



RAID Portfolio and Directions

ThinkServer Technical Marketing 10/29/13



RAID Product Directions

- LSI is strategic partner for complete RAID solutions
 - Industry leader in RAID technology
 - Best in class storage subsystem performance
- LSI RAID technology / products supported across entire portfolio (except TS140/440)
 - Common setup and management interfaces
 - Common RAID code and drivers
 - Common Management Tools
 - Simplifies learning and support
- Simplified RAID segmentation
 - Three tier approach (Entry, Value, Advanced)
 - Simplifies choices between performance, cost, reliability
 - Adapters support SAS/SATA and 6Gb/s SAS, SATA 3.0
 - Supports wide variety of storage intensive workloads including OLTP, e-mail, database, video streaming, web content, video-on-demand, security and surveillance, and reference data storage

ThinkServer RAID Naming Convention

Positioning	Naming Convention	Product Name	Product Description
Host based SATA	100 Series	ThinkServer RAID 100	Embedded SATA RAID (TS140, TS440)
Host based SAS	300 Series	ThinkServer RAID 300	Embedded SATA / SAS RAID (RD330,RD430)
Value / Hybrid	500 Series	ThinkServer RAID 500 Adapter ThinkServer RAID 500 Upgrade Key for Advanced RAID	LSI 9240-8i (RAID 0/1, 10) RAID 5, 50 Upgrade Key for LSI 9240-8i
Advanced	700 Series	ThinkServer RAID 700 Adapter ThinkServer RAID 700 Battery	LSI 9260-8i Battery upgrade for LSI 9260-8i
	710 Series	ThinkServer RAID 710 Adapter	LSI 9270CV-8i CacheVault – Supercap/Flash upgrade CacheCade and FastPath options

Server RAID Segmentation

Advanced – Controller Based RAID

Value – Hybrid RAID

Entry – Host Based RAID



- RAID Processing: Host CPU + Host PCH
- Cache: Host system memory
- RAID storage subsystem managed at OS level
- RAID 0, 1, 10, 5



- RAID Processing: Dedicated I/O controller on RAID adapter (IOC) + Host CPU; Uses Host system resources for RAID 5 calculations
- RAID storage subsystem managed by controller independent of host OS
- RAID 0, 1, 10 (Basic)
- RAID 5, 50 (Value)
- Advanced Features
 - Advanced Power Saving Modes
 - Online RLM & Capacity Expansion



- RAID Processing: Dedicated CPU on RAID adapter (ROC) offloads Host;
- HW acceleration for RAID 5 & 6
- Cache: Dedicated R/W memory on controller
- RAID storage subsystem managed by controller independent of host OS
- RAID 0, 1, 10, 5, 6, 50, 60
- Advanced Features
 - Battery backed cache for data protection
 - Advanced Power Saving Modes
 - Online RLM & Capacity Expansion
 - Advanced media error handling

- Cache Protected
- Business-Critical Applications
- Premium Software options

- Multiple Applications
- High CPU / Memory / Storage Utilization
- Virtualization environments

- Single / dedicated application server or appliance
- Low utilization
- OS Protection

RAID Selection Considerations

- Key architectural differences between Host based (software) RAID and Hardware based RAID influence choices based on the following criteria
 - Features
 - Price
 - Performance
 - Fault tolerance
 - Troubleshooting

* Virtualization Support for embedded Host Based RAID		
Hypervisor	Intel RSTe	LSI MegaRAID
MS Hyper-V	Yes	Yes
Linux Xen	No	Yes (R 0/1/10 only)
Linux KVM	No	Yes
VMware	No	No

	Host Based (Software) RAID	Hybrid RAID	Controller Based RAID	
Product	SW RAID	9240-8i	9260-8i	9270CV-8i
Supported Drives	SATA	SATA/SAS	SATA/SAS	SATA/SAS
Advanced RAID Features	Limited	Array migration, capacity expansion capabilities	RAID 6, 60; advanced data protection, array migration, capacity expansion capabilities	RAID 6, 60; advanced data protection, array migration, capacity expansion capabilities, advanced software
Price	Least	More	More	Most
Performance	Similar to H/W RAID in limited workload scenarios	Improved RAID performance in scenarios with increased numbers of workloads	Cache improves performance in large write / streaming scenarios (lower I/O latency for large # drives)	Cache improves performance in large write / streaming scenarios (lower I/O latency for large # drives), Dual Core processor
I/O Queue Depth	16 (LSI) / 32 (RSTe)	32	1024	1024
Fault tolerance	Tolerate HDD failure	Tolerate HDD failure, some I/O failures	Tolerate HDD failure or OS crash (protects any data left in cache) w/ BBU	Tolerate HDD failure or OS crash (protects any data left in cache) with optional CacheVault
Trouble-shooting	Limited event logs – OS based	Events logged to RAID controller	Events logged to RAID controller	Events logged to RAID controller
Virtualization Support*	Partial (see table)	Yes	Yes	Yes

