



DCX Backbone in the News



BROCADE

Cisco, Brocade Duke It Out in the Data Center

Cisco and Brocade are contending for dominance in next-generation data center networks.

By Paula Musich

January 25, 2008

Cisco Systems and storage area network rival Brocade Communications will clash over the future of data center networking with dueling next-generation switch architectures designed to converge separate networks in the data center.

Cisco on Jan. 28 will introduce its next generation Nexus 7000 switch, which uses a brand new architecture distinct from Cisco's flagship Catalyst switch line to combine Ethernet switching, IP routing, storage, security and virtualization for high performance data center networks.

Brocade sought to beat Cisco to the punch a week earlier with the launch of its new DCX Backbone, also a new generation switching platform designed for high performance and intended to support the requirements of large-scale server virtualization environments.

Spurring the duel is the realization that existing network switching technologies used in the data center such as Fibre Channel and Ethernet can't keep pace with new demands coming from server virtualization and video. At the same time new technologies such as Data Center Ethernet

are emerging that can overcome the limitations of those existing technologies.

Both new switches are intended to allow customers to consolidate separate storage and server networking infrastructures, but each addresses the consolidation effort from different perspectives.

"The Nexus [7000] is IP focused and the DCX is coming at it from a much more storage and Fibre Channel focused perspective," said Bob Laliberte, analyst at Enterprise Strategy Group in Milford, Mass. "[The DCX] handles Fibre Channel, FICON and FCOE [Fibre Channel Over Ethernet] when the standards become available. The Nexus is 10 Gigabit Ethernet supporting FCOE. They are still two very different platforms right now."

For raw speeds and feeds, the Nexus 7000 supports an aggregate switching capacity of 15T bps (terabits per second) and 512 ports of 10 Gigabit Ethernet, with support planned next year for 40 and 100G bps Ethernet as well as the emerging FCOE standard.

It runs a new operating system, the NX-OS, which combines elements of Cisco's SAN-OS from its SAN switches, Layer 2 switching

and Layer 3 routing protocols as well as switch virtualization functions with Cisco's well-known IOS interface.

The Nexus 7000 is the first implementation of Cisco's new TrustSec architecture, which implements role-based security and access lists rather than classical topology-based security. "The beauty of this architecture is we also offer wire speed, line rate encryption at 1 and 10 Gigabits per second," said Jayshree Ulla, vice president of data center networks at Cisco in San Jose, Calif.

The Nexus 7000 was designed to eliminate packet loss and avoid any service disruption during upgrades. For service providers, it also supports virtual device contexts that allow the switch to be partitioned into multiple logical devices, each having their own processor and command line interface that operate independently of each other.

Brocade's DCX Backbone is a "protocol agnostic" data center switch that supports Fibre Channel, FCOE, iSCSI and will support the emerging Data Center Ethernet standard, according to Ian Whiting, vice president and general manager of data center

infrastructure at Brocade in San Jose. Fibre Channel and FICON protocols are supported across a range of port speeds and over Gigabit Ethernet.

For raw speeds and feeds, it can scale to support an aggregate switching capacity of 12T bps and 896 ports, including a first-to-market 8G bps Fibre Channel interface, and later this year Brocade will add support for 10G bps Ethernet.

The DCX can support five times the switching bandwidth of current SAN directors and eight times as many virtual servers, claimed Doug Ingraham, senior director of product management at Brocade in Denver.

Software features in the DCX include several value added services that address communications between virtual machines and between virtual machines and storage. Dubbed Adaptive Networking, that capability helps manage virtual flows through the network by dynamically allocating shared resources as requirements from virtual servers change. If congestion happens or is anticipated, the switch fabric dynamically adjusts bandwidth and other resources based on pre-defined service levels.

Both vendors believe their next-generation switch architectures can reduce operational costs for management overhead, the number of boxes required and in the size of the energy bill.

"It allows a lot more movement of storage and servers without a huge operational hassle. You have a degree of freedom you didn't have before. You get a massive reduction in the amount of boxes," said Nick Lippis, principal at Lippis Consulting in Hingham, Mass.

Both vendors over time will also bring out other form factors built around their new switching fabrics.

For Cisco, the Nexus 7000 clearly represents a replacement for the top end of its aging Catalyst switch line, which has been in the market for 15 years. Still, Cisco remains committed to the Catalyst line and will continue to enhance and support it for "at least the next five to seven years," Ullal said.

Cisco in fact announced new 10 Gigabit Ethernet line cards for the Catalyst 6500, a new vertical Catalyst chassis for data centers and the Catalyst 4900 fixed-configuration, top-of-rack Gigabit Ethernet switch.

Still, Cisco is clearly worried that the Nexus 7000 could cause customers to halt or slow down Catalyst purchases.

"I expect there to be a whole new set of products that will be successors to the Catalyst Ethernet switches," said Dave Passmore, research director at Burton Group in Sterling, Va. "Cisco will be the last to admit this because it would cannibalize the Catalyst switches. If or until other members of the Nexus family are ready, they don't want anybody to be thinking that way."

Passmore believes the duel between Brocade and Cisco underscores a looming, broader industry battle for next-generation data center with battle lines drawn around competing technologies.

"We'll see a battle royal between Fiber Channel over Ethernet versus iSCSI. iSCSI retains the TCP/IP protocol stack, which scales, is extensible and provides nice things like error detection and flow control -- important things to

storage networking," he said.

