White Paper on

Storage Area Network

Essentials

By

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Abstract

This white paper provides an introduction to the technologies in storage area networking. It touches on the fundamental ideas underlying storage model, the challenges faced by network storage, the hardware, software components and the manageability of SAN.

What is SAN

A storage area network (SAN) is any high-performance network whose primary purpose is to enable storage devices to communicate with computer systems and with each other.

What is new or different in SAN

- Universal Storage Connectivity

Universal storage connectivity has some pretty powerful implications for information services departments:

- There's no need to devise and schedule data transfers between pairs of servers.
- There's no need to purchase and maintain extra storage for temporarily staging one server's data at another server.
- There's no need to worry about whether copies of data being used by two computers running different applications are synchronized (i.e., have exactly the same contents), because the two computers are working from the same copy of data.

Advantages Of SAN

- SANs can lower information processing capital costs through increased device and capacity sharing, as well as through more efficient communications
- SAN technology enables universal data access, even across widely distributed enterprises
- SAN technology enables servers to be organized into clusters for highly available application access and disaster recovery
- SANs enable the consolidation of data centers with similar characteristics for increased economies of data processing scale

SAN Architecture

The SAN is often built on a dedicated network fabric that is separated from the LAN network to ensure the latency-sensitive block I/O SAN traffic does not interfere with the traffic on the LAN network.

We have Basic SAN Model which depicts the difference between SAN and NAS functionality. The volume abstraction may be implemented in an embedded or External RAID controller, in an in-band or out-of-band SAN appliance, or by a volume manager running in an application or database server. The storage servers and application servers may be clustered to improve application availability and scaling.

The SAN software architecture required on the computer systems (servers), is essentially the same as the software architecture of a DAS system. The key difference here is that the disk controller driver is replaced by either the Fibre Channel protocol stack, or the iSCSI/TCP/IP stack that provides the transport function for block I/O commands to the remote

disk system across the SAN network.

Storage Networking Software

Operating system components, Storage middleware components, Application middleware components, Applications and database managers, Enterprise backup managers and new type of software such as SAN managers. All these can together be called as Stack Components.

Why Storage needs to be managed?

Enterprises can claim that it has adequate server space to keep its valuable data neatly tucked away. But does that really mean much? How will an enterprise optimally harness the data to make sure it's available all the time, and get maximum benefit out of it?

Storage management challenges

- Managing storage remotely and with the least amount of human intervention.
- Most enterprises have restricted IT budgets which naturally impacts storage hardware and software procurement decisions. IT heads are doubly cautious about spending money.
- Qualified technical personnel for storage systems are not easy to come by. This adds a cash component to the overheads.
- There may be unpredictable demands due to events like unpredictable growth, holiday rush, and catastrophic events.
- The biggest challenge is to manage the explosion of data growth. An enterprise needs to not only have adequate hardware, but a correct management strategy to handle volumes.

Overcoming challenges

Creating and deploying a well-structured storage management infrastructure is the best way to overcome the challenges. The storage software management modules should be able to capture information efficiently and allow monitoring of best practices and usage patterns. It should be able to load balance, simplify administration, automate the entire storage architecture, and ensure consistency.

Conclusions

SAN provides performance, scalability, flexibility and availability by ways describe above and SAN is prepared over any other storage devices used in cloud computing.