

COMMUNICATING WITH SAM

Consolidating Storage Area Networks

Question:

Currently our organization has a mix of Microsoft and OS/400 based applications. We have been mandated to provide a high availability solution for data management. Our Microsoft Server group has provisioned and implemented a SAN (Storage Area Network). The solution uses redundant virtual storage arrays with redundant Cisco fabric switches operating independently of each other. All of the virtual storage is managed in software. What is the best method to provide a similar solution for our iSeries? Can we leverage the existing network by integrating the solutions into a single homogenous environment?



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Answer:

With the advent of Canada's new privacy laws, increased scrutiny on companies in virtually every industry from regulatory bodies, and the overall pressure on corporate governance compliance, there is little doubt that we can expect exponential growth in the demand to secure, preserve and store data records. While SANs have become the norm in very large enterprises, these demands are likely to force even small organizations to re-evaluate their data storage practices.

Specific to your organizations' needs, it is definitely possible to perform a similar solution for your iSeries environment. You have a number of options and choices to make. In order to determine the right solution for your company you will have to make business and technology decisions. The iSeries is supported by two storage platforms – the IBM ESS and the EMC DMX storage products. So if your Microsoft group has one of these platforms you can leverage the same storage device and the network. It is one thing to have a copy of your iSeries data in a remote location, but it is another thing to use it in a disaster situation. From a business point of view you need to establish the Recovery Time Objective and the Recovery Point Object before deciding on the solution technology right for your organization.

If your requirement is for data resiliency or just replication, one of the next two

options should meet your business need. Assuming that you have a SAN storage device capable of supporting iSeries and you are running an iSeries with internal disk today, one simple option is to mirror the iSeries to the SAN storage device. As far as the iSeries is concerned the disk arrays are created as unprotected allowing the internal drives to be mirrored externally. The external disks must be the same size as the corresponding iSeries drives. This approach may meet your needs however it is important to point out that an iSeries, like all servers, will not mirror data that is in main storage. This approach offers a higher level of data redundancy but is not a true high availability solution.

Figure 1 illustrates a simplified point-to-point Fibre Channel connection, with an example of a direct connection between a server and a storage array. However, if the goal is to separate the storage arrays from the

Host Servers and perhaps even provide multiple, redundant Storage Arrays to a single or Multiple Servers then a SAN switching architecture is required to

enable the interconnection of Host and storage. With the introduction of two switches and the appropriate fibre interfaces, the SAN Storage device can be located up to 10km from the iSeries on dedicated fibre or can be geographically more distant with an IP infrastructure and Fibre Channel over IP (FCIP) technology.

If you are planning on provisioning dual disk arrays in multiple locations for improved reliability then a decision must be made whether your database replication will be synchronous or asynchronous. For synchronous mode updates to the database replication is done in a real time fashion such that each data I/O must

complete on the remote end with acknowledgements back to the application prior to writing another I/O. Thus, under these circumstances the WAN must be low latency and highly reliable remembering propagation delay plays into

latency on a link. You will need to check your application specific tolerances. For asynchronous replication the I/O process locally is not dependent upon com-

