IT-IDT-6.1 Explore and explain the basic components of computer networks.—develop a working network vocabulary.

Name _____ Period _____

Networking Note Sheet

Directions: **Use the Power Point to answer the following questions. Save in your directory as *Networking Note Sheet Your Name***

Types of Networks

What's a Network?

- A system of computers and peripherals that are _____ together
- Purpose is usually to _____ files, resources, and peripherals

Parts of a Network

Clients:

- Computers that _____ or order information from a server
- Usually desktop computers with their own_____ storage and processing power

_____ client – network computer with no local storage

Servers:

- Computers that work_____ the scenes to provide (serve) the resources requested by the _____

Two types

- Non-dedicated – provides many different_____ to its client computers such as file retrieval, _____, and_____
- Dedicated – provides only one type of resource to its clients, such as printing

Other Network Components

- Shared peripherals – a _____ that is connected to a computer and controlled by its microprocessor
- Media – physical pieces used to transport_____ from one computer to another computer or _____ on the network
- Data - packets

More About Networks

Advantages:

- Enable people to work together
- Reduce _____ from sharing networked hardware and software
- Increase _____ by sharing data
- Provide access to a wide range of services and specialized peripheral devices

Disadvantages:

- _____ resources when network malfunctions
- More vulnerable to _____ access than stand alone computers
- Susceptible to an increased number of worms, Trojan horses, and blended threats

_____ (LAN)

- Network of computers located in a _____, like a home, school, or office building
- Can share connection with other LANS and with the internet

Characteristics of a LAN

- Relatively limited in _____
- Computers connected in _____areas
- Same _____
- _____peer-to-peer
- Can support _____number of nodes

_____ (WAN)

- Network over a _____ like a city, a country, or multiple countries

Name _____ Period _____

- Connects multiple _____ together
- Generally utilizes different and much more expensive networking equipment than LANs
- The _____ is the most popular WAN

Types of WANS

- _____ Area Network – limited geographic area
- Metropolitan Area Network – towns and _____
- Home Area Network – home_____
- Global Area Network – uses _____ to link networks
- Storage Area Network – stores large amounts of _____

Wiring in Computer Networks

- _____ cable - often used to connect computers
- Phone or cable TV lines – connect LAN to an _____
- Fiber optic cable – used by much of the internet to send data quickly over long distances underground

Wired Network

- A wired network uses cables to connect network devices
- Wired networks are _____, _____, and _____to configure
- Devices tethered to cables have limited _____

Wireless Networking

- A network is considered wireless when data is transmitted from one device to another without cables or wires
- Tend to be _____ than wired networks
- Have more _____
- Common wireless terms:
- _____ - common standard technology for building home networks and other LANs
- _____– many businesses use Wi-Fi technology to allow the public an access point to a wireless network
- _____– allows handhelds, cell phones, and other peripherals to communicate over short ranges

Client/Server Network

- Network devices can function as clients or servers
- _____- computer that performs administration or coordination functions within a network
- Types: (1)application server, (2) file server, (3) print server
- _____ **–** regular workstation that performs applications

_____ **Network**

- A network of personal computers, each of which acts as _____client and server, so that each can exchange files directly with every other computer on the _____
- Each computer can_____ any of the others, although access can be_____ to those files that a computer's user chooses to make_____

_____ expensive than client/server networks but less efficient when large amounts of data need to be exchanged

How do we choose the architecture?

- Type of_____
- _____of the organization
- Administration
- _____
- Network _____
- _____

Name _____ Period _____

- Scalability

Topology

- Physical _____of devices in a network

Common types:

Star Topology

- Features a central connection point called a "_____“; that may be a hub, switch or router

Advantages:

- _____ to install
- Failure in any cable will only take down _____ computer's network access and _____ the entire LAN
- Easy to detect _____ and to remove parts

Disadvantages:

- Requires _____cable than linear topology
- If the hub fails, the entire network also fails
- Often used in home networks

Ring Topology

- Every device has exactly two neighbors for communication purposes
- All messages travel through a ring in the same _____ (either "clockwise" or "counterclockwise")
- A failure in any cable or device breaks the loop and can take down the entire _____
- Found in some office buildings or school campuses