RAID Selection Based on Workloads

Usage Model	Key Requirements	Type of RAID	RAID Level	HDD Type
Application Server, data stored elsewhere	Basic reliability	HW or SW RAID	RAID 1	SATA or SAS
Web / Media Server	Large capacity with basic reliability	HW or SW RAID	RAID 5	SATA
Video Editing	Large capacity with basic reliability, minimal impact on CPU	HW RAID	RAID 5 / 50	SATA
General purpose small business server	Data safety	HW RAID	RAID 10 / 5	SATA or SAS
Entry level small business server	Low cost	HW or SW RAID	RAID 1	SATA
Database server, File server, email server	High Availability	HW RAID	RAID 5 / 50	SATA or SAS
Database server, File server, email server	High Availability and High Performance	HW RAID	RAID 10	SAS
Video Surveillance	Maximum Throughput and Capacity with High Reliability	HW RAID	RAID 6 / 60	SATA or SAS

Embedded RAID Support (Intel RSTe 3.8)

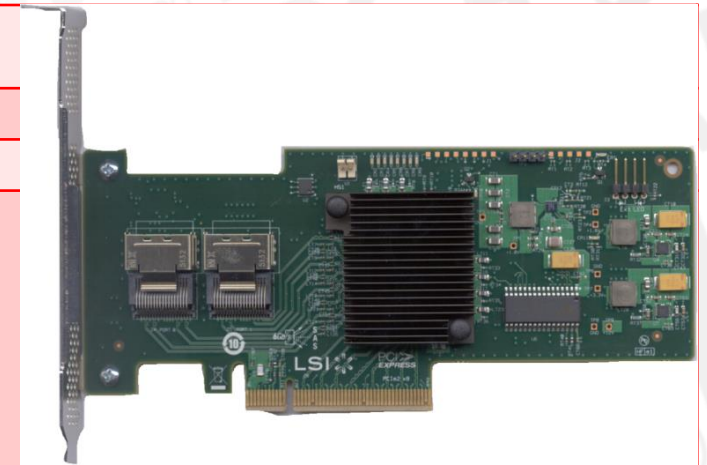
RAID Support	Technology: 0 / 1 / 10 / 5	
OS Support	Windows Server 2008 Standard/Enterprise/Datacenter Windows SBS 2011 Essentials, Standard, Premium Windows Server 2012 Standard, Foundation, Essentials Red Hat RHEL 6.4 (TS440 only)	
Features	<ul style="list-style-type: none">• SCU support for Matrix RAID 0/1/5/10• Pass-through drives• Hot Plug with I/O• Hot Spare Disk• Auto Rebuild on Hot Insert• Rebuild and Migration Check pointing• UEFI using metadata• SAS Expanders• SMART Support• Bad Block Management• Disc Coercion• Manual and Auto Rebuild	<ul style="list-style-type: none">• SGPIO for SAS & SATA• Email Alerting• CIM• Raid level migration (Raid 0,1,or 10 to 5)• Dirty Stripe Journaling• Verify and Repair• RAID Volume roaming between Linux and Windows• On Line Capacity Expansion• Large Stripe Size Support• WINDOWS ONLY• Matrix RAID for 2 RAID volumes on a single array
Alerts	<ul style="list-style-type: none">• Local Event notifications & Alerts to local management U/I• Remote Email Alerting via SMTP	
Cache	<ul style="list-style-type: none">• 16 MB	
Tools	<ul style="list-style-type: none">• RSTe RAID Option ROM UI (Pre-OS)• Intel Rapid Storage Technology UI (Windows UI Storage management Application)	
Performance	<ul style="list-style-type: none">• Generally on par with hardware solutions for RAID 0/1 and “small” numbers of drives• Minimal impact on CPU resources (<3%)	
Advantages	<ul style="list-style-type: none">• Inexpensive• Simple to use	
Disadvantages	<ul style="list-style-type: none">• Runs on host (CPU & memory) resources• Potential for data corruption (OS or application crash or power loss)	

Embedded RAID Support (LSI MegaRAID)

