Journal of Advances and Scholarly Researches in Allied Education
Vol. 17, Issue No. 1, April-2020, ISSN 2230-7540

Analyse Large Storage Network Technologies

Anamika*

Research Scholar, BCA, MCA Persuing PhD (Computer Science), Magadh University, Bodhgaya

Abstract – Multi path connectivity allows multiple IP addresses to associate with a network interface. Multipath provides continued access to storage even if a storage fabric component fails. Some important tools to resolve fiber channel network issues include I. e Name server, fcping, Rescan, and port error counters.

Keywords – Interoperability, load Balancing, Fail over, iSCSI, CIFS, NFS, protocols, Multipath, SAN.

----------X----------

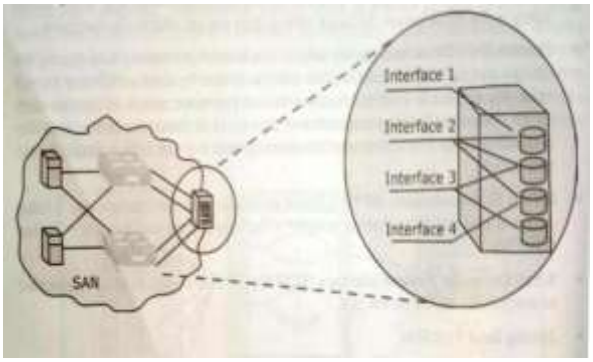
INTRODUCTION

Multipathing

Multipathing provides continued access to storage even if a storage fabric component fails.

In Multipathing redundant physical path components, such as adapters, create logical path between the server and the storage device.

The image provided below is showing how the multipathing works. There are four different interfaces that are connected to a single SAN network. It means, out of four interfaces anyone can work independently and multiple interfaces also can work as showing in the image.



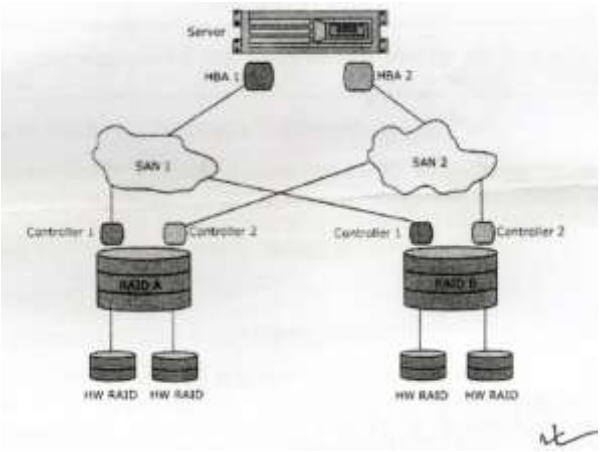
It provides the following features:

- Load Balancing - This refers to the distribution of workload across more than one resource or computer such as a computer cluster and network links. This avoids overload, minimizes response time, maximizes throughput, and helps achieve optimal resourse utilization.
- Fail over – This work s as a backup mode. In this mode, in case of scheduled down time or when the primary component fails for some reason and becomes unavailable the functions of a system component, the secondary components starts working.

Protocols

In multipathing, a server is configured to use all avilble routes. They can be used at the same time or in situation when a route fails. This feature procvides enhanced performance and reliability.

The below Figure 2.29 is an example of multipathing:

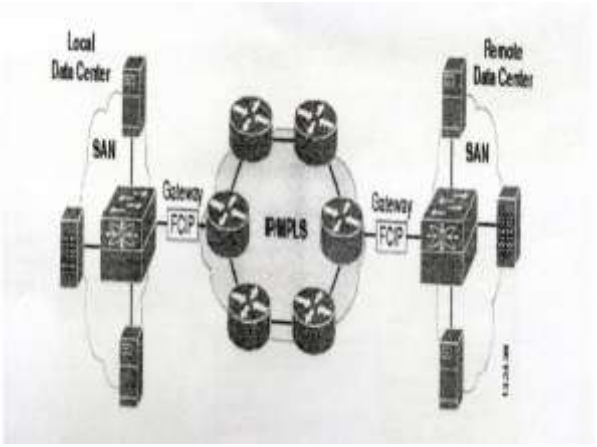


Physical connections vs. Logical Connections

Physical connections involve the physical connectivity of every host that are available on the network. In other words, it is the actual physical layout of the network which hardware for protocal offload engines (POEs) fiber channel protocols are designed. These POEs are required for high performance where fibre channels are being used

