The Best of Both SAN Storage Worlds

Dual Mode Fibre Channel and iSCSI Networked Storage Solutions from Dell/EMC Reduce Costs and Increase Efficiency
Introduction

Surveys have indicated that only about 20% servers (Searchstorage.com) are connected to some type of shared storage. This means that the vast majority of companies are missing out on the benefits of networked storage, and are spending too much time and money managing a host of underutilized hardware.

For enterprises with substantial budgets and trained staff, Fibre Channel SANs have been the storage networks of choice. However, with the introduction of iSCSI in recent years, small to midsized businesses (SMBs) with limited budgets now have the opportunity to create SANs over low cost Ethernet networks. Both Fibre Channel and iSCSI each have their pros and cons, and IT professionals are becoming increasingly aware that each can provide valuable solutions in a comprehensive storage strategy.

Dell/EMC has now made it possible to get the best of both SAN storage worlds with the introduction of the dual mode CX3 family of storage arrays that bring together the high performance and reliability of Fibre Channel and the low cost and versatility of iSCSI.

Why SAN?

There are several forces driving the need for storage networks:

- Capacity needs continue to escalate with email and other databases doubling in size on the average of every 12-24 months.
- Companies need to be able to share their information in a way that is flexible and easily managed.
- Data must be protected, even as it becomes more accessible.

Storage Area Networks (SANs) combine unrelated storage resources into pooled storage that all your servers can see and access. SANs are an efficient and cost effective way to manage your storage assets, as they increase utilization rates and allow for centrally located administration. Also, because a SAN attached storage array can replicate data from many servers to a secondary storage array at a remote location, SANs are vital components in disaster recovery strategies.

Several years ago, SANs were perceived as being too expensive and complex, but increasing awareness and advancements in the technology have dramatically changed those perceptions.

Fibre Channel Takes the Early Lead

Fibre Channel evolved from its inception in the 1980s to become the standard of choice for SANs in the last several years. Today, 4Gb Fibre Channel offers fast, high-performance connectivity for mission-critical applications that can’t afford any downtime. With 99.999% availability, and support across a wide range of operating systems and applications, enterprises could be assured that they were implementing the best storage network technology.

However, a Fibre Channel network is expensive, and due to its complexity requires specially trained IT staff.
iSCSI Makes the Scene

The iSCSI standard was ratified in February 2002, but its adoption got off to a slow start as it languished in the shadow of Fibre Channel. However, with the wider adoption of Gigabit Ethernet, more Tier 1 vendors providing robust products, and businesses of all sizes looking for affordable storage networks, that is all about to change.

According to a recent report from IDC, iSCSI is expected to make up nearly 45% of <$150K SAN disk storage systems revenue and nearly 57% of the <$50K SAN disk storage system revenue by 2011. (Source: IDC, Worldwide Disk Storage Systems 2007-2011 Forecast: Mature, But Still Growing and Changing, Doc #206662, May 2007) An article in SearchStorage.com states “Users are growing more familiar with the lower-cost alternative to Fibre Channel (FC), and according to analysts, on the horizon is a groundswell of new SAN users anxious to use VMware with shared storage. In general they find iSCSI more suited to their experience with Ethernet networks as well as their limited budgets.” (Searchstorage.com)

There are many products that support both Fibre Channel and iSCSI, allowing your firm to select the method that is best suited to your unique needs. The following table provides a brief glimpse at how some leading technologies use Fibre Channel or iSCSI:

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<tr>
<th>Technology</th>
<th>Use of Fibre Channel and/or iSCSI</th>
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<td>VMware</td>
<td>VMware provides a simple model to allocate storage space for individual virtual machines without exposing them to the complexity of the variety of physical storage technologies available. VMware supports Fiber Channel and iSCSI SANs as well as Direct Attached Storage.</td>
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<td>Exchange</td>
<td>Based on various benchmarks reviewed for this paper, it appears that the choice to use iSCSI or Fibre Channel for Exchange depends on the various factors. For instance, Dell has found that for many instances, iSCSI can deliver about 90% of the performance as using Fibre Channel for Exchange. If the Exchange Server is running on a high-performance server, then Fibre Channel may be the way to go. For lower-performance servers, iSCSI provides competitive performance with Fibre Channel. Using a device that supports both Fibre Channel and iSCSI would allow your company to benchmark both methods and pick the one that is right for you.</td>
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<td>SQL</td>
<td>Microsoft’s SQL Server supports both Fibre Channel and iSCSI. While Fibre Channel is still the method of choice for very high-performance applications, iSCSI has lowered the gap to the point that iSCSI can be used for many, if not most, SQL applications</td>
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Choosing Between Fibre Channel and iSCSI

There are three main considerations when deciding upon what type of SAN is best for your company.

- Performance needs of the application
- Availability (or lack of) storage administrators
- Need for non-disk SAN-attached devices such as tape that only are available for FC (very few iSCSI tape products exist today)

Although a thorough evaluation of all the criteria for selecting between Fibre Channel and iSCSI SANs is beyond the scope of this document, the following is a more detailed list of questions that should be answered to help select between the two methods:

1. I/O
   a. What type of I/O do your applications use? Block or File?
   b. Small or large block?
   c. I/Os per second?

2. How much bandwidth do you need?

3. Are you a pure Ethernet shop, or do you have Fiber Channel as well?

4. Do you have different requirements for your data centers, disaster recovery, and remote offices?

5. How important is getting the lowest cost?

Chances are most IT managers would find that they have some applications that would do best with Fibre Channel and some that would work fine with an iSCSI SAN. However, purchasing, implementing, and managing two completely different storage networks would be a daunting task, until now..

Why Chose a Dual Mode SAN?

Just about every environment has different performance requirements, and a dual mode SAN device that offers both Fibre Channel and iSCSI provides the following benefits:

- Increased flexibility
- Integrated management
- Lower TCO (Total Cost of Ownership)
- Comprehensive security
- Scalability
- Availability
Dell/EMC CX3-20c

Dell’s premier Fibre Channel/iSCSI dual mode device is the CX3-20c. This device offers versatility and scalability that make it the ideal choice for SANs for small to medium sized businesses as well as for branch offices and departmental use within large enterprises. Some of the features and benefits include:

- Eight iSCSI ports that use traditional IP connections to connect the CX3 storage array to server hosts for remote server environments or limited budgets.
- Four Fibre Channel ports that allow this dual mode array to create integration between your Fibre Channel SANs and IP networks, where performance needs are most critical.
- Optimizing for dual mode can help streamline costs and IT efficiency by consolidating data management and security within one environment.
- Allows for up to 83.25 TB of capacity; 15x300GB Fibre Channel drives plus 105x750 GB SATA II drives.
- Compatible with a variety of Compaq®, HP®, IBM® and SUN® servers, as validated by EMC.
- OS support for Microsoft Windows 2000 Server, Windows Server™ 2003, Linux®, Solaris™, VMware®, AIX and HP-UX

Case Study

What looks good in a sales brochure doesn’t always translate into real results. The best teacher is experience, and actual experience with a dual mode device is more valuable than a stack of brochures. The following case study involves a college that needed a flexible, scalable, cost effective SAN solution, and found everything they were looking for with the Dell CX3-20c.