RAID Support	0 / 1 / 10 standard Optional RAID 5 Upgrade with key
Technology OS Support	Windows, Red Hat, SLES
Technology Virtualization Support	Microsoft Hyper-V Yes VMWare No Linux Xen (R0/1/10) Yes KVM (R0/1/10/5) Yes
Features	<ul style="list-style-type: none">• Mixed capacity drives in RAID array• Patrol Read (Sector scan and repair)• Global Spares with Auto rebuild• Auto Rebuild• Auto Verify & Repair (Consistency check)• >2TB HDD Support (Data Volumes Only, Boot Volume Support to be added once uEFI is available)• Bad block management• Staggered HDD spin-up
Alerts	<ul style="list-style-type: none">• Local or remote Event notifications & Alerts via SNMP
Write Back Cache	<ul style="list-style-type: none">• Not supported
Tools	<ul style="list-style-type: none">• MegaRAID CTRL-M (Pre-boot)• MegaRAID Storage Manager (Operating System GUI Storage Management Application)• MegaCLI (Operating System Command Line Interface tool)
Performance	<ul style="list-style-type: none">• Generally on par with hardware solutions for RAID 0/1 and “small” numbers of drives• RAID 5 performance TBD• Minimal impact on CPU resources (<3%)
Advantages	<ul style="list-style-type: none">• Inexpensive• Simple to use
Disadvantages	<ul style="list-style-type: none">• Runs on host (CPU & memory) resources• Potential for data corruption (OS or application crash or power loss)

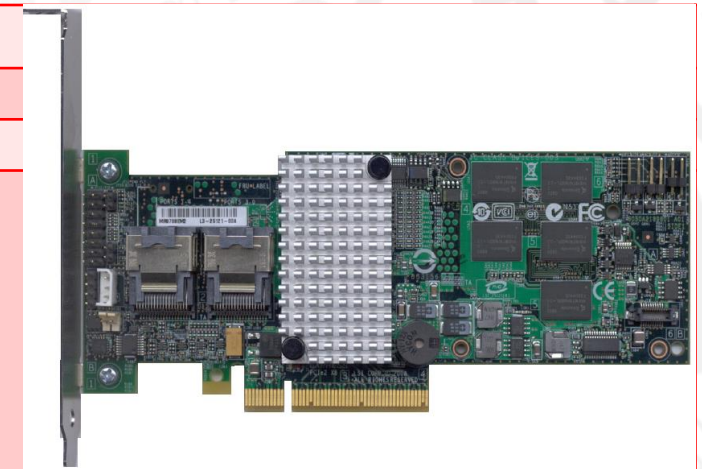
Hybrid RAID: MegaRAID SAS 9240-8i

RAID Support	0 / 1 / 10 / JBOD standard Optional RAID 5 / 50 Upgrade with key
OS Support	Windows, Red Hat, SLES, VMware
Virtualization Support	Yes
Features	<ul style="list-style-type: none">• LSI SAS2008 IOC Controller• PCIe 2.0 x8 HL / FH• Dedicated and Global hot spares with auto rebuild• Mixed capacity drives in RAID array• Patrol Read (Sector scan and repair)• Auto Rebuild• Auto Verify & Repair (Consistency check)• >2TB HDD Support (Data and Boot volumes)• Bad block management• RAID Level Migration• Online Capacity Expansion• Staggered HDD spin-up
Alerts	<ul style="list-style-type: none">• Local or remote Event notifications & Alerts via SNMP• Common Information Model (CIM) Provider
Write Back Cache	<ul style="list-style-type: none">• Not supported
Tools	<ul style="list-style-type: none">• MegaRAID WebBIOS (Pre-boot)• MegaRAID Storage Manager (Operating System GUI Storage Management Application)• MegaCLI (Operating System Command Line Interface tool)
Advantages	<ul style="list-style-type: none">• Low-cost Hardware RAID 0, 1, 10• Competitive Software RAID 5, 50 upgrade option• Improved RAS<ul style="list-style-type: none">- “No battery write journal” plus NVSRAM on HBA protect most RAID IO’s- Persistent event logging for advanced debugging and trouble shooting
Disadvantages	<ul style="list-style-type: none">• RAID 5 performance acceleration for Windows runs on host resources• No dedicated cache



Full-featured RAID: MegaRAID SAS 9260-8i

RAID Support	0 / 1 / 10 / 5 / 6 / 50 / 60 standard
OS Support	Windows, Red Hat, SLES, VMware
Virtualization Support	Yes
Features	<ul style="list-style-type: none">• LSI SAS2108 ROC• PCIe 2.0 x8 HL / LP• Cache Battery Backup Option – iBBU07 / iBBU08• Dedicated and Global hot spares with auto rebuild• Mixed capacity drives in RAID array• Patrol Read (Sector scan and repair)• Auto Rebuild• Auto Verify & Repair (Consistency check)• >2TB HDD Support (Data and Boot volumes)• Bad block management• RAID Level Migration• Online Capacity Expansion• Staggered HDD spin-up• Advanced power management of configured drives
Alerts	<ul style="list-style-type: none">• Local or remote Event notifications & Alerts via SNMP
Write Back Cache	<ul style="list-style-type: none">• 512MB, 72b, 800MHz
Tools	<ul style="list-style-type: none">• MegaRAID WebBIOS (Pre-boot)• MegaRAID Storage Manager (Operating System GUI Storage Management Application)• MegaCLI (Operating System Command Line Interface tool)
Advantages	<ul style="list-style-type: none">• HW acceleration for RAID 5 & 6 via dedicated IO processor• Dedicated R/W cache with Battery backup for data protection increases the number of operations running in parallel on a system• Advanced media error handling• Advanced HDD power (green) management
Disadvantages	<ul style="list-style-type: none">• Higher cost DAS RAID solution



