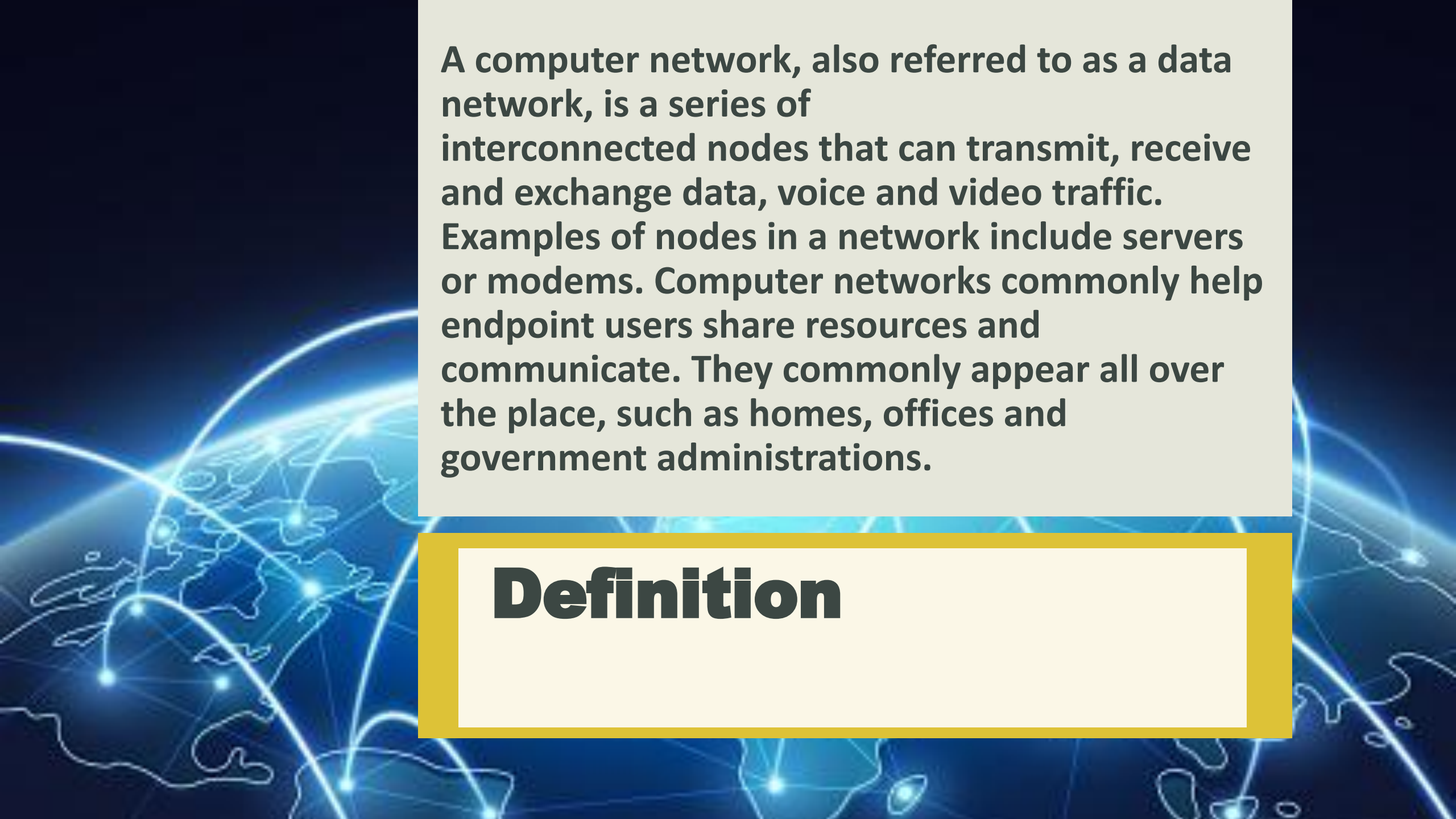


The background of the slide is a dark blue field filled with a complex network of glowing white and light blue nodes connected by thin, white lines, creating a sense of digital connectivity and data flow.

