CompTIA Network +

Chapter 1

Introducing Computer Networks

Objectives

- What is the purpose of a network?
- What are some examples of network components?
- How are networks defined by geography?
- How are networks defined by topology?
- How are networks defined by resource location?

Introducing Computer Networks

- What comes to mind when you thinks of a computer network?
  - Is it the Internet?
  - Is it e-mail?
  - Is it the wireless connection that lets you print to your printer from your laptop?

- Whatever your current perception of a computer network , this chapter and book, as a whole, helps you gain a deep appreciation and understanding of networked computing.

Defining a Network

- A (computer) network is an interconnection of two or more computing devices.
- It can serve a variety of purposes including:
  - File sharing between two computers
  - Video chatting across different parts of the world
  - Surfing the Web
  - Instant messaging (IM) between computer with IM software installed.
  - E-mail
  - Voice over IP (VoIP)
- A converged network is one that transports multiple forms of traffic (video, voice, and data)

Overview of Network Components

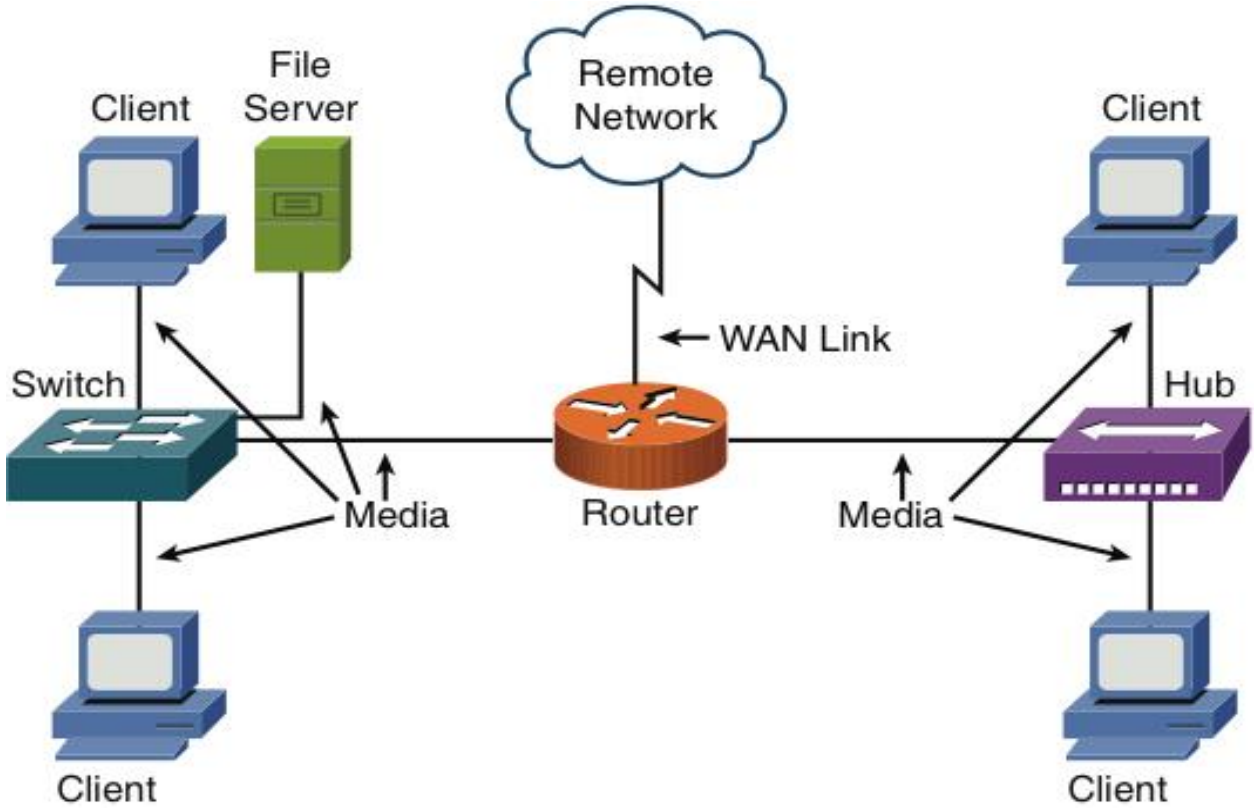

Figure 1-1 Sample Computer Network

Overview of Network Components

- **Client:** The term *client* defines the device an end user uses to access a network.
- **Server:** A *server* provides resources to a network. (Email, Web pages, or files)
- **Hub:** A *hub* is an older technology that interconnects network components. A hub broadcasts messages to all connected devices other than the recipient.

Overview of Network Components

- **Switch:** A *switch* interconnects network components. Unlike a hub, a switch makes forwarding decisions based on physical addresses.
  - ***Physical Address*** *is burned into the NIC, usually a* ***MAC Address***
- **Router:** A *router* is connection device that makes forwarding decisions based on logical network addresses.
  - ***Logical Address*** *is determined by physical location, usually an* ***IP Address***
- **Media:** The media is the physical substance on which the information of the system travels, such as copper wire for carrying electronic signals.
- **WAN link:** Most networks connect to one or more other networks. The link that interconnects those networks is typically referred to as a *wide-area network* (WAN) link.