Battery Backup Module – iBBU07 / iBBU08

- Li-Ion battery keeps write back cache protected during unexpected power loss
- Enhances controller's performance by allowing data being written to disk to be cached in battery-backed high speed memory.
- Battery mounts directly to 9260-8i



Full-featured RAID: MegaRAID SAS 9270CV-8i

RAID Support	0 / 1 / 10 / 5 / 6 / 50 / 60 standard	
OS Support	Windows, Red Hat, SLES, VMware	
Virtualization Support	Yes	
Features	<ul style="list-style-type: none">• LSI SAS 2208 ROC• PCIe 3.0 x8 HL / LP (MD2)• Cache Backup - CacheVault LSICVM01• Dedicated and Global hot spares with auto rebuild• Mixed capacity drives in RAID array• Patrol Read (Sector scan and repair)• Auto Rebuild• Auto Resume on Power Failure during Rebuild/Reconstruction• Auto Verify & Repair (Consistency check)• >2TB HDD Support (Data and Boot volumes)• Bad block management	<ul style="list-style-type: none">• RAID Level Migration• Online Capacity Expansion• SSD Support with SSD Guard™ technology• Staggered HDD spin-up• Advanced power management of configured drives
Alerts	<ul style="list-style-type: none">• Local or remote Event notifications & Alerts via SNMP• Common Information Model (CIM) Provider	
Write Back Cache	<ul style="list-style-type: none">• 1Gb DDR3 (1333 MHz)	
Tools	<ul style="list-style-type: none">• MegaRAID WebBIOS (Pre-boot)• MegaRAID Storage Manager (Operating System GUI Storage Management Application)• MegaCLI (Operating System Command Line Interface tool)	
Advantages	<ul style="list-style-type: none">• HW acceleration for RAID 5 & 6 via Dual Core dedicated IO processor• 1GB DDR3 Cache• Dedicated R/W cache with Advanced media error handling• Advanced HDD power (green) management• Optional CacheVault SuperCap NAND based backup for data protection increases the number of operations running in parallel on a system	
Disadvantages	<ul style="list-style-type: none">• Highest cost DAS RAID solution	



