Shouldn’t all your storage be highly available?
Greg Huff, LSI CTO
Agenda

- LSI storage leadership
- The universal need for highly available storage
- The new HA paradigm
- The evolution to Shared DAS Storage
- Introducing Syncro CS from LSI
- Deployment Models
- Call to Action
LSI Storage Heritage – 30 years of market firsts

- 1st SCSI controller
- 1st PCI controllers
- 1st PCI RAID on Chip
- 1st RAID controller
- 1st ROC based RAID Controller
- 1st SAS RAID Controller
- 1st 6Gb/s SAS ROC
- 1st 12Gb/s SAS ROC

Year Timeline:
LSI storage footprint inside servers

- LSI SAS inside 60% of servers
- 21 million LSI SAS & MegaRAID solutions shipped over last 3 years
- 9 out of 10 top server vendors use MegaRAID

The vast majority of the world’s servers count on LSI SAS & MegaRAID
The universal need for highly available storage

**Business uptime**
- Uninterrupted business continuity, on-line presence
- End-user access to business-critical and mission-critical workloads
- Exponential growth in data (unstructured, regulatory) that must be readily accessible

**Virtualization**
- Agile virtualized workloads
- Workload mobility across servers
- Seamless mobility between on-site infrastructure and cloud

**Storage density**
- Multi-core processors – 8 or more cores
- Drive capacity growth – from 1TB to 6TB
- Storage managed per server growing
Existing HA solutions only serve half the market

New paradigm is needed to enable affordable, easy to manage high availability
The Answer is a Shared DAS Solution

**Single Server DAS**
- Robust Data Protection
- High Performance
- Low Cost
- Easy Management

**Shared DAS**
- Shared Storage
- Continuous Application Availability
Introducing LSI Syncro CS

• Robust, cost-effective, easy to deploy and manage high availability solution for small and medium businesses

• Brings shared storage and storage controller failover into DAS environments

• Built on industry’s most trusted server data protection technology, LSI MegaRAID

• Complete Windows Server 2012 high availability solution

LSI – Microsoft collaboration enables a volume platform for high availability
LSI Syncro CS High Availability Solution

- Reduces downtime for critical applications – Makes failover latency transparent to the application
- Enables servers to share storage and provides failover support
- Based on advanced hardware data protection
- High performance SAS backbone enables shared storage and intra-cluster communications

Enterprise class HA with DAS performance and simplicity
High performance platform independent data protection

**LSI Silicon Foundation – SAS ROC**

- **74M gate design**
- **17M gate core ROC function** includes SAS & PCIe protocol, primary data path and control, error protection
- **2.7M gate Hardware RAID Engine** – advanced RAID algorithm and data-path HW acceleration
- **59M bits on-chip memory**
- **Hardened SAS and PCIe PHY, link and transport protocol layers**
- **Robust error detection, handling, and recovery at all protocol levels**
SAS expanders enable multiple peer Syncro adapters to share storage.

- 14M gate design
- 5M bits on-chip memory
- 22 GB/s aggregate bandwidth
- Fully non-blocking architecture
- Integrated enclosure management (fans, LEDs, etc.)
The Syncro CS Software Stack

- LSI / Microsoft partnership:
  - Parallel definition and development
  - Extensive joint validation and hardening

- Significant MegaRAID driver and management enhancements made for HA in tight collaboration with Microsoft

- Syncro CS FW built on industry leading MegaRAID FW with additional cache, cluster, and failover capabilities

Deep collaboration with Microsoft ensures seamless HA operation
The Syncro CS Host Stack

- Windows Server 2012 provides failover clustering and management capabilities
- LSI delivers the clustered storage subsystem
- MegaRAID driver and management suite (run-time and pre-boot) enhanced for seamless integration into Microsoft’s HA cluster framework
- Complete cluster setup using Microsoft tools in under 30 minutes

All SMB/SME/ROBO business applications can now benefit from HA
Cache management keeps the two write-back caches coherent

Cluster support ensures reliable storage sharing across servers

Failover support ensures application & data availability during server failures

MegaRAID foundation ensures world class robustness
Why do you want Hardware Data Protection?