for fast date transfer and also to build Storage Area Network (SAN).

- Fiber chnnel over IP(FCIP)- This is an Internet protocol and encapsulates fiber chnnel frames and forwards them over an IP network In other words, iFCP is the protocol used on the Internet where by using TCP/IP, and data is being transferred among various fiber channel storage devices. It not only capable of controlling traffic but also helps in data recovery process. FCIP is a tunneling protocol that connects two fiber channel SAN together over a TCP/IP route. It creates a point to point connection between two fiber channel SANs and simply comptesses all fiber channel frames into TCP/IP packets.



Storage in Ethernet Network Technologies

Mostly Storage technology use fiber channel network for better performance which is isolated to the existing LAN. LAN is always based on Ethernet technology. If storage network wants to use existing Ethernet technology to reduce cost in establishing a fiber channel network then following concepts need to be understood:

Multipathing Feature

The following protocols provide the multipathing feature:

- Multipath I/O (MPIO) – MPIO is Microsoft framework that reduces the effects of an HBA failure. It provides an alternate data path between storeage devices and a Windows operation system. MPIO enables up to 32 alternate paths to add redundancy.

- Link Aggregation Control Protocal (LACP) – It is a standard to combine multiple network connections in parallel. This increases thoughput and provides redundancy in case one links fails. Multipath is recommended if you want to implement iSCSI. Multipath connectivity is nothing but using multiple paths to a storage device on a storage subsystem. No condifuration is requied for the swithches. Only thing you have to make sure that you have to have at least two NICs for one iSCSI. It is always important to make sre that thereshouldbe at least two dedicated NICs for iSCSI, so that against a switch failure, another switch can be used via a separate network path.

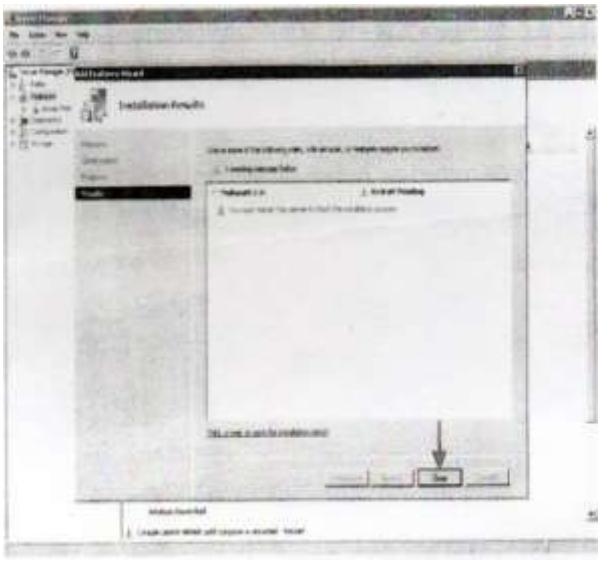
Installation of the Multipathing I/O Services on the Windows server.

