Types by Topology

We'll study the types of computer networks based on topologies in this lesson.

WE'LL COVER THE FOLLOWING

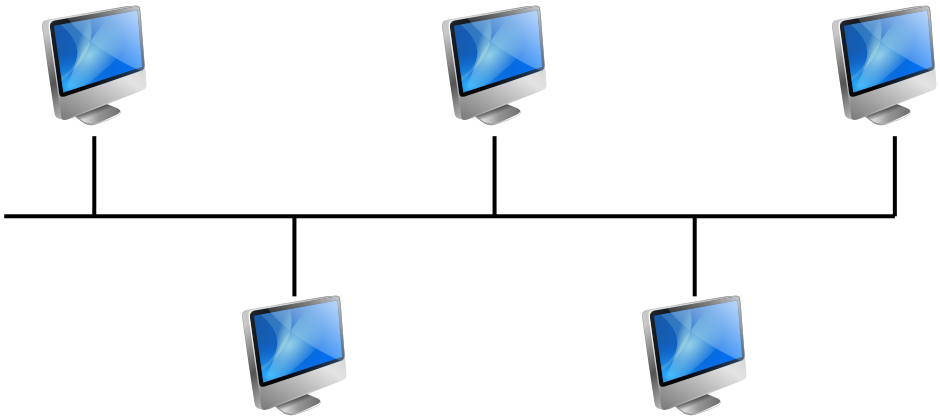
Computer networks can also be categorized in terms of **network topologies** that you might have studied about in a high school computer science class. These topologies include: **bus, ring, star, tree, and mesh**. Note that these topologies are strictly *logical*, i.e., they do not dictate how the wires would be connected physically, but they do dictate how the data flows in the network.

Bus

Every end system will receive any signal that is sent on the main or **backbone** medium. The medium can be guided or unguided.

Limitations

- A break in the cable will disrupt the entire network.
- Only one system can transmit at a time.



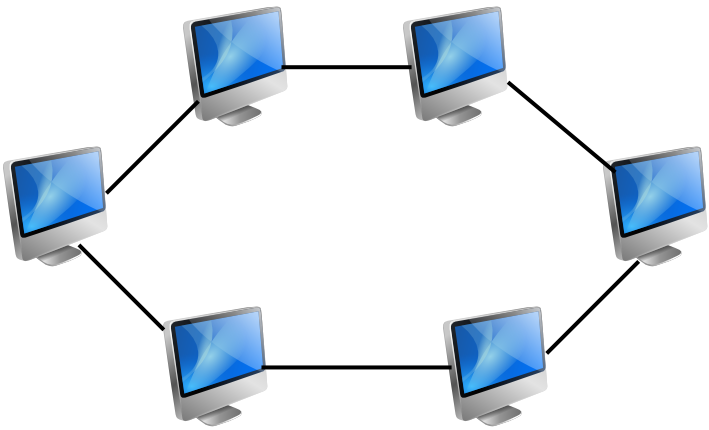
bus topology

Ring

In this topology, end systems communicate with each other **through each other**. So the message travels along the ring passing each system until the target system itself is reached. Theoretically, $n/2$ systems can be transmitting to their adjacent neighbor at the same time.

Limitations

- The basic ring topology is unidirectional so $n - 1$ end systems would have to transfer messages for end system #1 to talk to end system #n
- A break in the cable will disrupt the entire network.



Ring Topology

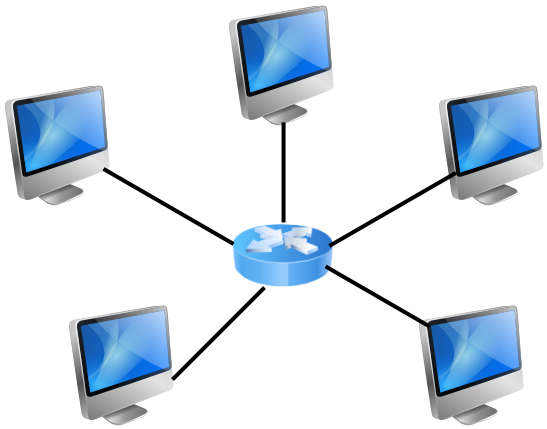
Star

All end systems talk to each other through one central device such as a router or switch. Routers and switches are discussed in-depth in the data link layer chapter!

chapter!

