Application Note

SAN as the SCSI Bus Replacement

The challenge - how to keep up with storage growth?

Today's IS manager is constantly burdened by the increasing demand for more and more disk space. This demand has been fueled largely by the growth of the Internet and e-commerce, and the increased importance of information systems in today's economy. In the past, the SCSI bus has provided most servers with their storage connectivity, however SCSI can be restricting in several ways:

Performance Limitations

Most SCSI implementations today provide a single path with throughput of 40 to 80 MB/s. A **better** solution would provide multiple high-speed paths between server and storage resources.

Configuration Inflexibility

Since SCSI is based on a legacy bus technology, storage is tied directly to the server. Even the newer SCSI implementations allow only 15 devices to be connected to each bus. Although some configurations allow for multiple buses, space limitations make it impractical to maintain all of the storage inside one box. Therefore, in a SCSI environment administrators may need to add another server, with its associated expenses of maintenance and management, in order to increase storage capacity. With today's information explosion, storage growth quickly translates to server proliferation just to add storage capacity. A **better** solution would uncouple storage from the servers, enabling the user to add servers or storage independently as individual requirements dictate.

Distance Constraints

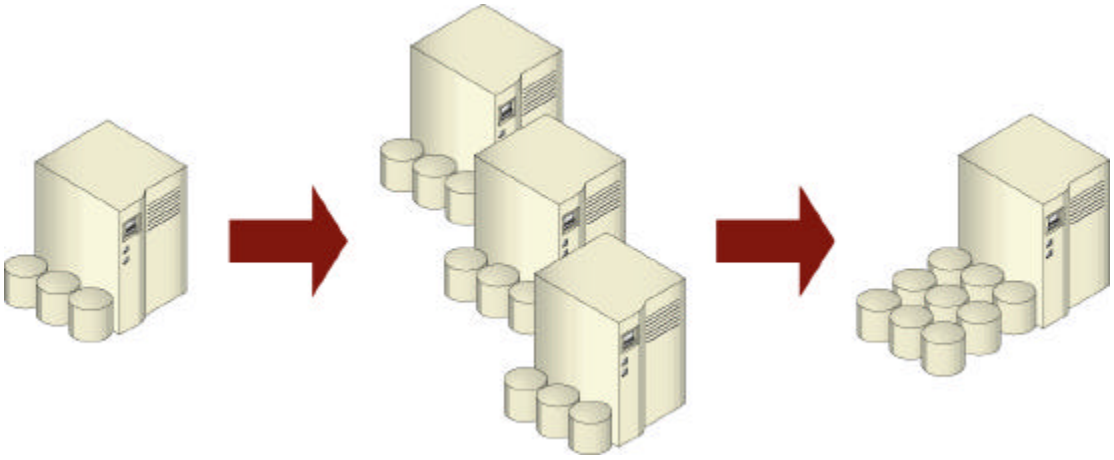
Most common SCSI configurations limit the distance between storage elements and servers to only 6 meters. Newer SCSI technologies have addressed this distance limitation but users are still restricted to 25 meters. Even with this increased distance, it is impossible to add storage across the company, impractical to add storage down the hall, and even difficult to add storage on the far side of the data center. A **better** storage solution would allow user flexibility to move the tape drives, JBODs, and RAID arrays not only outside the server, but potentially outside the room, and even to the next building to facilitate a more distributed environment.

Availability Limitations

In most SCSI environments storage is tied to a single server. If that server fails, all access to its associated storage is lost. Even the newest SCSI implementations support a maximum of two initiators, limiting cluster configurations and shared storage resources. A **better** storage solution would allow multiple paths to the data from many servers.

Cost Concerns

In addition to the expenses associated with managing the servers added simply to increase storage capacity, the close coupling of server and storage prevents effective sharing of tape and disk resources. A **better** solution would enable reduced TCO through easier management, resource sharing and consolidation.



1) The initial server with SCSI devices. . .

2) Grows to many servers with SCSI devices. . .

