

Introduction

The ATA and SCSI hard drive interfaces that are commonly associated with desktop and enterprise storage applications are examples of parallel bus architectures. These architectures will eventually transition to serial implementations to improve data signal integrity, enable smaller designs and overcome the bandwidth limitations of their predecessors. The new serial interfaces—Serial ATA (SATA) for PCs and workstations and Serial Attached SCSI (SAS) for mission-critical computing—have also been designed to improve performance, reliability and scalability. There are several attributes that combine to substantially reduce the



total cost of ownership for desktop and enterprise storage.

These emerging interface standards offer investment protection as a result of the following: configuration flexibility, backward compatibility and a performance roadmap extending out nearly a decade. Let's look at each of the characteristics in greater detail:

Configuration flexibility

SATA and SAS can share the same physical connection, enabling system builders to easily integrate both drive types on a single backplane. The system controllers have been designed to recognize both interface types and communicate with each device in its own language, thus coordinating their respective activities and performance. This capability will enable OEMs and systems integrators to design a single, configurable storage solution that meets a broad range of price, performance and scalability requirements.

The configuration flexibility will result in systems that include a combination of SAS drives—to provide high level of system performance and reliability—or SATA drives that provide a high capacity and low-cost-per-gigabyte solution for near-line storage, disk-to-disk backup and similar applications. This will enable disk arrays and other storage

systems to be developed that provide exactly what the application requires for the least cost and maximum return on investment.

Backward compatibility

SATA and SAS will change the physical interface to the disk drive (old style ribbon cables will be replaced with smaller round cabling and common connectors). The new interface standard however, has been designed to maintain backward compatibility with the established base of SCSI software and middleware that is currently being used in most enterprise storage environments. This comprehensive support of existing technology and standards will reduce risk and minimize total cost of ownership.

Transfer rate improvements

Both SAS and SATA were designed as industry standard interfaces with a roadmap for continuous transfer rate improvements. The first generation of SATA hard drives operate at half-duplex and have data transfer rates of 1.5Gb/s. Meanwhile, SAS has been designed for 3Gb/s, full-duplex operation—enabling simultaneous data transfers in both directions. In its next evolutionary stage, the SAS interface will scale to 6Gb/s. Standards organizations, including the SCSI Trade Association and T10 Committee continue to evaluate the specifications to ensure that they can scale to address future data transfer rate requirements. Maintaining the backward compatibility attributes of the new serial interfaces will continue to be a priority for these working groups.

These new serial interfaces combine to provide IT managers with exceptional configuration flexibility and investment protection. They have been designed so that as storage requirements change, customers can easily transition between SATA and SAS drives without a significant infrastructure upgrade. These exciting new developments will become increasingly important in the years to come as enterprise storage purchase decisions are scrutinized for investment protection and low total cost of ownership.

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