Series 8 (12 Gbps) and Series 7 (6 Gbps)

Technical Brief

Flexible Configuration Options for Microsemi Adaptec SAS/SATA RAID Adapters

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Microsemi

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Series 8 and Series 7 Flexible Configuration

High-density rack storage environments and expander-based backplane scenarios require solutions that are optimized for the form-factor, and can deliver capacity and flexibility in configuring direct-attach storage.

Microsemi Adaptec Series 8 (12 Gbps) and Series 7 (6 Gbps) RAID adapters offer flexible and automatic configuration for both raw and logical devices tailored to the application's need. Flexible configuration offers three settings, tunable through the adapter's pre-boot tools:

- Auto Volume mode—automatically configures all HDD/SSD devices as logical devices
- RAID mode—exposes or hides physical devices to the operating system for traditional RAID adapter functionality and traditional usage models
- HBA mode—automatically exposes physical devices to the operating system

By supporting mixed deployments of logical and physical devices, Series 8 and Series 7 adapters make it possible to control placement of data and to utilize hard disk drives (HDDs) and solid state drives (SSDs), along with tape and other storage peripherals.

Table 1 Benefits of Using Series 7 and Series 8 Adapters

Adapter Setting	Description	Supported Devices	Device Configuration	Benefit
Auto volume mode	Automatically configures all HDDs/SSDs as logical devices.	Logical drives	Automatic	Acceleration through DRAM read/write caching, which can lower access time and latency.

Adapter Setting	Description	Supported Devices	Device Configuration	Benefit
RAID mode .Expose .Hide	Traditional ARC functionality and usage models (with options to expose or hide physical devices to the operating system).	Logical drives, physical drives, and tape/other devices	Manual	Support for full hardware RAID data protection, features, and RAID level migration. Support for maxCache (SSD caching). Support all auto volume/HBA mode features.
HBA mode	Automatically exposes physical devices to the OS (HDD, SSD, tape, autoloaders).	Physical drives and tape/other devices	Automatic	Supports migration of disks from onboard SATA interfaces or other SATA/SAS I/O controllers. Provides full access to the physical device from the OS/App layer. Support for third party vendor tools to access and configure devices through mode pages.

Modes

Auto Volume Mode

The Auto Volume Mode setting automatically configures HDDs and/or SSDs as logical devices by writing a small amount of metadata to the drive. The drive is then recognized as a logical block storage device. The benefit to this is that onboard adapter memory is used for caching to accelerate reads/writes and to reduce access times and latency.

RAID Mode

The default adapter setting is RAID Mode, which provides support for full hardware RAID data protection, maxCache Plus, and more. The user can choose to either automatically expose (default) physical devices (that is, providing full access to them) like HDDs, SSDs, tape devices and autoloaders to the operating system, or hide these devices (for example, when it is useful to have the SCSI ID assigned by the host itself). Both RAID modes support migration of disks from onboard SATA interfaces as well as other SAS/SATA I/O adapters, and support third-party vendor tools (which access/configure drives through mode pages). RAID Mode also supports all the features and functionality of Auto Volume Mode and HBA mode through manual configuration of the attached devices.

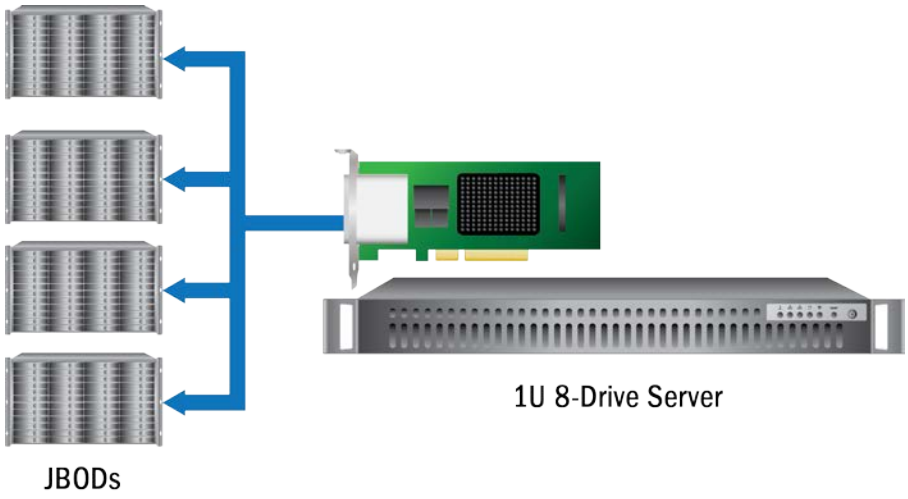
HBA Mode

The HBA Mode setting automatically exposes (provides full access) physical devices like HDDs, SSDs, tape devices, and autoloaders to the operating system. It supports migration of disks from onboard SATA interfaces as well as other SAS/SATA I/O adapters. Additionally, this mode supports third-party vendor tools which access/configure drives through mode pages.

Use Cases

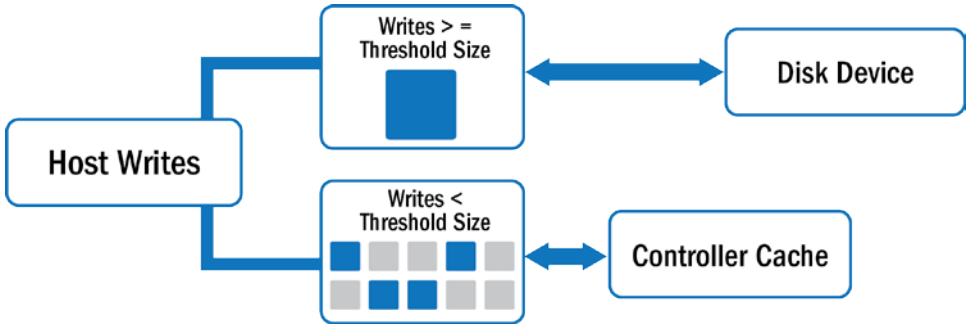
A 1U server has limited slot space and typically only supports 8 direct attach drive bays. The low-profile Microsemi Adaptec 8885 and Microsemi Adaptec 78165 RAID adapters with Flexible Configuration are designed specifically for these environments, offering support for 8 internal drives configured as logical volumes for critical data. Each adapter also provides external connectivity to JBODs. These can be configured as raw devices for maximum capacity cold storage usage—all within an MD2 form factor.

Figure 1 1U 8-Drive Server



Flexible Configuration is also ideal for expander-based backplane applications. Whether inside or outside the server chassis, expander-based backplanes allow for scalability but can introduce compatibility issues and latency. Series 8 and Series 7 RAID adapters offer 16- and 24-port direct connectivity options. By configuring each drive as a simple volume, on-board DRAM can be used to help accelerate reads/writes. When coupled with Big Block Bypass Mode (a setting available on every Microsemi Adaptec RAID adapter that filters large I/Os to the drive and keeps cache available for small random I/Os), Flexible Configuration delivers significant gains in random I/O performance.

Figure 2 Big Block Bypass Mode



Conclusion

With Flexible Configuration, Series 8 (12 Gbps) and Series 7 (6 Gbps) RAID adapters from Microsemi provide an effective and efficient hardware investment by allowing data centers to purchase one SKU and then choose from three configuration profiles to meet their needs.

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