6.3 Directory structure

6.3 Directory Structure and Disk Organization

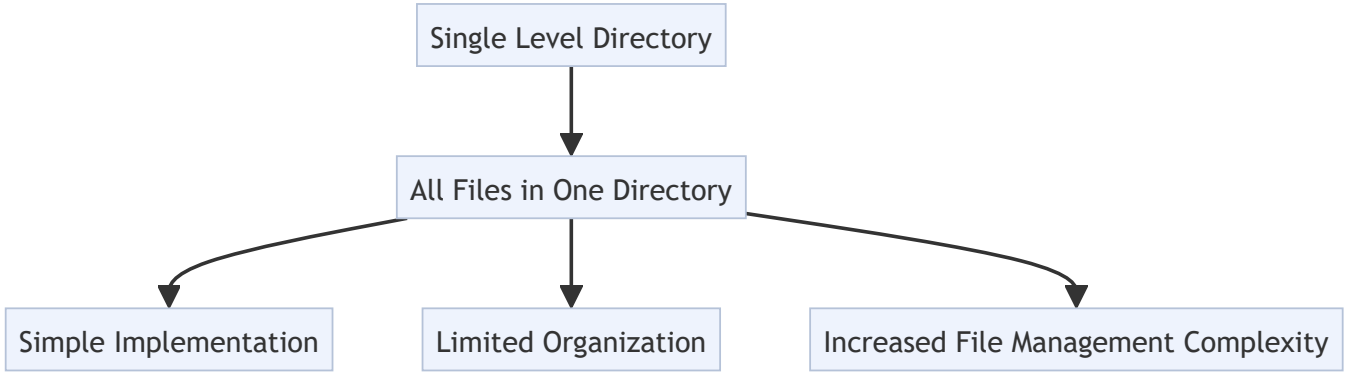
Directory Structure

Directory structures define how files and directories are organized on a disk. The main types are:

Single Level Directory

Working, Simple Usage, Explanation:
In a single level directory structure, all files are stored in one directory. This is the simplest structure but can become inefficient as the number of files grows.

