

RAID Technology

What is RAID?

RAID (redundant array of inexpensive disks) is a system which uses multiple hard drives to share or replicate data among the drives so that data is backed up in real time or arranged so that the read/write speed is dramatically enhanced.

Why RAID?

- Increased data protection. If in an unfortunate event where a drive fails, the same data is preserved on the mirrored drive.
- Intelligent array controllers can apply different types of RAID for different hard disk drives.
- Increased overall network system data capacity.
- Increased I/O read/write efficiency.

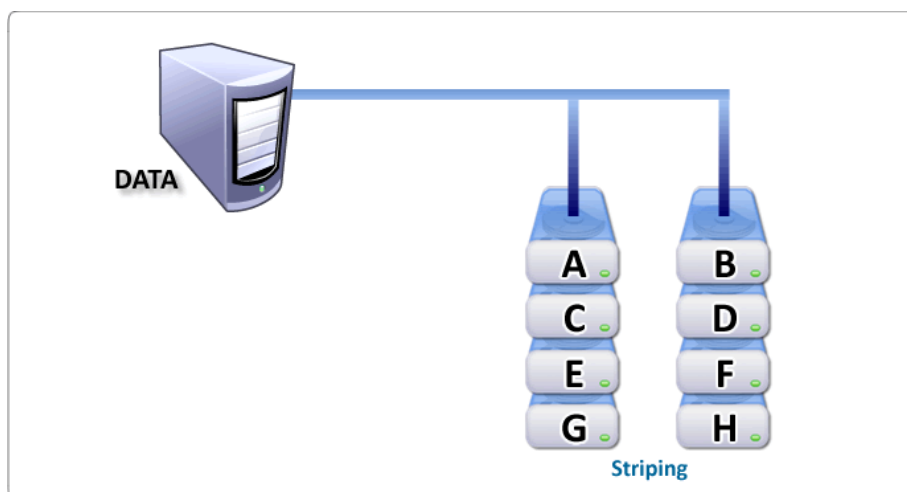
Detailed descriptions are provided below to depict how those RAID systems operate.



RAID 0 - Striping

RAID 0 is data that is split in between two hard drives. The data is also accessed the same way making data read and write faster.

The recovering of data is impossible if any one of the disks is damaged.
RAID 0 requires at least two hard drives, e.x.: 400GB + 120GB = 520GB



Feature(s)

- Read and write access times are increased.
- Data is not redundant so 100% of the two or more disks can be used.

Disadvantage(s)

- There is no redundancy so no data is recoverable if one drive is damaged.
- There is no security with RAID 0, only performance.

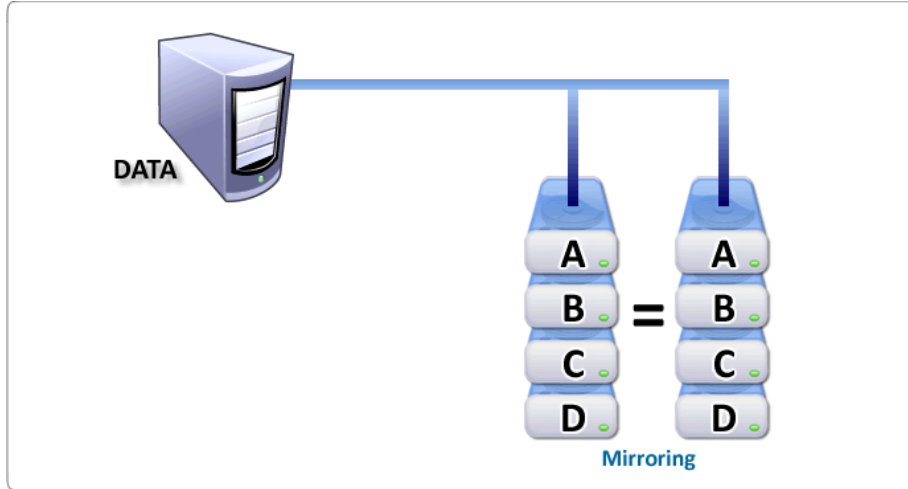
Applicaton(s)

- High speed Read/Write applications where backup and security is not important.

