

Study On-Comparison between IP SAN and FC SAN

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ABSTRACT

This study paper provides a brief explanation of storage networking and the requirements of storage networking. Internet Protocol (IP) SAN and Fibre Channel (FC) SAN these are two types of Storage Area Network (SAN). In this paper, we discuss the IP SAN and FC SAN, and the comparison between the IP SAN and FC SAN.

Keywords:- Internet Protocol (IP) Storage Area Network (SAN), Fibre Channel (FC) Storage Area Network, Internet Protocol (IP) Storage Area Network (SAN) vs. Fibre Channel (FC) Storage Area Network (SAN).

I. INTRODUCTION

To transfer the data between computer systems is the primary purpose of Storage Area Network (SAN) which is defined by Storage Networking Industry Association (SNIA). Storage Area Network is a network which provides the access for combining the two networks to each other. In the Storage Area Network (SAN) the data transfer is secure and robust because it consists of management layer, which establishes a connection between the storage element and computer system. SAN is a high-speed network which connected to the servers and the storage devices. SAN allows one-to-one connection beyond the networks. Two types of SAN exist (i) IP SAN and (ii) FC SAN.

Internet Protocol (IP) SAN is a Storage Area Network, which transfers the block-level data over the network using the Internet Small Computer System Interface (iSCSI).

Fibre Channel (FC) SAN is a networking technology which is design to help high-speed data transfer between storage devices and computer systems.

The Fibre Channel SAN provided High-speed option; it is a top dollar price, and it was the only alternative for networked storage till now. Fibre Channel SAN has higher throughput when compared with IP SAN, dedicated IP SANs running iSCSI interface are the viable option for some standard situations.

II. LITERATURE REVIEW

A. IP SAN:

IP SAN or Internet Protocol is become most widely used telecommunication storage in worldwide. This technology is easy to implement and understood. The IP Technology is affordable. For the many storages, environments iSCSI used, which is located at the practical and economical alternatives in the IP SAN. IP Technology is

accessed to a high-performance storage data for required the Direct Attached Storage (DAS) or a Fibre Channel (FC) Storage Area Network (SAN). IP Storage has grown to viewed it is extremely cost effective, easier to manage and it gets less complex storage solution to compare Direct Attached Storage (DAS) or Fibre Channel Storage Area Network(FC-SAN).

In IP SAN the Internet Small Computer System Interface (iSCSI) can transfer the traditional high performance "block-level" storage data rather than the typical IP Network. Remote Mirroring, Remote backup, and the similar application have no distance limitations on the IP Network are mostly found in the IP Network Storage because it attempted the centralized management and control. In IP Storage the multiple DAS systems are kept running is easy to manage and it's required the few management efforts to do.

The implementation and the management storage are dropped rapidly because of increasing in the applications barriers and market adoptions in IP Network storage. To overcome this problem IP Network storage used the intranasal technology. Intransa IP Storage solution many more applications are taken advantages of ultra high performance delivered by this technology. The Intransa IP Network storage solutions its start 3.75 terabytes (TB) architecture grows to 1000TB are more than the RAID protected storage.

Merits:

IP-based storage is driving quickly and is expected to offer benefits feeding on improvements in throughput rates to complete interoperability between storage components. IP-based storage, SANs used standard IP networks like Gigabit Ethernet. Ethernet-based LANs have a great industry standard, and the idea of creating a SAN with Ethernet holds the major proposal for many IT associations. Some of the advantages of IP-based storage networking:

Ethernet and IP Network exist in most shops today. Therefore, labour and equipment costs for connectivity and management will be reduced.

Ethernet speed increases faster than the Fibre Channel; this leads to improvement of the overall performance. For the IP, and SAN/LAN/WAN connectivity no distance limitations. For the business continuity and disaster recovery, IP-based storage paves the way for recovery and remote backup over long distances,

Fibre Channel and IP switches eliminate interoperability issues and improve WAN connectivity because of the recent connectivity improvements.

A Fibre Channel SAN utilise IP for LAN/MAN/WAN connectivity; there are no distance limitations.

B. FC SAN:

Storage Area Network (SAN) implementations are built on vital architectures such as fibre channel. Fibre Channel is allowed data to transfer at extremely high speeds. Newly implemented systems transfers data at 16 Gbps and more. Most of the standards bodies, technical associations, dealer, and industry-wide costumes are certified by Fibre Channel Standard. In the market, Fibre Channel architecture products take advantages of high-speeds and high-availability. Fibre Channel architecture is used to carry the traffic likes Intelligent Peripheral Interference (IPI) Traffic, Fibre Channel Connection (FICON) Traffic, Internet Protocol (IP) Traffic, and Fibre Channel Protocol (FCP) SCSI Traffic.

