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S2G1
LAB 1 – TUTORIAL 1
LIVING IN A NETWORK-CENTRIC WORLD

1.1 COMMUNICATING IN A NETWORK-CENTRIC WORLD

A. Concept Questions

1. In addition to data networks, what other breakthroughs in communication media have extended the reach of human interactions?

- Wireless network and cloud computing network

2. How has data networking changed your community (your family, school, city, or country?)

- It is easier to contact family members from far away

- Education can be accessed and learned via virtual classrooms

3. Early data networks carried character-based messages between computer systems. What types of network traffic do modern networks carry, and how has this changed human interactions?

- Files
  Modern network can carry files through stream of data packets to another computer. Resource sharing have never been made easier and it improves productivity and education.
- Voice and video
  Modern network can carry voice and video for long range video calls and live streams.

B. Vocabulary Exercise: Completion

Fill in the blanks in the following questions.
1. **Instant Messaging** is a form of online real-time communication between two or more people based on entered text.

2. A **blog** is a web page that is easy to update and edit by someone who wants to publish a record of his or her thoughts on a subject.

3. A **Wiki** is a web page that groups of people can edit and view together.

4. A **Podcast** is an audio-based medium that lets people record audio and publish it on a website.

5. **Packet Tracer** is a Cisco collaborative learning tool that provides a way to build virtual representations of networks that behave much like actual networks.

1.2 COMMUNICATION: AN ESSENTIAL PART OF OUR LIVES

A. Concept Questions

1. List four external factors that affect data networks.

- The quality of the pathway between the sender and recipient.
- The number of times the message has to change form.
- The number of times the message has to be redirected or readdressed.
- The amount of time allocated for successful communication.

2. List three internal factors that affect data networks.

- Size of the message
- Complexity of the message
- Importance of the message

1.3 THE NETWORK AS A PLATFORM

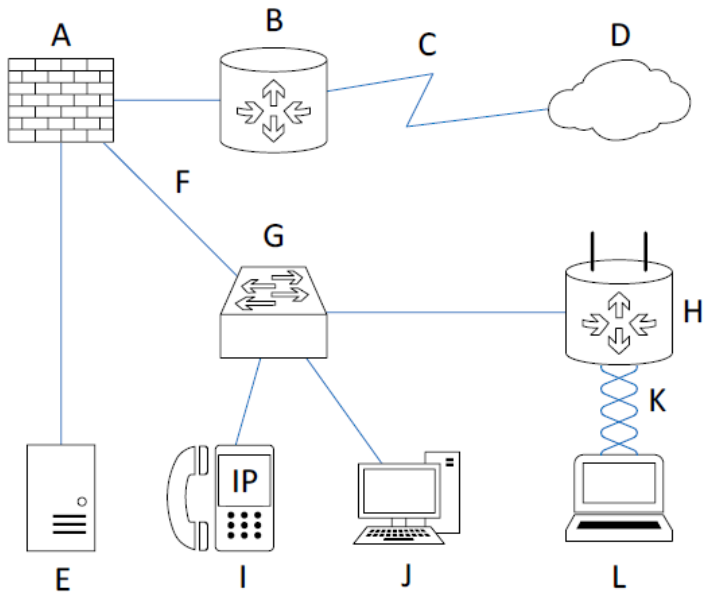
A. Vocabulary Exercise: Define

Table 1-1 lists the four fundamental elements of a network. Fill in the definition for each element.

Table 1-1 Network Element Definitions

Element	Definition
Rule	Rules are the standards and protocols that specify how the messages are sent, how they are directed through the network, and how they are interpreted at the destination devices
Medium	Computers must be connected to a wired or wireless local network to send a message. Network enables computers and other devices to share information with each other and to use a common connection to the Internet
Message	Message gets converted into a format that can be transmitted on the network. All types of messages must be converted to bits, binary coded digital signals, before being sent to their destinations
Device	Device that can send and receive messages over a network such as computer, telephones, cameras, music systems, printers and game consoles.