Following are the steps to install Multipathing I/O services by using windows server:

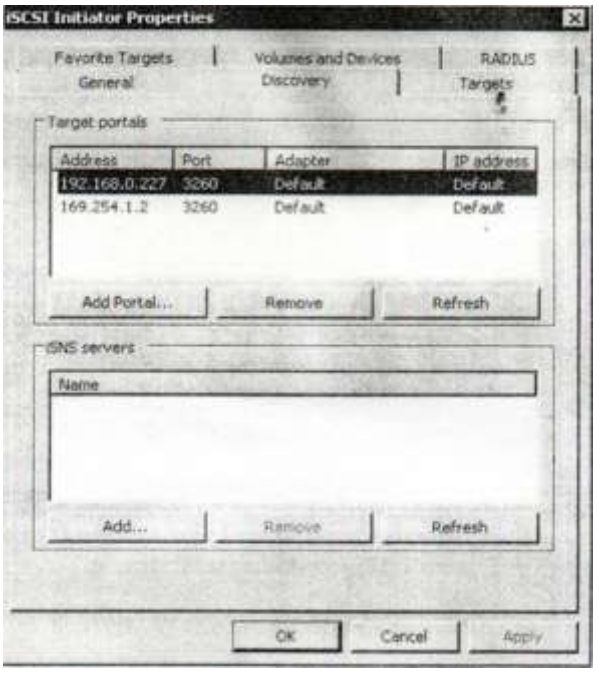
Step 1 – Open the server Manager Console, proceed to the Add Features Wizard and select Multipath I/O and click Install (You can skip this step if Multipath I/O is already installed).

Step 2 – Installation process will start.

Step 3 – Restart the Windows server before proceeding further and proceed to add the first path to the iSCSI Target.



Step 3 – To add the first path to the iSCSI Target, open the Microsoft iSCSI Initiator and proceed to the Discovery Tab and add the two-target portal IP address of the Station.



Step 4 – Proceed to the Targets Tab, select a target which will use MPIO and click on log on

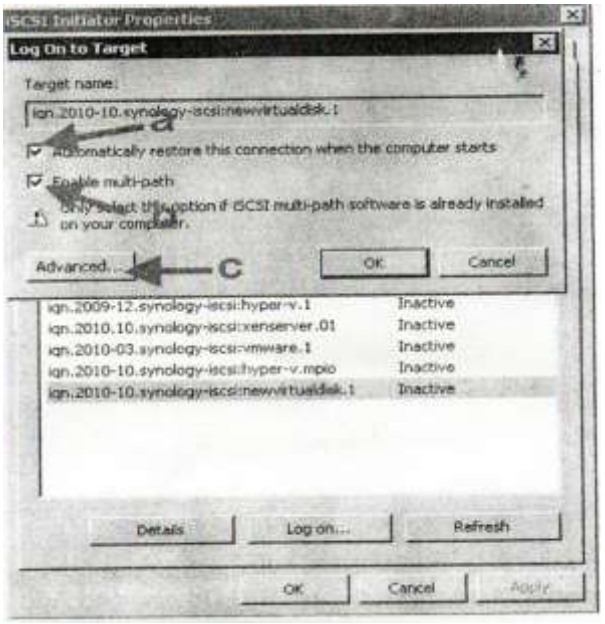
Step 5 0 Enable options named as Automatically restore this connection when the computer restarts ' and 'Enable Multi-path'.

Step 6 – Click Advanced.

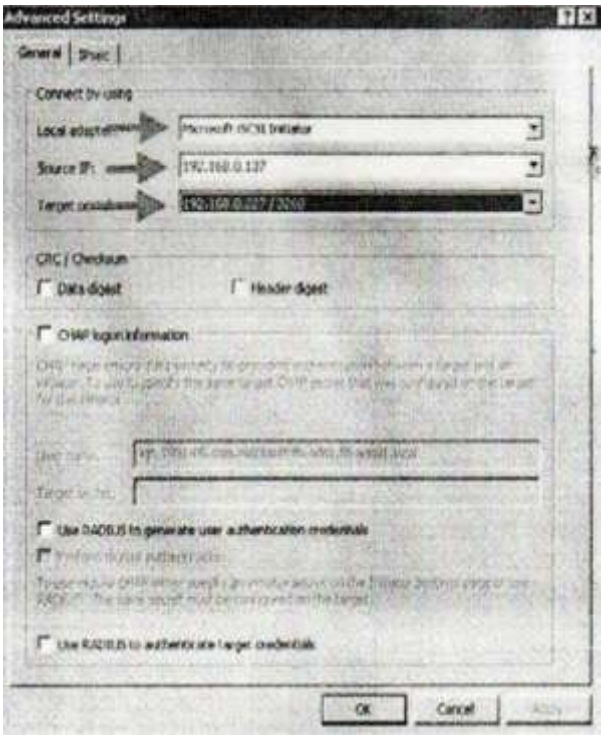
Step 7 – Manually select the below options and click OK and varify that the target has been connected:

- ► Microsoft iSCSI Initiator
- ► The first subnet of the Initiator Computer
- ► The first subnet of the DiskStation where both IP address of hte Initiator and the Target are within the same subnet.

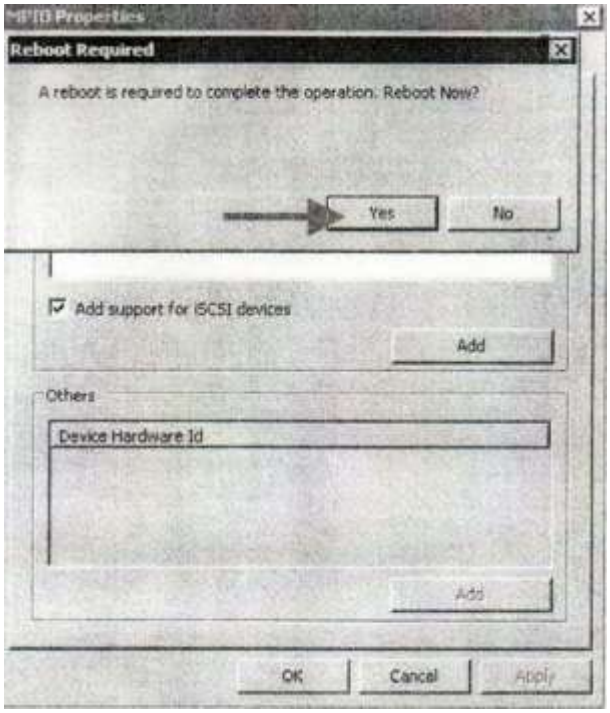
Step 8 – Close the iSCSI Initiator Application and proceed with enabling the MPIO on iSCSI Services.



Step 9 – To enabling MPIO on the iSCSI Service, open the MPIO Application and click the Discover Multi-Paths, Add support for iSCSI Drives, and options sequentially.

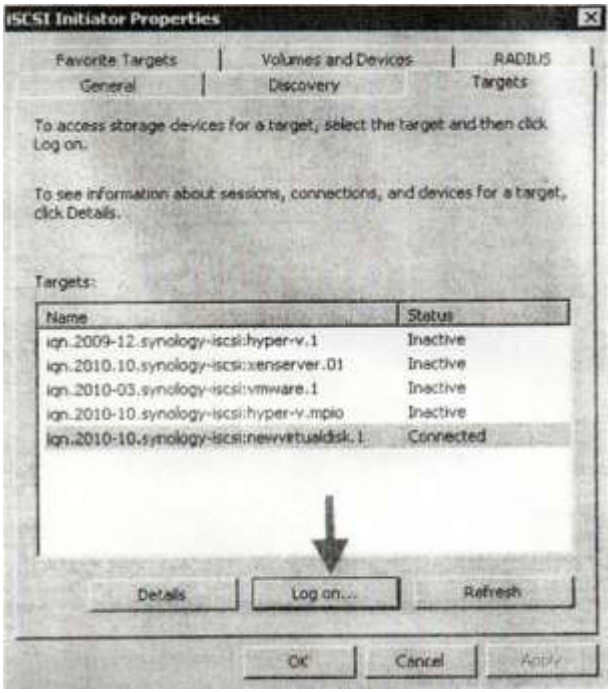


Step 10 – Restart the Windows server before proceeding further.