RAID 1

RAID 1 - Mirroring

RAID 1, data is mirrored so the exact same data is stored on two different hard drives. The data is identical and used for backup purposes. If one hard drive fails, the second one can be used to create another copy. RAID 1 requires a minimum of 2 hard drives, e.x.: $400GB + 120GB = 120GB$



Feature(s)

- Simple RAID application.
- 100% backup of hard drive in case one drive fails.

Disadvantage(s)

- RAID 1 uses more system resources.
- RAID 1 uses one hard drive for backup, the cost of two drives will only store the size of the smallest hard drive size. When two drives have different spec, the inferior one will have negative effect on the transferring speed of the RAID 1 as a whole.

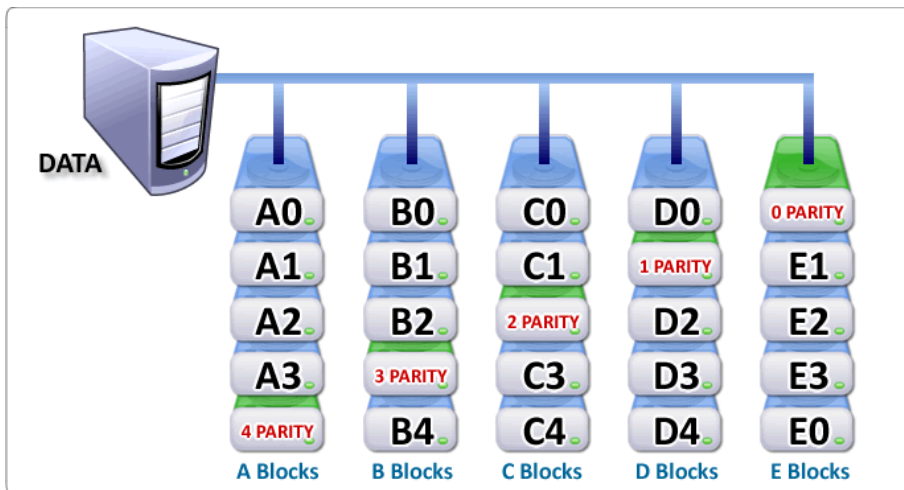
Applicaton(s)

- Systems that require backup of important files.

RAID 5

RAID 5 - Striping with Rotating Parity

RAID 5 makes a copy of a file and splits that copy among the different hard drives in the array while keeping a copy of the file in one of the many drives. If one drive fails, then the copies on the other drives can replace and re-create the files from the damaged drive. RAID 5 requires at least 3 drives, e.x.: $400GB + 300GB + 120GB = 240GB$



Feature(s)

- The time needed for data transferring is only next to the RAID 0.
- Able to use more hard drive space compared to RAID 1.

Disadvantage(s)

- Takes longer to rebuild a damaged drive compared to RAID 1.

Applicaton(s)

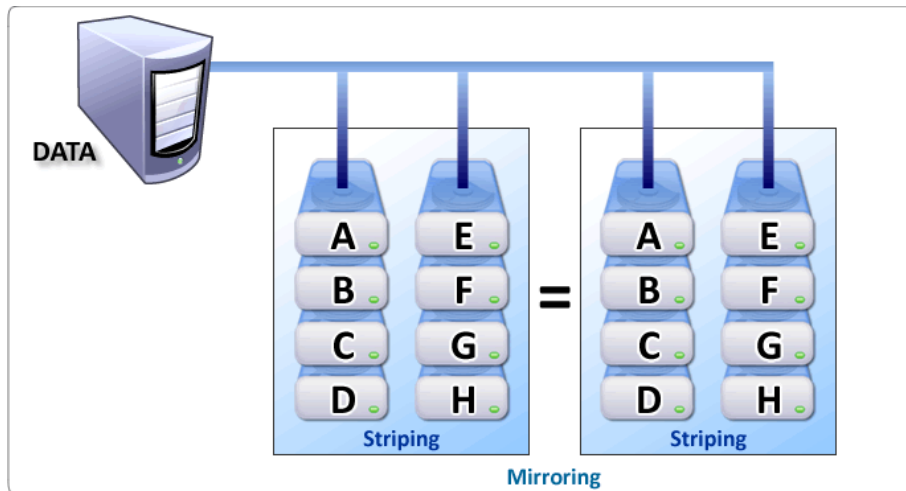
- General File Server.
- Database Server.
- Web and email servers.

