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Hard Disk Drive

Handling of Hard Disk Drive

1. **Vibration and Shock Precaution**

    Every hard disk has a limited lifetime, which means it is bound to fail ultimately. There are a number of moving parts in a hard disk drive, such as the read/write head and spindle motor. It is these parts that suffer the most wear and tear. Here are some precautions you can take to give your drive(s) a safer and longer life. It is especially dangerous when a hard disk drive receives a shock or jerk while it is operating. This can result in the read/write head scratching the disk surface. Since the head operates only a few micrometers above the disk surface, even a slight shock can cause the head to contact the disk and damage its outermost magnetic layer. Therefore, never vibrate PC or move it while operating.

2. **Temperature and Humidity Precautions**

    There is also a risk from sudden temperature changes, which can create condensation of Water inside the drive. This condensation can lead to the drive's read/write head(s) adhering to the disk surface(s), which will, in turn, stop the hard disk from rotating. Sudden changes in temperature or air pressure can cause disk surface material to evaporate, which can also cause the head to adhere to the disk surface. This sometimes happens when a hard disk drive is left unused for a long period of time.

3. **When Data is Lost or Corrupted**

    One possible reason for either losing or corrupting hard disk data may be the computer's application software. To minimize the risk of data loss or corruption, check your disk(s) regularly with a disk diagnosis utility, such as Windows "Scandisk". When using Windows, be sure to follow that OS standard shutdown procedure before switching the computer OFF. Suddenly turning the computer power OFF may result in hard disk data loss, which may prevent Windows from being able to start up again.

4. **Hard Disk Service Life**

    The average service life of a hard disk is usually 5 years, or 20,000 hours. This means if a hard disk operates 24 hours a day, you will need to replace your drive with a new one every 1.5 to 2 years.

5. **Data Backup**

    Backing up your data regularly is very important. Even if a drive failure is the result of a manufacturing defect, it is not guaranteed that you will be able to recover all your data.

6. **Replace Your Hard Disks Regularly**

    Since every drive has a finite service life, it should be replaced periodically with a new drive/according to the drive's service life rating. In addition, inspecting your drive(s) regularly will allow you to detect potential hard disk problems in advance, giving you the option of either fixing the current drive or replacing it with a new one. No part or device

can be transfer speed is 20 MBPS. Its main objective is to support optical fiber and long distance,

RAID Systems

Raid stands for Redundant Array of Independent Disks, a technology for implementing fault tolerance on a disk subsystem by using data redundancy, either with software or with a separate hardware RAID storage unit. There are many applications, particularly for a business environment, where there are needs beyond what can be fulfilled by a single hard disk; regardless of its size, performance or quality level. Many businesses cannot afford to have their systems go down for even an hour in the event of a disk failure. They also need large storage subsystems with capacities in the terabytes and they want to be able to insulate themselves from hardware failures to any extent possible. Some people working with multimedia files need faster data transfer, exceeding what current drives can deliver, without spending a fortune on specialty drives. These situations require that the traditional one hard disk per system model be set aside and a new system employed. This technique is called RAID.

The fundamental principle behind RAID is the use of multiple hard disk drives in an array that behaves in most respects like a single large, fast one. There are a number of ways that this can be done, depending on the needs of the application, but in every case, the use of multiple drives allows the resulting storage subsystem to exceed the capacity, data security, and performance of the drives that make up the system, to one extent or the other.

RAID is a category of disk drives that employs two or more drives in combination for fault tolerance and performance. RAID disk drives are used frequently on servers but aren't generally necessary for personal computers.

Levels of RAID Systems

Level 0 (Striped Disk Array without Fault Tolerance)→ Provides data striping (spreading out blocks of each file across multiple disk drives) but no redundancy. This improves performance ' but does not deliver fault tolerance. If one drive fails, all data in the array is lost.

Level 1 (Mirroring and Duplexing)→ Provides disk mirroring. Level 1 provides twice the read transaction rate of single disks and the same write transaction rate as single disks.

Level 2 (Error-Correcting Coding)→ Not a typical implementation and rarely use, data at the bit level rather than at the block level.

Level 3 (Bit-Interleaved Parity)→ Provides byte-level striping with a dedicated parity disk. Level 3, which cannot service simultaneous multiple requests, is rarely used.

Level 4 (Dedicated Parity Drive)→ A commonly used implementation of RAID, Level 4 provides block-level striping (like Level 0) with a parity disk. If a data disk falls, the parity data is used to create a replacement disk. A disadvantage to Level 4 is that the parity disk can create write bottlenecks.

Level 5 (Block Interleaved Distributed Parity)→ Provides data striping at the byte level and also stripe error correction information. This results in excellent performance and good fault tolerance. Level 5 is one of the most popular implementations of RAID.

Exercise:

1: What are the important points in HDD handling ?

2: What is RAID System?

3: Explain six levels of RAID System.