DISK TECHNOLOGIES

The primary function of most servers in small organisations is to store files and have them available to all network users. Since a server is likely to be accessing these files with much greater frequency than a PC, it makes sense that the server Hard Drives are as reliable and quick to access as possible. Indeed, the size, type and configuration of server Hard Drives are probably the most important factors in acquiring a server.

Serial ATA (SATA) is commonly used in ‘entry-level’ servers because it is cheap and has proved to be a great success in PC’s. However, the SATA disks seen in such servers are slower and less reliable than their cousin, SCSI (pronounced ‘scuzzy’). SCSI, at nearly 5 times the price, is expensive, but is considered essential for high performance systems. The latest version of SCSI is SAS - Serial Attached SCSI - essentially a SCSI drive but with a different connector allowing for improved performance in multi-disk servers.

The following table offers a quick comparison between SATA-150, SCSI U320 and SAS, the three main disk options provided by a typical server manufacturer in March 2007

Comparison of SATA-150 with SCSI Ultra 320

Server	**Technology**	**Disk Spin Speed (RPM)**	**Transfer Rate (Mbps)**	**Mean Time Before Failure (hours)**	**Typical Size**	**Cost**
Lower Spec	SATA	7200	150	750,000 at 25% duty	250 GB	£45
Higher Spec	SCSI	10,000 or 15,000	320	1,300,000 at 100% duty	146 GB	£160-£250
Higher Spec	SAS	15,000	300 NB 300 per disk as opposed to 320 total for all disks with SCSI	1,300,000 at 100% duty	146 GB	£300-£400

Certainly then, SCSI / SAS costs more per GB than SATA, but if your new server has a significant role in file *storage* and/or is the only server on a network of more than 15 or so PC's, SCSI may be the better option. If you are considering a server with very heavy duties or with multiple hard drives, SAS will give the best performance but no innate improvement in reliability over plain SCSI

A further consideration is the number of Hard Drives to install in your server. For any server with a major role or roles, a RAID Array (Redundant Array of Independent Disks) should be

considered vital. RAID means that the server has more than one disk in it to protect against disk failure. RAID is NOT a backup system! Rather then, that two or more drives mirror each other, so that if one develops a*hardware* fault, the server is able to carry on working.

Confusingly, *RAID* 1 is where two disks are used and RAID 5 is where three are used. RAID may either be controlled 'onboard' (i.e. as part of the server motherboard) or via a RAID card (an add-on, costing more money). The table below compares some typical RAID configurations:

Typical RAID configurations

Server	**Disk Technology**	**RAID Type**	**Size of Array**	**No. of Disks**	**Controller**	**Cost**
Lower Spec	SATA	RAID 1	250 GB	2 (2 x 250 GB)	On board	£90
Higher Spec	SCSI or SAS	RAID 5	246 GB	3 (3 x 146 GB)	PCI-X Card	£600-£1000

Finally, with all these disk types, one has the option of 'hot-swappable' Hard Drives. These drives stick out of the front of the Chassis such that if they break, or the RAID array fails, a new one can be added without turning the server off. Hot-Swappable disks are needed if it is critical that a server is not turned off.

Source: http://www.ictknowledgebase.org.uk/serverhardware