Diagram

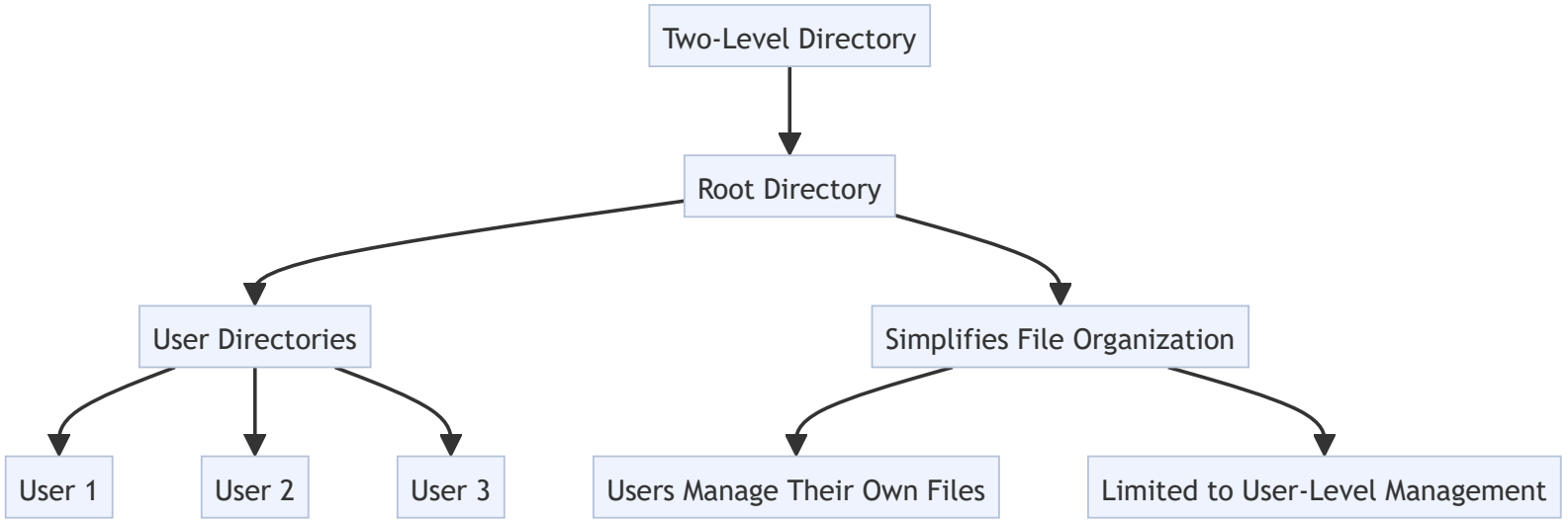


Two-Level Directory

Working, Simple Usage, Explanation:
The two-level directory structure introduces a root directory with subdirectories for individual users. Each user has their own directory, making file

management easier compared to a single-level structure.

