iSCSI vs. Fibre Channel SANS: Three reasons not to choose sides

A discussion of storage networking technologies and the importance of technology flexibility within the data center fabric

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Executive Summary

The debate over which shared storage interconnect to deploy – Fibre Channel (FC) or iSCSI – rages on, from boardrooms and back offices to the blogosphere. Fibre Channel provides low latency and high availability, making it the ideal storage platform for many business-critical applications. But for other organizations, FC can be overly expensive and complex to manage. For these organizations, iSCSI can better streamline implementation, simplify management, and improve affordability than Fibre Channel, thanks to the universality of TCP/IP. Adding to the discussion is the emergence of Fibre Channel over Ethernet (FCoE) and the increasing acceptance of 10 Gb iSCSI. So how do you choose?

Dell believes that you should have the freedom to choose the network fabric that’s right for you – not only within one SAN, but across your enterprise. This includes the flexibility to change technologies as business needs change or to implement new technologies as they become available. In other words, choose the technology that’s right for you based on your existing infrastructure and business needs – not on what your storage vendor recommends – keeping in mind how those needs may change over time.

Organizations need the flexibility to choose between FC and iSCSI server connectivity to optimize storage resources in accordance with their unique needs. Your organization may standardize on FC to deliver the performance required for select applications, or on iSCSI to enable the cost-effective addition of new devices to your storage area network. Dell provides highly scalable, standards-based hardware architectures with flexible options for end-to-end server, networking and storage connectivity over Ethernet or Fibre Channel networks. One means of reducing technology risk is to use these architectures to mix and match server interfaces and drive technologies within your SAN in a way that lets you easily adopt new technologies as they become available. A converged network design that is flexible to handle LAN, iSCSI and FCoE is the basis of flexible choices. For more detailed information on Dell Virtual Network Architecture, see this whitepaper.

This white paper will explore three reasons why you need to simplify networking fabrics in a way that keeps your options open for new requirements and technologies. Customer examples will illustrate how these three reasons play out in the real world.
Reason One: Each Technology Has Its Place

In order to design storage solutions that meet their unique needs, users need the latitude to utilize iSCSI connectivity when manageability and cost are the key criteria, and to opt for FC when availability and performance are paramount.

With the emergence of Data Center Bridging (DCB) standards, it is now practical to access high-performance storage devices over a converged broadband IP network while leveraging the economies of low-cost Ethernet switches and IP routers. DCB accommodates the migration of an expanding list of traffic types to 10GbE through the ability to classify and prioritize different data flows, thus reducing the number of failure points in an Ethernet network and, consequently, the overall cost of networking. In data center fabrics running Ethernet at rates of 10Gb and higher, DCB puts iSCSI on a par with FC in terms of network speed. This in turn brings a number of new variables into the cost/performance equation.

As an active contributor to the standard, Dell has helped to drive DCB capabilities to offer organizations unprecedented flexibility to choose the right storage technology for their specific requirements. With many technologies still maturing, most organizations are taking a measured, calculated approach to their deployment strategies, starting with small, segregated pilot projects. For others, however, the decision is more clear-cut. Organizations with multiple departments or applications, each with different connectivity requirements, can often face unique networking challenges. Indiana Public Schools offers an insightful example.

Think for a moment about the money and time you’d need to provide every resident of a medium-sized city with reliable access to computing resources, and to maintain those resources over their lifecycles. With more than 30,000 students, Indianapolis Public Schools (IPS), Indiana’s largest school district, must accomplish essentially the same task— with the additional responsibility of making sure the infrastructure can capably support education and keep up with change.

“We like flexibility,” says Luther Bowens, systems and operations manager, Information Technology Division, Indianapolis Public Schools. “If we do not have the foresight and capability to grow as our students grow and as the world changes, then we run the risk of becoming stagnant.”

To gain more flexibility in the way it delivers desktop computing resources to students, faculty and staff, the district launched a virtual desktop infrastructure (VDI) initiative with VMware® View, Windows™ Server 2008 R2 and Windows 7. “We need to give users access to the latest technology, but we also want to save money. With VDI, we can take an eight-year-old machine, strip it down, and run Windows 7 on it with no problems,” says Bowens.
The HP LeftHand iSCSI-based storage in which the district had a significant investment could not provide the input/output operations per second (IOPS) necessary to host the virtual desktops and ensure good performance. “It’s not that I couldn’t run VDI on LeftHand, it’s that I needed to do it quickly,” says Bowens.