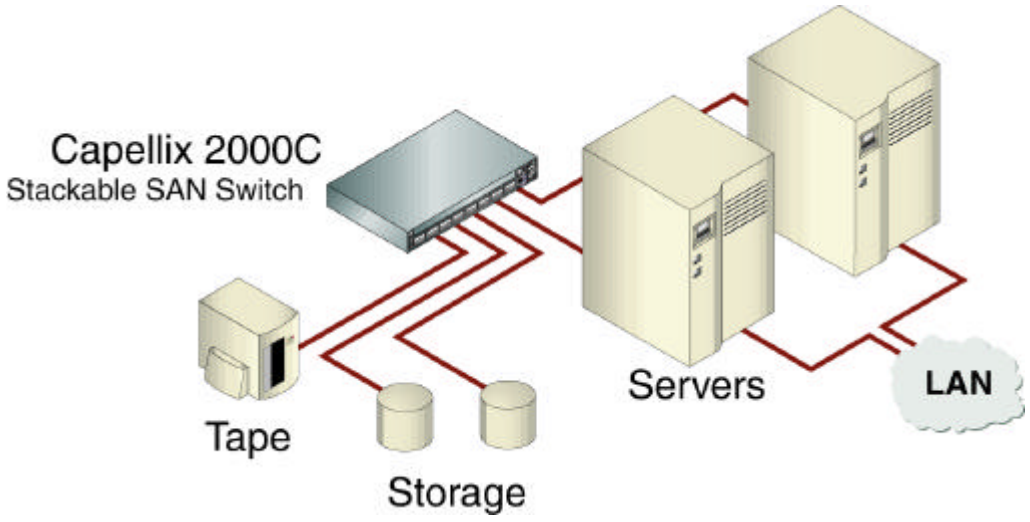
3) Why not make it a SAN?

The Solution

With the capability of scaling to hundreds of servers and storage devices at distances up to 10 kilometers, a storage area network (SAN) allows the user to place storage external to the server, giving you the flexibility to scale servers and storage independently. Now you can share storage resources between multiple servers. Now you can provide multiple 1Gb/s paths between storage and server. Now you can create clusters that maintain access to data and keep applications up and running even when a server fails. Now you can add, maintain, or remove a server or storage device without impacting any of the other elements. Now you can dynamically reallocate storage capacity between different servers and application. Now server and storage configurations can be optimized independently with cost and operational savings in mind. Now you can take advantage of exciting new applications such as remote mirroring, LAN-free backup, and Windows® or NetWare® cluster services.

The Implementation

Using Fibre Channel technology, the SAN creates a network for storage much like a LAN creates a network for clients. In the diagram below, an entry-level SAN is implemented with a Gadzoox® Networks Capellix™ 2000C SAN switch, which was designed for outstanding price/performance, modular flexibility, broad interoperability and open management. It's easy to get started. The next time you want to add more storage, don't add another server, add a Fibre Channel Host Bus Adapter (HBA) to attach a server to a SAN. Connect the Capellix 2000C switch to the server, add the storage and you've built a SAN. No additional software changes are needed. The Capellix 2000C has the built-in bandwidth and expandability to grow as your company's storage needs grow.



Conclusion

Starting with a simple SAN configuration, like the one above, you can derive significant operational and financial benefits. Implementing a Fibre Channel SAN not only solves the SCSI performance, configuration, distance, availability and cost problems, but also enables you to more easily manage your storage. A SAN is the best way to manage high storage growth and the Gadzoox Networks Capellix 2000C, optimized for entry-level configurations, is the best way to get started. If you are thinking about adding a server for additional storage, make it a Fibre Channel SAN configuration instead, and watch it grow.

Configuration Details

Fibre Channel Switch:	*The Gadzoox Networks Capellix 2000C*
Fibre Channel Host Bus Adapter:	Qlogic, JNI, Emulex and others successfully tested.
Fibre Channel Storage:	Seagate, IBM & a variety of RAID systems successfully tested.
SCSI to Fibre Channel Router:	*The Gadzoox Networks Geminix* for connecting legacy SCSI devices into the SAN to protect those existing investments
Tape Libraries:	Quantum DLT, Seagate DAT, and ATL, Exabyte, ADIC libraries successfully tested.