Zakho Technical Institute / IT

Operation System -

Theory

6. Storage Management

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Contents

Storage Management

Storage Management is defined as it refers to the management of the data storage equipment's that are used to store the user/computer generated data. Hence it is a tool or set of processes used by an administrator to keep your data and storage equipment's safe. Storage management is a process for users to optimize the use of storage devices and to protect the integrity of data for any media on which it resides and the category of storage management generally contain the different type of subcategories covering aspects such as security, virtualization and more, as well as different types of provisioning or automation, which is generally made up the entire storage management software market.

Storage management key attributes:

1. Performance

2. Reliability

3. Recoverability

4. Capacity

File Systems in Operating System

A computer file is defined as a medium used for saving and managing data in the computer system. The data stored in the computer system is completely in digital format, although there can be various types of files that help us to store the data.

What is a File System?

A file system is a method an operating system uses to store, organize, and manage files and directories on a storage device. Some common types of file systems include:

1. **FAT (File Allocation Table):** An older file system used by older versions of Windows and other operating systems.

2. **NTFS (New Technology File System):** A modern file system used by Windows. It supports features such as file and folder permissions, compression, and encryption.

3. **ext (Extended File System):** A file system commonly used on Linux and Unix-based operating systems.

4. **HFS (Hierarchical File System):** A file system used by macOS.

5. **APFS (Apple File System):** A new file system introduced by Apple for their Macs and iOS devices.

File:

A file is a collection of related information that is recorded on secondary storage. Or file is a collection of logically related entities. From the user's perspective, a file is the smallest allotment of logical secondary storage.

Operations on files:

1. Create
2. Open
3. Read
4. Write
5. Append
6. Truncate
7. Delete
8. Close

Types of files:

1. Doc
2. Exe
3. Jpg
4. Xis
5. C
6. Java
7. class

Attributes of file:

1. Name

2. Type

3. Size

4. Creation Data

5. Author

6. Last Modified

7. protection

File Directories

Below are information contained in a device directory.

- Name

- Type

- Address

- Current length

- Maximum length

- Date last accessed

- Date last updated

- Owner id

- Protection information

The operation performed on the directory are:

- Search for a file

- Create a file

- Delete a file

- List a directory

- Rename a file

- Traverse the file system

Types of directory structure:

1. Single-Level Directory
2. Two-Level Directory
3. Tree-Structured Directory

File Allocation Methods

1. Continuous Allocation
2. Linked Allocation(Non-contiguous allocation)
3. Indexed Allocation

- Disk Scheduling Algorithms

  1. FCFS (First Come First Serve)
  2. SSTF (Shortest Seek Time First)
  3. SCAN (Elevator Algorithm)
  4. C-SCAN (Circular SCAN)
  5. LOOK
  6. C-LOOK
  7. RSS
  8. LIFO (Last-In First-Out)
  9. N-Step SCAN
  10. F-SCAN

Key Terms Associated with Disk Scheduling

1. **Seek Time:** Seek time is the time taken to locate the disk arm to a specified track where the data is to be read or written. So the disk scheduling algorithm that gives a minimum average seek time is better.
2. **Rotational Latency:** Rotational Latency is the time taken by the desired sector of the disk to rotate into a position so that it can access the read/write heads. So the disk scheduling algorithm that gives minimum rotational latency is better.
3. **Transfer Time:** Transfer time is the time to transfer the data. It depends on the rotating speed of the disk and the number of bytes to be transferred.
4. **Disk Access Time:**