Network Defined by Geography

- Local-area network (LAN)
- Wide-area network (WAN)
- Campus-area network (CAN)
- Metropolitan-area network (MAN)
- Personal-area network (PAN)

LAN

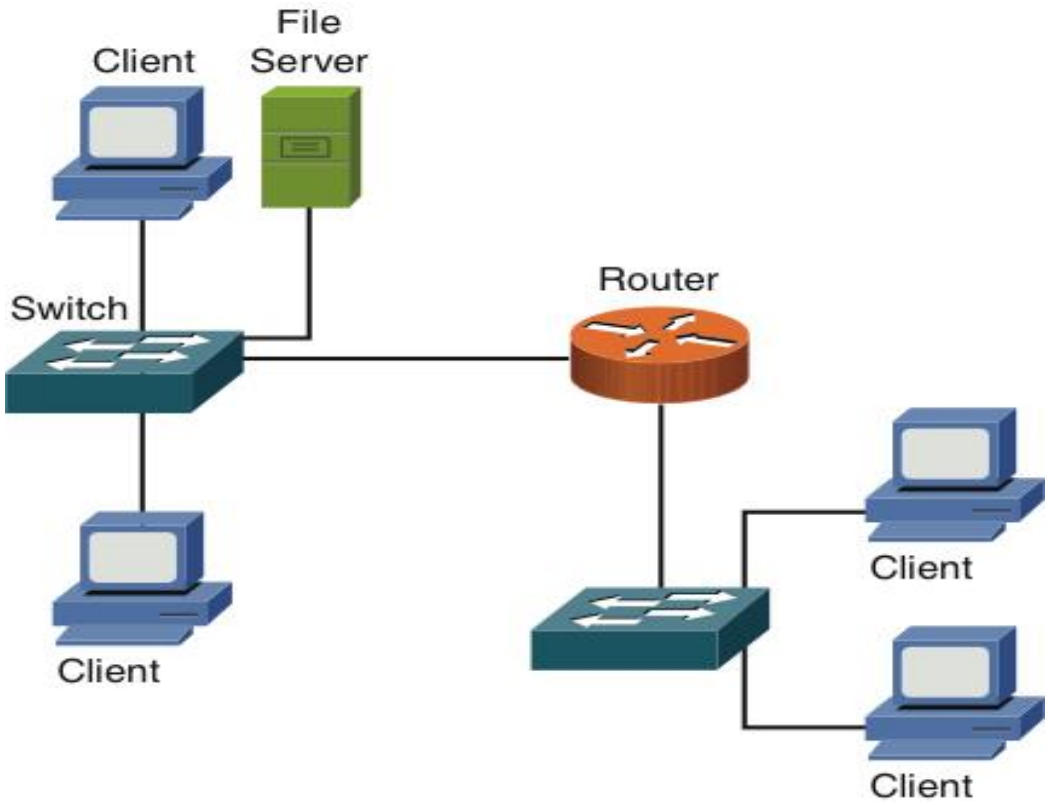

Figure 1-2 Sample LAN Topology

WAN

Figure 1-3 Sample WAN Topology

Other Area Networks

- **CAN**: A CAN is created from interconnecting multiple LANs
- **MAN**: A MAN is between a LAN and a WAN, typically covering a metropolitan area such as three office branches in the same city.
- **PAN**: A PAN is created from the interconnection of personal devices such as a phone, headset, and portable tablet.

Network Defined by Topology

- In addition to classifying networks based on the geographical placement of their components, another approach to classifying a network is to use the networks ***topology.***
- There are two major topology groupings
  - Physical Topology
  - Logical Topology

Network Defined by Topology

- Physical Versus Logical Topology
  - Physical Topology -- how components are physical interconnected determines the physical topology
  - Logical Topology -- the actual traffic flow determines the logical topology

