a restart of each server containing an Emulex OneConnect UCNA.

For users that already have Fibre Channel storage area networks, the Brocade, Cisco and QLogic approaches make the most sense from a deployment viewpoint. SSG-NOW recommends that users with Fibre Channel SANs that opt for Emulex OneConnect UCNAs would be best advised to wait for FCoE availability before evaluating Emulex’s implementation.