

What is RAID?

RAID stands for Redundant Array of Inexpensive Disks. RAID is a method of combining several hard drives into one unit. It offers fault tolerance and higher throughput levels than a single hard drive or group of independent hard drives. RAID levels 0, 1, 10 and 5 are the most popular.

3ware's Escalade controllers support RAID 0, 1, 5, 10 and JBOD.

Please read the information below for a more in-depth explanation of the different RAID levels.

RAID Level 0:

RAID level 0 offers no redundancy, and is sometimes called striping. This RAID level offers a very high level of performance compared to the other RAID levels. It also offers the lowest cost per megabyte, as no extra storage is required for fault tolerance. A minimum of two hard disk drives are required, and you can have as many drives in the RAID 0 array as are supported by the RAID controller card.

This level is good for applications that don't require any data redundancy. For example, digital video editing is a common application for RAID 0. If one of the drives in the RAID 0 array goes down, the source can be recovered from the original videotape.

RAID Level 1

RAID 1 is sometimes referred to as mirroring. RAID 1 is almost always implemented with two and only two disk drives (if four drives were available, RAID 10 would be used). RAID 1 arrays are fault tolerant, since if one drive fails, the other drive still has the data to keep the system going. It is easy to rebuild a degraded RAID 1 array, as the data is available on the remaining drive.

RAID 1 is a good RAID level to use for applications that have critical data. Depending on the RAID controller used, performance with RAID 1 arrays can be very good. For example, 3ware Escalade controllers implement a feature known as TwinStor specifically designed to increase performance with RAID 1 and RAID 10 disk arrays.

RAID Level 5

RAID 5 uses block level striping and distributed parity. The RAID 5 parity is used for fault tolerance. If one of the disk drives in the RAID 5 array goes down, data can be recovered from the remaining drives. In this case, the RAID 5 array is said to be "degraded". A degraded RAID 5 array is not fault tolerant until the failed drive is replaced and the RAID 5 array is rebuilt.

RAID 5 has an advantage over RAID 3. Although both of these RAID levels have parity, RAID 5 distributes the parity over all of the drives to increase performance by decreasing the bottleneck to a single drive. RAID 3 uses a dedicated disk drive for all of the parity information.

The usable capacity of a RAID 5 array is equal to (the number of drives in the array minus 1) x (the capacity of the smallest drive in the array). Generally, the disk drives used in a RAID 5 array should all be of the same disk capacity. A RAID 5 array of three disk drives uses 33% (1 / 3) of its capacity for parity protection. However, this percentage drops as more drives are added into the RAID 5 array. For example, a RAID 5 array with 8 drives uses only 12.5% (1/8) of its capacity for parity protection.

RAID 5 is one of the most popular RAID levels being used today. RAID 5 is an excellent combination of performance, redundancy, and storage efficiency. Some 3ware Escalade controllers have the R5 Fusion feature implemented to greatly increase performance with RAID 5 disk arrays.

RAID Level 10

RAID level 10 is a combination of RAID levels 0 and 1. The array is first set up as a group of mirrored pairs (RAID 1), then striped (RAID 0). A RAID level 10 array done in this manner can sustain multiple drive failures, as long as both drives of a mirrored pair do not fail at the same time. The probability of this occurring is very low.

Performance is very good with RAID 10 arrays, and redundancy is also very high, but it comes at the cost of additional disk drives.

JBOD

JBOD is an acronym for "Just a Bunch Of Drives". In this mode, the attached disk drives are seen by the operating system as single drives.