White Paper





Re-enforcing a Reduced IT Infrastructure Model with High Availability

About LSI Syncro CS High Availability with Shared DAS

High Availability with Shared DAS utilizes the high-speed 6Gb/s SAS interface to deliver server clustering by using SAS as a backbone. LSI is delivering this solution by building the clustering capability on top of its MegaRAID° controller technology. The Syncro CS solutions offers the full RAID and off-load advantages of the SAS ROC controller while providing a shared DAS, communication platform for low-latency server failover. More importantly, the shared DAS solution can be configured and deployed with existing DAS Administrative support and at a fraction of the cost of many competing Fibre Channel or iSCSI solutions today.

The concept is simple to grasp. Small businesses that are unable to afford the traditional, higher cost, high availability solutions can take advantage of the shared storage and failover capabilities that are traditionally only offered by the more expensive SAN The generational advance of Serial Attached SCSI (SAS) to 6Gb/s has opened the door to using SAS for purposes other than direct storage IO. LSI is taking advantage of this performance advantage in its low-cost, simpler-to-deploy, Syncro[®] CS High Availability (HA) with shared direct attached storage (DAS) clustering solution.

Managed by the Windows Server 2012 Cluster Failover Manager, the LSI* Syncro CS solution can be deployed in two ways. One configuration uses the LSI Syncro CS external controllers where an IT administrator could easily build this configuration with two volume servers and an external dual-port SAS JBOD. The servers cable out through the Syncro controllers and into the back of each ESM. The second configuration is a Cluster-ina-Box (CiB), containing both servers, storage and necessary cabling in a single all-inclusive chassis. Both configurations allows both controllers to see all of the SAS drives while communicating with each other.

As a 2-node high availability server cluster, the Syncro CS solution today is largely targeted toward small to medium sized businesses (SMB) and remote office settings. Coincidentally, public/private cloud application hosting and software as a service (SaaS) models are being used more often in both of those environments. As hosted solutions continue to grow, it is easy to understand why there are questions around the reasons for offering a new application server technology for the SMB and remote offices.

This paper provides a perspective from one company that understands the value of moving application software to a hosted service model, but also knows the criticality of deploying robust servers in their remote offices in order to keep the offices up and running. solutions. Remote offices can localize applications that have been pushed to the headquarters, over the WAN, because of a continuous uptime requirement, reducing application response times considerably. And a low cost, redundant storage appliance can be configured to service virtual machines running across multiple servers in a rack.

About the Microsoft Continuous Availability Initiative

Convergence of server and storage and the growth of virtualization outside the datacenter have laid the groundwork for Microsoft's considerations of availability. Recent studies conducted by Microsoft polling over 100 SMBs and remote offices determined that the #1 area that these businesses wanted to improve was application uptime. The study further concluded that existing HA solutions that would improve uptime were too expensive and too difficult to manage.

The result of these studies was Microsoft's Continuous Availability initiative. Under this initiative, the Windows Server 2012 Launch included a completely restructured high availability clustering tool, with easy-to-use wizards. Additionally, Microsoft engaged LSI to create a simplified Syncro CS shared DAS solution

Edgenet Inc.

Edgenet, Inc. is a product data software as a services company with offices in Milwaukee, Nashville and Atlanta. Edgenet's solutions include Ezeedata, built for retailers and manufacturers, which collects Global Data Synchronization Network (GDSN) and marketing product data, improves it, structures it, then syndicates the data through its network; Ezeeguides, a consumer product guide found at retailers like AutoZone, which is mounted on structured data to guide shoppers to the products best suited for them; The Big Hammer Design series, a deck/fence/outbuilding designer; and m2o, a product configurator featured at big-box retailers like The Home Depot and Lowe's.

A few years ago, Edgenet decided to leverage its capital investment for supporting host services, and move its internal IT infrastructure to the Edgenet datacenters. The move was set up to ultimately benefit Edgenet's customers by freeing up capital to reinvest in Edgenet's products and support. Edgenet realized that offices still needed to have some robust local IT infrastructure.

Maintaining the Remote Offices

Michael Steineke, Vice President of Information Technology at Edgenet, drove the transition to relocate infrastructure to datacenters. According to Michael, Edgenet was able to move development and test systems to the datacenter, but still needed to have infrastructure in its local office to help support the local users, with services like Active Directory Domain Controllers, print services, local mailbox servers, and in some cases, line of business applications.

According to Michael, "...not every office has IT staff onsite. So whatever hardware is in that office needs to be highly reliable and easy to manage." He continues, "In Atlanta, we don't have any IT folks on staff. So making something simple and easy to manage, and remotely manageable is definitely a priority."