Network Defined by Topology

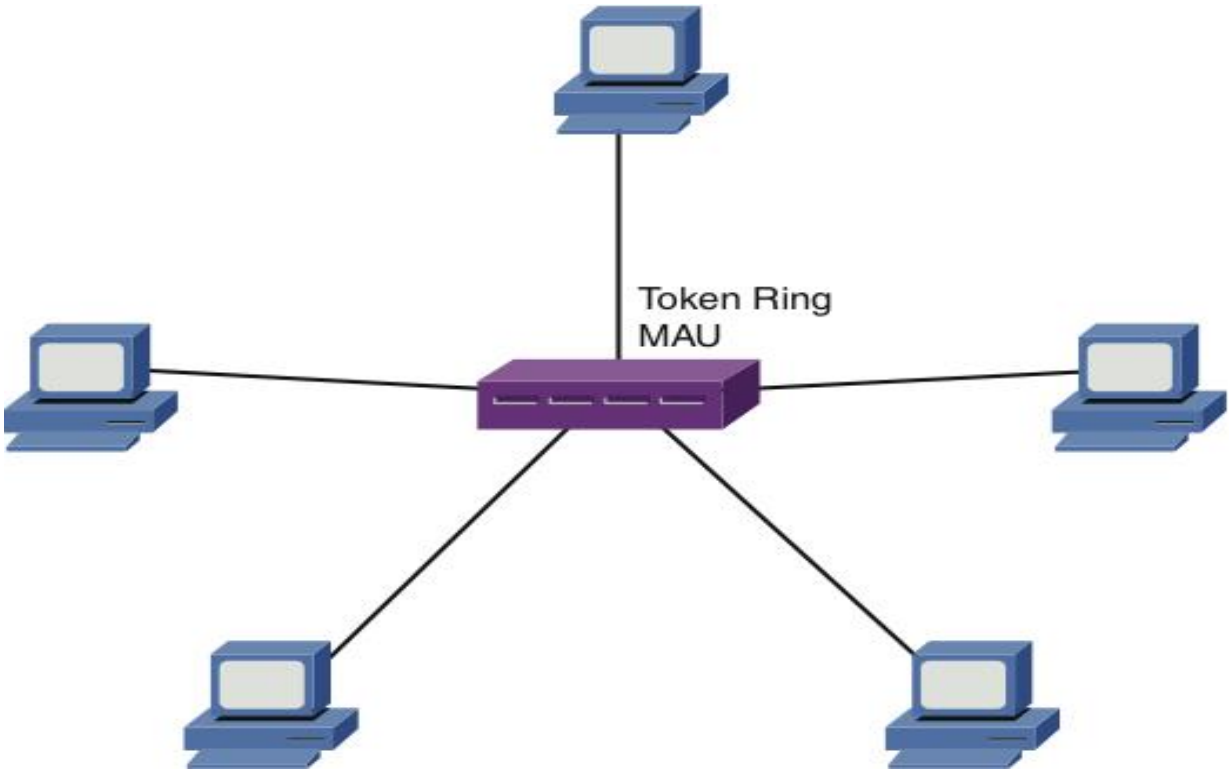

Figure 1-4 Physical Star Topology

Network Defined by Topology

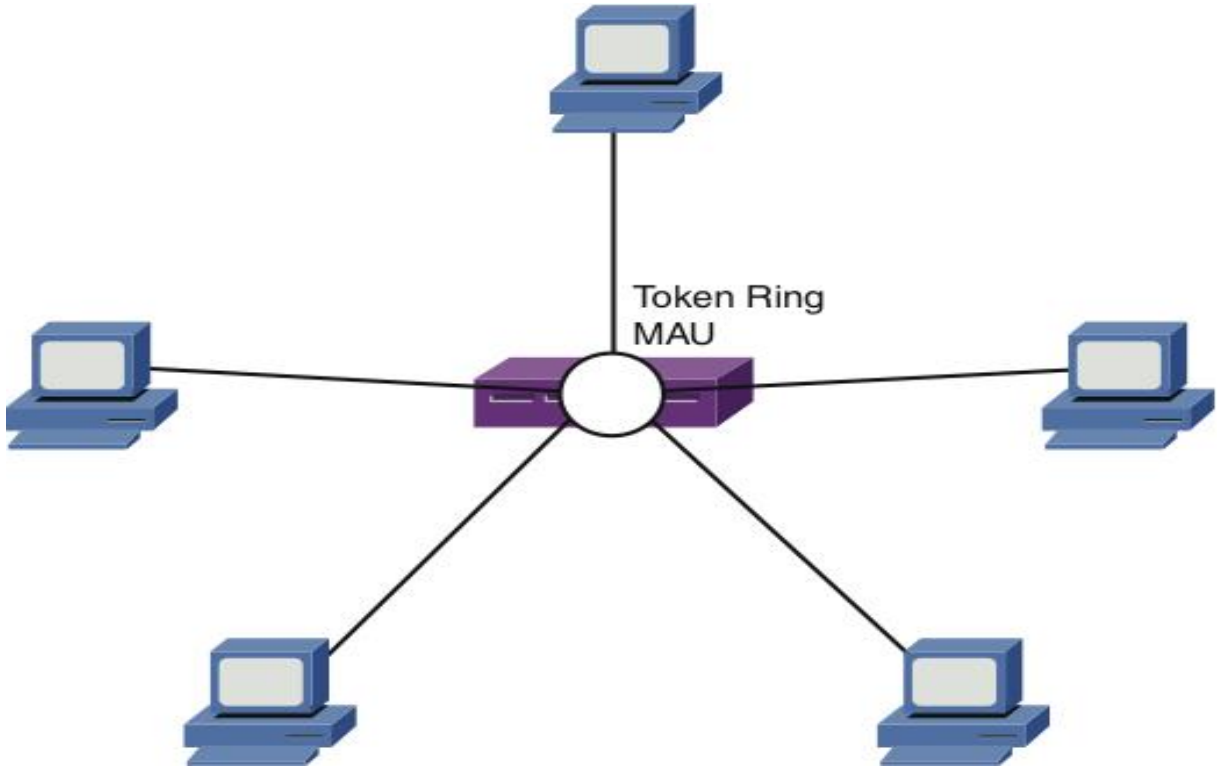

Figure 1-5 Logical Ring Topology

Bus Topology

