

Exam Prep: Microsoft Technology Associate 98-366: Networking Fundamentals

Meet the Presenters

Christopher Chapman, MCT
Content Project Manager, Microsoft Learning

Background

- IT manager and implementer focused on deploying, maintaining and optimizing networks of all sizes
- IT Consulting projects include Custom SharePoint for Microsoft IT, Netware/Notes migration to AD/Exchange, Transition to centralized management (250 clients)
- Instructor and Director of Instruction
- Multiple Microsoft and other industry certifications (MCP, MCTS, MCSA, MCSE, MCT)

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Meet the Presenters

Thomas Willingham
Content Developer, Cloud and Enterprise

Background

- Taught the Microsoft MCSE and the Novell CNE certifications, and worked as a network consultant for almost 10 years
 - Courseware Author for MS Learning
- Content developer for Remote Desktop Virtualization at Microsoft for the last 5 years

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Course Topics

Network Fundamentals

- 01 | Understanding Local Area Networking
- 02 | Defining Networks with the OSI Model
- 03 | Understanding Wired and Wireless Networks
- 04 | Understanding Internet Protocol (IP)
- 05 | TCP/IP Tools
- 06 | Network Services
- 07 | Understanding Wide Area Networks
- 08 | Defining Network Infrastructure and Security

Setting Expectations

- Target Audience
 - IT Help Desk staff interested in moving into Network/Systems Administration
 - Anyone interested in learning more about networking
- Suggested Prerequisites/Supporting Material
 - Exam 98-349: Windows Operating System Fundamentals

Understanding Local Area Networking

Module 1

MVA

Microsoft
Virtual
Academy

Objectives

Skills/Concepts	Objective Domain Description	Objective Domain Number
Examining Local Area Networks, Devices and Data Transfers	Understand local area networks (LANS)	1.2
Identifying Network Topologies and Standards	Understand network topologies and access methods	1.5

Network components and Terminology

Data

Node

Client

Server

Peer

Network adapter

Hub

Switch

Router

Media

Transport Protocol

Bandwidth

Local Area Network

A Local Area Network (LAN) is group of computers confined to a small geographic area, such as a single building

A LAN is a group of computers or devices that share a common communication medium, such as cabled or wireless connections

Networks

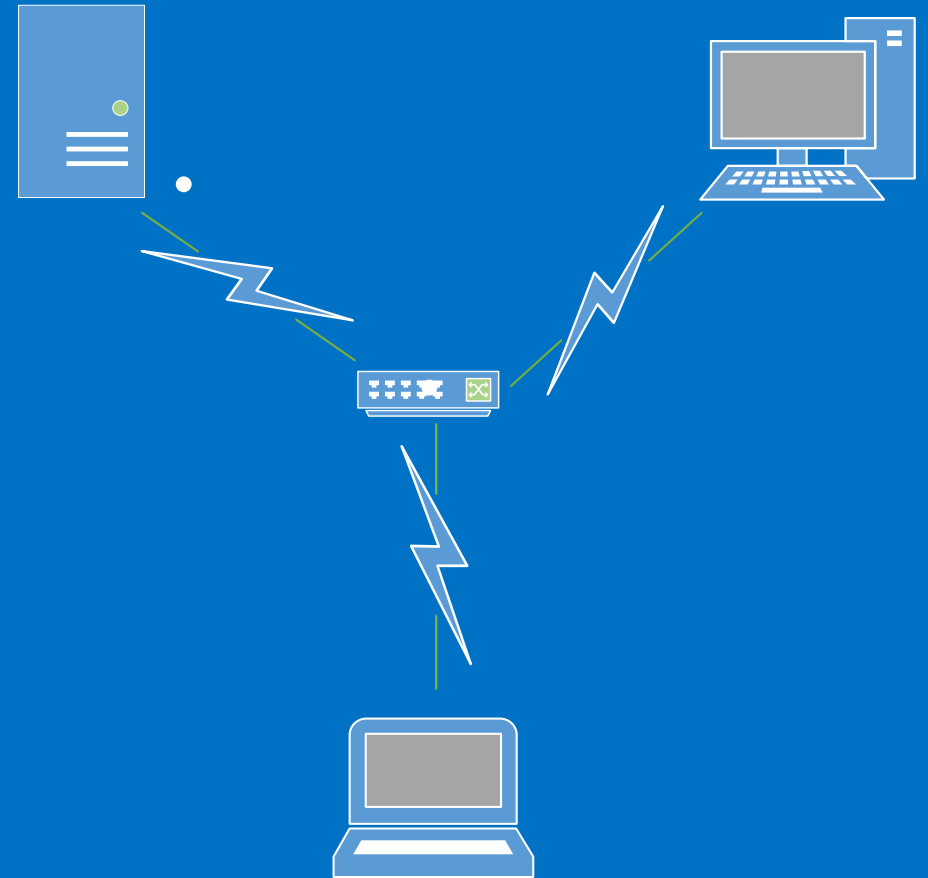
- Networks are used to exchange data
- Reasons for networks include
 - Sharing information
 - Communication
 - Organizing data

