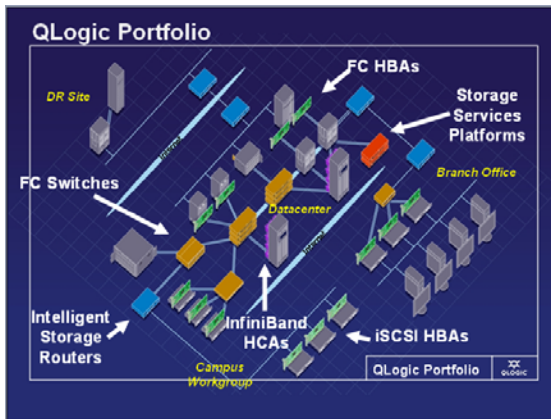


SAN Infrastructure for Disaster Recovery and Business Continuity

QLogic Fault-Tolerant SAN Architecture and Backup/Recovery Solution

Executive Summary



Storage area network (SAN) solutions are now a key component in most IT organizations to provide accessibility and protection of critical data. To avoid the high cost of downtime, this data must be available 24x7.

Managing storage is increasingly complex as demands continue to rise. In addition, regulatory and corporate requirements dictate the protection of these stored assets against regional or national disasters. Preparing for a disaster requires the creation and implementation of a Disaster Recovery (DR) or Business Continuity (BC) plan. This plan must include fault-tolerant SAN architecture and a backup/recovery solution.

SAN architects will understand how QLogic products enable these solutions.

Key Points

Company locations in a campus-wide, metro, or wide area can share storage resources, maximize usage efficiency, and store critical data remotely for disaster recovery. The data is protected against the loss of an entire site or the failure of a component in the SAN.

This is done via QLogic fault-tolerant SAN architecture and backup/recovery solution, with the following benefits:

- Dual paths between all servers and storage.
- Access to shared storage from multiple corporate sites in different regions/countries.
- A duplicate copy for direct access (or recovery to another site) if a disaster destroys the original storage or makes it inaccessible.
- A network extending across long distances to support remote backup of critical data.
- Path failover software selects an alternate path in the event of a failure.

QLogic host bus adapters (HBA), switches, and multi-protocol routers have been qualified for use with most popular remote backup applications. In addition, key QLogic features, like Extended Distance wizard tool, optimize the links for maximum performance.

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Fault-Tolerant SAN Architecture

Fault-tolerant SAN architecture consists of remote backup and high-availability SANs.

Remote Backup

The core component of any disaster-recovery plan is the remote backup solution.

Replicating critical storage in a remote site provides the following:

- Access to shared storage from multiple corporate sites in different regions/countries
- A duplicate copy for direct access (or recovery to another site) if a disaster destroys the original storage or makes it inaccessible

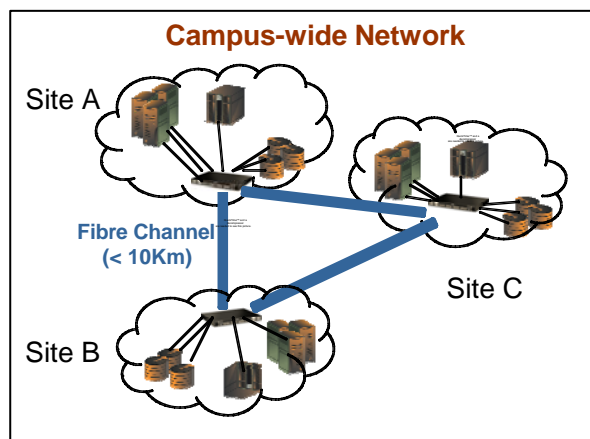
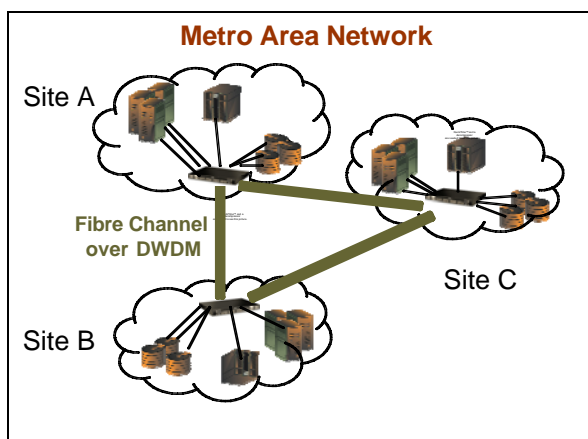
One of the key benefits of a SAN solution is its ability to extend the network across long distances to support remote backup of the critical data. This technique is called SAN Extension. It can be implemented in several methods, depending on the distance between the sites and the level of performance required.