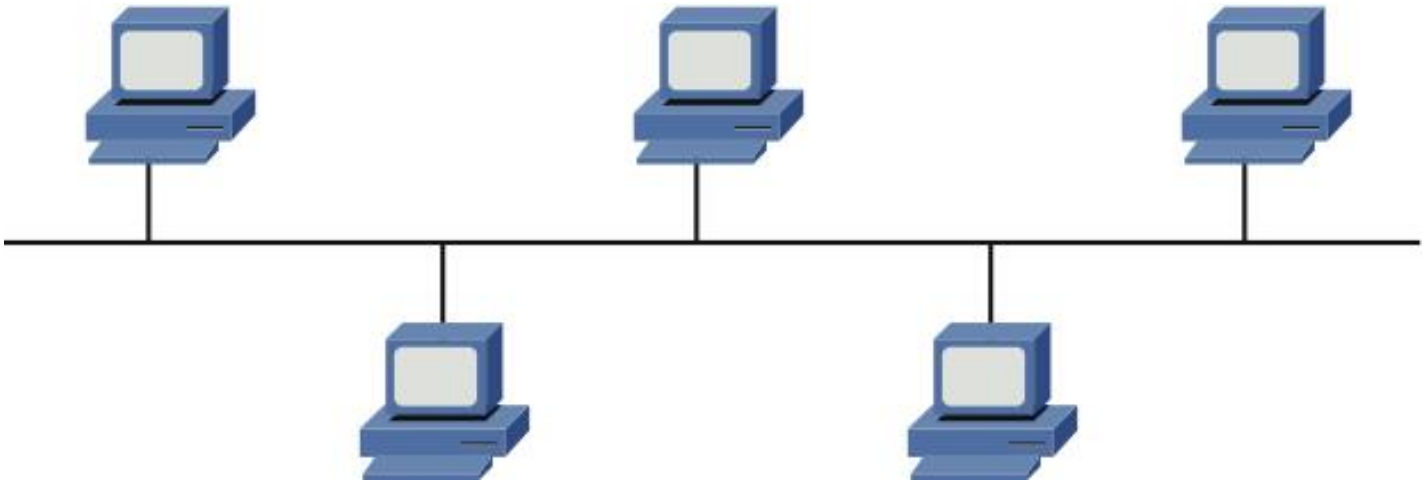

Figure 1-6 Bus Topology

Bus Topology

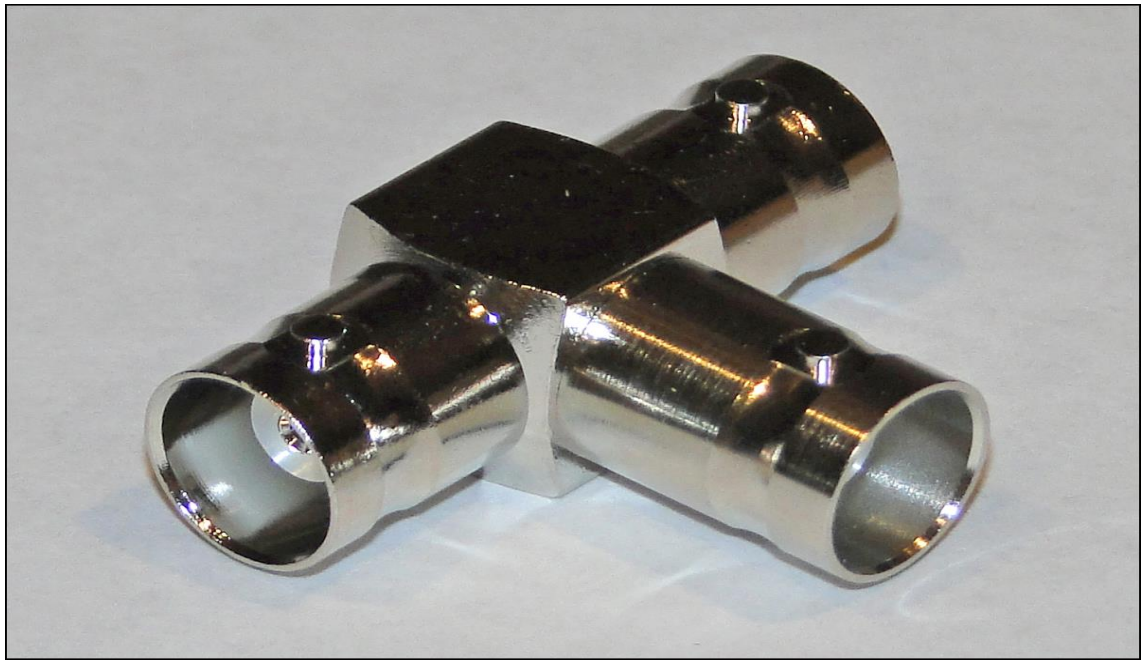

Figure 1-7 T Connector

Ring Topology

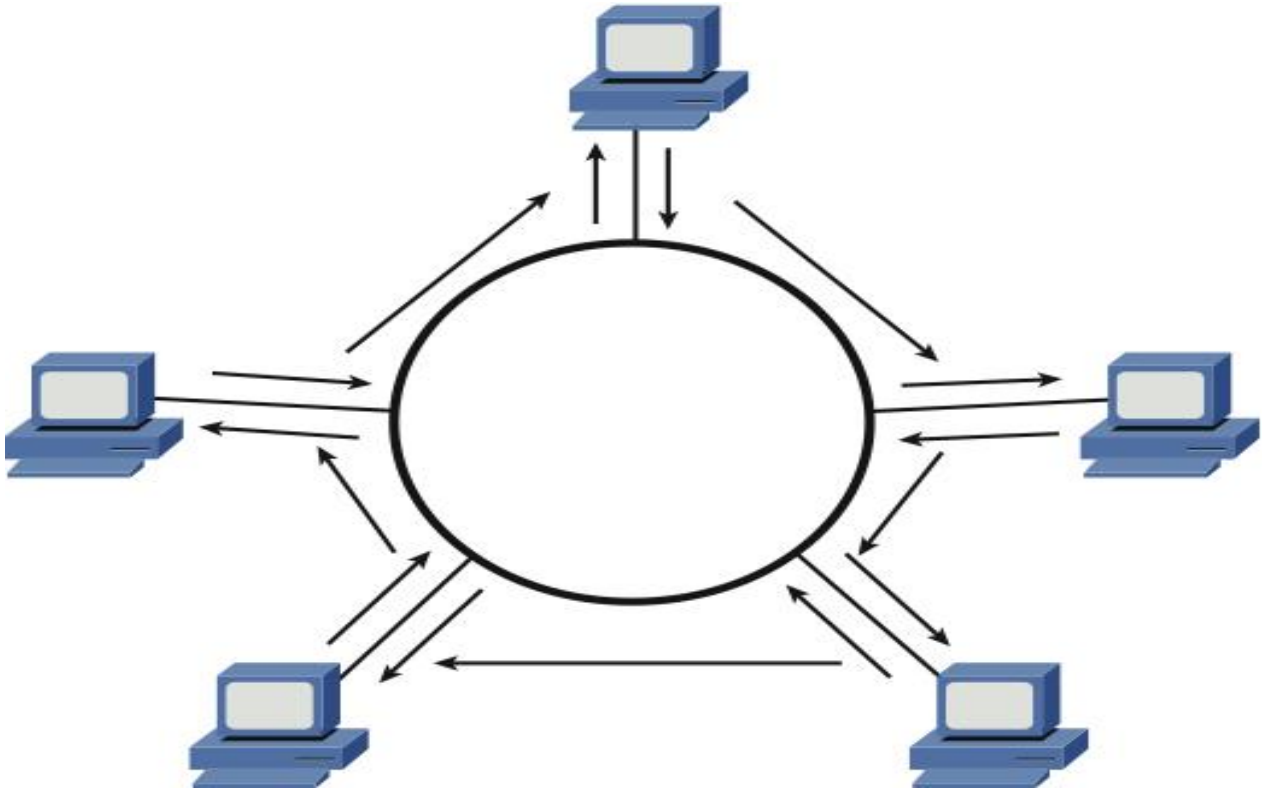

Figure 1-8 Ring Topology

Star Topology