J. D. Meek is the Senior Systems Engineer in Edgenet's Nashville office where they focus primarily on the Guided Selling line of products. Referring to his home improvement retail customers, J. D. says, "We work with manufacturers to help categorize their data in such a way that we can then put it into our configurator system and enable consumers to configure highly complex items such as windows, doors, fashion plumbing, things along those lines."

Some of Edgenet's Guided Selling customers that have specialized systems that have to be emulated so that the new configurator can be properly Quality Assured (QA'd). Meek says, "Since QA happens here in Nashville for those products we keep a copy of that emulator system here in the Nashville office instead of having to run all of that data across the wide area network."

Running QA through an emulation of the customer's specialized system requires an active file server in that office. According to J. D., "In that process, it's really important that we have high availability in those systems for the simple fact that I can't have my QA department sitting idle while I repair a piece of gear" noted Meek, "I need to be spending my time focused on what's going on in our data centers and servicing our customers rather than worrying about what's going on in the enterprise infrastructure."

using the Windows Server 2012 Cluster Failover Manager. For CiB deployments, Microsoft developed an Out of Box Experience (OOBE) utility, providing a simple checklist of wizards for deploying the CiB in minutes.

An Ideal Solution in a Remote Setting

As a Microsoft Gold Certified Partner, Edgenet continues to be an early adopter of many Windows products. Edgenet also has participated in numerous case studies initiated through Microsoft's Technology Adoption Program (TAP), evaluating pre-release versions software. This experience drives Michael Steineke and Edgenet to seek other new technologies being developed with Microsoft including hardware solutions such as CiB using the LSI Syncro CS controllers.

Steineke first learned about the CiB in 2012. He was looking for alternatives to his existing HA solution in the Atlanta and Nashville offices. That solution was using a Fibre Channel / Storage Area Network (SAN) configuration with two 1U servers in a 2-node cluster. The Fibre Channel HA solution presented a number of problems in that it was expensive, complicated to configure, consumed a large section of rack space, and presented a number of manageability hurdles with different equipment coming from different vendors.

As part of the TAP program, Microsoft offered a CiB built by Quanta Computer, using the Syncro CS solution, that would provide a number of advantages for Michael and Edgenet in its remote offices. The CiB would offer a 2-node server cluster and shared storage similar to the Fibre Channel / SAN solution. However the CiB would be significantly less expensive, simpler to configure and manage and would consume a much smaller section of rackspace (see Figure 1).



Figure 1: Quanta High Availability Cluster-in-a-Box with LSI Syncro CS solution

There is a significant difference between the rack space requirement of the Fibre Channel HA solution and the Quanta CiB. The Fibre Channel solution requires two 1U servers that would connect through a Fibre Channel switch to an external SAN. The overall rackspace required for Edgenet to build out the Fibre Channel configuration is 5U. The Quanta CiB uses two blade servers that slide out the back of the CiB chassis. The front of the chassis provides 12 drive trays for SAS hard disk drives (HDDs) or solid state drives (SSDs). All of the cluster cabling and management connectivity is included. The rackspace required for the Quanta CiB is 2U at a cost around 5/8 the cost of the Fibre Channel solution. (See Table 1)

Current SAN-based Solution			Shared DAS CiB Solution			
QTY	Equipment	Space	QTY	Equipment	Space	
2	1U Volume Servers	2U	1	Quanta Cluster-in-a-Box	2U	
1	Fibre Channel Switch	1U	2	LSI Syncro CS Controllers	-	
1	Storage Area Network	2U				
12	SAS HDDs	-	12	SAS HDDs	-	
Total Rack Space:		5U	Total Rack Space:		2U	
Estimate	Estimated Hardware Cost: \$N *		Estimated Hardware Cost:		~\$ (⁵%N) *	

*Cost is projected based on published pricing for available products at the time of this paper

Table 1: Footprint and Cost Analysis of the Fibre Channel SAN HA solution vs. CiB

As J. D. Meek from the Edgenet Nashville office says, "By reducing this footprint, we're able to lower our cost in power and cooling overhead as well as maintaining space that is extremely valuable in a branch office scenario."

Configuration and Management Simplicity

Microsoft is adding value to shared DAS solutions with its ability to simply configure and manage clusters, without the need for additional software or specialized expertise. By engaging Microsoft early in its Syncro CS solution development, LSI was able to create the necessary SMI-S provider so that the storage could be configured and managed using the Windows Storage Manager. This effort allows end-users to handle the end-to-end configuration completely within Windows using a few short wizards, without having to learn other management applications.