After reviewing storage solutions from Dell, IBM, EMC and HP, Bowens selected a Dell Compellent Storage Center SAN with 11 SSDs and 16 SAS drives. “I was confident that we would get the IOPS we needed with Dell Compellent, and the perpetual software licensing model also made Dell Compellent very, very attractive,” he says. “That makes it cheaper as we expand because we don’t have to re-buy a license each time we upgrade. All we have to do is buy hardware. I think that’s awesome. We have the flexibility to grow our virtual desktop initiative efficiently and cost-effectively, while maintaining good performance with Dell Compellent. We’re running 5,500 virtual desktops on just 11 SSDs, and that’s only the beginning.”

The choice of connectivity protocols supported by Dell Compellent also appealed to the district. “We have Fibre Channel capability with Dell Compellent as well as iSCSI,” says Bowens. “I wanted to make sure that we could adapt to any situation.”

**Reason Two: Affordability Can Put Technology Within Reach**

When it comes to storage network selection, many organizations tend to commit over the long term to the technology in place today. However, with today’s rapidly evolving performance capabilities, many companies have begun to take a wider view of their technology options, and to broaden their long-term perspectives. For all its advantages as a purpose-designed storage interconnect, FC implementations can sometimes raise cost and complexity issues that place it beyond the reach of some companies. Dell believes many such companies can turn to iSCSI to architect shared storage solutions they cannot afford to implement with FC. One such solution – remote replication – offers an instructive example of this; many organizations choose not to implement remote replication, despite its potential to extend application uptime and improve business continuity. These concerns often draw from storage administrators’ experiences with tape-based backup solutions, which have traditionally suffered from poor reliability. Yet organizations have also shied away from disk-based backup solutions, discouraged by the cost and complexity associated with many leading FC storage vendors’ offerings.
But remote replication over IP-based wide area networks (WANs) can provide robust, easy-to-use disaster recovery solutions without the complexity or cost associated with FC-based solutions, and bringing business continuance within reach for companies of nearly any size. With IP-based replication, organizations can leverage existing networks and infrastructures, while IT teams proficient in TCP/IP basics can benefit from simple setup and management.

**Serviceplan Group**, headquartered in Munich, is the largest owner-managed media agency in Germany. Founded in 1970, its services cover all forms of media and communications. Today, the group has offices in nearly 30 locations, including Berlin, Buenos Aires and Beijing. Plus, it works with some of the world’s leading brands, such as BMW, Continental, E.On, HiPP, Lufthansa, Miele and Sony Ericsson.

As both its user numbers and file sizes have grown in recent years, Serviceplan has come to regard its data storage strategies as critical for business success. With so much at stake, the company decided to replace its existing FC-based NetApp® MetroCluster storage when it ran out of warranty. “Since the business relies on IT – and the storage infrastructure, in particular – we wanted to take advantage of this opportunity to look ahead and devise a better plan for scaling and replicating our storage,” says Stefan Reitmeier, Senior Network Administrator at Serviceplan Group.

After considering solutions offered by both NetApp and Dell, the Serviceplan Group decided to replace its aging NetApp MetroCluster with a Dell EqualLogic storage solution for its business-critical environment. The company deployed Dell EqualLogic PS6000XV arrays to store its production data and Dell EqualLogic PS6500E arrays at a secondary site for backup. The company uses this Dell EqualLogic solution to store both enterprise data – from its Microsoft® Exchange Server and Oracle databases – and virtual machine (VM) data from its virtualized environment, which is based on Windows Server® 2008 with Hyper-V™. There are around 150 terabytes of data on the production storage arrays, which is replicated to the backup arrays every four to 24 hours and retained for 30 days.

Reitmeier says: “The cost of the MetroCluster solution was three times more than the Dell EqualLogic technology, yet we feel that we’ve got a more efficient storage solution from Dell.”

“We are very pleased with the results of the deployment,” continues Reitmeier. “The Dell EqualLogic solution offers us reliable, robust performance, and the seamless integration with Microsoft® Exchange Server has made it easy to transition users to a new system.”