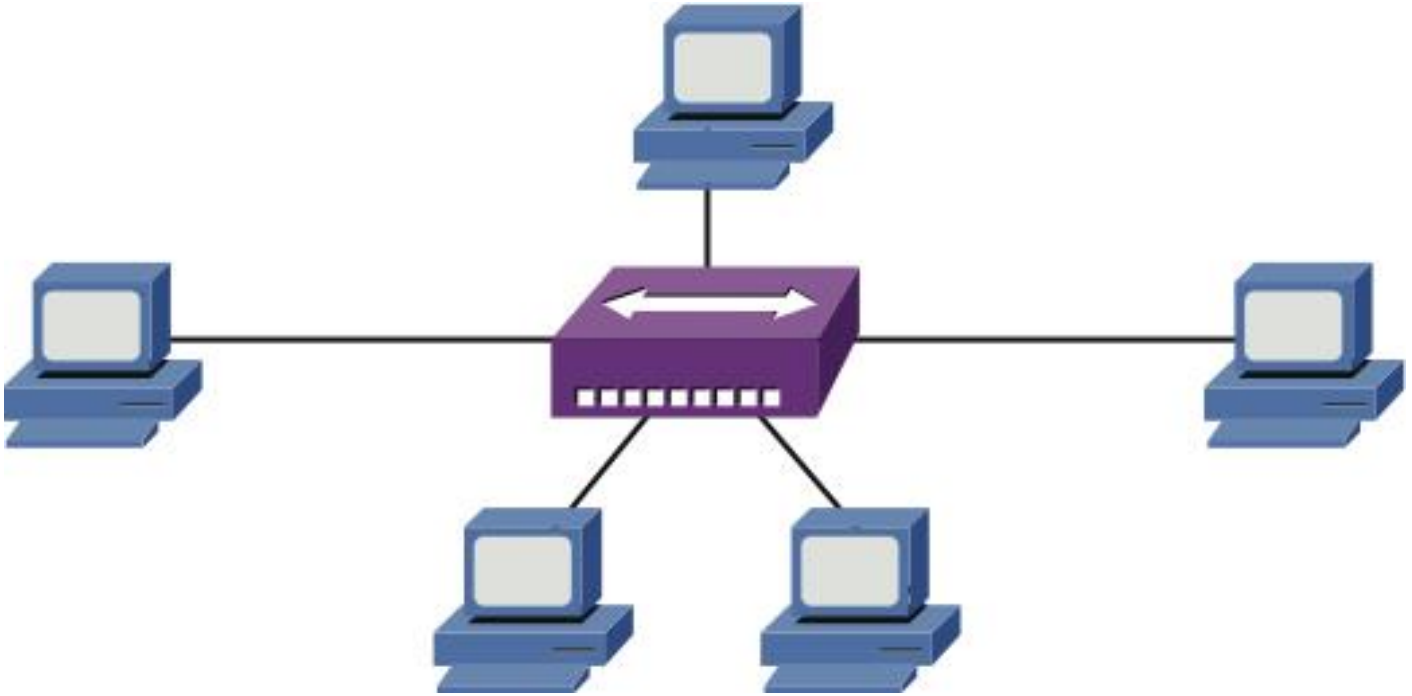

Figure 1-9 Star Topology

Hub-and-Spoke Topology

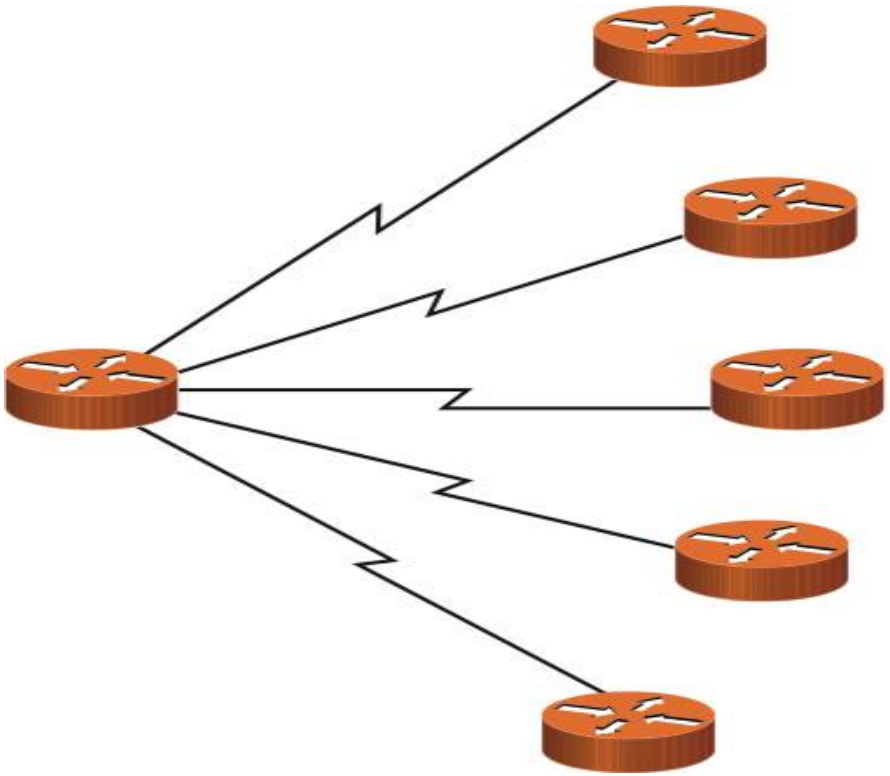

Figure 1-10 Hub-and-Spoke Topology

Full-Mesh Topology

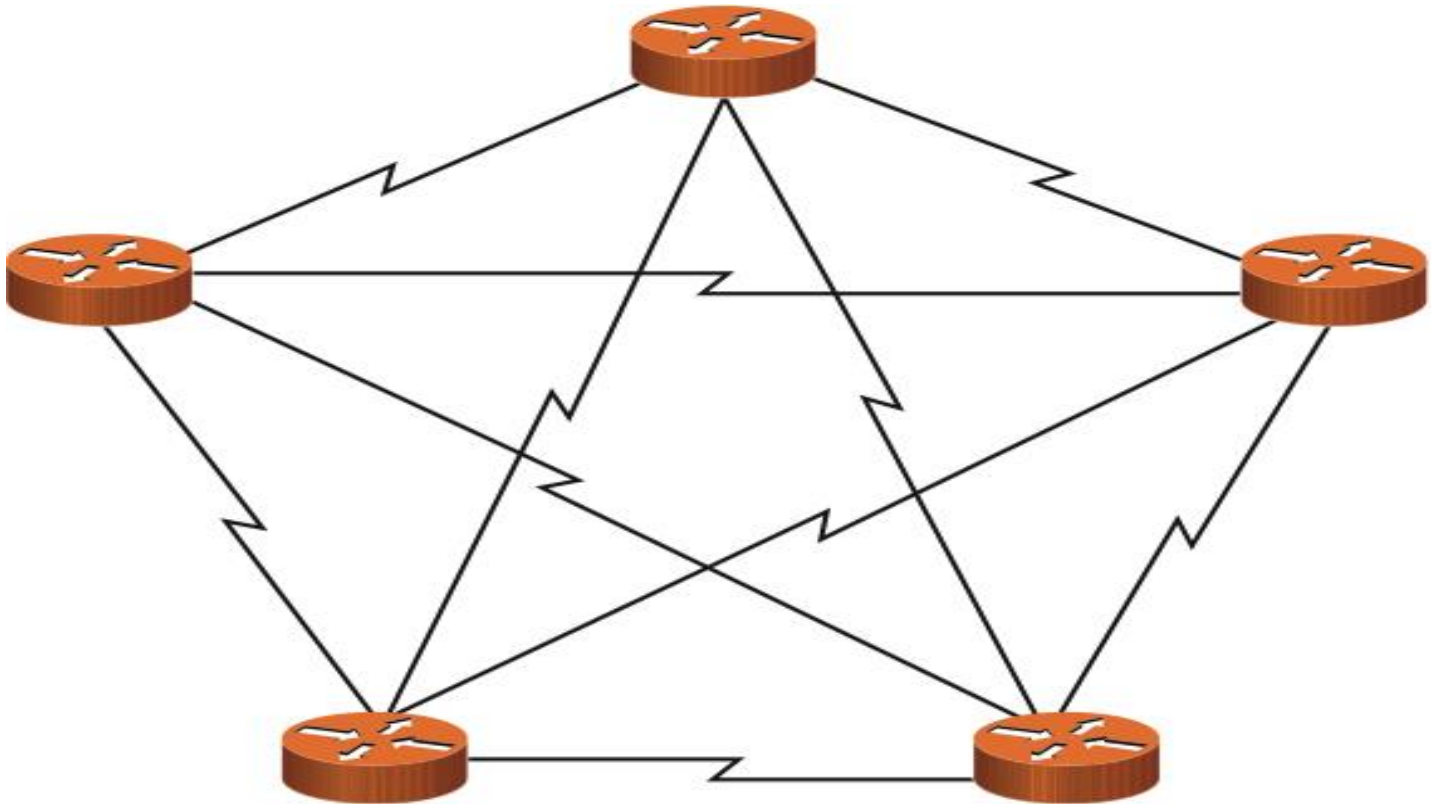