Bus Topology

- A common backbone (a _____) to connects all devices and devices attach, or tap into, the cable with an interface connector
- Devices wanting to communicate with other devices on the network send a broadcast message onto the wire that all other devices see, but only the intended recipient actually _____ and _____ the message

Advantages:

- Easy to connect a computer or peripheral to a linear bus
- Requires _____ cable length than a star topology

Disadvantages

- Entire network _____ if there is a break in the main cable
- _____ are required at both ends of the backbone cable
- _____to identify the problem if the entire network shuts down
- Work best in networks with just a _____ computers

Tree Topology

- Integrates multiple star topologies together onto a bus
- In its simplest form, only _____ devices connect directly to the tree bus, and each hub functions as the "_____" of the tree

Advantages

- Point-to-point wiring for individual segments
- Supported by several hardware and _____
- Easier to _____ than bus or star

Disadvantages

- Overall length of each segment is _____ by the type of cabling used
- If the backbone line breaks, the entire _____ goes down
- More _____ to configure and wire than other topologies

Hybrid Topology

Name _____ Period _____

- _____ of any two or more network topologies
- Note 1: Two of the same topologies, when connected together, may still retain the basic network character, and therefore not be a hybrid network
- For example, a tree network connected to a tree network is still a tree network, but two star networks connected together exhibit hybrid network topologies
- Note 2: A hybrid topology always accrues when two different basic network topologies are connected

Considerations When Choosing a Topology

_____

_____

Protocol

- A _____ is a set of rules that govern the connection, communication, and data transfer between computers on a network
- These rules include guidelines that regulate the following characteristics of a network: access method, allowed physical topologies, types of cabling, and speed of data transfer

Internet Protocols

_____ (HTTP)

- HTTP is a protocol used by the World Wide Web that defines how messages are _____ and _____, and what actions Web servers and browsers should take in response to various commands
- Protocol built on top of TCP
- The three main HTTP message types are GET, POST, and HEAD

_____ (HTTPS)

- Combination of normal HTTP interactions, but with a different default TCP port and an additional _____/_____ layer between the HTTP and TCP
- Widely used on the World Wide Web for security-sensitive communication such as payment transactions and corporate logons
- Ensures reasonable protection from eavesdroppers and _____ attacks

_____ (FTP)

- Network protocol used to transfer data from one computer to another through a network, such as the Internet
- Protocol for exchanging and manipulating _____ over any TCP-based computer network
- A FTP client may connect to a FTP server to manipulate files on that _____.
- Since there are many FTP client and server programs available for different operating systems, FTP is a popular choice for exchanging files independent of the _____ involved

Network Protocol

- Defines rules and conventions for _____ between network devices
- Protocols for computer networking all generally use _____ techniques to send and receive messages in the form of *packets*
- Network protocols include mechanisms for:
- Devices to identify and make connections with each other
- Formatting rules that specify how data is packaged into messages sent and received
- Message acknowledgement
- Data compression designed for reliable and/or high-performance network communication
- _____ of different computer network protocols have been developed each designed for specific purposes and environments

Network Protocol …Cont'd

Communications Protocols

Name _____ Period _____

- Rules for efficiently transmitting data from one network node to another
- Divide messages into _____
- Affix addresses to packets
- Initiate transmission
- _____ flow of data
- Check for transmission _____
- Acknowledge _____ of transmitted data
- Network Security

_____

- When personal computer users want to encrypt e-mail or other documents, they turn to public _____ encryption software called PGP (Pretty Good Privacy) software

Encryption…Cont'd

- Encryption transforms a message so that its contents are hidden from _____ readers
- Plaintext has not yet been encrypted
- An encrypted message is referred to as _____

_____ is the opposite of encryption

- Cryptographic algorithm
- Cryptographic key

Encryption…Cont'd

- Encryption methods can be broken by the use of expensive, specialized, code-breaking computers
- _____ (PKE) eliminates key-distribution problem, by using one key to encrypt a message and another key to decrypt the message

Wi-Fi Security

- Wireless networks are much _____ susceptible to unauthorized access and use than wired networks
- LAN jacking, or _____, is the practice of intercepting wireless signals by cruising through an area

Wi-Fi Security…Cont'd

- Wireless encryption scrambles data transmitted between wireless _____ and then unscrambles the data only on devices that have a valid encryption key
- Activate encryption by using a wireless network _____