**Stefan Reitmeier**
Senior Network Administrator at Serviceplan Group

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**Reason Three: Avoid Technology Lock-in**

As rapid change continues to define the technology and business landscapes, the conversation may very well shift over the next three years from FC-versus-iSCSI to some completely different technological debate. Investing in a solution limited solely to iSCSI or to FC can stifle innovation and block a business from adopting new technologies that may loom on the horizon. From a networking perspective, a converged network design that is flexible to handle LAN, iSCSI and FCoE provides the most options.

Consider *Moss & Associates* (Moss), a national construction, consulting and management firm that grew from 5 to 300 employees in only two years. With annual revenues that exceed $750 million, Moss is one of the largest construction companies in South Florida. As the business has expanded, its demand for storage capacity has grown exponentially. Moss has more than 20 estimators working on gigantic spreadsheets to estimate and quote new construction business. “If our employees can’t access the right file, we are losing thousands of dollars a minute,” says Bill Snow, IT Director, Moss & Associates.

“The robust feature set and excellent price point led us to choose a Dell Compellent Storage Center SAN,” says Snow. When Moss deployed the SAN it loaded all its data onto Tier 1 FC drives and enabled Dell Compellent Data Progression an automated data tiering feature. Within five to seven days, inactive data—which comprised nearly 80 percent of Moss’s data—automatically migrated down to higher-capacity drives. Moving inactive data off of the high-speed drives freed up the SAN’s Tier 1 spindles, increasing Tier 1 performance by 60 percent.

Moss is freed from technology risk by the standards-based Dell Compellent hardware architecture. The company can mix and match server interfaces and drive technologies, and can easily adopt new technologies as they become available. One key criterion in Moss’s storage selection decision was the ability of Compellent solutions to support both iSCSI and high-performance connectivity simultaneously. Now Moss uses high-speed server connections for business-critical, performance-intensive SQL Server, Exchange Server and file server applications, while it uses iSCSI connections anywhere it doesn’t need extreme performance.

“High-speed drives give us proven performance, and iSCSI allows us to overcome distance limitations and replicate to a co-location facility 60 miles away,” says Snow. “We get the best of both worlds, without being locked into any given technology, because of the technology independence of the Dell Compellent SAN.”
Dell Position: Simplify data center fabric to achieve the most flexibility

The exponential increase in bandwidth enabled by the rapid adoption of network fabrics running Ethernet at 10Gb and higher brings new urgency to efforts to architect multi-service data center network fabrics. While iSCSI storage networking is now well accepted as a solution for a diverse set of applications, the need for extremely low-latency storage to support certain application environments can make Fibre Channel indispensable for many organizations. Each storage technology has strengths and weaknesses – many situation-specific – and Dell’s position is that businesses shouldn’t be forced to take sides when investing in shared storage. You should have the freedom to choose based on your specific application needs and environmental particulars. This philosophy drives the introduction of innovative products like the Dell Networking S5000 Converged LAN/SAN Switch, which can speak both FCoE and iSCSI. It is modular to enable a scale-out growth and is part of the Dell Active Fabric approach.

The emergence of broadband fabrics offers a tremendous opportunity to help you to both architect data center solutions that suit your specific needs and environments and incorporate newer technologies as they mature. DCB is a vital enabler in this regard, offering a standard means to reduce complexity while adding robust, unified, high-throughput networking capabilities for today’s dynamic, high-volume data traffic patterns. Dell has contributed to DCB standards as part of a larger mission to enable high performance, reliability and affordability for both iSCSI and FC storage operations over mixed-traffic Ethernet fabrics running at 10GB and higher. Dell offers a range of topologies and converged networking fabrics to help organizations build and manage modular, scalable, and cost-effective server and storage infrastructures.

By architecting solutions based upon Dell open, standards-based storage and networking platforms, IT organizations can improve the durability, agility and ROI of their strategic data center fabrics. Whether building a data center from the ground up or optimizing an existing infrastructure, organizations can benefit from Dell’s extensive product and services portfolio, as well as from Dell’s experience in helping customers of all sizes overcome a variety of IT challenges across all industries worldwide. A true single-vendor solution provider, Dell offers unique advantages as a developer of storage and networking technologies, and as a provider of an expansive suite of professional service offerings.

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