Limitations

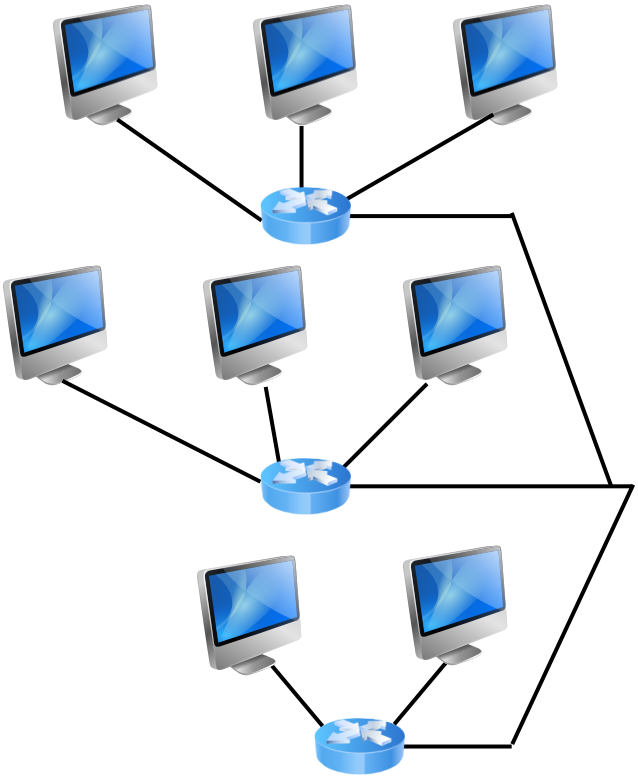
- Hosts can all be transmitting at the same time. However, if the central device fails, the network is completely down.



Star topology

Tree

This topology is also known as the **star-bus** topology. It essentially consists of a bunch of star networks connected together with a large bus.



tree topology

Mesh

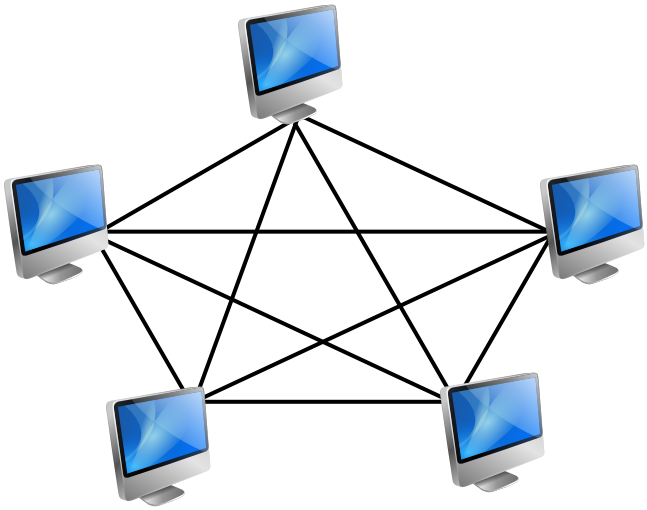
In this topology, every end system is **directly connected** to every other end

system.

Limitations

The mesh topology (if physically realized as a mesh):

- Is expensive
- Hard to scale
- Used in specialized applications only



mesh topology

Quick Quiz!

1

A disadvantage of the bus topology is that if the backbone wire is broken, the network may get negatively impacted

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Starting in the next lesson, we'll learn about how the working of the Internet is organized into conceptual layers.

is organized into conceptual layers.