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Curriculum

**Interview Preparation - Algorithms**

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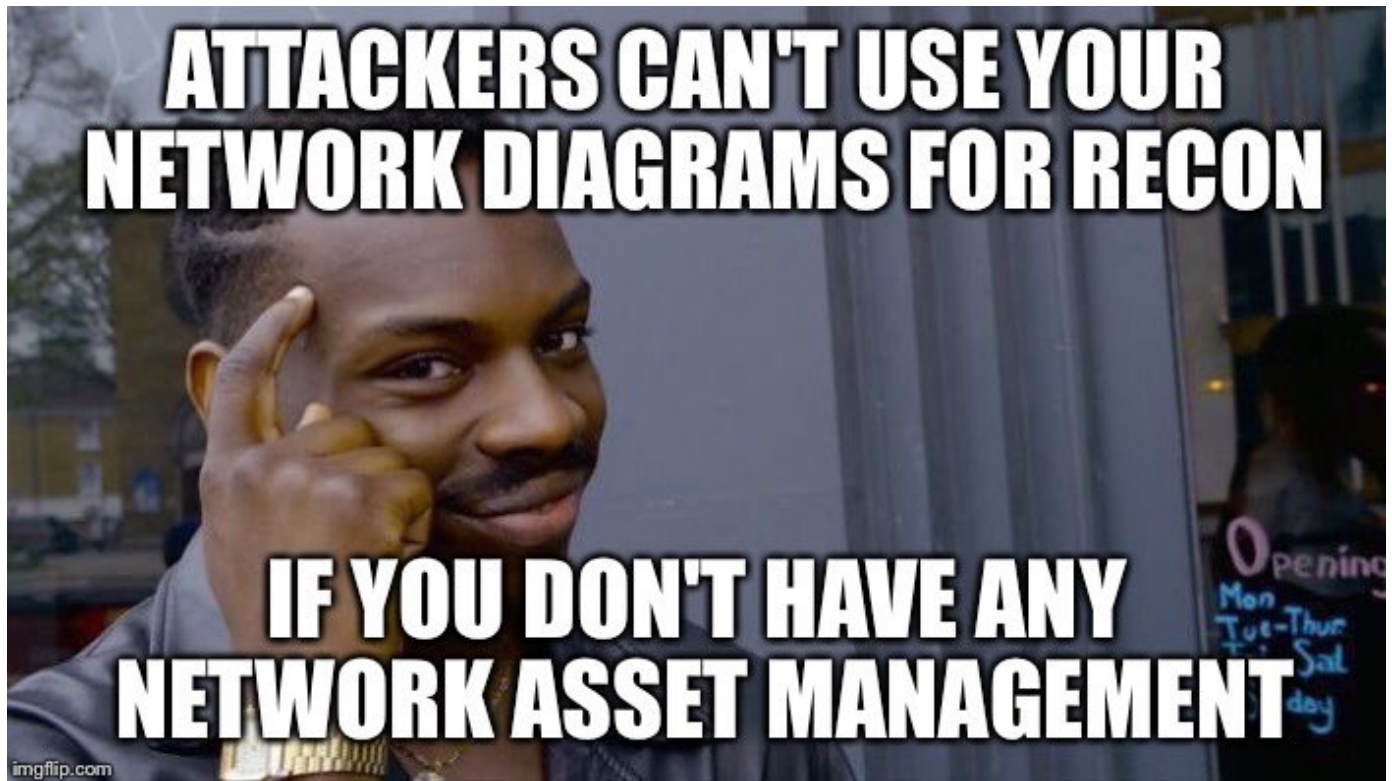
# Network Topologies

## Introduction

The purpose of this concept page is to put the network topologies aspect in the context of computer networking. We will see different aspects of network topologies, such as their purpose, how they are used in the industry. Let's start!!

**Before delving into network topologies, let's first define networking in general**

## Networking - Definition



Networking refers to the practice of connecting multiple devices or systems together to facilitate communication, data sharing, and resource sharing. It involves the establishment and maintenance of connections between these devices, enabling them to interact and exchange information.