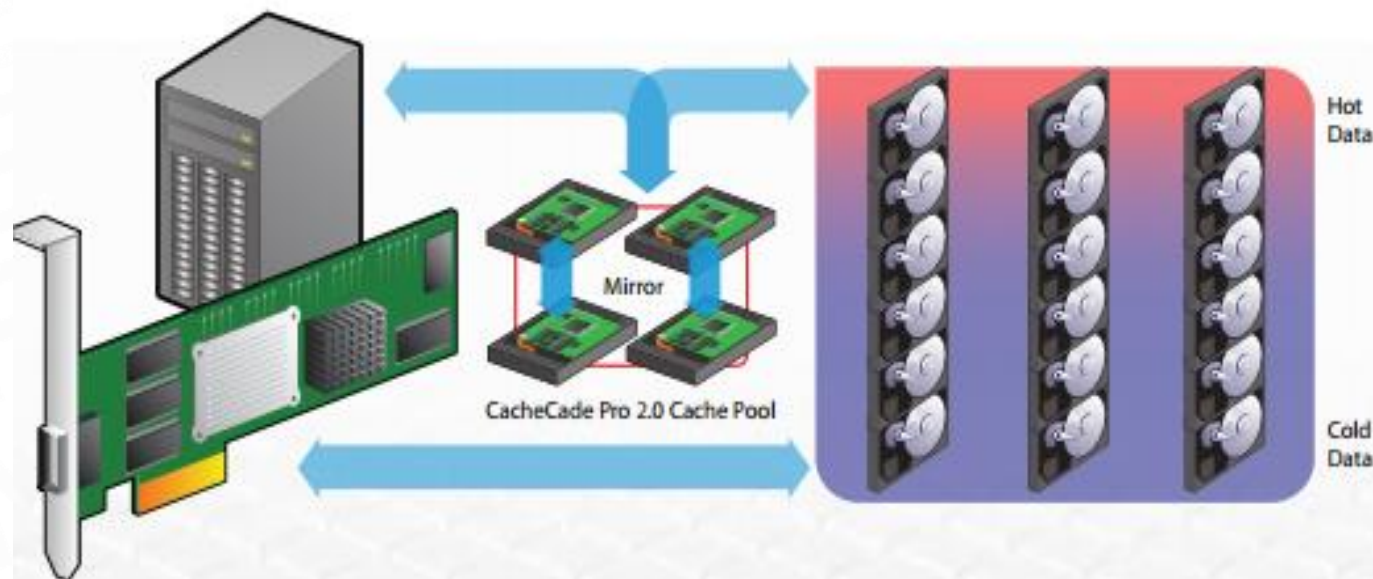
CacheVault

- Data is written to flash memory in the event of an unexpected power outage
- Super capacitor supplies power until cache is written to flash memory
- Eliminates possibility of losing data due to battery backup rundown
- Greener and Lower TCO
 - No need for battery maintenance, replacement, and disposal
- Available on RAID 710



CacheCade

- Combination of HDD capacity and SSD speed.
- Improve the performance of a server's existing drive volume(s) by dynamically utilizing SSDs as a dedicated pool of RAID controller cache.
- Useful for high volume low latency applications, random read intensive workloads:
 - OLTP, web server, file server, data mining
- Enabled as a Hardware Key
- Available on RAID 710
- Includes FastPath license



FastPath

- A high-performance IO accelerator for Solid State Drive (SSD) arrays
- Optimized version of LSI MegaRAID technology
- All data on faster media (SSD) with optimized I/O
- 2 to 10 times performance improvement over SSD alone
- Suitable for all workloads, maximum advantage in Random I/O
 - OLTP
- Enabled as a Hardware Key
- Available on RAID 710

CacheCade / FastPath Comparison

■ CacheCade

- Uses SSD for Cache
- Keeps “Hot” data in Cache
- Typically deployed as small number of SSD and large capacity rotating drives
- Can fit into existing deployments
- Less Expensive
- Mix of performance and High Capacity

■ FastPath

- Optimized version of MegaRAID for SSD
- Accelerates an array of SSD only
- Typically new deployment
- More expensive
- Smaller capacity, higher performance

RAID Management Tools

Environment	Intel RSTe SW RAID	LSI Embedded SW RAID	LSI Adapters
Pre-Boot Configuration	RSTe RAID Option ROM U/I	CTRL-M MegaCLI (Limited function)	Web BIOS MegaCLI (Limited function)
Storage Management Console (OS-level GUI)	Intel Rapid Storage Technology UI (Windows Only)	MegaRAID Storage Manager (Windows, Linux)	MegaRAID Storage Manager (Windows, Linux, VMware)
CLI (OS-level)	RSTCLI.exe	MegaCLI (Windows, Linux)	MegaCLI (Windows, Linux, VMware)

Capability	Features	RSTe U/I	MegaCLI	MegaRAID MSM
User Interface	<ul style="list-style-type: none"> Local / Remote access 	O/S GUI	Command Line	O/S GUI
Configuration	<ul style="list-style-type: none"> Setup and view controllers, and attached devices Drive Groups and Virtual Drives 	Local Access	Local Access	Local or Remote Access
Monitoring	<ul style="list-style-type: none"> Displays status of Virtual Drives, Hard disk drives, and other devices View Event Log file and on-screen alerts 	Local Access	Local Access	Local or Remote Access
Maintenance	<ul style="list-style-type: none"> Start and view progress of initialization, Consistency Check, Rebuild, Reconstruction, Patrol Read Updating adapter firmware 	Local Access	Local Access	Local or Remote Access
Alerts	<ul style="list-style-type: none"> Provide notification of errors, warnings 	Local Access (GUI) or Remote Access via SMTP alerts	N/A	Remote Access via SNMP

RAID Features (Summary Table)

