

Adaptec® **Serial ATA RAID:** Opening New Markets with a Next-Generation I/O Platform

Synopsis

Serial ATA (or SATA) is an emerging new technology planned to replace today's Parallel ATA as the storage I/O interface for desktop PCs and workstations. But because of its many new capabilities and advantages – including cost-effective RAID protection – Serial ATA is also expected to become a vital storage connection force in important new markets, particularly the desk-top, low-cost server, and work station segment. In order for resellers to fully capitalize on this new opportunity, they must both understand the technology's benefits and plan effectively for the market transition to Serial ATA.

Storage Interfaces in the Enterprise Environment

The interface used to connect a system's CPU to a storage device (usually a hard disk drive) is a critical component of a user's overall system performance. For optimum success, the I/O interface must be appropriate to the storage and performance demands of the user. This means that the I/O interface's cost, data throughput performance, reliability, flexibility, robustness, and ease of integration and migration must be balanced with the needs of the user.

Since the early 1990s, Parallel ATA's key advantages of low cost and appropriate performance have made it the predominant I/O standard for desktop PCs and workstations. However, today's rapidly growing use of data-intensive applications has put pressure on the Parallel ATA technology to keep up. New, more powerful applications coupled with faster and less expensive CPUs have created an increasing demand for a more capable and scalable storage I/O standard.

Traditionally, a key differentiator between I/O standards has been the cost/benefit trade offs between performance, reliability, and data protection in the form of RAID capabilities. In general, higher-performance I/O standards with RAID capabilities have been implemented in enterprise environments, while lower-cost I/O standards without full RAID have been standard in the more price-sensitive market segments. In the sub-entry server, desktop PC, and workstation markets, it has generally not been cost-effective to implement high-performance I/O and RAID interfaces because they have been too costly – until now.

The emergence of Serial ATA as a new I/O standard for direct attached storage changes the traditional cost/benefit equation, and the addition of powerful, yet cost-effective RAID capabilities alters the landscape for low-cost server storage. Resellers who wish to gain a competitive advantage need to help their customers understand the benefits of migrating to Serial ATA as the best storage I/O platform for future growth.

The Emergence of Serial ATA for Low-Cost Servers

Serial ATA has been designed to become the next-generation storage I/O standard for budget-constrained users. And with a roadmap of accelerating performance plus new capabilities that make real RAID more cost-effective than ever, Serial ATA will open up to resellers a broad new market of cost-conscious small business users.

Serial ATA incorporates a number of important feature enhancements that deliver compelling new benefits for users today, and well into the future. Key Serial ATA features include:

- **High-performance roadmap.** The first generation of Serial ATA offers 1.5 Gigabits/sec data throughput speed – faster than the most advanced Parallel ATA speed – with at least two succeeding generations bringing performance up to 3.0 Gigabits/sec and then 6.0 Gigabits/sec.

- **Low cost.** Serial ATA is designed to be cost-competitive with equivalent Parallel ATA solutions, which brings the attractive cost scaling of a desktop standard to the low-cost server market. Serial ATA hard disk drives (HDDs) are expected to maintain their cost advantage over SCSI drives (though SCSI drives will continue to be more reliable and higher-performing for high-transaction volume, mission-critical environments), making the benefits of Serial ATA RAID arrays more economically feasible for small business.
- **Simplified connections.** With Serial ATA, storage is directly connected to the backplane, making adding and removing devices safe, easy, and reliable for users.
- **Better cabling.** Thin flexible cables eliminate Parallel ATA cable clutter, enabling space-saving, smaller footprint Serial ATA servers. An expanded cable length (up to 1 meter) gives greater flexibility for drive configurations, making Serial ATA RAID systems much more practical.
- **Point-to-point connection.** Serial ATA provides a separate connection path between the host and each device so that devices can transmit data in parallel, without jumper settings or external termination, again, making RAID configuration easier.
- **Command optimization.** Commands to a device are queued-up for immediate execution, without having to wait for responses, increasing performance and making RAID systems more practical.
- **Backward compatibility.** Complete software and driver transparency with Parallel ATA, makes for faster migration from the old standard to the new, and without additional migration costs.

In the past, features of this caliber have not been available to low-cost user environments because of the limitations of the Parallel ATA standard. Because Serial ATA cost-effectively eliminates these technology restrictions, the adoption of Serial ATA by desktop PC, workstation, and sub-entry server users is expected to grow throughout 2003 and 2004.

