# FAQ : RAID

## What is RAID?

RAID stands for "*Redundant Array of Inexpensive Disks*". The concept of RAID originated from a paper (*"A case for Redundant Arrays of Inexpensive Disks"* - 1987) published from the University of California at Berkley, proposing that using multiple small and rather inexpensive disks to replace the use of a single large disk to achieve *fault-tolerant data redundancy*. Another term "*Parity Data*" was often mentioned together with RAID. The parity data or disk is used to reconstruct data to a failed drive by comparing the data for the remaining drives in the array.

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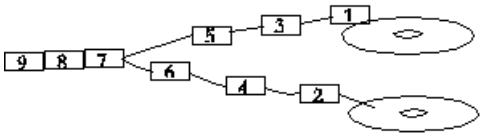
## What are those RAID Levels ?

Originally five RAID configurations, levels 1 through 5, were defined. A newer version, "*data striping*", or level 0, offers some performance advantages over other RAID levels but no data redundancy, so technically it isn't actually RAID.

The most popular RAID level are 0, 1, 3 and 5, their definition of RAID levels are:

### RAID 0




Known as disk striping. It combines disks that are used to improve some performance, but there is no logic to protect/recover data. *Synchronized disks are used.

| Pros | Cons |
|---|---|
| Fast data transfer on large blocks of data I/O. | No parity check for fault-tolerance. |

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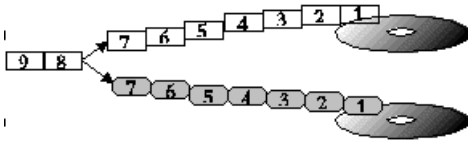
### RAID 1




This is known as mirroring, where data is written to two different disks at the same time, and data can be read from either disk.

| Pros | Cons |
|---|---|
| Secure against disk failure. | Double the cost of storage. |

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### RAID 2

Disk striping with several disks similar to RAID 0, but a small percentage of those disks were set aside to be "check disk," A special Hamming Error Correction Codes is implemented. Not used because of high performance penalty.

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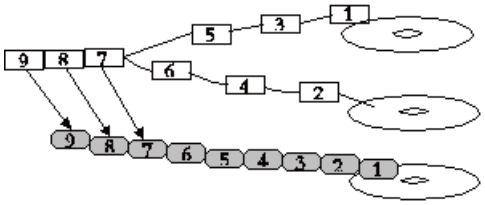
### RAID 3



Striping data over several disks. Parity interleaves at byte level and is stored in a dedicated disk. *Synchronized disks are required.

| Pros | Cons |
|---|---|
| Fastest for large-file transfer, lower cost for data security. | If the dedicated parity disk failed, all data integrity is lost. |

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## RAID 4

Similar to RAID 3, striping data over several disks. Parity interleaves at block level rather that byte level and is stored in a dedicated parity disk. Unlike RAID 3, Non-synchronized disks are being used. RAID 4 improves read access but suffers form a write penalty since every write must access the parity disk.

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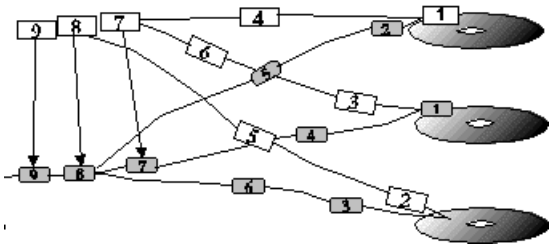
## RAID 5



Striping data and parity over several disks with no dedicated disk for parity.

| Pros | Cons |
|---|---|
| Higher I/O rate for writing data and since no dedicated parity disks, no data loss for any disk failure | Not as fast as RAID 3. |

* Synchronized disks - Multiple disk are being used to write a single file. This is a function of the disk controller.