Network Documentation

- Network documentation helps describe, define, and explain the physical and logical method for connecting devices
- The documentation phase occurs before a network is built, or when changes are made to the network
- Microsoft Visio is a tool that can be used to document networks

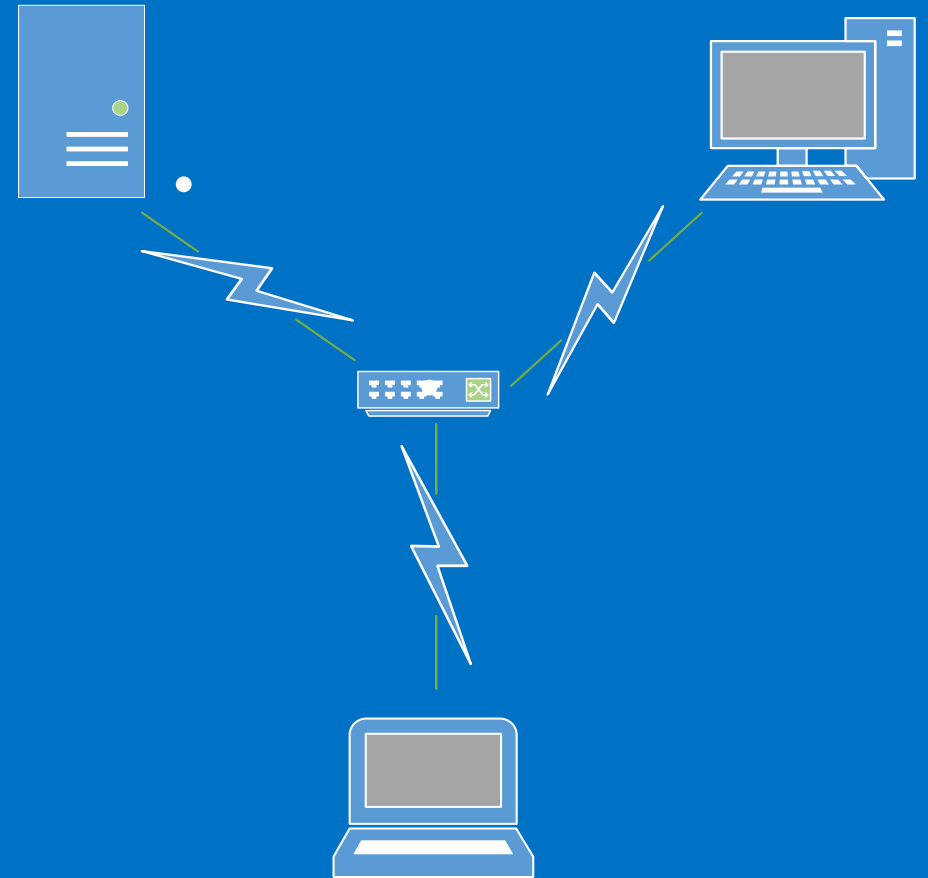
Hub

- A Hub is the most basic central connecting device
- Hubs enable computers on a network to communicate
- A host sends data to the hub. The hub sends the data to all devices connected to the hub



