

NIELIT Gorakhpur

Course Name: O Level (2nd Sem)

Subject: ICT

Topic: RAID

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RAID:-Stands for "Redundant Array of Independent Disks." RAID is a method of storing data on multiple hard disks. When disks are arranged in a RAID configuration, the computer sees them all as one large disk. However, they operate much more efficiently than a single hard drive. Since the data is spread out over multiple disks, the reading and writing operations can take place on multiple disks at once. This can speed up hard drive access time significantly. Multiple hard drives may not improve hard disk performance as much as multiple processors may enhance the CPU performance, but it is based on a similar logic.

The benefits of RAID come from a technique called "striping," which splits up the stored data among the available drives. The "stripes" of data are usually a couple of megabytes large and are interleaved between the drives. The striping system also increases the mean time between failure (MTBF), when reading data. This allows more data to be read accurately in a short period of time. The benefits of the RAID system are especially noticeable when storing large amounts of data. Therefore, many Web hosting and Internet Service Providers use RAID to store data for their clients.

Versions of RAID:-

RAID 0:-

Software striping and block interleave (minimum 2 drives). Data is written to each drive in succession, each block going to the next available drive (striping) for a faster operation and less chance of overloaded. The volume can of course be much larger than any single drive. Since no redundancy is provided, the failure of a single drive will bring the system down. RAID 0 is the fastest and most efficient array type, but offers no fault tolerance.

RAID 1:-

Disk mirroring and duplexing (minimum 2 drives). Drives are used in pairs and all data is written identically to both drives. Each drive can be duplexed by being connected to its own interface controller. The failure of one drive will not bring down the system, instead the other drive will continue to operate. Of course, two drives are now used for the equivalent storage capacity of one drive. There is no

performance gain with this level. The array of choice for performance-critical, fault tolerant environments. Also, RAID 1 is the only choice for fault tolerance if no more than two drives are desired.

RAID 5:-

Block interleave, data striping with distributed check data on all drives. The one to use for NetWare. Parity information is distributed across all drives. RAID 5 efficiency goes up as the number of disks increases. You can use hot spares to rebuild a failed drive on "the fly". The best choice in multi-user environments, which are not write performance sensitive. However, at least three, and more typically five drives, are required for RAID 5 arrays.

RAID 6:-

Extension to RAID 5, which adds a log structured file system providing a mapping between a disk drive's physical sectors and their logical representation. As information is written, it is placed to sequential physical disk sectors.

RAID 10-

Striped array whose segments are RAID 1 arrays and containing the same fault tolerance as RAID 1. High I/O rates are achieved by stripping RAID 1 segments. Excellent solution for those considering RAID 1 since it provides good write performance, but is an expensive solution.

Assignment:-

- 1- Why RAID is Essential explain it?
- 2-Write down Difference between Mirroring and stripping.