In today's world, where everything is connected, networking is essential for communication and collaboration. It is used in businesses, schools, and telecommunications, and it allows for the efficient transfer of data, voice, and video across different locations.



# Where do we start?

We will discuss the LAN topology in more detail in the next step. For now, let's just say that there are many different types of networks. The best type of network for you will depend on your specific needs. It is a fascinating topic, and it is essential for understanding how the internet works. Our first thing is about topology.

Let the fun begin!

## Topology - Definition

The topology of a network is the way that the devices and links in a network are arranged. It illustrates the geometric arrangement of stations, repeaters, bridges, and other components, showcasing how they are interconnected.

Among the various network topologies, one of the significant ones is the Local Area Network (LAN).

## LAN Topologies

A LAN is a type of network that connects devices within a limited geographical area, such as a home, office building, or campus. It allows for the sharing of resources, data, and applications among the connected devices.

## Categories of LAN Topologies

There are three basic LAN topologies: bus, ring, and star.

- **Physical topology:** This is the physical layout of the network, including the way the cables are run and the devices are connected.
- **Logical topology:** This is the way that data flows through the network, regardless of the physical layout.

### Framing and Addressing

A frame is a unit of data used in all three LAN topologies. It contains the data to be sent, as well as a header that may include the sender and receiver physical addresses, the sequence number, error detection information, and other data.

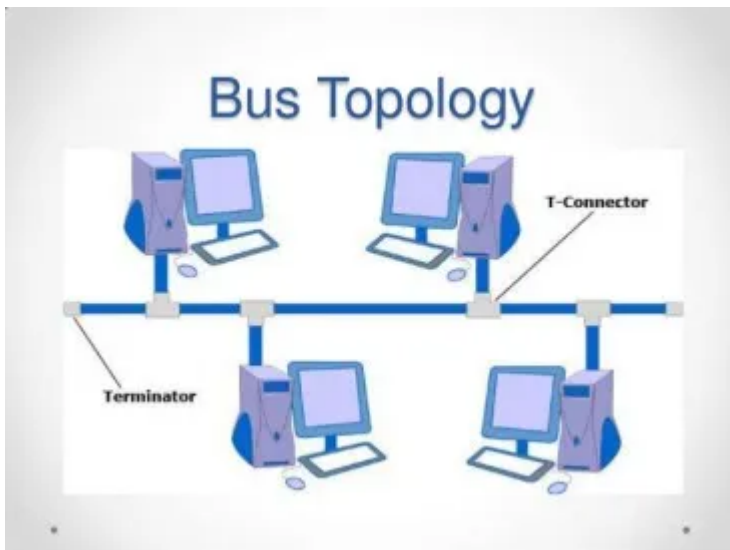
Each station on a LAN is assigned a unique physical address. There are three types of addressing that can be used in LANs:

- **Unicast addressing** is used for one-to-one communication.
- **Multicast addressing** is used for one-to-many communication.



- **Broadcast addressing** is used for one-to-all communication.  
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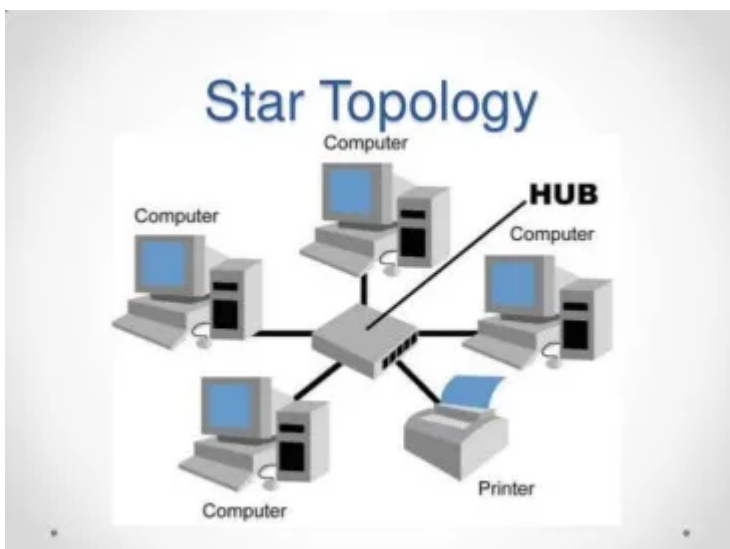
## Bus Topology