Step 11 – Present a new device 'MSFT2005IBus Type 0x9' or similar ID under MPIO-ed Devices. Then proceed to add the second path of the iSCSI target.

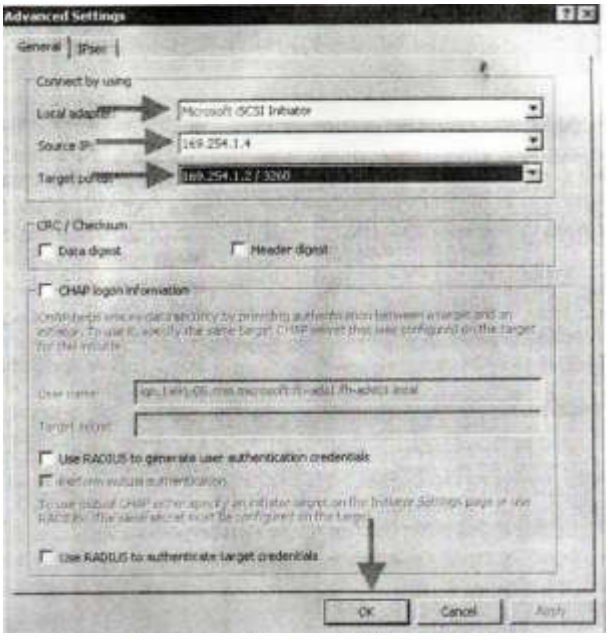
Step 12 – To add the second path to the iSCSI Target, open the iSCSI initiator Application and select the Target to use MPIO. Make sure it's connected.



Step 13 – Click Log on.

Step 14 – Manually select the below options and click OK when finished:

- ► Microsoft iSCSI Initiator
- ► The second subnet of the Initiator Computer.
- ► The second subnet of hteDiskStation where both IP address of the Initator and the Target are within the same subnet.



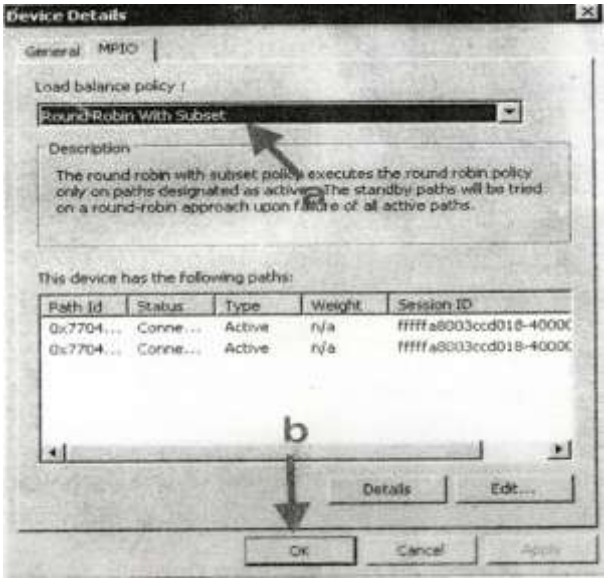
Step 15 – Click on the details, Devices and Advanced options sequentially.

Step16–SelectaLoad-balancePolicysuchas:

#RoundRobinwithSubset

Failover

MPIOsetupoftheiSCSITargetiscompleted.Clickok



CONCLUSION:

After going through the various components, storage network is a high speed network of shared storage devices. This connects different types of storage devices with servers for a larger network. New storage devices and can be added anytime and can be accessible from any server in this network.

PROTOCOLS

- iSCSI – Small computer systems interface is a procedure which enables computers to interact with storage devices. iSCSI is a protocol that helps data transfers over intranet and data storage over long distances. It can be used with LAN, WANs or the internet. Transfer through iSCSI is possible by using normal SCSI commands between server and storage via TCP/IP network. By installing ISCSI, the total storage cost can be reduced and also very easy to implement.