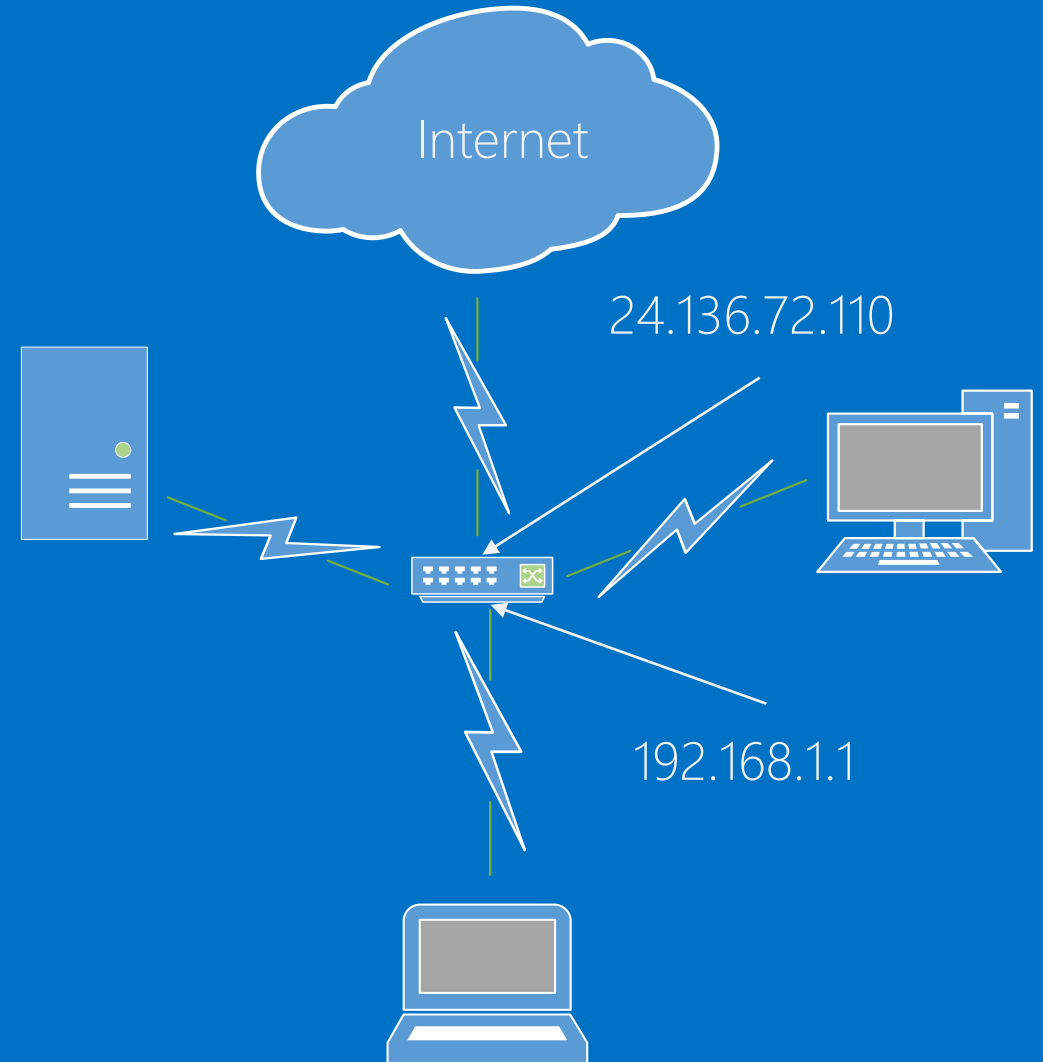
Switch

- Switches work the same way as a hub, but they can identify the intended recipient of the data
- Switches can send and receive data at the same time



Router

- Routers enable computers to communicate and allow communication between two networks – such as your home network and the Internet
- This communications link between the one network and the other is where the LAN ends

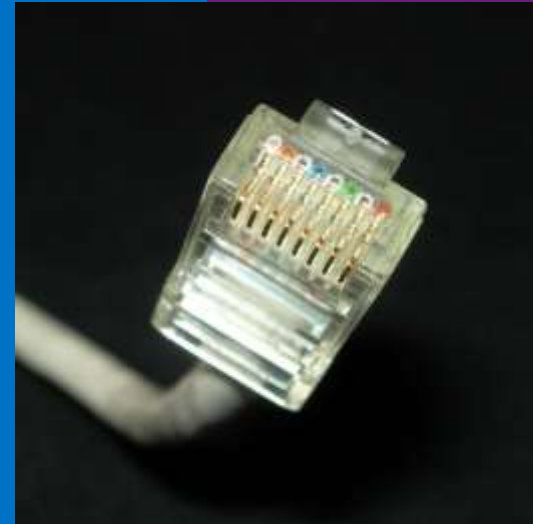


Network Adapter and RJ45 Patch Cable

A network adapter, also known as a network interface card (NIC), is the hardware device that enables you to send and receive from your computer



RJ45 is the most common type of network adapter connection



- A network adapter can connect to the network by using cable (wired) or by air (wireless)

Wireless Access Point

- The wireless access point (WAP) acts as the central connecting device for the network
- Wireless networks can consist of many types of devices other than traditional PCs:
 - Smart phones
 - PDAs
 - Tablet computers
 - Micro computers
 - PCs and laptops equipped with wireless network adapters can connect to these networks as well

Demo

- Device Manager Showing Network Adapters
- Network Adapter Properties
- IP Address

Serial Data Transfer

- Serial data transfer is the transfer of one bit at a time—in other words, transfer in a single-bit stream, like a one lane highway
- On the network cable, data travels in a single bit stream

