SAN Switches

How many more acronyms that rhyme with LAN will the networking industry spawn? Now in addition to expanding your company’s LAN to a wide area network (WAN) or a metropolitan area network (MAN), you can implement a storage area network (SAN).

Chances are that your company is or soon will be outgrowing the storage capacity of its servers. Of course, you can simply install another server or you can add a volume to an existing server (if possible), but knowing that your company’s storage needs will continue to grow, you may want to consider installing a SAN. One of the switches featured in this article could be the building block for your company’s SAN. (Please note that NetWare is Tested and Approved for use with NetWare 5 and NetWare Cluster Services for NetWare 5. (For more information about products that are Novell Yes, Tested and Approved, visit http://developer.novell.com/prodcert.)

If you are not familiar with Fibre Channel or other SAN technology, you can get more information about SAN technology by visiting the following web sites:

- Fibre Channel Industry Association at www.fibrechannel.com
- FibreAlliance at www.fibrealliance.org
- Storage Networking Industry Association at www.snia.org

Many of the SAN vendors include excellent tutorials about SAN technology and architecture on their web sites. You may also want to check out the following web sites:

- Vixel Corp. at www.vixel.com/whitepapers
- Brocade Communications Systems Inc. at www.brocade.com/SAN
- Gadzoox Networks Inc. at www.gadzoox.com/san_library

CAPELLIX 3000 MODULAR SAN SWITCH

The Capellix 3000 modular SAN switch from Gadzoox Networks Inc. is available in two models: a three-slot standard model (Capellix 3000) and a three-slot high-availability model (Capellix 3000HA). Each port works in full duplex, delivering 100 Mbps in each direction. The standard model has a 2U rack-mountable chassis. The high-availability model has a 3U rack-mountable chassis, which includes redundant power supplies and fan assemblies.

Both models of the Capellix 3000 offer a choice of DB-9, dual-SC, Gigabit Interface Converter (GBIC), or small form-factor connectors. To provide these connectivity options, the Capellix 3000 uses plug-in modules. If you configure the Capellix 3000 with the plug-in modules for DB-9 and dual-SC, the switch can support 8, 16, or 24 ports. If you configure the Capellix 3000 with plug-in modules for small form-factor connectors, you can configure the Capellix 3000 to support up to 32 ports.

You can also configure the Capellix 3000 to support different cable media on a port-by-port basis. The six-port GBIC plug-in module supports any combination of copper, shortwave optical, and longwave optical GBICs for connections up to 10 kilometers.

If you need a solution that supports long-distance connectivity, you can configure the switch to use the Fabric Services Module, which includes Gadzoox’s Xport. According to Gadzoox, Xport is designed to support links up to 80 kilometers long. To provide this long-distance connectivity, Xport minimizes the effects of link latency through an oversized port buffer.

In addition, the Capellix 3000 includes the following:

- 28 Gbps switching engine
- Reflex II Name Server, which monitors and analyzes the status of SAN devices
- Ventana SANtools GSX management software
- Optional Ventana SANtools GX management software
- Optional Ventana SANtools GSX, which includes Simple Network Management Protocol (SNMP) support and snap-in modules for third-party management software such as Tivoli’s NetView, Novell’s ConsoleOne, and Computer Associates’ Unicenter TNG

Not surprisingly, the Capellix 3000 supports SAN industry standards, such as Fibre Channel Arbitrated Loop and Fabric, Fibre Channel Management Information Bases (MIB).

The Capellix 3000 is NDS-enabled, which means you can manage the switch via NDS eDirectory. In addition, the Capellix 3000 has been Novell Yes, Tested and Approved for use with NetWare 5 and NetWare Cluster Services for NetWare 5. (For more information about products that are Novell Yes, Tested and Approved, visit http://developer.novell.com/prodcert.)
For more detailed information about Capellix switches, visit www.gadzoox.com. You can also call 1-888-423-3222 or 1-408-360-4950.

SILKWORM 2800 SWITCH

The Silkworm 2800 switch from Brocade Communications Systems Inc. is a 16-port Fibre Channel switch. Each port works in full duplex, delivering 100 Mbps in each direction. To improve performance, the Silkworm 2800 switch uses cut-through routing. (A switch that uses cut-through routing reads only the destination address in the frame header of each packet in order to determine where to route the packet.)

In addition, the Silkworm 2800 monitors environmental components to ensure they are functioning properly. To guard against electrical failures, the Silkworm 2800 also features redundant cooling fans and optional hot-swappable power supply.

Because the Silkworm 2800 is GBIC based, it supports any combination of copper, shortwave, and longwave fiber-optic cabling.

The Silkworm 2800 also includes several management tools: a command line utility, the Brocade Web Tools, and the Brocade Zoning. In addition, the Silkworm 2800 supports MIBs. As a result, you can use an SNMP-based management system to access information about the Silkworm 2800.

If problems occur, you can use the power-on self-test and online diagnostics to monitor and test ports while the switch is still running. The Silkworm 2800 provides statistics for each individual port, so you can isolate problems and remove ports that need repairing. The other ports will continue to work, so you do not have to remove the entire switch from the SAN.

The Silkworm 2800 also includes an internal troubleshooting feature: An embedded port-monitoring capability automatically detects and disables a failing port. The monitoring capability restarts the port after the problem is corrected. When a failing port is detected, the Silkworm 2800 reroutes traffic to alternate routes.

The Silkworm 2800 supports both Fibre Channel Arbitrated Loop and Fabric. (For a list of the specific Fibre Channel protocols supported, visit Brocade Communications’ web site at www.brocade.com.) The Silkworm 2800 also offers Fabric services such as Simple Name Server (SNS), Registered State Change Notification (RSCN), and zoning.