RAID 0+1

RAID 0+1 (RAID 10) - Mirror + Striping

RAID 0 + 1 (RAID 10). They are two stage RAID configurations. In RAID 0 + 1, the base level is striping and on the second level is mirroring. Essentially RAID 0 + 1 is mirroring RAID 0 arrays while RAID 0 is striping two RAID 1 arrays.

RAID 0 + 1 (RAID 10) requires 4 hard drives or more, e.x.: $400GB + 400GB + 400GB + 400GB = 800GB$



Feature(s)

- Performance of RAID 0 and security of RAID 1.

Disadvantage(s)

- Costly. 4 drives only store the same amount as 2 drives.

Applicaton(s)

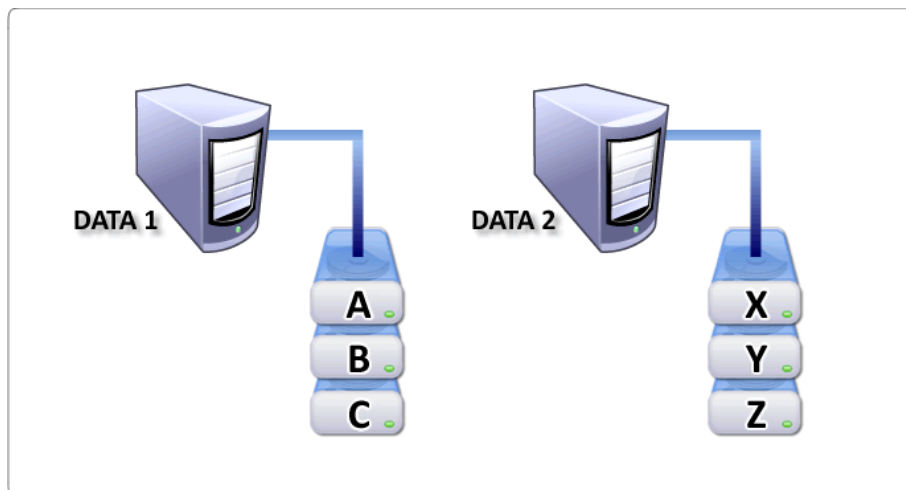
- General File Server.
- Large capacity image files.

JBOD or Linear

JBOD or Linear

Individual disk. This mode doesn't provide redundancy.

Only need one hard drive, e.x.: $400GB / 300GB = 400GB / 300GB$



Feature(s)

- Individual disk.

Disadvantage(s)

- No redundancy for backup.

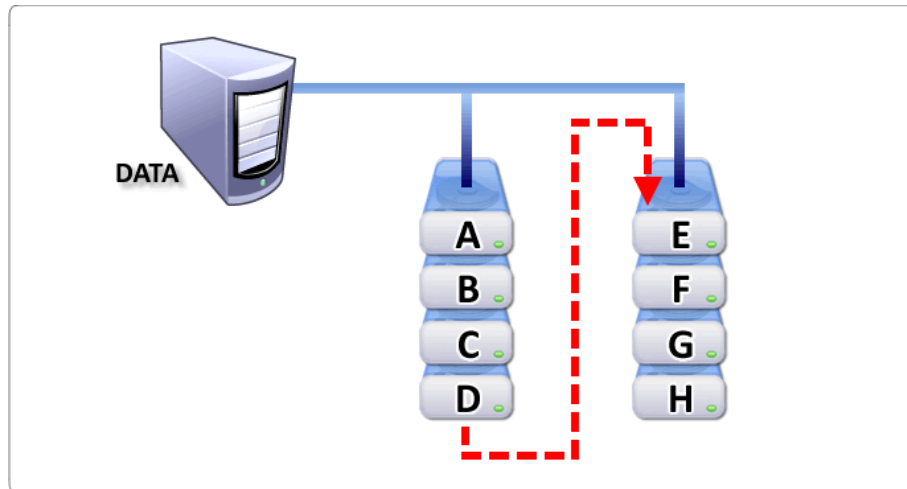
Applicaton(s)

- There is no additional efficiency or backup functions.

BIG**BIG**

Several physical disks combined as a logical disk. In other words, the capacity of the logical drive is the total capacity of the physical drives. This mode doesn't provide redundancy.

BIG requires two or more drives, e.x.: 400GB + 120GB = 520GB

**Feature(s)**

- Will hold more space than a virtual drive.
- Large files will flow over to the next drive.
- Effective use of hard drive space.

Disadvantage(s)

- No redundancy.