Bus is a simple design that utilizes a single length of cable, also known as the medium, with directly attached LAN stations. All stations share this cable segment. Every station on this segment sees transmissions from every other station on the cable segment; this is known as a broadcast medium. The LAN attachment stations are definite endpoints to the cable segment and are known as bus network termination points.

## Star Topology

In a star topology, all devices are connected to a central hub or switch. This central device is responsible for routing traffic between the devices on the network. Several different types of cables can be used to connect the devices to the hub, including shielded twisted-pair (STP), unshielded twisted-pair (UTP), and fiber-optic cabling. Wireless media can also be used for communications links.

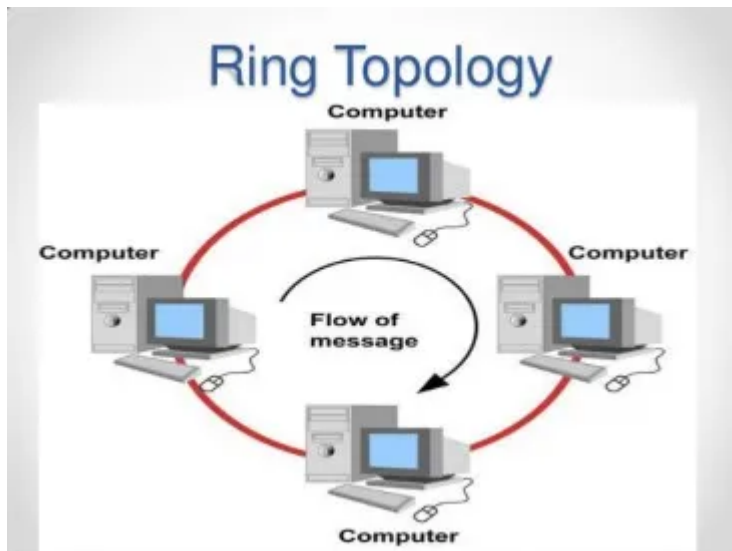


# Ring Topology

All stations in a ring topology are considered repeaters and are enclosed in a loop.

A ring topology is a network topology in which the devices are connected in a circular fashion. This means that data travels around the ring in one direction. Ring topologies are typically implemented using FDDI, SONET, or Token Ring technology.

Ring networks are most commonly wired in a star configuration. This means that each device is connected to a central hub or switch. The hub or switch then routes the data around the ring.



Let's now explore LAN networking devices, which will take our knowledge to a new level.

## (LAN) networking devices



Local area network (LAN) networking devices are the physical components that allow computers and other devices to connect to a LAN.

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These devices can be divided into two main categories:

**Connectivity devices:** These devices connect computers and other devices to the LAN.

- **Network interface cards (NICs):** NICs are installed in computers and other devices to provide a physical connection to the LAN.
- **Hubs:** Hubs are simple devices that connect multiple computers and other devices to the LAN.
- **Switches:** Switches are more intelligent devices than hubs and can direct traffic more efficiently.
- **Bridge:** Bridge is a network device that connects two similar network segments together. The primary function of a bridge is to keep traffic separated on both sides of the bridge.

**Routing devices:** These devices route traffic between different LANs. Examples of routing devices include:

- **Routers:** Routers are the most common type of routing device. They can connect LANs of different sizes and topologies.
- **Gateways:** Gateways connect LANs to other networks, such as the internet.

By learning about the fundamental concepts and devices associated with LAN topology, you have built a strong foundation for putting your new knowledge into practice. Now, You can apply your skills to real-world scenarios.

