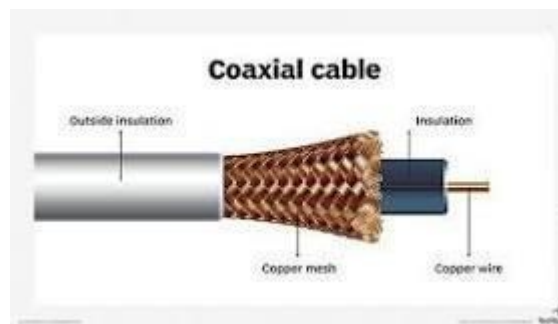
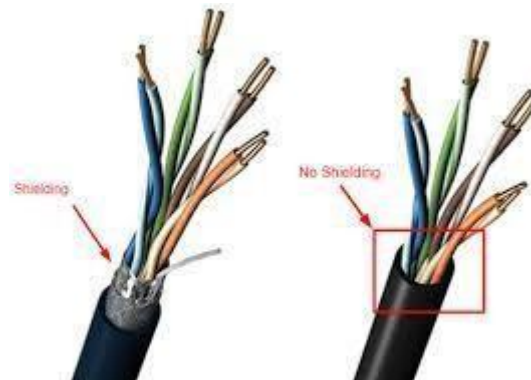


TITLE: LAN CABLING, WIRED AND WIRELESS MEDIA, TYPES OF CABLES AND RAID OVERVIEW

- **LAN CABLING** - LAN (Local Area Network) cabling refers to the physical infrastructure that connects devices within a specific, limited geographical area, such as a home or office, to form a network.
- **Types of Cables Used in LAN:**
 - **Coaxial Cable** - Looks like: One thick wire with a copper core and layers of insulation. A single pipe carrying all the data. Used in: Early internet and cable TV. Rarely used in modern LANs. Connector: BNC



- **Twisted Pair Cables** - Inside the cable: 8 thin wires twisted into 4 pairs.
 1. **Unshielded Twisted Pair (UTP)** – Most Common, No extra metal protection. Lighter, cheaper. Used in homes and offices. Example: Cat5e, Cat6. Like normal wires twisted together to reduce interference.
 2. **Shielded Twisted Pair (STP)** - Each pair has metal shielding to block interference. Used in factories or noisy electrical areas. More expensive and thicker. Like wrapping each wire pair in foil to protect the signal.



➤ Wired Media

• Twisted Pair Cable

- **UTP (Unshielded Twisted Pair):** This is the most common type of cable used for connecting devices in networks (like Ethernet). There are different categories (e.g., Cat5e, Cat6) that vary in speed and performance.
- **STP (Shielded Twisted Pair):** This is similar to UTP but has extra shielding to protect against electrical interference. It's used where there's a lot of interference around, like in factories.

• Coaxial Cable

- This older cable type was once used for Ethernet networks and is still used for cable TV. It's made of a central wire, an insulating layer, a metal shield, and another layer of insulation.