For the other protocols, Fibre Channel is also carried traffic. FICON and FCP both are used the Fibre Channel Architecture to bring the traffic. FICON protocol is used for z/OS, and it will swap the all Enterprise system Connection (ESCON) Environment in the end. Fiber Channel is an exhibited and handled introduction with numerous organisations fabricating FC segments for SANs.

Merits:

The multi-layered network is Fibre Channel Network, which is based on the series of American National Standard Institute (ANSI), is defined by the functions and characteristics for moving data over the network. It includes the translations of physical interfaces, for example:

Distances, signalling, and cabling. Flow control and classes of service, Shared services, Data delivery regarding frames, Protocol interfaces, Data encoding and link controls.

Applicable in SAN having big IT User Base. Communication and Data Overhead, which includes Framing, Efficiency, Data Communication, Latency, Routing Control, and Access Control. Availability, Redundancy, and Failure. Flexible, Scalable about Topologies, Speed, Performance, Distance, Node connectivity, and cost.

C. COMPARISION BETWEEN IP SAN AND FC SAN:

1) COST:

In TCP/IP network, the iSCSI runs over the SCSI. Considerable understanding and experience with IP networks

make simple deployment for such technology. For the IP SAN and Fibre Channel SAN topologies, there are cost differences, the common list price for the following components. In this table we discuss the total cost of HBA, Switch, and drivers, this is an important consideration.

Table 1: comparison on basis of cost

Above all elements considering the minimum price range, iSCSI overall components are less expensive than the

NO.	Fibre Channel list price of tested	IP SAN list price of tested
1	\$1000 for the HBA (Host Bus Adaptor)	\$400 for the HBA (Host Bus Adaptor)
2	\$1000 for the switch (per port)	\$70-\$250 for the switch (per port)
3	Drivers included with HBA	Drivers free for Windows, NetApp and Linux
4	N/A for Network Interface Card (NIC)	\$50-\$100 for Network Interface Card (NIC)
5	Overall cost \$2000	Overall cost \$520-\$750

Fibre Channel components. Higher-Performance technology is Fibre Channel, but it is more complicated, expensive, and requires Fibre Channel expertise.

2) PERFORMANCE:

As per an existing study conducted by other researchers, for the email, basics office correspondence, work group planning, Microsoft's MS-Exchange server is a more powerful application. A 20 GB database was created for the representing the separate mailboxes for the benchmarking test. It is utilised mostly as a part of both considerable and little hard and keeps running on an extensive collection of tools. The host was a Pentium® Intel® four dual-processor (2 x 2.0 GHz) server having 4 7200 rpm ATA disk drives.

For the Spectra Logic Spectra 20K tape library, the database was backed up. Here used Four Sony AIT-3 tape drives, IP SAN and Fibre Channel SAN performance tests, were run to see how each configuration would balance and to expose any bottlenecks.

Table 2. Comparison on basis of performance

NO.	Fibre Channel Performance	IP SAN performance
1	DB Size is 20 GB	DB Size is 20 GB
2	Server performance- 2 x 2.0 GHz Pentium four, 7200 rpm	Server performance- 2 x 2.0 GHz Pentium four, 7200 rpm ATA Disk

	ATA Disk Drives	Drives
3	RDBMS performance- MS-Exchange server 2000	RDBMS performance- MS-Exchange server 2000
4	(HBA) Host Bus Adaptor performance- Qlogic QLA-2200 (FC)	(HBA) Host Bus Adaptor performance- Intel PRO/1000 T IP (iSCSI)
5	Switch performance- Brocade SilkWorm 3200, version 3.02	Switch performance- extreme summit 5i IP switch
6	Backup Hardware- four AIT-3 Tape drives (1 GB Fibre Channel, using G1 F-QIP), spectra 20 K	Backup Hardware- four AIT-3 Tape drives (1000 Base-T Ethernet, using G2 E-QIP), spectra 20 K
7	Backup Software- Veritas Backup Exec, version 9.0	Backup Software- Veritas Backup Exec, version 9.0

III. CONCLUSIONS

The natural addition to IP networks is Storage network. Therefore, IP-based storage networks will come at the amount of other technologies and predictable, such as Fibre Channel.

All benefits of a higher-cost FC SAN can be provided by IP SAN: aggregation of storage allowing higher utilization; infinite scalability of storage for a server or group of servers; offloading of storage traffic from the LAN; capacity consolidation across storage devices on the subnet; local or remote disaster recovery; snapshots, disk-to-disk backup, and failure. At very high-cost FC SANs gives enhanced performance. IP SANs offer considerably less performance at a low cost. Considering exchanges between price and performance, IP SAN is increasing more popularity.

However, IP SANs can get the benefits without the distance limitations, infrastructure hassle, and cost of a Fibre Channel SAN. Fibre Channel SAN will be finally replaced by IP SANs it was only a matter of time.

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