Cisco SN 5420 Storage Router

Competitive Overview

Introduction

The following is an analysis comparing the SN 5420 Storage Router to expected competitors. The SN 5420 is the industry's first router product to support the Small Computer Interface over IP (iSCSI) standard. To date, no other company is shipping production units making a traditional competitive analysis challenging.

Given this emerging market, this document will evaluate the expected competitors based on information from a variety of sources. Features and availability dates are provided where available.

Figure 1 The Cisco SN 5420 Storage Router

Competitive information is only as useful as it is updated, so there will undoubtedly be new information. This is particularly true for the SN 5420 (Figure 1) since it is the first router product released in a rapidly emerging market space.

Technology Overview

The SN 5420 is based on iSCSI, a draft standard proposed to the IETF[1] expected to be ratified in late-2001. Before evaluating SN 5420 competitors, it is important to review various technologies that support IP-based storage to determine who is a competitor and who is offering an alternative technology to iSCSI.

- iSCSI—IBM and Cisco submitted the initial iSCSI draft standard that encapsulates SCSI commands over Transmission Control Protocol (TCP). For server communication to disk and tape over an IP network for distance, security or manageability reasons, iSCSI is ideal. Fibre Channel (FC) over IP (FCIP) will also work, but requires two gateways rather than one and exhibits point-to-point limitations, whereas iSCSI is point to multipoint.

1. See http://www.ietf.org/html.charters/ips-charter.html for additional information on the proposed standard.

- FCIP—Gadzoox and Lucent have proposed Fibre Channel over IP, which routes storage to storage traffic across a metropolitan area network (MAN). Since most storage-to-storage communication today is proprietary to a storage vendor (e.g. EMC's Symmetrix Remote Data Facility [SRDF], Hitachi Data Systems' Extended Remote Copy [HXRC] and Compaq's Data Replication Manager [DRM]), the full Fibre Channel frame is typically used. This requires the entire fibre channel frame from the two end points. iSCSI won't do this since it transports the SCSI data portion of the frame, not the entire fibre channel frame. Therefore, for storage-to-storage traffic today, FCIP (fibre channel tunneling) is preferred.
- SoIP—Nishan Systems has submitted a suite of protocols under the trademark SoIP for "Storage over IP." SoIP transfers blocks of data instead of files over local Gigabit Ethernet or wide-area SONET networks. In a SoIP network, FC to FC storage devices (tape libraries and disk arrays) can connect and interoperate with devices on a Gigabit Ethernet network via a SoIP adapter or a switch that joins to a Gigabit Ethernet switch or router.

Vendor	Products	Available	
Cisco	SN 5420 Storage Router	April '01 Beta Feb. '01	• Cisco's storage router will support the iSCSI draft standard. As a co-author of the original draft and author of the iSCSI MIB, Cisco will actively support the standard as it progresses. Cisco also is co-chair of the Storage Networking Industry Association (SNIA) IP Storage Forum to market and promote standards-based block storage networking solutions using IP networks. Interoperability and compliance to standards will be fully supported by the SN 5420. • The SN 5420 will initially support one Fibre Channel interface and one Gigabit Ethernet port. Additional port options will be available in future releases. • The SN 5420 is built on a standard hardware platform, supported by a real time OS, with extensive software capabilities. The SN 5420 is an extremely flexible architecture that will support additional iSCSI features and advanced networking features and network management capabilities. • Key partnerships are in place with leaders in both the storage industry as well as the leading players in TCP/IP accelerated network interface (NIC) cards. Cisco's solution provides an end-to-end solution supported by the leaders in the storage industry.

Vendor	Products	Available	
NetConvergence Santa Clara, CA	Matrix ISG (Integrated Storage Gateway) & iSCSI NICs	Beta shipments began last year Expect products in 2001	• Approach is primarily focused on the use of software to create end-to-end IP SANs, which NetConvergence dubs "ips." Company officials claim that their technology has no performance limitations and does not require protocol translation. • Based on the emerging iSCSI protocol standard. • NetConvergence plans to offer several critical components required to facilitate IP storage area networks (SANs). Part of the Matrix family of products, these will initially include: – iSCSI gateway for moving data between current SCSI devices and IP via Gigabit Ethernet. Gateways linking IP to Fibre Channel and InfiniBand devices are also planned. – iSCSI network interface card (NIC) that includes Gigabit Ethernet connections, on-board network processors, and iSCSI drivers. – iSCSI "data blades" for use in existing Gigabit Ethernet switches to provide SAN connectivity using installed base assets. There will be many challenges for switch vendors who allow a third party to develop blades for their proprietary switch architectures. • Although the company plans to deliver hardware devices, its value-add premise is a software layer that offloads the operating system, and is optimized for performance. • Shipping a beta version of its first product, The Matrix Integrated Storage Gateway (ISG). UCLA's Department of Computer Sciences has been a Matrix ISG beta site since December 1999, and is currently using the technology for 200GB daily backups. The Matrix ISG is a pre-standard iSCSI SAN gateway. • NetConvergence is rarely mentioned by high-profile potential accounts. Their products appear to be far from being released and are not considered a significant competitor.