B. Vocabulary Exercise: Identify



	Name of Element		Name of Element		Name of Element
A	Firewall	E	Server	I	IP Phone
B	Router	F	LAN media	J	Desktop
C	Wan Media	G	LAN switch	K	Wireless media
D	Cloud	H	Wireless router	L	Laptop

C. Vocabulary Exercise: Completion

Name of Element	Device Definition
Wireless media	One form of a wide-area network (WAN) connection
LAN media	Interconnects computers and cabling to form a local-area network (LAN)
Cloud	Summarizes a group of network elements in topology drawings
Wireless router	A device often found in home and small networks that lets laptop computers connect to a network without cabling
Router	Connects two or more networks and directs messages as they travel across a set of networks
Firewall	Provides network security

D. Exercise: Completion

Fill in the blanks in the following questions.

1. In wired connections, the medium is either **copper**, which carries data in the form of electrical signals, or **optical fiber**, which carries data in the form of light signals.

2. Wireless media include the wireless connection between a **router** and a computer in a home network, the **terrestrial** wireless connection between two ground stations, or the communication between devices on Earth and **satellite** in orbit.

3. Network **services** such as web browsing, e-mail, and instant messaging require a network to provide **communication** .

4. **Protocols** are the rules that network devices use to communicate.

5. **TCP/IP** is a set of standard protocols that is widely used in home and business networks as well as on the Internet.

6. Messages must be converted to **bits** (binary coded digital signals) before they are sent to their destination.

E. Concept Questions

1. List the steps that take place on a network when you send an instant message.

1- Your client has the IP address and port number for the device of the person you're sending to, your message is sent directly to the client on the person's device.

2- The other person gets the message and responds. Each person's instant messages appear on both devices

3- When the conversation is complete and you exit the message window, your client sends a message to the server to terminate the session. The server then deletes the temporary file that contained the connection information for your client.

2. What is meant by the term *converged network*, and why are converged networks becoming so common? What advantages do converged networks offer?

- Network convergence is the efficient coexistence of telephone, video and data communication within a single network
- Network convergence is common because it offers convenience and flexibility
- One of the advantages of network convergence is that the costs for the operation is lower than sets of different network infrastructures

1.4 THE ARCHITECTURE OF THE INTERNET

A. Vocabulary Exercise: Define

Characteristic	Definition
Fault tolerance	Ability of a system to continue operating without interruption when one or more of its components fail
Scalability	Refers to how easy it is to add or remove bandwidth or processing capacity to their systems to keep up with demand without overspending
Quality of service	A set of technologies that work on a network to guarantee its ability to dependably run high priority applications and traffic under limited network capacity
Security	A set of rules and configurations designed to protect the integrity, confidentiality and accessibility of computer networks and data using both software and hardware technologies

B. Vocabulary Exercise: Completion

Fill in the blanks in the following questions.

1. The two types of network security concerns are network **infrastructure** security, which protects devices and cabling, and **content** security, which protects the information carried in packets and stored on network-attached devices.

2. Tools to provide security for individual messages must be implemented on top of the underlying **protocols** which are the rules that govern how packets are formatted, addressed, and delivered.

3. Three fundamental security measures include ensuring **confidentiality** so that only intended and authorized recipients can read data, maintaining **integrity** to ensure that information is not altered in transmission, and ensuring **availability** so that timely and reliable access to services are not disrupted by security breaches.

4. Network **firewall devices** can help ensure system reliability by detecting, repelling, and coping with network attacks.

1.5 TRENDS IN NETWORKING

A. Multiple-Choice Questions
Choose the best answer for each of the following questions.

1. Which of the following are major trends that are contributing to the current evolution of networks? (Choose two.)

A. The increasing number of mobile users
B. Fewer services as networks converge
C. Fewer applications as networks converge
D. Increasing use of simplified network devices
E. The need to protect networks from unauthorized access
F. The need to support circuit switching

2. Which of the following is most associated with the concept of converged networks?

A. More users wanting to access web pages in character mode
B. More voice and video transmissions that require a level of consistent quality and uninterrupted delivery
C. More networks that are locked down so that new applications and services cannot be added
D. More networks that are open and unconcerned with protection from unauthorized access

3. Which of the following is a relatively new information technology (IT) job title?

A. Programmer
B. Information security officer
C. Network technician
D. Software engineer

4. Which of the following best defines a fault-tolerant network?

A. A fault-tolerant network supports users who have different viewpoints.
B. A fault-tolerant network limits the impact of hardware or software failures and recovers quickly when a failure occurs.
C. A fault-tolerant network can expand quickly to support new users and applications without causing errors for existing users.
D. A fault-tolerant network is built to withstand earthquakes.