Dell CX3-20c Case Study

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<th>Case Study</th>
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<td><strong>Subject</strong></td>
<td>Mike Garner, Assistant Director for Computing &amp; Network Services</td>
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<td><strong>The Environment</strong></td>
<td>A college with about 2,500 students and 120 faculty in a remote location in the mountains of Colorado. The college has approximately 1,000 computers for staff and classrooms, and students own another 600-700 computers, with an extensive wireless and wired network. The majority of classrooms also contain audio-visual equipment. According to Garner, “The entire campus is heavily reliant on technology.”</td>
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<td><strong>The Problem</strong></td>
<td>After conducting a full audit, it was determined that the college’s 75 physical servers were only using 20% of their available storage. For several years the data center had considered</td>
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implementing a SAN to streamline management, increase efficiency, and provide more services, but Fibre Channel solutions were too costly. When iSCSI SANs became available, it appeared to provide a lower cost alternative, but iSCSI alone would not provide a total solution.

Garner stated, "We may have considered using only iSCSI if we were only supporting file servers, but we also wanted to accommodate Exchange and VMware. "What we needed was the best of both worlds."

Selection Process

The college's Data Center staff conducted extensive research on SANs, comparing the pros and cons of iSCSI and Fibre Channel. They carefully explored the offerings of many companies, but it wasn't until the Dell engineer came to the campus and presented information on the new hybrid CX3-20c, which offered both iSCSI and Fibre Channel that they realized they could, "Have our cake and eat it, too. That was exactly what we were looking for."

Dell’s Reputation

How important was Dell’s reputation in the decision-making process? According to Garner it was "critical." Previous purchases of Dell equipment provided the opportunity to interact with Dell’s local sales and support staff, which always proved to be positive experiences. "The trust I have with them," made the decision to purchase a CX3-20c all that much easier.

Installation

Dell’s "impressive installation team" arrived one afternoon in the middle of the term. It was crucial that the installation and transition go smoothly. Any lengthy downtime would have proven disastrous. Fortunately, the installer "knew exactly what he was doing" and worked through the night to ensure that all systems were up and running the next morning.

The Environment Now

The 75 original physical servers have been reduced to 45, with further significant reductions expected as the SAN implementation process continues over the coming months. There are now 36 virtual servers, with an additional 12 expected. When completed, the total number of physical and virtual servers will exceed the original number of physical servers. This is being accomplished even as management becomes more streamlined, and many more services will be provided, including media-rich services such as streaming video and blogs.

This new SAN "dramatically increases storage capacity, while also increasing server virtualization possibilities, and provides greatly improved disaster recovery solutions."

Post-Installation

While everything looks good on the showroom floor, the true test of any product is how it performs in the real world. To date, after three months Garner can report that there have not been any "post-installation issues." In other words, there have not been any problems.
Support

As the college’s Data Center continues its SAN implementation, questions have arisen. Thanks to Dell’s Gold Support program, all of the staffs’ questions have been answered promptly and accurately.

“I was surprisingly impressed at how quickly I get the right answer the first time I ask. We can’t afford the ‘try this’ or ‘that should work’ type of responses some other companies give."

And considering the remote location of the campus, this type of support is critical in avoiding downtime, as no help is readily available nearby.

“With Dell, I’ve never felt as if I was on my own.”

The Future

Will Western State College outgrow this SAN? “Certainly not in the foreseeable future,” Garner asserts with confidence. While there are many plans for growing and scaling up, the CX3-20c is capable of handling over thirty times their current volume of data. (Note: An upgrade to the higher capacity CX3-40c is also an option if Western State College’s growth exceeds the capabilities of the CX3-20c.)

Conclusion

Would Garner recommend the Dell CX3-20c to other colleges and businesses considering implementing a SAN?

“I would highly recommend the Dell CX3-20c.”

Once the facts about iSCSI and Fibre Channel are understood, “It’s easy to make the justification.”

Conclusion/Summary

There is no longer any reason why a company must choose either Fibre Channel or iSCSI and have to trade off performance or cost. By combining the strengths of Fibre Channel and iSCSI, Dell’s dual mode CX3-20c has created a comprehensive SAN solution that will benefit SMBs, educational institutions, and other organizations that need to consolidate and increase the efficiency of their storage, while working within a modest budget.

To learn more about the CX3-20c, visit the Dell website at http://www.dell.com