Vendor	Products	Available	
Nishan Systems San Jose, CA		Expect products in 1QCY01	• The company, founded by Aamir Latif, Gary Orenstein, Pete Hepburn and five engineers, veterans of GigaLabs and a variety of networking companies. • Announced a suite of protocols under the SoIP trademark in Dec. 2000. The protocols include Internet Fibre Channel Protocol (iFCP), Metro Fibre Channel Protocol (mFCP), Internet Storage Name Service (iSNS). iFCP and mFCP provide Fibre Channel tunneling over IP and Metro networks, respectively. Nishan claims that this technology provides multipoint access to Fibre Channel opposed to the point-point technology currently offered by Fibre Channel today. With Fibre Channel tunneling, the entire Fibre Channel frame is sent, suitable for storage-storage applications. • Nishan announced a series of products in Feb. 2001. These products support only mFCP today. There is currently no support for either iFCP or iSCSI. Nishan is the only company developing products compatible with the iFCP/mFCP products so purchasing this equipment would require a single vendor solution. This is not what customers want—open standards with a choice of vendors. • Data is transported across Gigabit Ethernet network to storage area networks (SAN) on the other side of the IP-based network or local workstations without the latency, dropped packets and packet-sequencing problems often attributed to TCP/IP, Nishan claims. • Received $50 million from several venture capital firms and partners (e.g. Dell, Sun, Siemens and Quantum). While noteworthy companies, they are not leaders in the storage industry. Cisco is working with the leaders in the storage industry, including IBM, Compaq, EMC, Veritas, and Brocade; a who's who list in the storage industry. • They have stated at conferences that their goal is to displace Brocade as the leader in Fibre Channel switches, a competitor with much larger resources. • Steve Duplessie, President of storage analysis firm Enterprise Storage Group, "There's a large degree of wishful thinking on [Nishan's] part," he says. "It's not realistic to assume that any of the standards bodies are looking to create a single, unified standard for three effectively disparate topics. It is completely unrealistic to assume that one relative neophyte is going to change the way those bodies operate."

Vendor	Products	Available	
PIRUS Acton, MA		Expect products in 2001	• The Pirus device, with its Fibre Channel, Gigabit Ethernet and SCSI connectivity, will let servers, storage and network-attached storage (NAS) devices, IP and Fibre Channel switches on storage area networks (SAN), wide area networks (WANs) or local area networks (LANs) join together to improve storage data transmission across corporate networks. It will be a director class device that will be Network Equipment Building System (NEBS) compliant. • The unnamed Pirus device will route, switch and bridge multiple protocols over a variety of links, among them X.25, frame relay and ISDN. The box can be configured to join IP switches with Fibre Channel switches, to join NAS devices to a SAN, or to improve communications between a number of heterogeneous Windows NT, Unix, NetWare or Linux servers and a SAN. It will route or switch data between these devices as requested. • Founded in December 1999 by network veterans Rich Corley and Chris Cochran, Pirus has $10.2 million of venture funding into developing its IP storage device. The company has 60 employees.

For a complete list of which vendors have aligned themselves with the various technologies to provide storage over an IP network, refer to appendix A. There are additional companies developing FCIP products which are beyond the scope of the SN 5420. iSCSI and FCIP are different technologies for different applications.

Partners

IBM

On February 21, 2001, IBM announced two key products, the IBM 300G and IP Storage Appliance 200i. The significant aspect of the IP Storage Appliance is that it supports iSCSI. This is the industry's first iSCSI product announcement. IBM is a key partner for Cisco's Storage Networking efforts, and the announcement of the IP Storage Appliance was supported by Cisco.

The 300G is a networked attached storage (NAS) gateway device with option to connect to heterogeneous SANs on the back-end. As a NAS device, it supports file access through CIFS, NFS, HTTP, FTP and Netware protocols. The 300G provides access to storage over an IP network eliminating the need for all servers to have FC HBAs. Hence all the storage traffic traverses on the IP network. As a NAS device, it is optimized for file oriented applications.

The IP Storage Appliance 200i is small JBOD (just a bunch of disks) combined with a 1U Netfinity server, together acting as an iSCSI storage appliance. This product is aimed at workgroup and departmental applications where storage needs are modest and cannot afford the infrastructure costs required by Fibre Channel technology. IBM has an enterprise class storage array, internally named Shark, that is better suited for large scale enterprise and xSP type applications. IBM and Cisco are collaborating together to provide iSCSI access to the Shark through the SN 5420. The SN 5420 becomes an ideal device to combine Fibre Channel SANs, and enterprise class storage devices like the Shark, to an IP network.

Appendix A: Summary Chart for IP Storage Technology Alliances

Company	iSCSI	Fibre Channel over IP	Fibre channel backbone	Nishan SoIP
Adaptec	X			
Agilent/HP	X			
Brocade		X	X	
Cisco	X	X		
CNT	X	X	X	
Crossroads	X	X	X	
Dell				X
EMC	X	X		
Entrada	X	X	X	
Gadzoox		X	X	
HP	X			
IBM	X			
Lightsand		X	X	
Lucent		X	X	
McData		X	X	
Nishan	X	X		X
Nortel		X		
Pirus	X			
Qlogic		X	X	
Quantum		X		X
SANgate	X			
SANRAD	X			
Siemens				X
Sun				X
Vixel	X	X	X	

Source: Network World, 12/25/00, "Network infrastructure, storage start-up and Fibre Channel vendors joust over storage-over-IP standards," Deni Connor

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