Data Transfer Rate

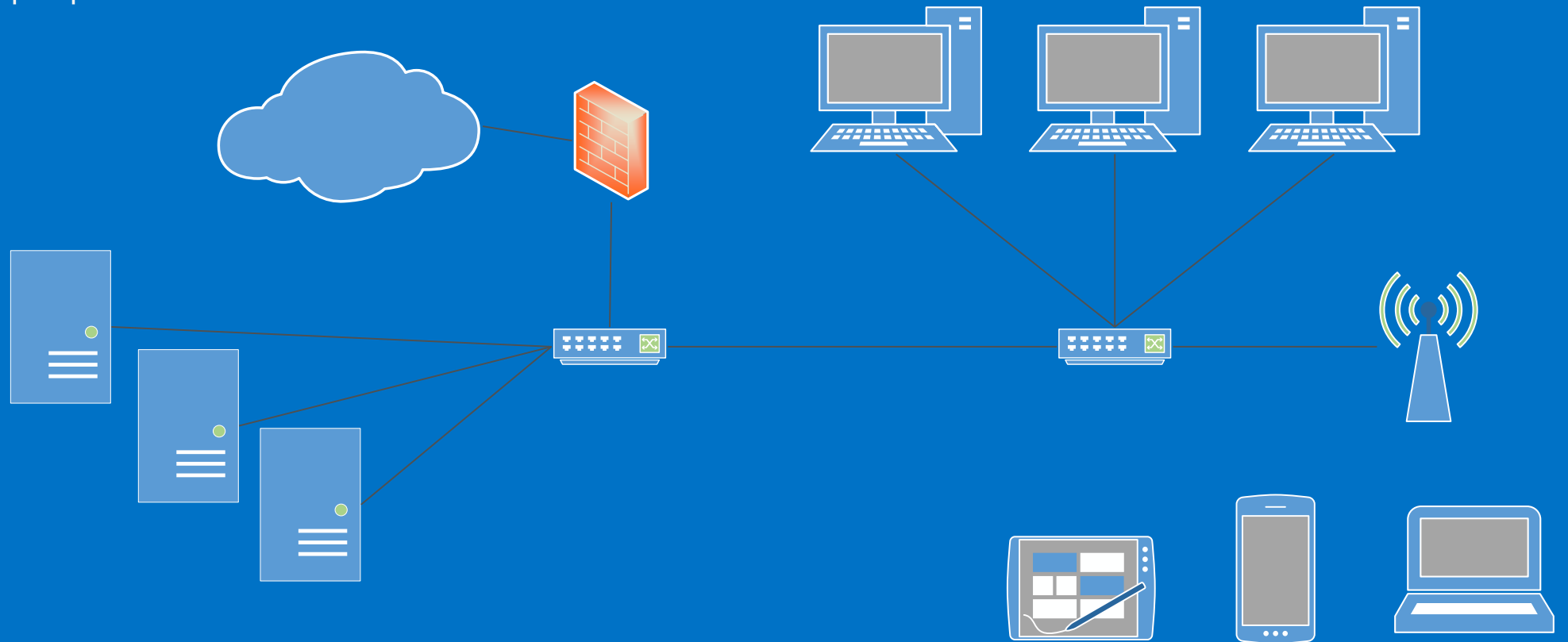
- Data transfer rate defines the maximum bits per second (bps) that can be transmitted over a network
- Rated in bits, and signified with a lowercase b (for example, 10 Mbps)
- The lowercase b differentiates this unit from data that is stored on a hard drive, which uses an upper case B that stands for bytes (for example 10 MB)
- Types of Transfers
 - Broadcast sends data to every other host on the network
 - Unicast sends data to a specific host

IP Address

- Most every computer and many other devices have an Internet Protocol (IP) address
- An IP address uniquely identifies your device and the associated network and allows each device to send and receive information
- A typical example of an IPv4 address would be 192.168.1.1
- Every IP address is broken down into two parts by a subnet address
 - Network ID 192.168.1
 - Host ID 1

LAN

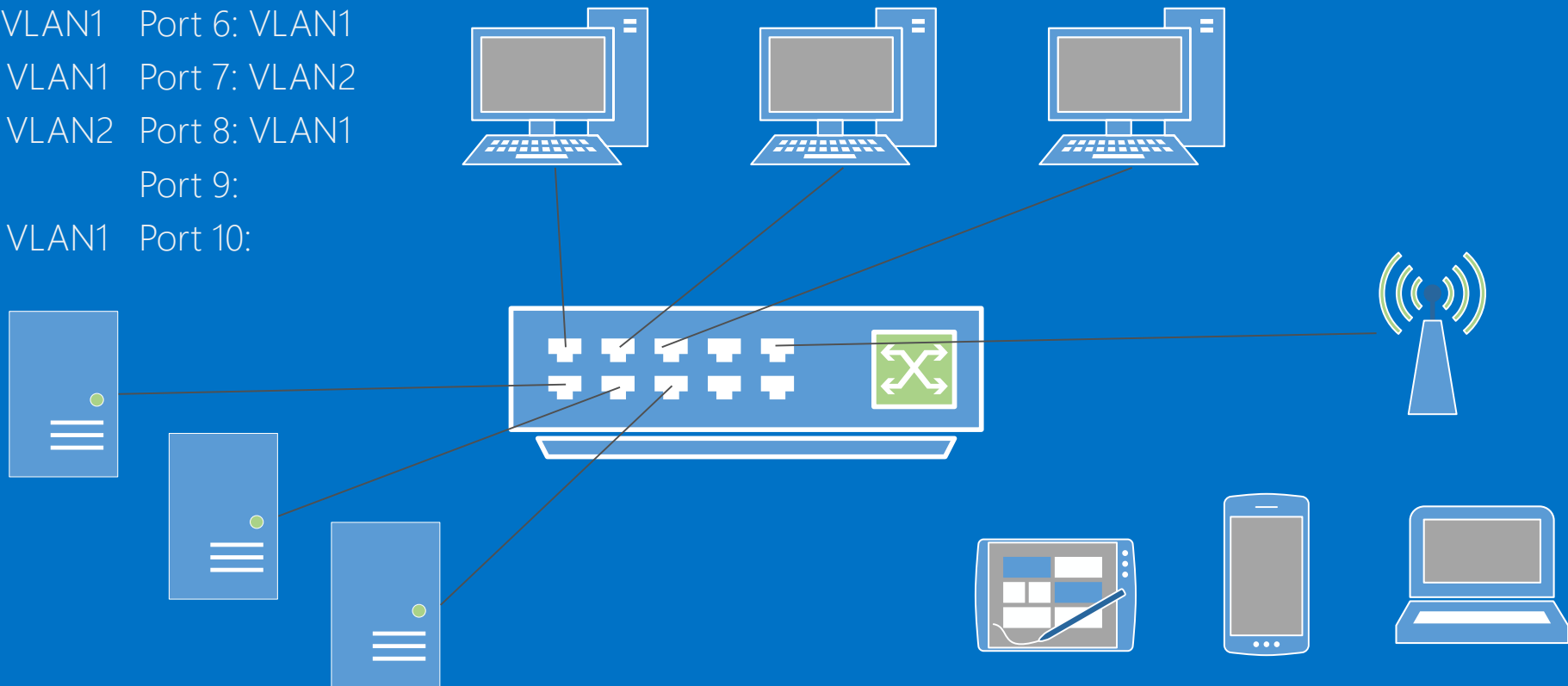
- Computers and other devices are connected using copper-based twisted-pair cables or wireless equipment