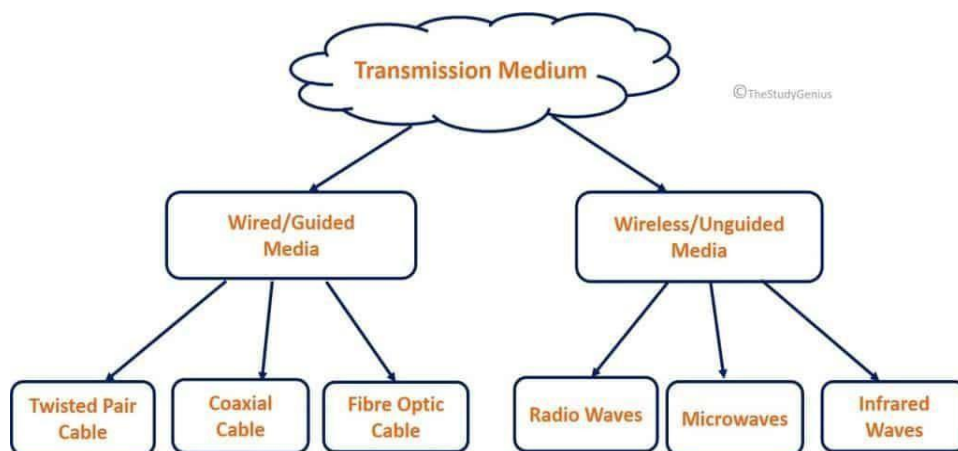
- **Fiber Optic Cable**

- **Single-mode Fiber:** This is designed for long-distance data transfer. It has a small core and uses a laser to send data.
- **Multi-mode Fiber:** Used for shorter distances, with a larger core, and uses LEDs to send data. Fiber optics are fast and don't lose much signal over long distances.

➤ **Wireless Media**

- **Radio Waves**

- **Wi-Fi:** This is what gives you wireless internet. It works by sending data through radio waves, with different versions offering different speeds and ranges.
- **Bluetooth:** Used for short-range connections, like connecting a phone to a headset or keyboard.



- **Data Center** - A data center is a physical facility used to store and manage a large amount of data. It's where organizations keep their servers, storage devices, and network systems to ensure that data is accessible, secure, and processed efficiently.

- **RAID (Redundant Array of Independent Disks)** is a technology used to combine multiple hard drives (HDDs) or solid-state drives (SSDs) into a single unit for improved performance, data redundancy (protection against failure), or both. The idea is to increase speed and/or reliability by distributing data across multiple disks.

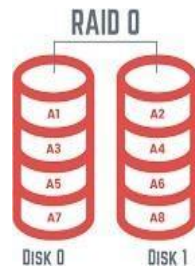
Here's a simplified explanation of common RAID levels:

1. RAID 0 (Striping) - Splits data into chunks and stores them across multiple disks.

Pros: Improves speed (faster read/write operations) because data is accessed from multiple drives simultaneously.

Cons: No redundancy; if one drive fails, all data is lost.

Use case: When performance is the priority, and data loss isn't critical (e.g., temporary data storage).

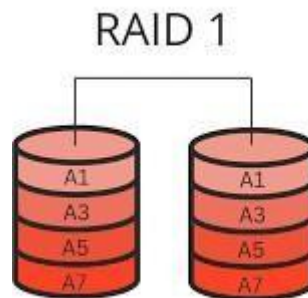


2. RAID 1 (Mirroring) - What it does: Duplicates the same data on two drives. Each drive contains an identical copy of the data.

Pros: Provides data redundancy, meaning if one drive fails, the data is still available on the other.

Cons: No performance boost; you get the same read/write speed as a single drive. It also requires double the storage capacity (two drives for the same amount of data).

Use case: When data reliability is important and storage space isn't a concern.

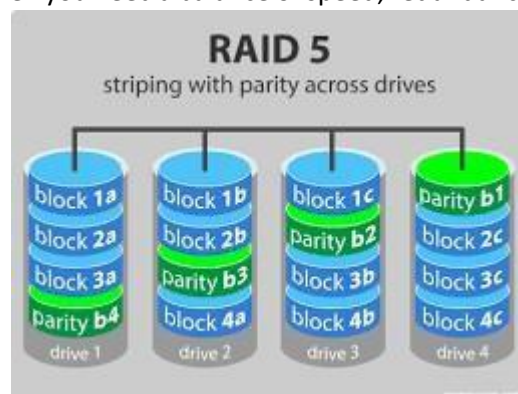


3. RAID 5 (Striping with Parity) - What it does: Data is striped (split) across three or more disks, with parity information (extra data for recovery) stored on each drive.

Pros: Balances performance, redundancy, and storage capacity. If one drive fails, data can be rebuilt using the parity information.

Cons: Slower write speeds due to the need to update parity information.

Use case: When you need a balance of speed, redundancy, and efficient use of storage space.