	Intel RAID Storage Technology (RSTe 3.x)	LSI Embedded SAS RAID	LSI MegaRAID SAS 9240-8i	LSI MegaRAID SAS 9260-8i	LSI MegaRAID SAS 9270CV-8i
Product Name	RAID 100	RAID 300	RAID 500	RAID 700	RAID 710
Description	Intel Host Based RAID	LSI Host based RAID	8 port internal SAS/SATA	8 port internal SAS/SATA	8 port SAS/SATA
Host bus I/F	N/A	N/A	PCIe 2.0 x8	PCIe 2.0 x8	PCIe 3.0 x8
Data transfer I/F	3/6Gbps SATA3	3Gbps SAS/SATA	3/6Gbps SAS/SATA3	3/6Gbps SAS/SATA3	3/6Gbps SAS/SATA3
Connectors (Internal / External)	2x onboard SATA ports	Supports 8 SAS/SATA SCU ports	2x Internal SFF-8087 (x4)	2x Internal SFF-8087 (x4)	2x Internal SFF-8087 (x4)
RAID levels	0, 1, 10, 5	0, 1, 10	0, 1, 10, JBOD	0, 1, 10, 5, 50, 6, 60	0, 1, 10, 5, 50, 6, 60
Upgrade Key RAID Levels	N/A	5	5, 50	N/A	N/A
Form factor	N/A	N/A	Low Profile MD2	Low Profile MD2	Low Profile MD2
I/O Processor	CPU / PCH	CPU / PCH	LSI SAS2008 IOC	LSI SAS 2108 ROC	LSI SAS 2208 Dual-Core ROC
Write-back Cache	N/A	N/A	N/A	512MB800MHz DDR2	1GB DDRIII cache (1333MHz)
Host memory	16MB		32MB	N/A	N/A
Battery Option	N/A	N/A	N/A	iBBU07 / iBBU08	CacheVault LSICVM01
Encryption	None	None	None	None	None
Tape drives supported	No	No	Yes	Yes	Yes
Utilities	Intel RSTe Storage Manager	LSI MegaRAID Management Suite	LSI MegaRAID Management Suite.	LSI MegaRAID Management Suite	LSI MegaRAID Management Suite
TS140	•	-	-	-	-
TS440	•	-	•	•	-
RD330	-	•	•	•	-
RD430	-	•	•	•	-
RD540	-	N/A	•	•	•
RD640	-	N/A	•	•	•

THANK YOU GRAZIE MERCI DANKE GRAZIAS 謝謝 СПАСИБО
GRACIAS OBRIGADO ありがとう DANK TAKK BEDANKT DAKUJEM

Backup



Hybrid RAID: MegaRAID SAS 9240-8i

■ Key features

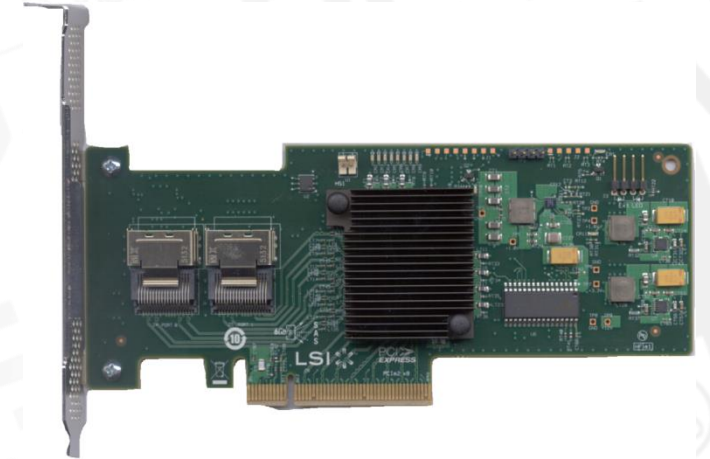
- LSI SAS2008 IOC Controller
- PCIe 2.0 x8 HL / FH
- Two SFF-8087 SAS x4 connectors
- Cache, 2MB CRAM
- 6Gb/s SAS & SATA Support
- RAID 0,1,10 (Basic)
- RAID 5, 50 (Value) via Upgrade Key
- 16 Physical Disk Support
- Full OS suite that includes Windows, Linux, and VMware

■ Advantages

- Low-cost Hardware RAID 0, 1, 10
- Competitive Software RAID 5, 50 upgrade option
- By virtue of firmware running on IOC processor – data is maintained through an operating system failure
 - improved RAS
 - “No battery write journal” plus NVSRAM on HBA protect most RAID IO's

■ Disadvantages

- Software RAID 5 runs on host resources
- No dedicated cache



Full-featured RAID: MegaRAID SAS 9260-8i

- Key features

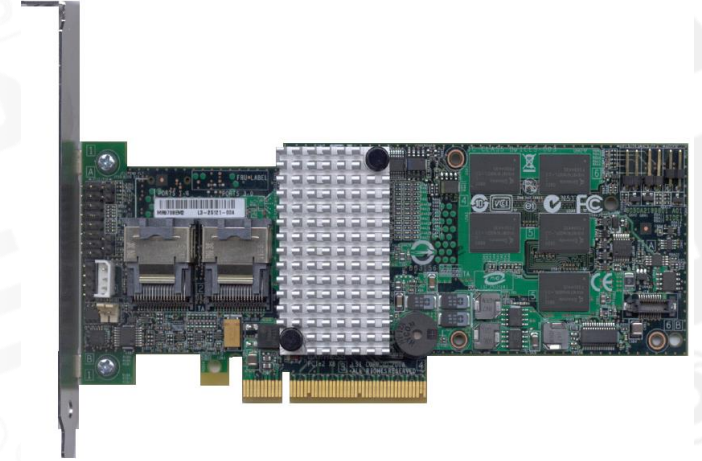
- LSI SAS2108 ROC
- PCIe 2.0 x8 HL / LP (MD2)
- Two SFF-8087 SAS x4 connectors
- Cache, 512MB, 72b, 800MHz
- 6Gb/s SAS & SATA Support
- RAID 0, 1, 10, 5, 6, 50, 60
- 128 Physical Disk Support
- Full OS suite that includes Windows, Linux, and VMware
- Cache Battery Backup Option – iBBU07 / iBBU08