SAN Extensions are defined as follows:

- Campus-wide or metro area extension (< 100Km)
- Wide area extension (> 100Km)
- Remote backup applications

Campus-Wide or Metro Area Extension (< 100Km)

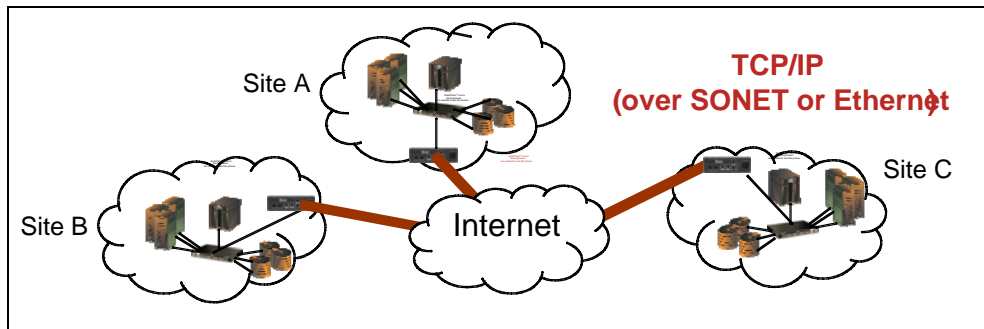
Fibre Channel (FC) links between locations are extended with long wave optics, repeaters, or wave division multiplexers (WDM), including dense WDM (DWDM). The Extended Distance software wizard (from QLogic) optimizes the links for maximum performance using the credit extension capability of QLogic Fibre Channel switches, like the SANbox 5602.



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Wide Area Extension (> 100Km)

QLogic multi-protocol routers, like the SANbox 6142, convert Fibre Channel links to the TCP/IP protocol (FC-IP) to enable connections between national or global locations via either the Internet or private network.



Remote Backup Applications

SAN extension provides the infrastructure to access remote sites. Remote backup applications are used to copy critical data to these sites.

The following two methods are used to transfer this data:

- Synchronous – Data transfers are synchronized in a two-way fashion between the source and destination sites with minimal time delay. This method generally provides a higher level of performance and is used for shorter distances to guarantee the synchronization.
- Asynchronous – Data transfers are sent with some delay. Over longer distances this method generally provides a higher level of performance due to the travel time of the communication.

QLogic host bus adapters (HBA), switches, and multi-protocol routers have been qualified for use with most popular remote backup applications. In addition, key QLogic features, like Extended Distance wizard tool, optimize the links for maximum performance.

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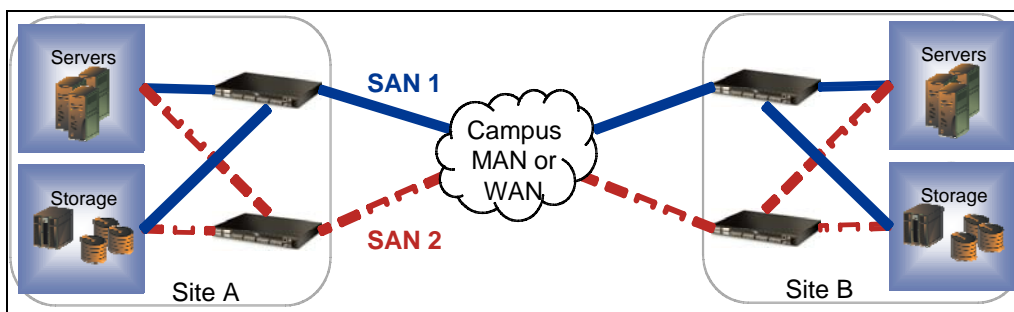
High-Availability SANs

A key element in a disaster-recovery plan is to protect against the failure of a component in the SAN itself. This is done with a High-Availability SAN, using redundant SANs and path failover.

Redundant SANs

The key to protecting against component failure is to connect all servers and storage with redundant SANs. Each server is connected to the switches in SAN1 and SAN2 via separate HBA cards. In addition, each storage device has similar switch connections via dual fibre channel ports.

The following figure shows a high availability SAN extended over distance.



QLogic fibre channel switches, like the SANbox 5602, feature dual, redundant power supplies and cooling fans. These provide additional protection from both component failure and power-source disruption.

Path Failover

The implementation of dual, redundant SANs gives each server two paths to each storage device. The selection of an alternate path in a failure scenario is Path Failover. It is achieved by software installed on the servers that monitors the path to the storage in use.

If this path is broken via a failed component, the software detects the error, usually via an I/O operation timeout, and automatically selects the backup path. In the figure above, servers would failover from **SAN1** to **SAN2** and maintain connections to their storage.

QLogic HBAs, switches, and routers are qualified with most popular failover software tools to simplify the implementation of a high-availability SAN.

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Benefits of QLogic SAN Solutions

For the essential tasks of disaster recovery and business continuity, company locations in a campus-wide, metro, or wide area now have the ability to:

- Share storage resources
- Maximize usage efficiency
- Store critical data remotely

The SANs are connected over distance via extended switch or router links. Critical data is archived or simply replicated over the links using remote backup software.

The data is protected against the loss of an entire site or the failure of a component in the SAN. This is done via QLogic fault-tolerant SAN architecture and backup/recovery solution.

The QLogic architecture and backup/recovery solution give the following powerful benefits:

- Dual paths between all servers and storage.
- Access to shared storage from multiple corporate sites in different regions/countries.
- A duplicate copy for direct access (or recovery to another site) if a disaster destroys the original storage or makes it inaccessible.
- A network extending across long distances to support remote backup of critical data.
- Path failover software selects an alternate path in the event of a failure.

QLogic host bus adapters (HBA), switches, and multi-protocol routers have been qualified for use with most popular remote backup applications. In addition, key QLogic features, like Extended Distance wizard tool, optimize the links for maximum performance.

For more information on QLogic products and disaster recovery/business continuity solutions, visit www.qlogic.com.