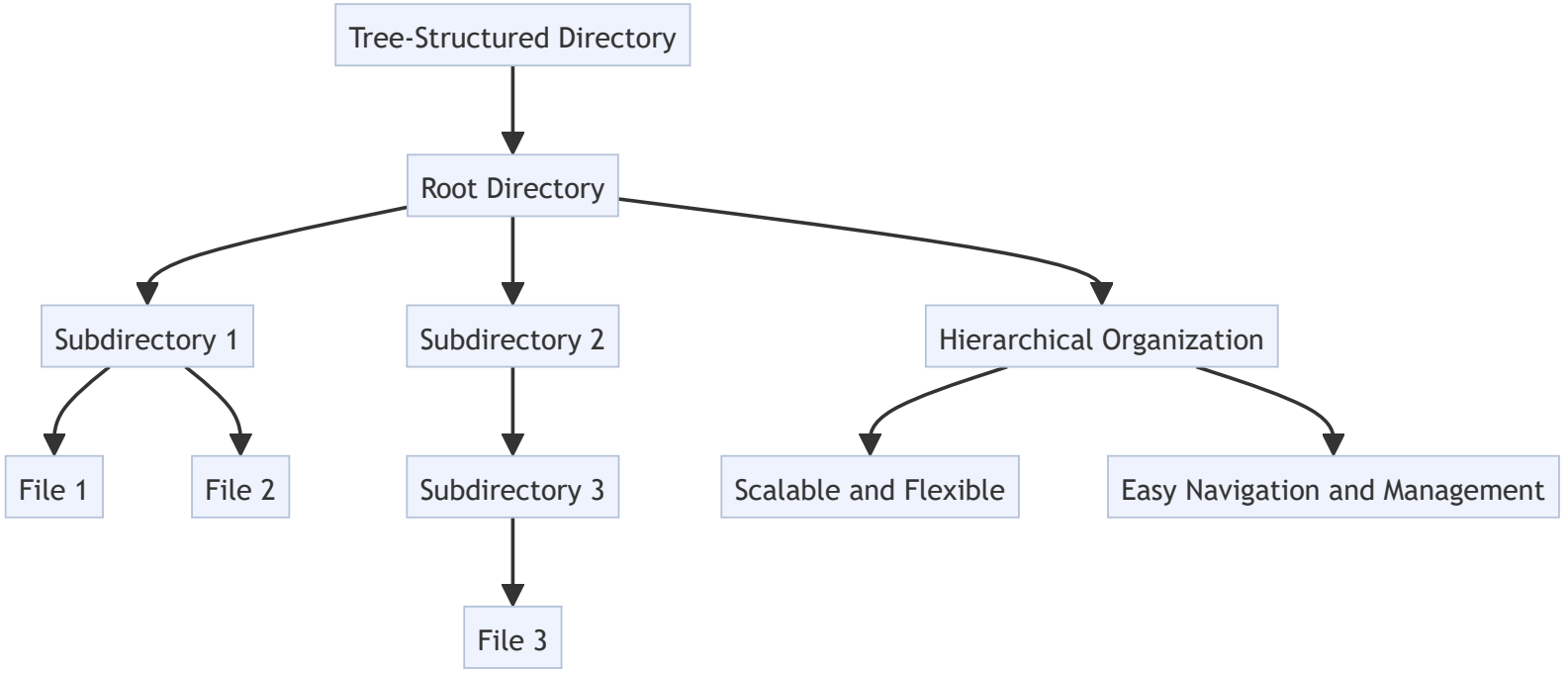
Diagram



Tree-Structured Directory

Working, Simple Usage, Explanation:
A tree-structured directory organizes files and directories in a hierarchical tree-like structure. Each directory can contain subdirectories and files, allowing for a more organized and scalable file system.

Diagram



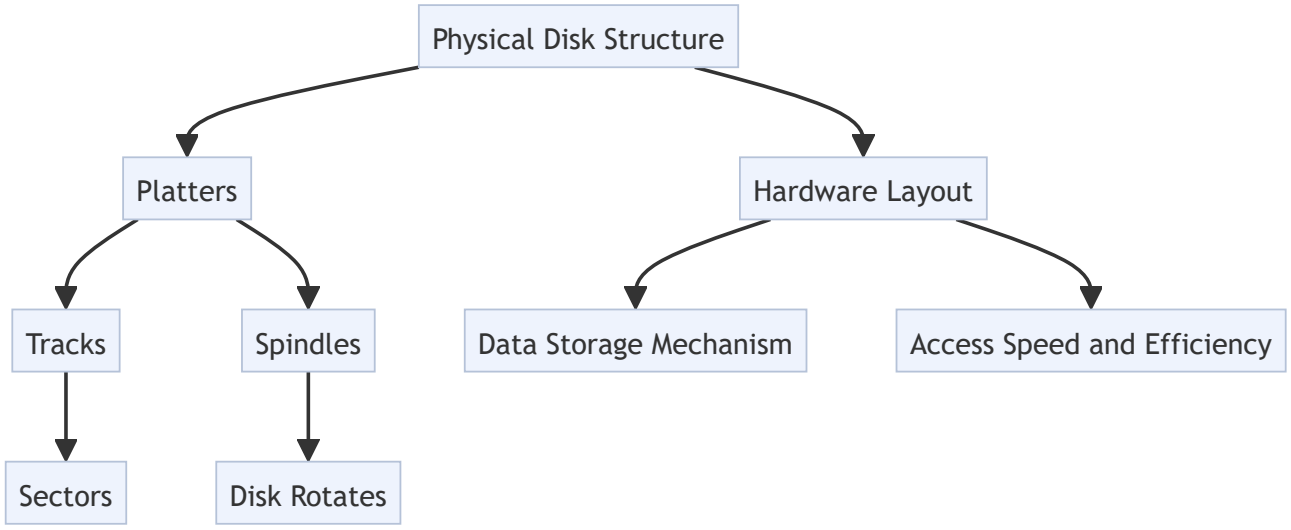
Disk Organization and Disk Structure

Disk organization and structure refer to how data is physically and logically stored on a disk. Here are the key aspects:

Physical Structure

Working, Simple Usage, Explanation:
The physical structure of a disk refers to its hardware layout, including platters, tracks, and sectors. This structure determines how data is actually stored and accessed on the disk.