Performance
• Offloads compute intensive R5/R6 algorithms from host CPU cores and cache
• Offloads bandwidth intensive R5/R6 IO and memory operations from host memory and network (vs. SW RAID and replication schemes)
• High-performance, mirrored, coherent, non-volatile DRAM write cache

Enterprise Robustness
• Platform Independent
• Insulates data from server failures
• Insulates OS from drive failures and asynchronous drive/cable pulls

Enterprise Capabilities
• Bootable
• Support for large drive pools
• Common MegaRAID driver / management across DAS and shared DAS

Syncro CS is based on Enterprise Proven Hardware Data Protection Technology
## Syncro CS Cost Benefit Comparison

<table>
<thead>
<tr>
<th>Components</th>
<th>Syncro CS</th>
<th>SAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application Servers &amp; OS</td>
<td>$8,358</td>
<td>$8,358</td>
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<tr>
<td>LSI Syncro Kit</td>
<td>$5,495</td>
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<tr>
<td>iSCSI NIC &amp; Boot Drives</td>
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<td>JBOD</td>
<td>$3,000</td>
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<td>PB 3 External Storage</td>
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<td>Data Drives (8 drives 7 data, 1 parity)</td>
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<td>$4,632</td>
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<td>GE/iSCSI Switch (1)</td>
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<tr>
<td>Total Solution</td>
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<tr>
<td>Storage Only (unique pieces)</td>
<td><strong>$8,495</strong></td>
<td><strong>$24,019</strong></td>
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</table>

Publicly available list prices

Syncro CS solution costs less than 1/2 the traditional HA approach
Syncro CS Relative Performance

- High Availability Solution
- Direct DMA over PCIe
- SAS bandwidth >> FC or Ethernet
- Modest HA overhead, primarily on writes for cache coherency and mirroring

Single Server MegaRAID
- No High Availability

Syncro CS
- High Availability Solution

SAN
- High Availability Solution

Syncro CS outperforms traditional HA alternatives
There are two Syncro CS Deployment Models

**Discrete Server/Storage**
- Windows 2012 Server 1
- Windows 2012 Server 2

**Cluster-in-a-Box**

- SERVER 1
- SERVER 2
- STORAGE

- All Syncro CS benefits *plus* ...
- CiB form factor further simplifies deployment and ease-of-use
- Significant infrastructure reduction
Syncro CS deployment scenarios: ROBO example

- Parts inventory
- Pricing database
- POS terminal
- Security apps
- Backup & monitoring
- Web store
Syncro CS deployment scenarios: HA Shared Storage Appliance

Virtualized Servers
- Servers run Hyper-V Server 2012
- HA shared storage appliance enables fast, smooth VM mobility

HA Shared Storage Appliance
- Syncro CS and Windows Storage Server 2012
- Discrete or CiB form factor

Syncro CS provides continuous uptime and reduced VM storage cost
How do I get started with Syncro CS?

LSI is closely engaged with major OEM and ODM partners
How do I get started?

System Builder Partners for validated solutions

Tested Enclosure Providers for build it yourself

LSI supports multiple business models
Syncro CS from LSI

- High availability solution for Small and Medium Businesses and ROBO datacenters
- Affordable, easy to deploy, and manage
- Built on the industry’s most trusted data protection technology, LSI MegaRAID
- LSI investing in exciting roadmap of Syncro CS shared DAS storage innovations

Introducing LSI® Syncro™ CS
HIGH AVAILABILITY without the high PRICE

Syncro CS solutions. Intelligently high availability DAS. Now brings down the cost to keep business up and running.

www.TheSmarterWayToOn.com
Learn more at the Tech Ed show this week

- Visit LSI in booth 1602
- Attend our “Executive Angle” session – opportunity to sync up with LSI and Microsoft execs about this product. Tue, 12:30 to 2:00 PM, Booth 1602
- Talk to us tonight at the Tech Ed “Ask the Experts” Session. Tue, 6:30 to 8:30 PM
- Visit www.SmarterWayToOn.com
Introducing SYNCREO CS
LSI lowers the cost
UPTIME

High Availability without the high price.

Syncro CS. Intelligent high availability DAS Solution now brings down the cost to keep business up and running.

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