- CIFS – Common Internet File System (CIFS) is used for Windows operating system. With CIFS you specify a resource you want to share on a given server then the client connects to that resource using something called a Universal Naming Convention (UNC) path. A UNC path may look something like \\MyServerShareName or \\MyServer\Sharename\myfile where My Server is the name of your server, and Share name is the name of the resource that has been shared and

- Interoperability – Bye this method sending and receiving data between interconnected networks are done continuously. Interoperability is an issue with fiber channel SAN, as in all new cross manufacturer technologies. In this case, we must differentiate between the interoperability of the underlying fiver channel network layer, the interoperability of the fiber channel application protocols, such as FCP and the interoperability of the applications running on the applications running on the Fiber Channel SAN.

SAN provides servers with access to storage. It includes a series of disks and controllers. The storage is distributed into sections called virtual disks. When a server is attached to a virtual disk, it appears that the disk is attached to the computer directly. Fiber channel can be used to attach the servers to the disk. An HBA card is used for attachment. There are usually multiple fiber-channel switches between the server and the storage.

There can be multiple routes between the storage and the servers. Each server can have multiple HBAs. The same virtual disk can also be accessed using more than one controller. There can be various routes through the switches.

In multipathing, a server is configured to use all available routes. They can be used at the same time or in situation when a route fails. This feature provides enhanced performance and reliability.

REFERENCE:

1) A. Nasipuri, R. Castaneda, and S. R. Das (2001). “Performance of Multipath Routing for On-Demand Protocols in Mobile Ad Hoc Networks,” Mobile Networks and Applications, vol. 6, no. 4, pp. 339–349.

2) A. Tsirigos and Z. J. Haas (2001). “Multipath Routing in the Presence of Frequent Topological Changes,” IEEE Communications Magazine, vol. 39, no. 11, pp. 132–138.

3) H. Lim, K. Xu, and M. Gerla (2003). “TCP Performance over Multipath Routing in Mobile Ad Hoc Networks,” Proc. ICC 2003, vol. 2, pp. 1064–1068.

4) A. Tsirigos and Z. J. Haas (2004). “Analysis of Multipath Routing—Part I: The Effect on the Packet Delivery Ratio,” IEEE

Trans. Wireless Communications, vol. 3, no. 1, pp. 138–146.

5) S. Card, F. Tims (2004). "Concurrent Multipath Routing & Transport in a Mobile Wireless Gateway," unclassified paper presented in MILCOM 2004 classified session, available upon request from support at www.critical.com.

6) N. Kammenhuber, "Traffic-Adaptive Routing", Chapter 6.2 "Related Work", http://mediatum.ub.tum.de/doc/635601/635601.pdf to improve network security

7) W. Lou and Y. Fang (2001). “A Multipath Routing Approach for Secure Data Delivery,"" Proc. MILCOM 2001, vol. 2, pp. 1467–1473.

8) C. K.-L. Lee, X.-H. Lin, and Y.-K. Kwok (2003). “A Multipath Ad Hoc Routing Approach to Combat Wireless Link Insecurity,” Proc. ICC 2003, vol. 1, pp. 448–452.

9) S. Bouam and J. Ben-Othman (2003). “Data Security in Ad Hoc Networks Using Multipath Routing,” Proc. PIMRC 2003, vol. 2, pp. 1331–1335.

10) P. Papadimitratos and Z. J. Haas (2003). “Secure Data Transmission in Mobile Ad Hoc Networks,” Proc. ACM WiSe 2003, pp. 41–50.

11) Zhi Li and Yu-Kwong Kwok (2005). "A New Multipath Routing Approach to Enhancing TCP Security in Ad Hoc Wireless Networks," Proc. ICPP Workshops, pp. 372–379.

Corresponding Author

Anamika*

Research Scholar, BCA, MCA Persuing PhD (Computer Science), Magadh University, Bodhgaya