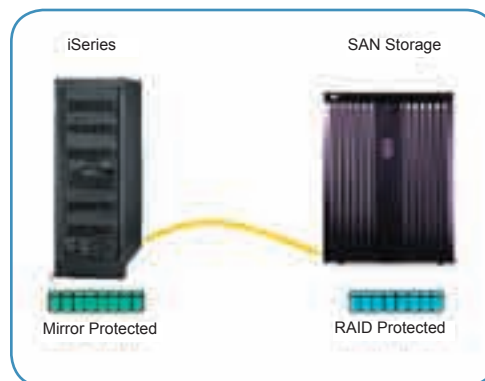


Figure 1. Point-to-point Connection

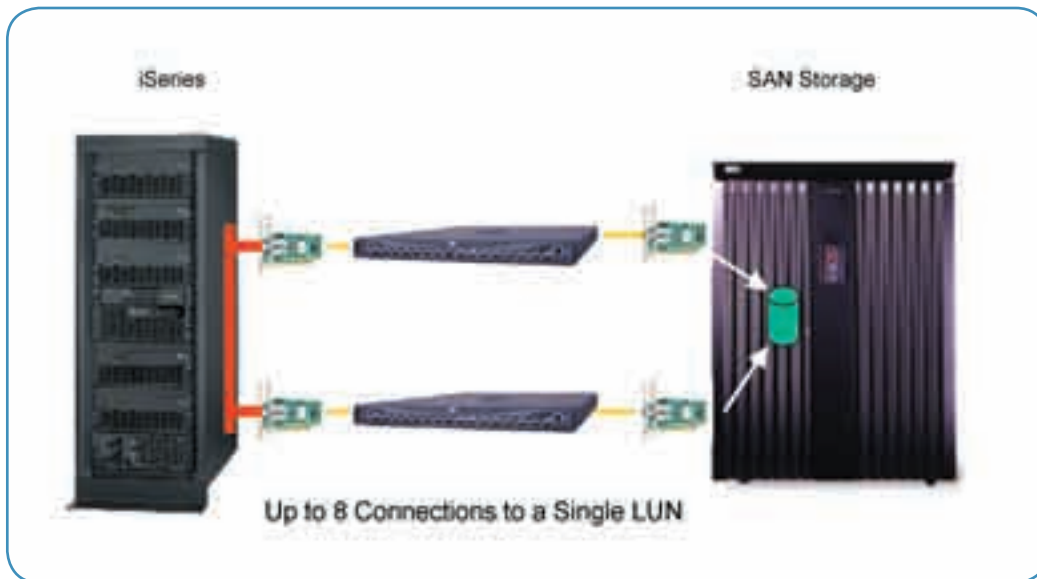


Figure 2. Multipathing

plete I/O to the remote storage array but is rather done as a separate process. This is a more cost effective approach but has some data replication considerations.

In V5R3 IBM has introduced a new capability for iSeries called multipathing. In **figure 1**, if we were to have a failure of the fibre host adaptor in the iSeries there would be no way to access the SAN Storage device. To ensure access to SAN storage, up to eight paths can be created for the same LUN (Logical Unit Number). The approach is to create multiple paths (**figure 2**) to the same LUN in the storage device by assigning them to different iSeries fibre host adaptors. The iSeries will recognize the paths and spread the I/O across all available paths using the “Round Robin” load balancing technique.

If you require system level high availability you will need a second iSeries to operate as part of a cluster or with High Availability Software. The machines can be located in different cities using Metro Ethernet, Sonet, or IP Routed WAN networks to connect the two sites. The iSeries supports a switched fabric at V5R2 and later. Switched fabric refers to

whenever a switch is used to interconnect Fibre Channel adapters. It is an intelligent switching infrastructure that delivers data from any source to any destination. **Figure 3** shows the most common WAN media using Cisco MDS switches.

The iSeries has become much more open to external storage over the past few releases. Robust solutions to improve data resiliency and disaster recovery times are easily created using OS/400

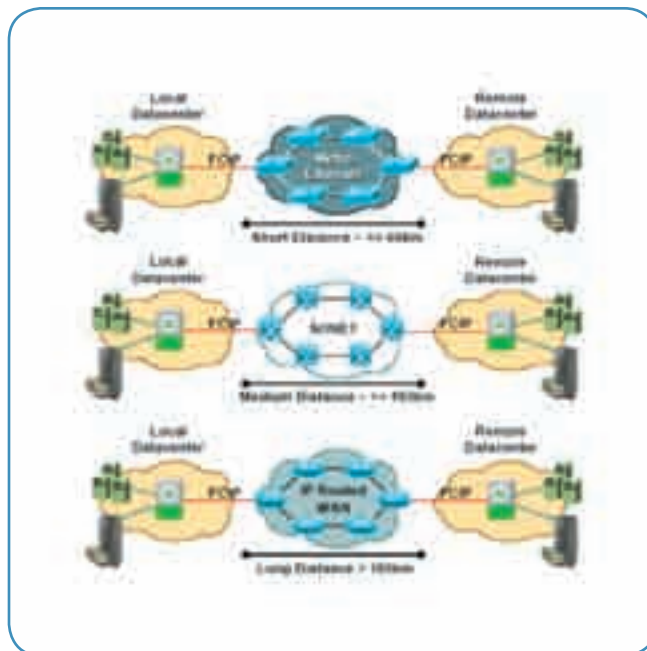


Figure 3. SAN Extension

operating system functions and industry leading SAN products from manufacturers such as Cisco and EMC. The question now really becomes, “What level of redundancy or recovery capability does the business need to ensure business continuity?” The SAN technology related to iSeries is now “harvest ready” and solutions are easily designed to provide disaster recovery and high availability capability at all levels.

Ultimately, Storage Area Networks, as with most solutions that we want to extend to the OS/400 environment, require unique treatments due to the inherent architecture nuances that differentiate the iSeries from other platforms. Don’t let this alter your course. While your SAN solution will need to adapt to these nuances, it is essential that you take a consolidated approach. By creating a single SAN architecture and strategy, even when it needs to adapt to heterogeneous technologies, you will gain other operational benefits such as having a single group responsible for managing the solution, not to mention leveraging common network architecture for maximum efficiencies. **TUG**

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