Figure 1-11 Full-Mesh Topology

Partial-Mesh Topology

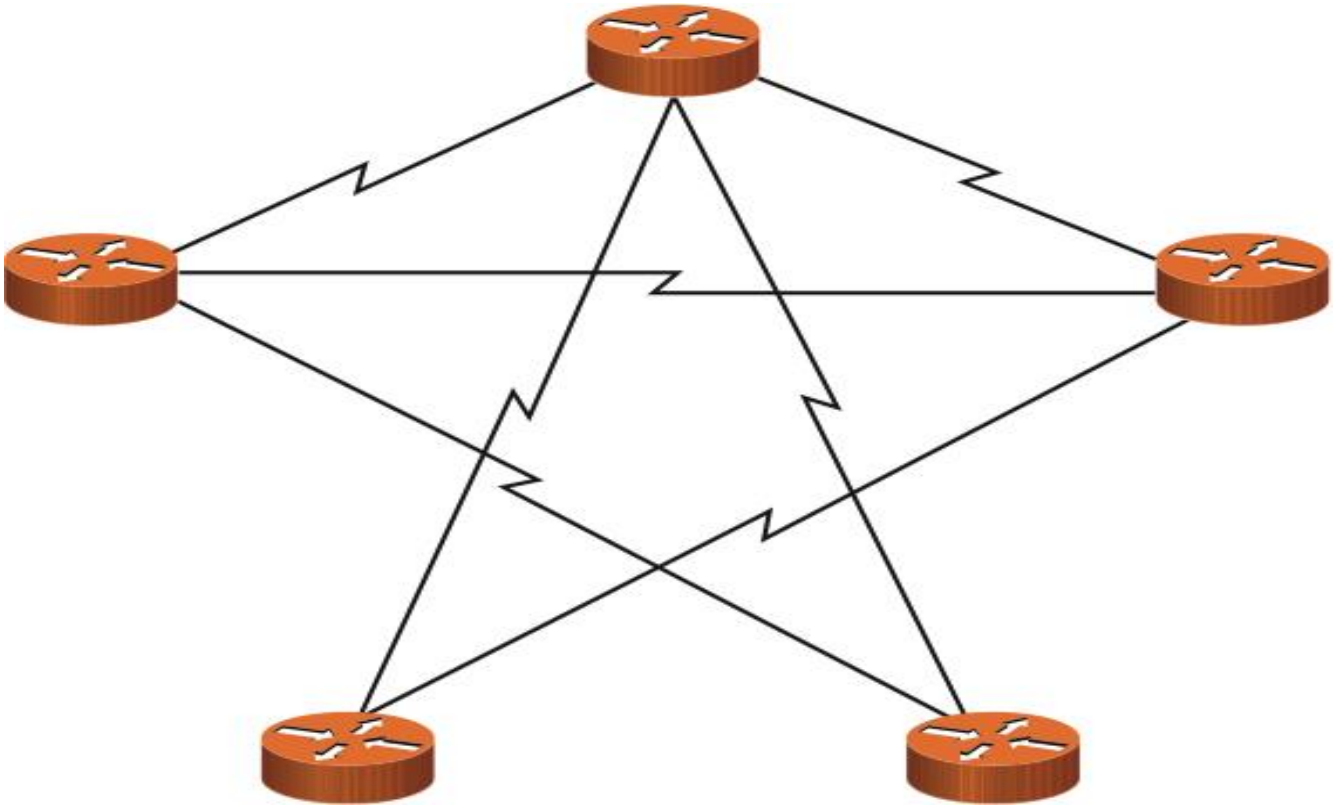

Figure 1-12 Partial-Mesh Topology

Network Defined by Resource Location

- Yet another way to categorize networks is based on where network resources reside.
- Network that have all the resources residing in a server are called ***client – server networks.***
- Network that have their resources on several clients and no server is called a ***peer-to-peer network***