The turf war between Brocade, the dominant SAN vendor in the industry, and Cisco, the dominant LAN vendor, could cause battle lines to be drawn within the data center, and between different technology silos.

"There's the server people, the network people, the storage people, and they tend to live in their own little worlds. This data center fabric technology [could] break down some of those barriers if they want this to become reality," said John Webster, industry analyst with Illuminata in Nashua, NH.

"Cisco will spin this vision to any CIO they can find. Brocade knows they can talk to the operations people, because that's where they play. That's the door they're going to go into. It'll be interesting to see which winds up the better door," he added.

In that scenario, it's possible both switches could end up in the same data center. Should that be the case, "it will be interesting to see how well they interoperate," commented Enterprise Strategy Group's Libberte.

The battle could also become a three way clash of titans once Juniper Networks enters the fray as expected later this year.

But Juniper may not have the same skin in the game, believes Lippis. "To me what you'll get from Juniper is high port density, high performance and high availability, but they won't have the intellectual property Cisco brings to Nexus," Lippis said.

"Cisco spent about \$1 billion over four years [on Nexus 7000] and they've got 1500 patents, six million lines of code, 10 custom Application Specific Integrated Circuits. This is so high design," he said.

Brocade DCX chassis has strong Backbone

Review: Data center Backbone handles high data rates

By Cameron Sturdevant @WEEK LABS

Brocade's new data center Backbone, built around the new DCX chassis, introduces 8G-bps Fibre Channel capability in server and storage connectivity.

I saw two DCX chassis, operating singly and in tandem to provide impressive performance at Brocade's San Jose, Calif., test facility. Under ideal conditions and using traffic generated from an Agilent test box, the systems were able to support data rates claimed by Brocade.

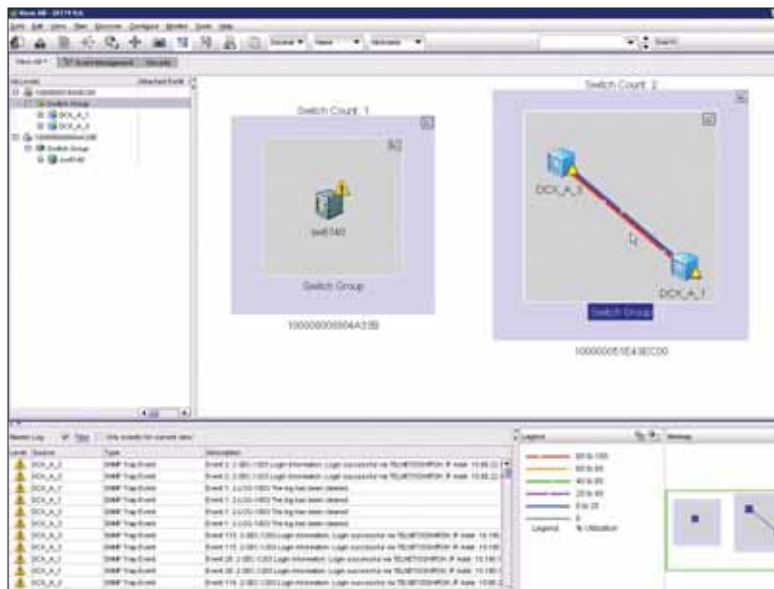
Two 14U (24.5-inch) DCX chassis using copper ICL (Inter-Chassis Links) can provide high-density connectivity with as many as 896 available ports.

While it is customary to configure SAN (storage area network) capacity, including redundant links to cover just about any contingency, Brocade enhanced QOS (quality of service) and other policy-based traffic management functions called Adaptive Networking Services.

Built mainly to govern workloads over expensive long-distance circuits when a fabric failure causes conges-

tion, the new system worked well in Brocade's lab setting.

I was able to see QOS policies that were written by Brocade engineers prioritize certain workloads into the "high" category that allocated 60 percent of bandwidth, while low-priority traffic was starved back to just 10 percent.



The red line between the two DCX chassis (shown on the right side of the screen) shows that traffic is at 80 to 100 percent of the link and that congestion is occurring.

Data center managers who are already using zones to manage servers and storage by either automatically or dynamically arranging fabric-connected devices into logical groups will readily grasp policies used in Adaptive Networking Services.

Many of the policies that govern how bandwidth is allocated in extreme conditions, including the

new ingress rate-limiting feature, are configured using many of the same concepts employed in zones. This includes how storage, servers and workstations within a Brocade fabric are provisioned.

During my observation, Brocade engineers were able to create policies that restricted write bandwidth on specific ports on the DCX chassis.

The high-density nature of the DCX, along with Brocade's FOS (Fabric OS), enables the consolidation of physical fabrics into a virtual framework.

During my first-look visit at Brocade, I was able to watch engineers carve the physical fabric in the DCX chassis pair into multiple, completely separate virtual fabrics using

ADs (Administrative Domains). We were able to create users with administrative access only to specific ADs.

Of course, Brocade is quite concerned with interoperability between the DCX and users of McData M-series switches. (Brocade acquired McData in August 2006 and is working to keep users from considering rival Cisco Systems' SAN gear.)

The demonstration that I saw in San Jose showed

native interoperability between a DCX chassis and a McData 6140 switch. Brocade was able to create zones, including the McData switch, and make storage access changes in the zone without affecting unrelated zones. **e**

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