

INVENT

Technology Newsletter



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Technology Feature

Choosing the right hard disk

There are many choices available when it comes to selecting hard disk drives. Recent developments in this field have increased the reliability, size and speed of drives available.

Choosing the right type of drive is very important for the proper functioning as well as optimum performance of the workstation, and the applications loaded.

When it comes to workstations, there are 3 major choices in the market – SATA, SCSI and SAS. All have their own benefits and limitations.

Let's examine the available technologies, and see how you should select the right hard disk for your workstation.

SCSI

Traditional parallel SCSI (Small Computer System Interface) is a tried and tested hard disk interface that has been around for decades, with data transfers up to 320 megabytes per second.

SCSI also offers a lot of unique features, such as command tag queuing (CTQ), to improve I/O performance.

SCSI hard drives are noted for their reliability, and it is possible to daisy chain up to 15 devices per SCSI adapter channel over short distances.

The problem with traditional SCSI is that it's reaching the end of its practical service life. 320 MBps SCSI interface won't go much faster at the distances of today's SCSI cables.

The potential for expandability and data transfer performance is just overwhelming SCSI.

SCSI is considered an obsolete technology on workstations today, and replaced by SAS/SATA disk arrays for faster speed and superior connectivity.



SCSI cable

SCSI cables connect devices in a parallel fashion, and requires termination. Cables are long and bulky.

SAS (Serial Attached SCSI)

SAS drives follow the SCSI command set and carry many of the same characteristics of reliability and performance found in SCSI drives, but it employs a 300 MBps serial version of the SCSI interface.

Although this is currently a bit slower than SCSI at 320 MBps, a SAS interface can support up to 128 devices over longer distances than Ultra320 and can be expanded to 16,000 devices on a channel.

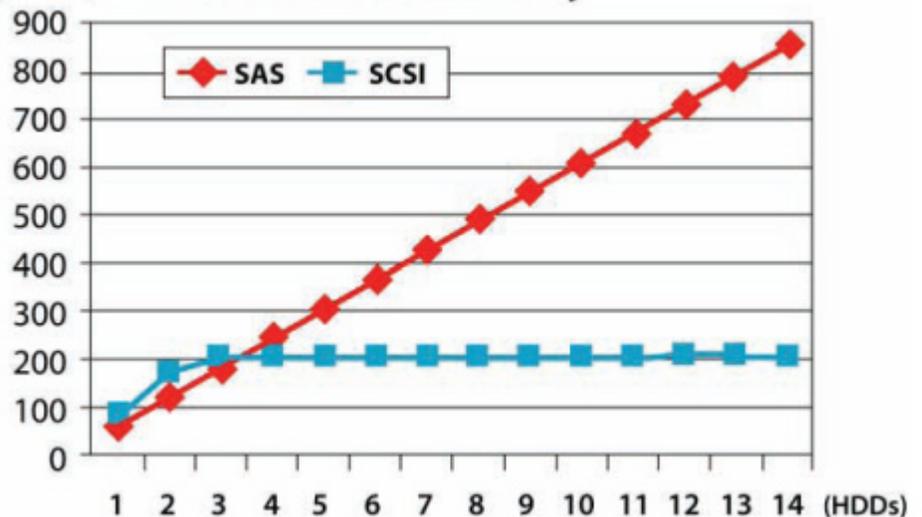
Also, because of the serial (point-to-point) nature of the architecture, the actual bandwidth on a SAS bus will be higher than that of SCSI. The bus is not shared, as in SCSI, and this makes the interface perform better.

SAS drives offer the same reliability and 10,000-15,000 rotational speeds that SCSI drives do.

SAS drives are also available in SFF (Small Form Factor) in selected sizes.

The reliability of SFF drives is greater than larger drives. Industry drive manufacturers indicate 2.5" drives have up to 15% better mean time between failure results (higher reliability) than the large 3.5" drives.

(MB/s) SAS vs. SCSI Scalability



Write cache enabled. Sequential Read_Block Size = 16K Queue depth = 16
SAS Drives offer better reliability than traditional SCSI drives, especially in configurations with more hard disk drives.

In addition to reliability, performance also increases dramatically on SFF drives, thanks to the smaller platter and consequently shorter seek times. A few independent benchmark tests have been conducted which substantiate the performance of SFF drives.

SATA (Serial ATA)

SATA is a serial implementation of the ATA (Advanced Technology Attachment) interface, mainly used in desktop computers earlier. This standard was also known as IDE.

All versions of ATA up until ATA-7 in 2004 utilized parallel transfer of data from the motherboard to the drive controller built onto the disk. The ATA-7 specification introduced Serial ATA.

The most obvious change with Serial ATA is the difference in drive cables. Other differences:

- Higher throughput
- Support for drives (eSata)
- Point-to-point connections increase actual bandwidth per device.

While IDE drives had a maximum speed of 7200 RPM, SATA drives are available with 10000 RPM speed in selected configurations. Also, SATA drives are available with very large storage capacity – upto 1TB.



SAS and SATA use smaller cables, and make a cleaner system.

Which one to choose?