Client-Server Network

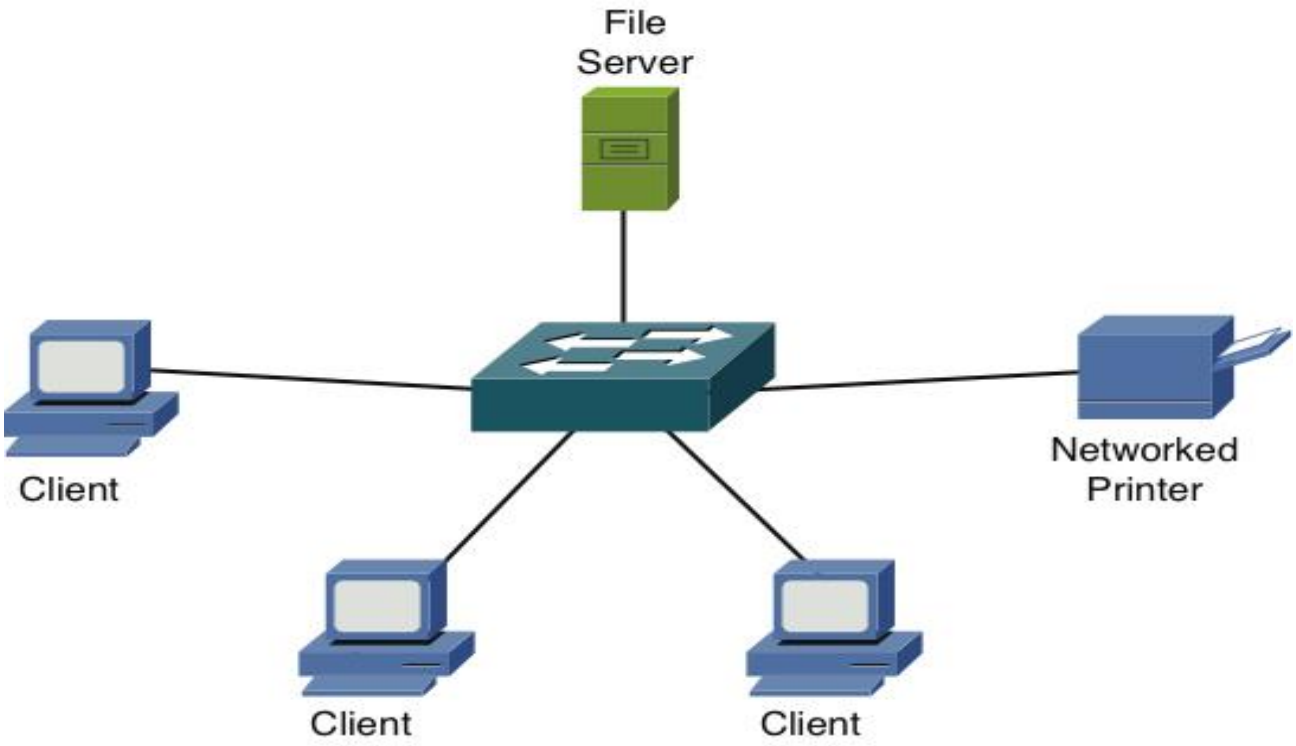

Figure 1-13 Client-Server Network Example

Peer-to-Peer Network

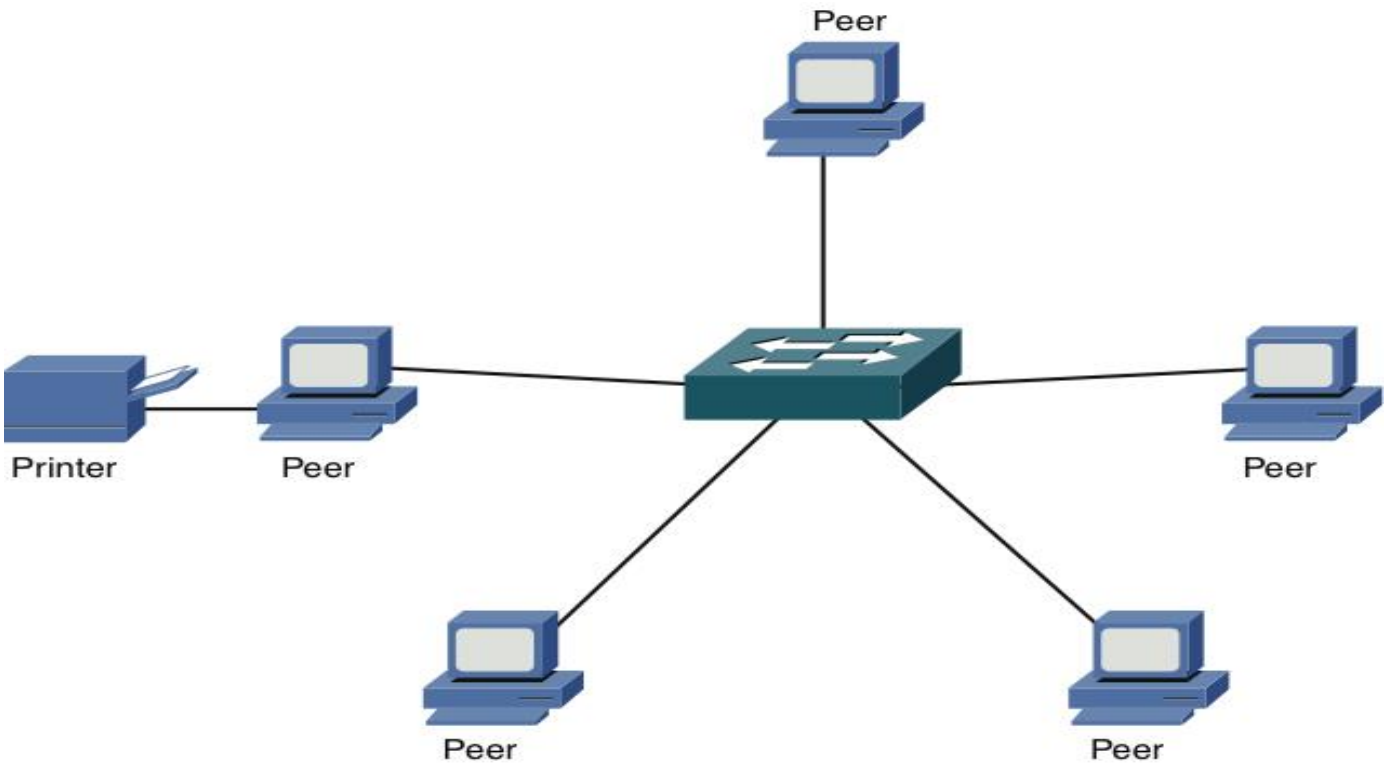

Figure 1-14 Peer-to-Peer Network Example