Virtual LAN

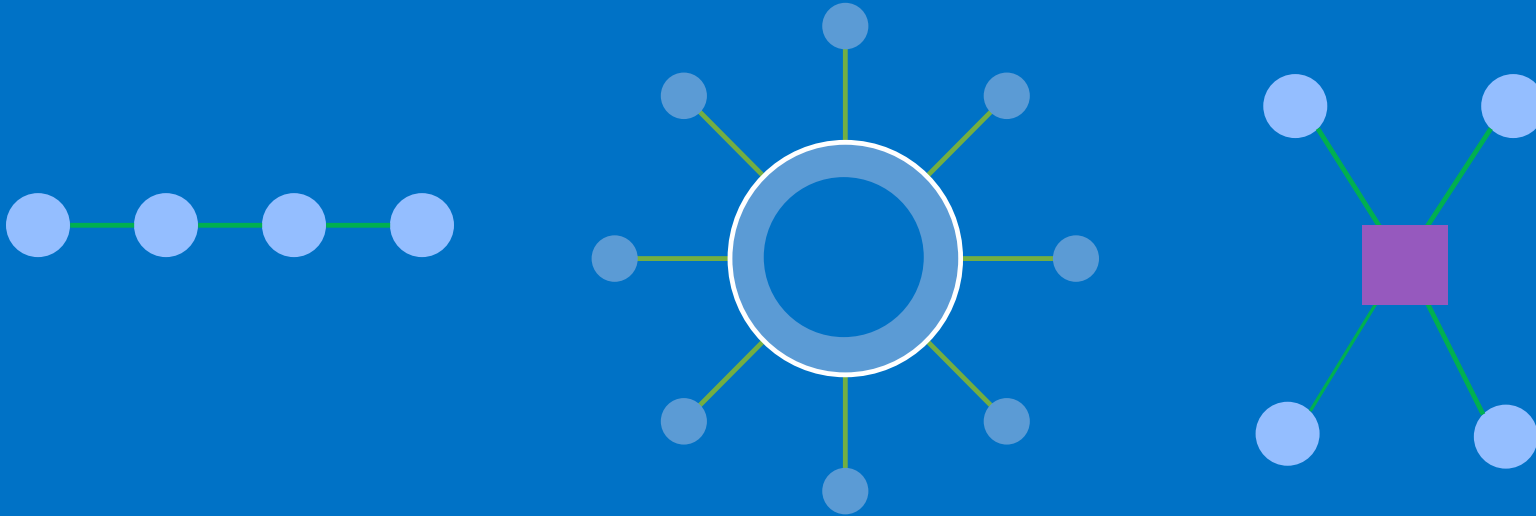
- A virtual LAN (VLAN) is a group of hosts with a common set of requirements that communicate as if they were connected together in a normal fashion on one switch, regardless of their physical location.

Port 1: VLAN1 Port 6: VLAN1
Port 2: VLAN1 Port 7: VLAN2
Port 3: VLAN2 Port 8: VLAN1
Port 4: Port 9:
Port 5: VLAN1 Port 10:



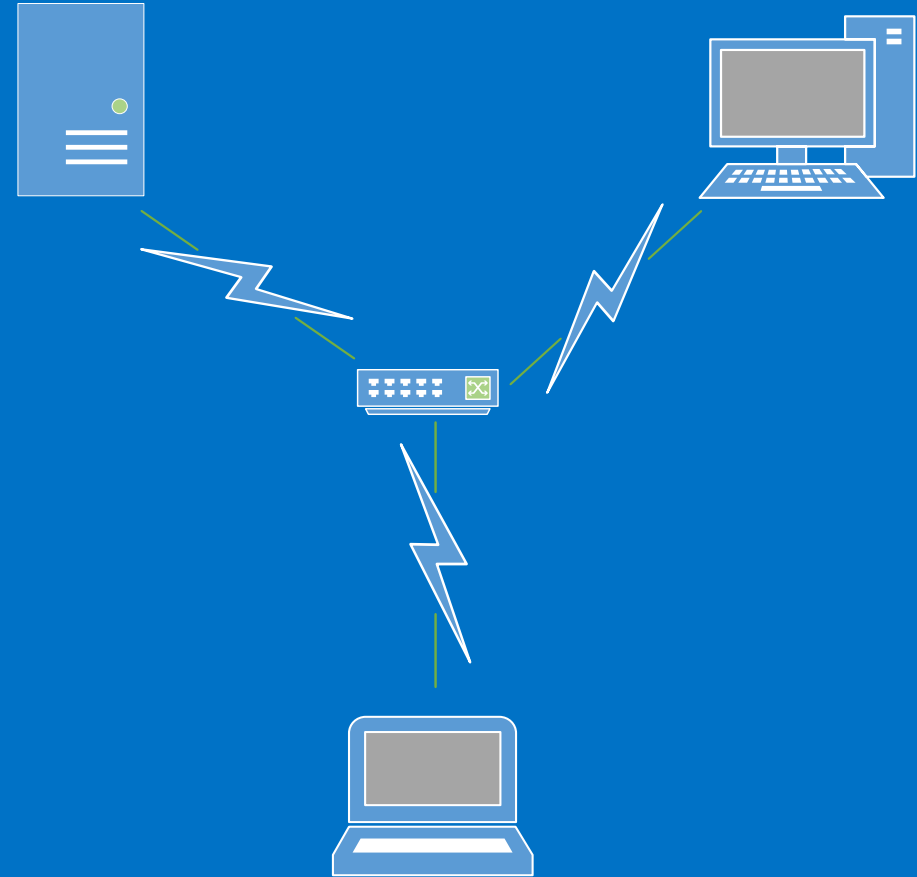
Network Topology

- A network topology defines the physical connections of hosts in a computer network.
- There are several types of physical topologies including:
 - Bus
 - Ring
 - Star
 - Mesh
 - Tree



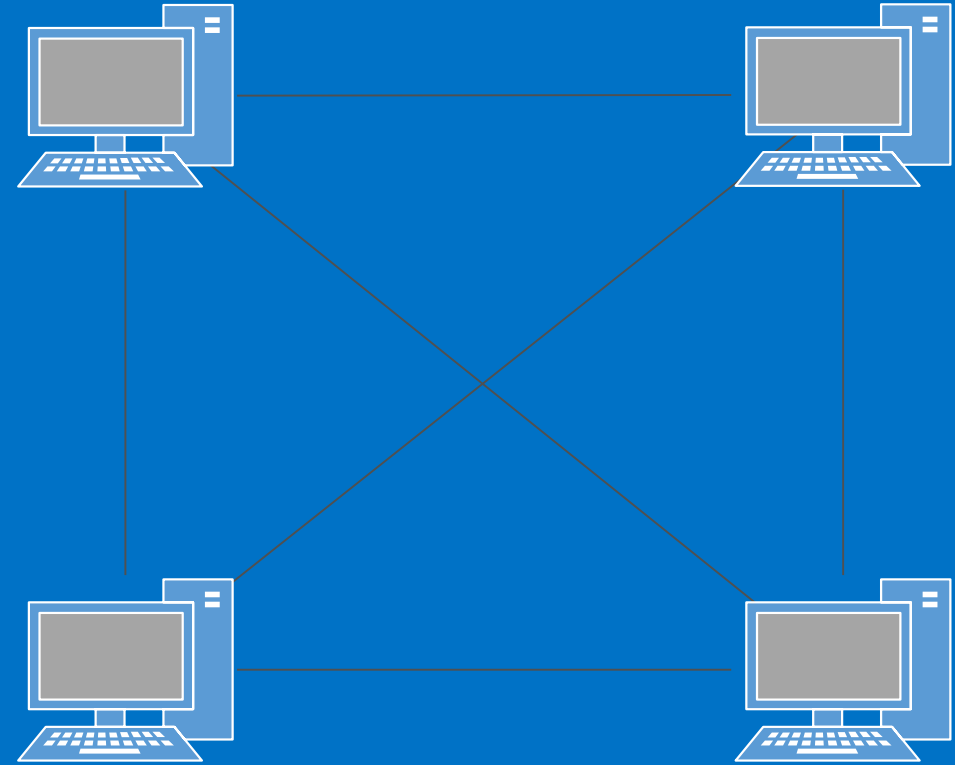
Star Topology

- Most Common topology
- Each computer is individually wired to a central connecting device (hub, switch or SOHO router) with twisted-pair cabling