For CiB, Microsoft developed an Out of Box Experience (OOBE) utility that assembles all the configuration wizards into a checklist. The OOBE initiates as the CiB is booted up for the first time. Experimental configuration of the CiB with the Microsoft OOBE have been completed in as few as 15 minutes.

Edgenet has been able to experience the simplicity of the CiB configuration with the Microsoft OOBE as part of the TAP program. Their existing Fibre Channel solution required a complicated setup process. According to Steineke, "With our current configuration, my network engineers need to know how to manage a SAN, zone Fibre Channel switches, as well as work with the operating system on a two server cluster." He continues, "With CiB, they really only have to worry about two server cluster and can spend the rest of their time working on other things, supporting our software engineers and customers better."

As Steineke confirms, "With their out of box experience, or OOBE, you're able to set up a cluster without knowing anything about Windows clustering and have the system up and running in a matter of minutes."

*	Initial Configuration Tasks			
Perform the following configuration	in tasks	- 	Vindows Server 2012	
View Connection Status				
Connect to remote nodes	Connection Status	Connected		
Configure Networking				
Configure retreating for reds 1 (local)	Green Cross-Over Red of thernet ICT Virtual Switch -01	Not configured IPv4 address assigned by DHCP, IPv8 enabled IPv4 address assigned by DHCP, IPv4 enabled		
Carilgues removing for Nucle 2 (100-254.126.38)	Cruise-Over Red Green of thereast OCT Virtual Solitch -01	IPol address assigned by DHCP. IPol enabled Not configured IPol address assigned by DHCP. (Ibit enabled		
Configure Settings		a na ann an gur gur ag an ann an an ann an -		
fr Set time zone	Time Zone	(UTC-08:00) Pacific Time (US & Canada)		
🥵 Create virtual switches for Hyper-V	Virtual Switch Status	Configured		
Reference cluster name and domain	Cluster Name Domain	Not configured Not configured		
💱 Leable Windows Error Reporting	Windows Error Reporting	он		
👔 Enable Customer Experience Improvement Program	Customer Experience Improvement Program	Not participating		
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Figure 2: Microsoft Cluster-in-a-Box Out-of-Box Experience

CiB in Action

Space, cost and simplicity aren't the only critical elements needed for the Edgenet remote office server. As Steineke states, "We're heavily focused on data. And because of that, we need to have database servers that can perform very quickly."

What Michael sees from the Syncro CS solution is a 4.8Gb/s pipe driven by 86Gb/s SAS ports. The current generation Fibre Channel solution only delivers 1.6GB/s from two, 8Gb/s Fibre Channel PHYs. That's a 3x improvement in aggregate bandwidth between the shared storage and each server by moving to the Syncro CS solution.

In terms of the operation under failure, Michael has already performed some tests that are exceeding his expectations. The Syncro CS solution managed by the Microsoft Failover Cluster Manager was designed to perform server failover in as few as 5 seconds for certain small workload applications. Michael reports that he has been able to test 50 Virtual Machines (VMs) failing over from one server to the other in 50 seconds. This is practically unheard of for HA solutions today.

The evaluation of the CiB as a replacement for the Fibre Channel HA configuration at the Edgenet remote offices continues today. Edgenet will continue to add data and test more mission critical applications. However, as of today, this solution is exceeding Steineke's expectations. The solution seems ideal for what Edgenet is trying to accomplish and it is performing in a way that will meet Edgenet's needs. Following the Edgenet mantra, Michael states, "At Edgenet, we embrace new technology and leverage that into our solutions to help our customers sell easier and sell more."

A High Availability Server Solution in a Hosted Solution World

The growth in public and private cloud has presented an interesting question among technologists and administrators supporting business critical applications. As more applications move to cloud and hosted solutions, what need will there be for servers in the SMB and remote offices? The perspective that Edgenet gives seems to contradict the opinions of some that servers will not be needed in those environments. In fact, the Edgenet example seems to suggest that a move toward hosted solutions may actually increase the need for robust, high-availability servers at remote offices.

However many SMBs and remote offices don't have the budget or resources to deploy and support the type of high-availability solutions that are available today. This lays the ground-work for the Syncro CS shared DAS solution, Microsoft Windows Server 2012 Clustering and CiB. These three components come together to provide a dense, low-cost, simpler, high-performance robust server solution that is ideal for the SMB and remote offices, where IT resources may be limited.

"Hardware has to be very fault tolerant as well as reliable", says Michael Steineke. "With CiB, it gives us one solution, with one pair of servers to manage with shared storage." He continues, "CiB, Syncro CS and Windows Server 2012 allow us to have low cost, high bandwidth storage for SQL Server to make very fast performance systems for our customers."

For more information and sales office locations, please visit the LSI website at: www.lsi.com



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