For more information about the Silkworm 2800 switch, visit www.brocade.com. You can also call 1-408-487-8000.

SANBOX DIRECTOR

The SANbox Director from QLogic Corporation is built to scale from 32 ports to 128 ports. Each chassis can hold eight plug-in modules, and each plug-in module has eight ports. You can then connect two chassis, which each have 64 ports, via an independent backplane to form a 128-port switch. Each port works in full duplex, delivering 103 Mbps.

The SANbox Director provides several fault tolerant features, including the following:

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The SANbox Director also supports hot-pluggable, industry-standard GBICs. For example, the SANbox Director supports copper, shortwave, and long-wave GBICs.

Like the Silkworm 2800 switch, the SANbox Director uses cut-through switching to improve performance. In addition, each port has a guaranteed eight-credit buffer.

You have several choices for managing the SANbox Director: The SANbox Director includes SANsurfer, an embedded web-based management tool, which enables you to manage the SANbox Director via the Internet. The SANbox Director also supports Trivial File Transfer Protocol (TFTP) and Telnet. In addition, the SANbox Director supports SNMP, which means you can use any SNMP-compatible console to access information about the switch.

Finally, the SANbox Director supports Fibre Channel Arbitrated Loop and Fabric and offers Fabric services such as SNS, RSCN, and zoning. (For a list of the specific Fibre Channel protocols supported, visit QLogic’s web site.) For more information about the SANbox Director, visit www.qlogic.com. You can also call 1-800-342-7379 or 1-949-389-6000.

VIXEL 7200 FABRIC SWITCH
The Vixel 7200 Fabric Switch from Vixel Corp. is a 16-port fibre channel switch. Vixel claims that this switch has the industry's highest port density because these 16 ports are encased in a 1U chassis.

Each port delivers 100 M bps and can take advantage of 32 frame buffers. The ports also have auto-sensing and self-configuring capabilities.

All 16 ports also support industry-standard hot pluggable GBIC connectors, including GBIC connectors for short-wave optical, long-wave optical, and copper cabling.

Like the other switches featured in this article, the Vixel 7200 supports Fibre Channel Arbitrated Loop and Fabric. (For a list of the specific Fibre Channel protocols the Vixel 7200 supports, visit Vixel’s web site at www.vixel.com.) In addition, the Vixel 7200 offers Fabric services such as Fabric login (FLOGI), SNS, RSCN, Fabric Address Notification (FAN), and flexible zoning.

To manage the Vixel 7200, you use Vixel's SAN InSite 2000 management software. In fact, you can use SAN InSite 2000 to manage all of your company’s SAN devices. SAN InSite 2000 can automatically discover, monitor, and manage hubs, switches, routers, and HBAs from other vendors. SAN InSite 2000 provides port-level management of all of these devices. In addition, the Vixel 7200 switch supports the Fibre Alliance MIB.

Vixel offers a three-year factory warranty on the Vixel 7200 switch. For more information, visit www.qlogic.com.
more information about the Vixel 7200 switch, visit www.vixel.com. You can also call 1-425-806-5509.

INRANGE FC/9000-64 SWITCH
The INRANGE FC/9000-64 switch from INRANGE Technologies Corporation supports up to 64 1.062-Gbps ports. This switch supports multiple interoperable topologies, such as switched topologies, arbitrated-loop (both private and public) topologies, and point-to-point topologies. For a list of specific Fibre Channel protocols supported, visit INRANGE’s web site at www.inrange.com. The INRANGE FC/9000-64 also offers fabric services such as SNS, RSCN, and both software- and hardware-based zoning.

In addition, the INRANGE FC/9000-64 has node discovery capability that detects the address, type, and symbolic name for each attached device. The ports on the INRANGE FC/9000-64 are self-configuring. For example, they can configure themselves in Fibre Channel Arbitrated Loop mode, switch-to-switch mode, or point-to-point mode.

The INRANGE FC/9000-64 also offers troubleshooting and management features. For troubleshooting, the INRANGE FC/9000-64 includes a power-up self-test, which reports the status of switch functions. The INRANGE FC/9000-64 also includes one Ethernet port, which enables you to perform diagnostics and management from remote locations. For management, the INRANGE FC/9000-64 provides a browser-based SAN management system and supports SNMP.

To help you implement and manage the INRANGE FC/9000-64, INRANGE Technologies offers training courses. These courses teach you how to successfully integrate INRANGE products into your SAN solution. For example, you can attend the FC/SAN basics class or the FC/9000-64 Port Administrator Training class. To find out more about the classes and the times they are offered, visit www.inrange.com/services/training/san.html.

For more information about the INRANGE FC/9000-64 switch, visit www.inrange.com. You can also call 1-800-222-0187 or 1-856-234-7900.

CONCLUSION
If your company’s servers are bursting at the seams and you are having to nag users to delete data, you may want to implement a SAN. By attaching a SAN to your company’s existing network, you may be able to consolidate all of your company’s data and form a cohesive management strategy for maintaining that data.

Because SANs incorporate some specialized technology, setting up a SAN will probably involve some research, and you will undoubtedly need to consult a SAN expert. The companies that manufacture the switches featured in this article should be a good starting point for your research.

Is your company considering SAN technology? NetWare Connection may include feature articles on this technology in future issues. Please let us know if you are interested in learning more about SANs. Please send any specific questions about SAN technology as well, and we’ll try to address them in our article.