Diagram

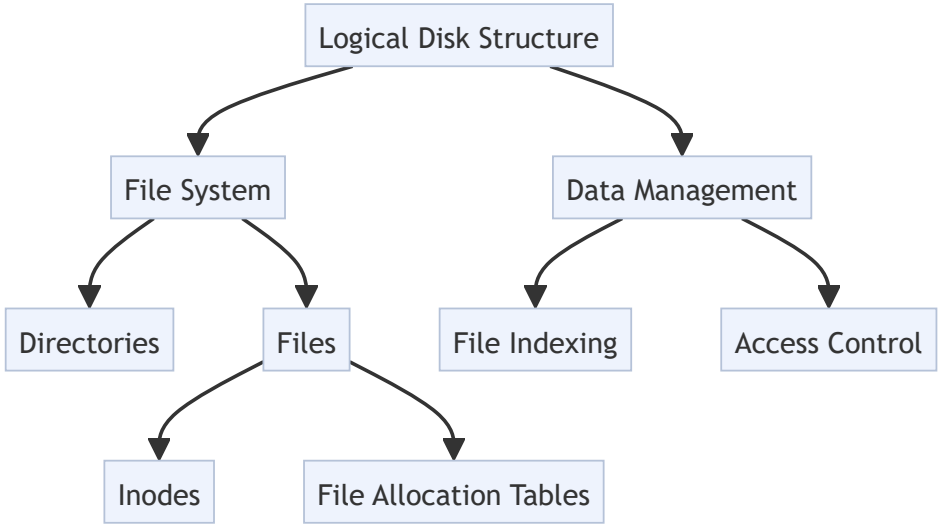


Logical Structure

Working, Simple Usage, Explanation:

The logical structure refers to how data is organized and managed by the file system. It includes file systems, directories, and how files are indexed and accessed.

Diagram



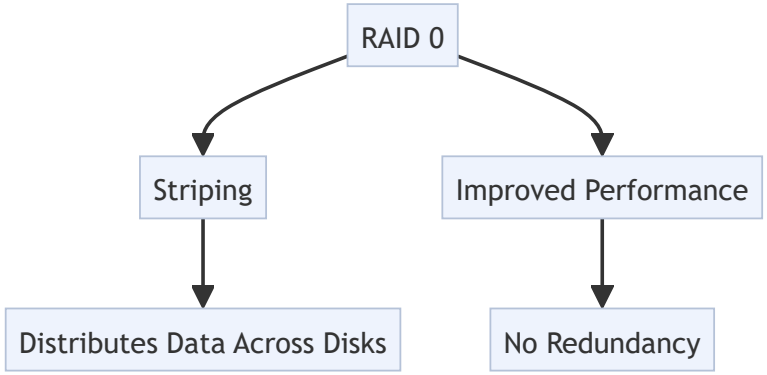
RAID Structure

RAID (Redundant Array of Independent Disks) is a technology that combines multiple disk drives into a single unit to improve performance and reliability. Here are the RAID levels:

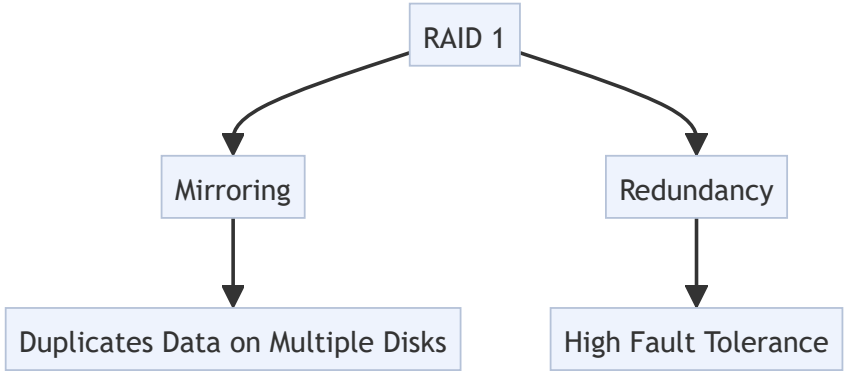
- **RAID 0 (Striping)**: Data is split across multiple disks, providing improved performance but no redundancy.
- **RAID 1 (Mirroring)**: Data is duplicated on multiple disks, offering redundancy and reliability.
- **RAID 2**: Data is striped across disks with Hamming code error correction, but it is not commonly used.
- **RAID 3**: Data is striped with a dedicated disk for parity information, providing redundancy.
- **RAID 4**: Similar to RAID 3 but with a dedicated parity disk for better performance.
- **RAID 5 (Striped with Parity)**: Data and parity information are striped across all disks, providing both performance and redundancy.
- **RAID 6 (Striped with Double Parity)**: Similar to RAID 5 but with two sets of parity data for increased redundancy.