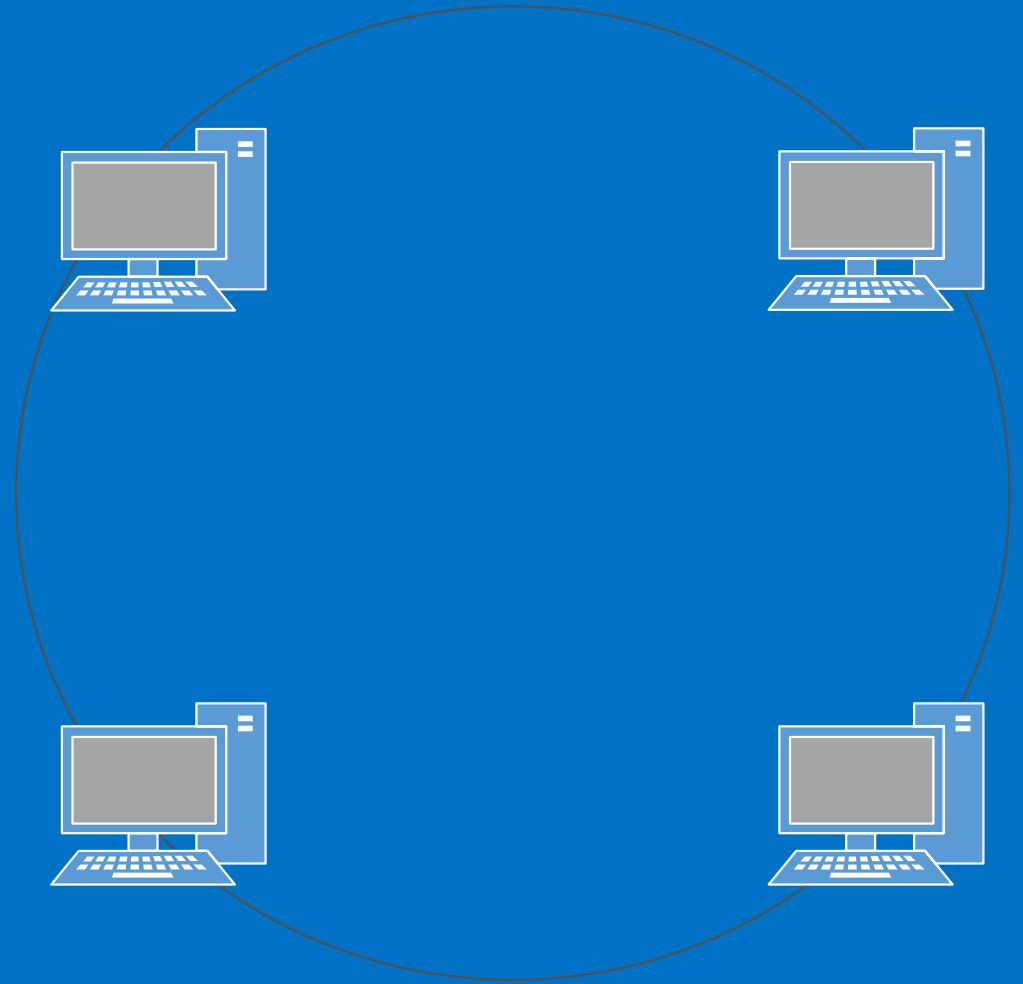
Mesh Topology

- Every computer connects to every other computer; no central connecting device is needed.



Ring Topology

- In a LAN environment, each computer is connected to the network using a closed loop
- Used by Token Ring and Fiber Distributed Data Interface (FDDI)



Token Ring

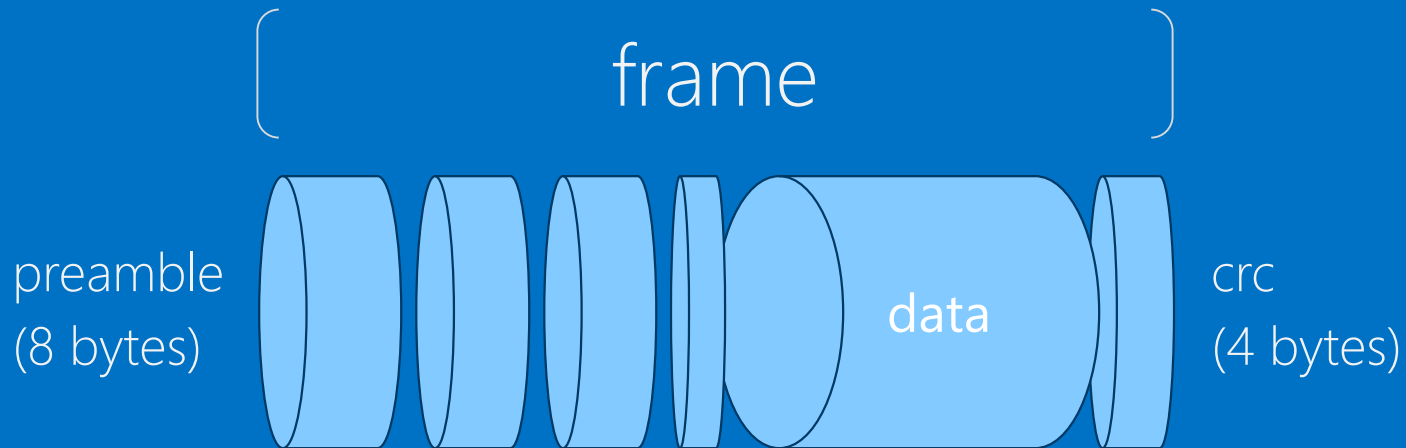
- A Token Ring network sends data logically in a ring fashion, meaning that a token goes to each computer, one at a time, and continues on in cycles
- Physically Token Ring computers are connected in a star fashion
- Namely, all computers in a Token Ring network are connected to a central connecting device known as a Multistation Access Unit (MAU or MSAU)