Selecting a hard disk depends on what application will be loaded on the workstation. It also depends on what is the type of data, size of files, number of files etc.

For applications demanding high performance, such as critical parts of a database or real-time video editing, SAS is the drive of choice. Not only is the interface faster, but SAS drives tend to be optimized for throughput. SAS drives are available with 15K RPM drive speeds, which makes applications run faster and smoother.

SAS drives also make the workstations boot and applications load faster. You will also notice that file open and save commands execute faster on a SAS drive.

Some of the markets that have desired these higher performance SAS hard disk drives include digital content creation, medical imaging and the military.

For jobs needing lots of storage at reasonable cost, such as disk-to-disk backup, SATA has the advantage.

For applications which produce large files, you will require very large volumes (>300GB) on a single drive. SATA is an ideal choice here, since SATA drives are available in larger sizes (500GB, 750GB and even 1TB) today. However, for such applications, using RAID is a better option, since the read/write performance increases by using this technology.

If you need superior performance from a SATA drive, make sure to select a 10K RPM drive. Please note that you will have to balance the speed and capacity factors, since not many drives are available in 10K RPM speed.

SATA drives are also suitable for less critical data or offline storage or backup of your existing data. You can even mix SAS drives and SATA drives in a system. You can use SAS drives for OS and applications, and SATA drives for storing data that is not very frequently used.

However, in a lot of cases you can't simply choose which type of disk based on the application. Different parts of applications can benefit from different kinds of drives. Rather than looking at your storage needs by application, it makes more sense to drill down to the mix of needs within each application.

HP workstations are capable of supporting both SAS as well as SATA drives.

The future of Hard Disk

SAS and SATA drives continuously improve in terms of the on-disk cache memory, capacity of the drive, form factor etc. As per SCSI Trade Association, higher capacity SAS drives with 6GBps throughput should be available by 2009 and 12 GBps SAS drives should be available by 2013.

SATA, on the other hand will increase the capacity per drive from today's 1TB. Sometime in the future, 6Gbps transfer rates will be supported but when is unclear at this point.

Solid State Hard Disk Drives (SSD) is taking the industry by storm. The technology promises performance increases and reliability improvement over traditional hard disk drive (HDD) technology.

SSD overcomes the limitations of traditional hard disk drives that are the standard for data storage today. Because of the spinning parts, these drives are highly fragile, and the performance also is limited. SSD replaces the spinning platters with solid state "flash" memory, resulting in much improved reliability and performance.

However, this technology is limited to mobile platforms as of now, and has a long way to go before it finds its place to the enterprise market.

Know an HP Product

HP xw4550 workstation

Available ex-stock!!!!!!



HP Workstation innovation is now within reach of more small and mid-size businesses with the introduction of the new xw4550. Designed and engineered to give you and your business a professional edge, the xw4550 Workstation delivers state-of-the-art workstation technology at a compelling new price point.

The xw4550 workstation features the second generation AMD Opteron workstation class dual core CPU. xw4550 takes advantage of AMD's Direct Connect Architecture, which includes an integrated memory controller and HyperTransport™ technology links to accelerate performance

of bandwidth and compute-intensive applications.

The system is designed around the AMD 690G chipset, with ATI Radeon X1250 graphics subsystem. The integrated graphics controller can have upto 256MB of shared video memory from the system RAM.

In addition to this, xw4550 can accommodate a PCI Express graphics card with upto 512 MB of dedicated video memory. The system has a memory capacity of 4GB, and can accommodate 2 SATA hard drives with NCQ support.

HP xw4550 provides an efficient footprint system that was engineered to operate quietly and without distraction.

Features of xw4550

- Second-Generation AMD Opteron processors and architecture power the performance to satisfy the visually-intensive demands and reliability requirements of professional applications.
- With its convertible mini-tower design, the xw4550 features a quiet, tool-less chassis and clean interior for easy access and was designed for system flexibility and upgradeability options for the future.
- Ideal for advanced business users who have outgrown the limits of traditional PCs.
- Realize a savings in power consumption and energy costs. With an 80 PLUS efficient power supply standard the HP xw4550 is designed to optimize energy use.
- Integrated Graphics controller for running non-3d applications.
- 2 Internal USB ports for securing the USB license dongles or storage devices.
- Certified to run both Windows XP and Vista OS
- Application certification from major ISV's like Autodesk, PTC, UGS, Bentley, Adobe etc.
- OS, Application and system fine-tuning support with the HP Performance Tuning Framework software.

Tips for improving your XP performance – Display

1. Right click on the "My Computer" icon, and select "Properties". Go to "Advanced", then "Settings" and select "Adjust for best performance". Click OK to close the dialog boxes.
2. Right click on the desktop, and select "Properties". On the "Themes" page, select "Windows Classic". Click "Apply".
3. While in display properties, select "Appearance", and select "Effects". Uncheck all boxes, and select OK. Close the dialog box.
4. Please note that you will have to reset the desktop wallpaper, since these steps will blank the desktop background.
5. Make sure you use a simple desktop background or nothing at all. Heavy files consume a lot of system resources, and make graphics applications slower.



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