- Advantages

- HW acceleration for RAID 5 & 6 via dedicated IO processor
- Dedicated R/W cache with Battery backup for data protection increases the number of operations running in parallel on a system
- Advanced media error handling
- Advanced HDD power (green) management

- Disadvantages

- Highest cost DAS RAID solution



Full-featured RAID: MegaRAID SAS 9270CV-8i

■ Key features

- LSI SAS2208 Dual-Core ROC
- PCIe 3.0 x8 HL / LP (MD2)
- Two SFF-8087 SAS x4 connectors
- Cache, 1Gb DDRIII (1333 MHz)
- 6Gb/s SAS & SATA Support
- RAID 0, 1, 10, 5, 6, 50, 60
- 128 Physical Disk Support
- Full OS suite that includes Windows, Linux, and VMware
- Cache Backup Option – CacheVault LSICVM01

■ Advantages

- HW acceleration for RAID 5 & 6 via dedicated Dual-Core IO processor
- PCIe 3.0
- Dedicated R/W cache with CacheVault backup for data protection increases the number of operations running in parallel on a system
- Advanced media error handling
- Advanced HDD power (green) management

■ Disadvantages

- Highest cost DAS RAID solution



LSI Products Feature Comparison



Product Differentiation

	MR SWR	9240 Series	9260/9280 Series	9270 Series
Hardware RAID solution	No	Yes*	Yes	Yes
OS independent	No, design for each O/S	Yes	Yes	Yes
Firmware base code	No-Driver base	Yes	Yes	Yes
Full O/S support	Windows & Linux	Yes	Yes	Yes
Specific HW support	AHCI & SCU devices	Only LSI SAS IOC with 2MB CRAM	LSI SAS IOC/ROC	LSI SAS IOC/ROC
Cache Protection	No	No	Battery	CacheVault
WB Cache Policy	No	No	Yes	Yes

*RAID 5 uses Host resources for performance acceleration in Windows environments.

Features Comparison: Device Support

Device Support	MR SWR	9240 Series	9260/9280 Series	9270 Series
>2TB HDD Support	Yes	Yes	Yes	Yes
Max. Device per controller	8	64	Value: 128 Feature: 240	128
Max. PD for RAID configuration	8	16	Value: 128 Feature: 240	128
Max . Disk Group per controller	8	8	16	16
Max. PD per Disk Group	8	16	32	32
SAS 6Gb/s/SAS 3Gb/s Disk & Non Disk	Yes	Yes	Yes	Yes
SATA 6Gb/s/SATA 3Gb/s Disk & Non Disk	Yes	Yes	Yes	Yes
HDD Pass-thru Support (JBOD Mode)	No	Yes/64	No	No
SATA SSD Support	Yes	Yes	Yes	Yes
SAS SSD Support	Yes	Yes	Yes	Yes
S.M.A.R.T Support	Yes	Yes	Yes	Yes
SAS TCQ Support	Yes	Yes	Yes	Yes
SATA NCQ Support	Yes	Yes	Yes	Yes

Features Comparison: Device Support

Device Support	MR SWR	9240 Series	9260/9280 Series	9270 Series
Online HDD FW Update	Yes	Yes	Yes	Yes
Enable/Disable Disk's Write Cache	Yes	Yes	Yes	Yes
Write Journaling for Disk Cache Protection	No	No	Yes	Yes
SED Support (Encryption)	No	No	Yes	Yes
Device Power Management				
ACPI	Yes	Yes	Yes	Yes
Dimmer Switch I: Unconfigured HDDs	No	Yes	Yes	Yes
Dimmer Switch II: Hot Spare HDDs	No	Yes	Yes	Yes
Dimmer Switch III: Configured HDDs	No	No	Yes	Yes
Monitor HDD temperature	No	Yes	Yes	Yes
Staggered Disk Spin up	Yes	Yes	Yes	Yes
Drive Hot Plug	Yes	Yes	Yes	Yes