Diagram

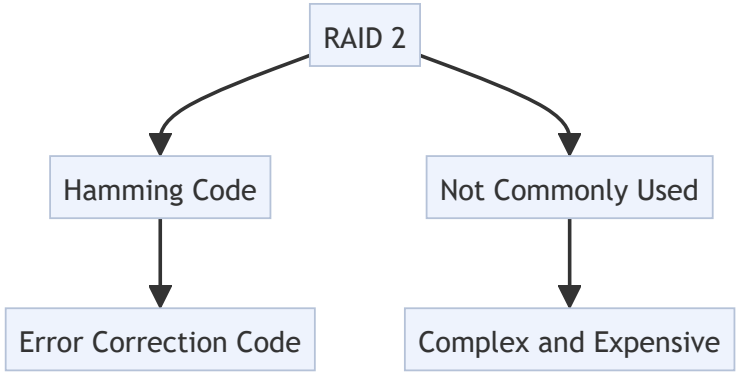
1. RAID 0



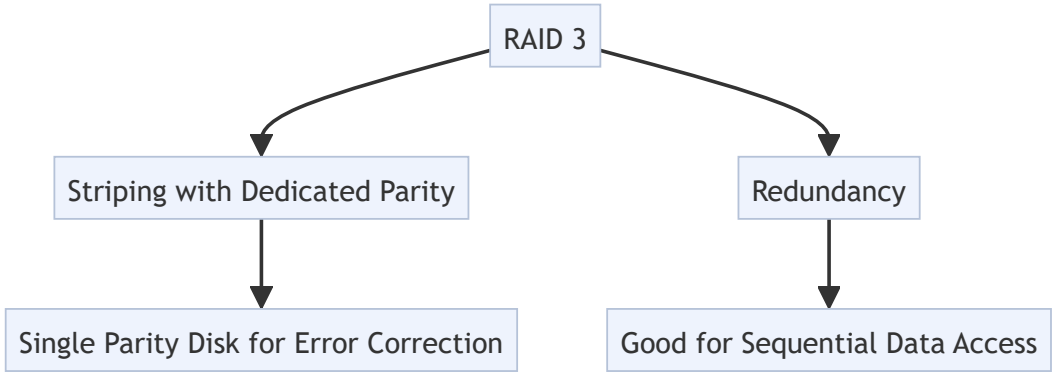
2. RAID 1



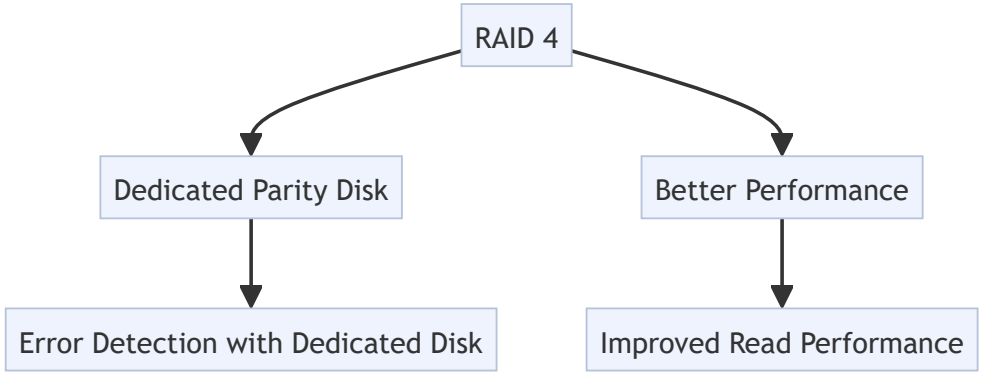
3. RAID 2



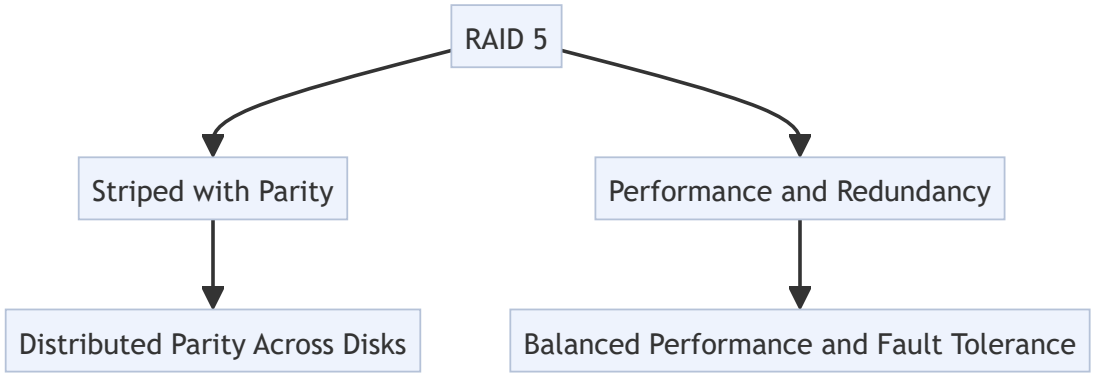
4. RAID 3



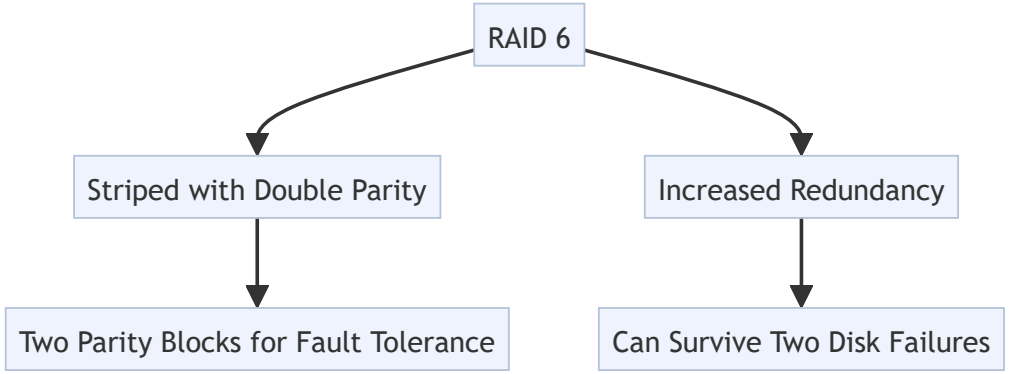
5. RAID 4



6. RAID 5



7. RAID 6



Summary Table

Aspect	Details
Single Level Directory	All files in one directory, simple but inefficient for large numbers of files.
Two-Level Directory	Root directory with user-specific subdirectories, improves organization.
Tree-Structured Directory	Hierarchical organization, scalable, and easy to navigate.
Physical Structure	Includes platters, tracks, sectors, and spindles. Affects data storage and access speed.
Logical Structure	Involves file systems, directories, and file indexing. Manages data organization and access.
RAID 0	Data striping, improved performance, no redundancy.

Aspect	Details
RAID 1	Mirroring, data redundancy, high reliability.
RAID 2	Stripes data with error correction, rarely used.
RAID 3	Data striping with dedicated parity disk.
RAID 4	Similar to RAID 3 with improved performance.
RAID 5	Data and parity striped across disks, balance of performance and redundancy.
RAID 6	Double parity, high redundancy and fault tolerance.