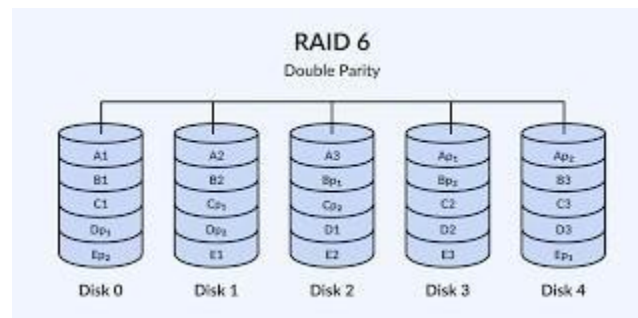


4. RAID 6 (Striping with Double Parity) - Similar to RAID 5 but with two sets of parity information, so two drives can fail without data loss.

Pros: Offers extra protection against drive failures compared to RAID 5.

Cons: Slightly slower than RAID 5 because it stores more parity data, and you lose more storage space (two drives worth of space for parity).

Use case: When extra data protection is needed, and storage space is less of a concern.



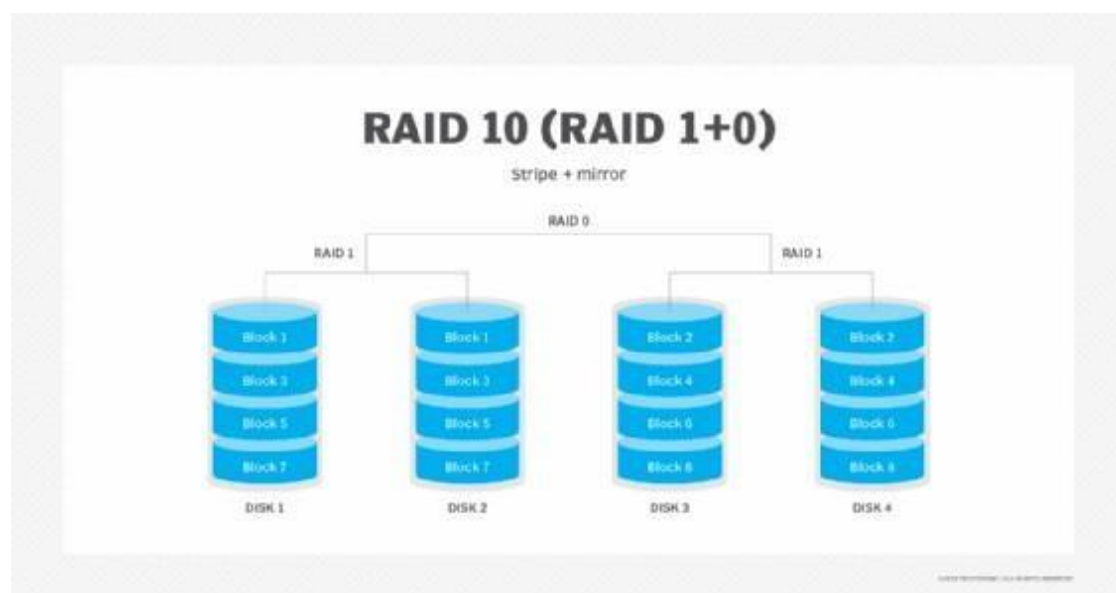
5. RAID 10 (Stripping and mirroring) - Combines RAID 1 (mirroring) and RAID 0 (striping).

Data is mirrored across pairs of drives, and those pairs are striped.

Pros: Offers both redundancy (from RAID 1) and performance (from RAID 0).

Cons: Requires at least 4 disks and halves the usable storage space (because of the mirroring).

Use case: When you need both high performance and redundancy, especially for databases and critical applications.



➤ What is Static Routing?

Static Routing is a type of routing where the network administrator manually configures routes in the router's routing table.

➤ When Do We Use Static Routing?

- In **small networks** with a simple structure
- When the network topology doesn't change often
- To have **more control** over data paths

➤ What is Windows Administration - Windows Administration refers to managing and maintaining Windows operating systems, typically in a professional or enterprise environment. It's a core skill for IT infrastructure support roles.