Features Comparison: RAID Features

MR SWR	9240 MR SWSeries	9240 Series	9260/9280 Series	9270 Series
RAID Levels	0/1/10/5	0/1/10/5**/50**	0/1/10/5/50/6/60	0/1/10/5/50/6/60
Max. VD per controller	8	16	64	64
Max. VD per Disk Group	8	16	16	16
Outstanding I/O	16	32	1024	1024
> 2TB VD Support	Yes	Yes	Yes	Yes
VD Migration up to MegaRAID	Yes	Yes	N/A	N/A
Random Deletion of VD	Yes	Yes	Yes	Yes
Background Initialization (BGI)	Yes	Yes	Yes	Yes
Foreground Initialization	Yes	Yes	Yes	Yes
Fast and Slow VD initialization	Yes	Yes	Yes	Yes
RAID Level Migration (RLM)	No	Yes	Yes	Yes
Online Capacity Expansion (OCE)	No	Yes	Yes	Yes
Rebuild	Yes	Yes	Yes	Yes
Check Consistency (CC)	Yes	Yes	Yes	Yes
Auto Resume after Power Fail	Rebuild, CC, BGI	RLM, OCE, Rebuild, CC, BGI	RLM, OCE, Rebuild, CC, BGI	RLM, OCE, Rebuild, CC, BGI
Patrol Read (Disk sector scan and repair)	Yes	Yes	Yes	Yes

** With upgrade key

Features Comparison: RAID Features

Virtual Disk (VD) Capabilities	MR SWR	9240 Series	9260/9280 Series	9270 Series
Variable stripe size for all VD	64K only	Yes, up to 64K	Yes, up to 1MB	Yes, up to 1MB
MegaRAID foreign config. import	No	Yes	Yes	Yes
Auto Rebuild Support	Yes	Yes	Yes	Yes
Boot in Degraded Mode	Yes	Yes	Yes	Yes
Disk Data Format (DDF) Compliance	Yes	Yes	Yes	Yes
Copy Back Hot Spare	No	Yes	Yes	Yes
Maintain Failed Drive History	No	Yes	Yes	Yes
Write Journaling	No	No	Yes	Yes
Global Hot Spare	Yes	Yes	Yes	Yes
Dedicated Hot Spare	No	Yes	Yes	Yes
Max Number of Hot Spare support	8	8	32	32
Drive Roaming	Yes	Yes	Yes	Yes
Revertible Hot Spare	No	Yes	Yes	Yes
Bad Block Management	Yes	Yes	Yes	Yes
Soft Bad Block Management	Yes	Yes	Yes	Yes
Configuration Backup and Restore	Yes	Yes	Yes	Yes
Selectable Logical Drive Boot Order	Yes	Yes	Yes	Yes
Drive Multipath Support	No	Yes	Yes	Yes

Features Comparison: RAID Features

Cache Policy Support	9240 MR SWSeries	9240 Series	9260/9280 Series	9270 Series
Controller Write Back Cache policy	No	No	Yes	Yes
Controller Read Cache policy	No	No	Yes	Yes
Enclosure and Device Management				
External Enclosure Support	No	No	Yes	Yes
Max Number of Expanders	0	2	32	32
SGPIO	Yes	Yes	Yes	Yes
SES	No	Yes	Yes	Yes
Direct Attached LED	No	Yes	Yes	Yes
Storage Management				
Pre-Boot	Yes	Yes	Yes	Yes
Command Line	Yes	Yes	Yes	Yes
GUI	Yes	Yes	Yes	Yes

Features Comparison: Advanced Options

Advanced Software Options	9240 MR SWSeries	9240 Series	9260/9280 Series	9270 Series
CacheCade™ SSD Read Caching	No	No	Yes	Yes
CacheCade™ Pro SSD Read/Write Caching	No	No	Yes	Yes
MegaRAID Recovery	No	No	Yes	Yes
MegaRAID Fast Path™ SSD VD Optimization	No	No	Yes	Yes
SafeStore Encryption Services for SED HDDs	No	No	Yes	Yes
CacheVault onboard cache protection	No	No	Yes	Yes
Battery Backup onboard cache protection	No	No	Yes	Supercapacitor

Features Comparison: OS Support

OS	9240 MR SWSeries	9240 Series	9260/9280 Series	9270 Series
Windows O/S	x86, x64	x86, x64	x86, x64	x86, x64
Linux O/S	x86, x64	x86, x64	x86, x64	x86, x64
Sun Solaris	No	x86	x86, SPARC	x86, SPARC
Netware 6.5	No	Yes	Yes	Yes
SCO OpenServer 6	No	Yes	Yes	Yes
Unixware 7.1.x	No	Yes	Yes	Yes
Free BSD	No	Yes	Yes	Yes
VMware ESX	No	Yes	Yes	Yes
Hyper-V	Yes	Yes	Yes	Yes
uEFI	Yes	Yes	Yes	Yes

THANK YOU GRAZIE MERCI DANKE GRAZIAS 謝謝 СПАСИБО
GRACIAS OBRIGADO ありがとう DANK TAKK BEDANKT DAKUJEM