Adoption of Serial ATA will also accelerate as low-cost Serial ATA HDDs begin entering the market in volume in the second half of 2003, and as performance-tuned Serial ATA RAID controllers and host bus adapters

(HBAs) are introduced by vendors like Adaptec. Resellers will need to be prepared to meet market demand with the most capable Serial ATA products they can supply.

Added Value of Serial ATA RAID

Resellers who have been providing Parallel ATA solutions will soon need to be providing value-added Serial ATA solutions. And one of the most important new value-adds that Serial ATA enables for low-cost small business servers, is low-cost full-performance RAID.

RAID is an industry standard, flexible method for maximizing the protection and availability of stored data. RAID requires multiple independent HDDs managed as an array, in order to write data in such a way that it is striped across the different drives for better performance, fault tolerance, and redundancy. When RAID functionality is added to the higher throughput speed and lower cost of Serial ATA, it becomes a very cost-effective way to boost the quality of data protection, availability, and reliability for small business users.

It is useful to remember that RAID originally stood for Redundant Arrays of *Inexpensive* Disks. Since Serial ATA HDDs will enter the market at a similar price point to existing Parallel ATA drives, deploying Serial ATA RAID arrays on low-cost servers will deliver higher performance (both currently, and in the future) and fully protected data at approximately the same inexpensive cost as Parallel ATA.

This combination of low cost and real RAID gives resellers a powerful new product set that will have great appeal to budget-tight small business users.

While Parallel ATA RAID implementations certainly remain viable, their applicability is focused on legacy Parallel ATA systems. Disk drive manufacturers are increasingly releasing Serial ATA HDDs as the standard's adoption grows, and additional Serial ATA RAID controllers and HBAs are emerging to meet the growing market demand. Forward-looking users are choosing Serial ATA as their standard for the future. Forward-looking resellers are looking for the most capable Serial ATA RAID solutions to meet the needs of their small business customers.

RAID Everywhere: Including Low-Cost Servers

Serial ATA RAID completes the promise of Adaptec's *RAID Everywhere* strategy. RAID technology has traditionally been associated primarily with higher-range enterprise servers—and yet the benefits of RAID are applicable to *any and all* computing environments. Adaptec is the industry leader in bringing RAID to the widest possible market. Now, with Adaptec Serial ATA RAID, full data protection capabilities are cost-effective for PC's, high-end workstations, and sub-entry servers.

Just as Serial ATA itself offers users a roadmap of features choices, so Adaptec's family of Serial ATA RAID products will offer a range of capabilities. Adaptec's Serial ATA RAID products are designed to roll-out to the market in accordance with the adoption curve of Serial ATA itself. Adaptec's range will include a complete family, comprising chip-level RAID solutions and zero-channel controllers, as well as low-profile multiple-channel add-in cards.

In addition to full conformance with the ATA standard, Adaptec's Serial ATA RAID products will offer users the following:

- A single management software application, Adaptec Storage Manager™ – Browser Edition, providing seamless storage integration and management across all Adaptec RAID solutions (Serial ATA, SCSI, and soon Serial Attached SCSI).
- A broad range of price/performance Serial ATA options, including 2-, 4-, 8-, and 16-port cards that offer multiple RAID level support for maximum data protection.

- Up to 1.5 Gbit/sec I/O throughput with HDD performance tuning
- The industry's most comprehensive technical support for maximum uptime and productivity
- Adaptec signature reliability, quality, compatibility... as always, "it just works!"

Adaptec Serial ATA RAID products complete the Adaptec RAID Everywhere strategy. At every critical point across every enterprise, Adaptec delivers storage connections with complete RAID protection, ease of storage management, comprehensive service and support—a total solution. The chart below illustrates where Serial ATA fits in the selection range of Adaptec RAID storage I/O product families.

Reseller Advantage: Adaptec Serial ATA RAID

The transition to Serial ATA RAID will take place over the next two years. To help you better take advantage of this transition, Adaptec has prepared a series of resources called the Adaptec Serial ATA RAID Starter Kit. Available online, these tools include a technical white paper, Serial ATA RAID product data sheets, and 3rd party educational material on Serial ATA. To access the Adaptec Serial ATA RAID Starter Kit, go to <http://www.adaptecconnect.com/go/sata>.

Adaptec RAID Everywhere

	Desktop PCs	Workstation	Sub-entry Servers	Entry Servers	Mid-range Servers	High-end Servers
Fibre Channel RAID						•
Ultra320 SCSI RAID					•	•
Ultra160 SCSI				•	•	
Serial ATA RAID	•	•	•	•		
Parallel ATA RAID	•	•				