Ethernet

- Institute of Electrical and Electronics Engineers (IEEE) standard (802.3) that defines how information is sent and received between network adapters, hubs, switches, and other devices
- Ethernet is the de facto standard and is the most widely-installed local area network technology
- Common types of Ethernet include:
 - 802.3u or Fast Ethernet that runs at 100 Mbps
 - 802.3ab or Gigabit Ethernet

Frames

- Computers on Ethernet networks communicate via frames
- A frame is a sequence of bits containing a detectable beginning and end of a packet in the stream of bits
- A frame is a data packet residing on Layer 2 of the OSI model



Centralized Computing

- Computing is done at a central location using terminals that are attached to this main system
- Mainframes are a powerful computer and the rest of the devices connected to the computer are known as terminals (or dumb terminals)
- Each terminal consisted solely of a keyboard and display with no processing power

Client/Server Model

- The client/server model is an architecture that distributes applications between servers and client computers
- Server: System that provides services such as Windows Server 2008 R2
- Client: Device that requests services such as Windows 7



Peer-to-Peer Networking

- Peer-to-peer networking distributes applications or workloads between computers
- Peers are both service providers and service requestors



Distributed Computing

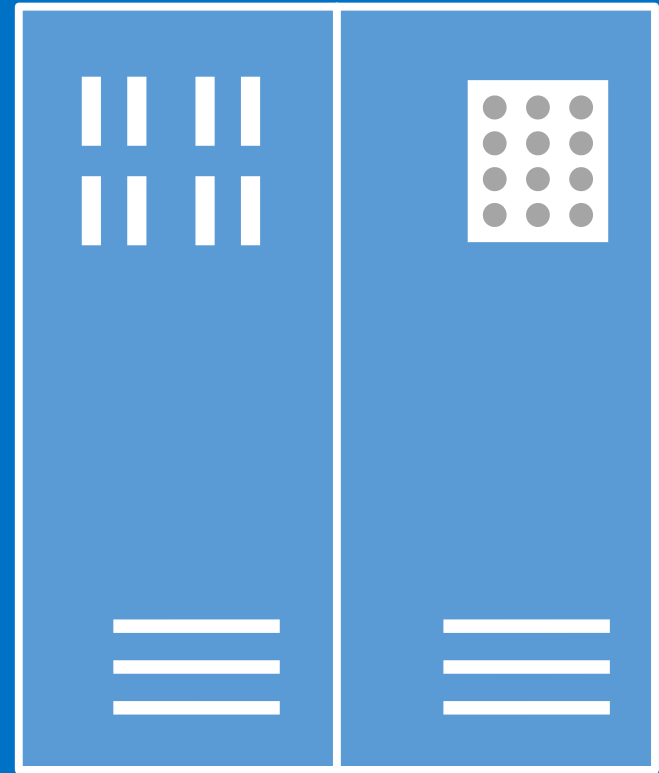
- Distributive computing includes both client-server and peer-to-peer networks
- Every device or workstation has its own processing power

Remote Desktop Services and Remote Sessions

- Centralized computing has made a comeback of sorts. Remote Desktop Services and remote sessions to computers are based off of the centralized computing model
- Thin-client computers do not have a hard drive and store an operating system in RAM, to be loaded up every time the device is turned on
- All other applications and data are stored centrally, this system is a blend of centralized and distributive computing

Servers

- More powerful computers that provide centralized services:
 - File
 - Print
 - Database
 - Network controller
 - Messaging/Email
 - Web



Client and Server Operating Systems

Client Operating Systems	Server Operating Systems
Windows 8	Windows Server 2012
Windows 7	Windows Server 2008 R2 Windows Server 2008
Windows Vista Windows XP	Windows Server 2003
Windows 2000 Professional	Windows 2000 Server
Windows NT 4.0 Workstation Windows ME/98/95	Windows NT 4.0 Server

P2P

- Peer-to-peer or P2P has recently taking on an additional meaning
- P2P can also refer to file sharing networks
- Examples of file sharing networks
 - Napster
 - Gnutella
 - G2
- Other technologies also take advantage of P2P file sharing:
 - Skype
 - VoIP
 - Cloud computing

Summary

- Understand local area networks (LANs), including but not limited to LAN elements, design, perimeter networks, IP addressing, and LAN types
- Understand network topologies and access methods, including topologies such as star, mesh, and ring; Ethernet architecture; and the client-server and peer-to-peer networking models

Additional Resources & Next Steps



Instructor-Led Courses

- 40033A: Windows Operating System and Windows Server Fundamentals: Training 2-Pack for MTA Exams 98-349 and 98-365 (5 Days)
- 40349A: Windows Operating System Fundamentals: MTA Exam 98-349 (3 Days)
- 40032A: Networking and Security Fundamentals: Training 2-Pack for MTA Exams 98-366 and 98-367 (5 Days)
- 40366A: Networking Fundamentals: MTA Exam 98-366



Books

- Exam 98-366: MTA Networking Fundamentals (Microsoft Official Academic Course)



Exams & Certifications

- Exam 98-366: Networking Fundamentals