Network System

English for Information of Technology



A computer network, also referred to as a data network, is a series of interconnected nodes that can transmit, receive and exchange data, voice and video traffic. Examples of nodes in a network include servers or modems. Computer networks commonly help endpoint users share resources and communicate. They commonly appear all over the place, such as homes, offices and government administrations.

Definition

Variety uses of Computer Network

Computer networks have a variety of uses that many would see as essential today, including the following:

- **file sharing**, which enables users to share data files through a network;
- **application sharing**, which enables users to share applications through a network;
- **hardware sharing**, which enables users in a network to share hardware devices, such as printers and hard drives;
- **client-server model**, which enables data to be stored on servers, where end-user devices -- or clients -- can access that data;
- **voice over IP (VoIP)**, which enables users to send voice data through internet protocols;
- **communication**, which can include video, text and voice;
- **e-commerce**, which enables users to sell and buy products over the internet; and
- **gaming**, which enables multiple users to play together from various locations.

In addition, program design requires skills and knowledge in both computer network technologies and program requirements.

How computer networks work

Computer networks operate using a varying set of hardware and software. All packet-switched networks use Transmission Control Protocol/Internet Protocol (TCP/IP) to establish a standard means of communication. Each endpoint in a network has a unique identifier that is used to indicate the source or destination of the transmission. Identifiers include the node's IP address or Media Access Control (MAC) address. Endpoint nodes, which are used for routing purposes, include switches and routers, servers, personal computers, phones, networked printers and other peripheral computing devices, as well as sensors and actuators. The Open Systems Interconnection (OSI) model defines how data is transferred between computers.

Advantages of using computer networks

- ✓ **file sharing**, which enables users to share data between users;
- ✓ **resource sharing**, which enables users to share multiple devices, such as copiers and printers;
- ✓ **communication**, which enables users to send and receive messages and data in real-time from multiple devices;
- ✓ **convenience** in that data is accessible through an internet connection;
- ✓ **cost** in that there are reduced hardware costs since networked devices can share resources; and
- ✓ **storage**, which enables users to access data that's stored remotely or on other network devices.

Types of computer networks

Networks are often categorized by the wired or wireless transmission technology they support, as well as the scope of their domains. Some examples of computer networks include the following:

- **local area networks (LANs)**, which interconnect endpoints in a single domain;
- in contrast, **wide area networks (WANs)**, which interconnect multiple LANs;
- **metropolitan area networks (MANs)**, which interconnect computer resources in a geographic area;
- **storage area networks (SANs)**, which interconnect storage devices and resources;
- **personal area networks (PANs)**;
- **WLANs**;
- **campus area networks (CANs)**;
- **virtual private networks (VPNs)**;
- **passive optical networks (PONs)**;

Types of Networks

Based on Geographic Scope:

Type	Full Name	Coverage	Example
PAN	Personal Area Network	Few meters	Bluetooth devices
LAN	Local Area Network	Building/Campus	Office network
MAN	Metropolitan Area Network	City	City-wide network
WAN	Wide Area Network	Country/Global	The Internet



Star



Ring



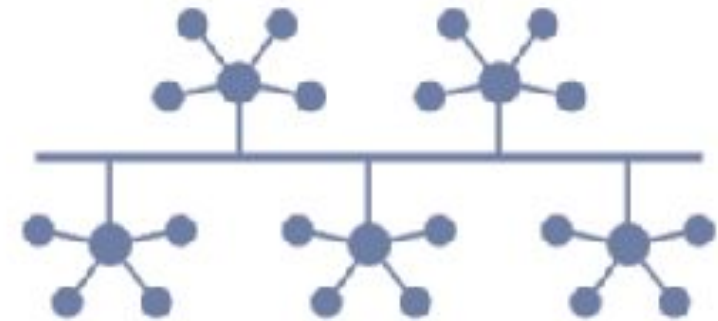
Token ring



Mesh



Bus



Tree

Network Topology

Network topologies

A network topology is the physical or logical structure of a network. Network topologies include the following:

- ✓ **Full mesh network**. All nodes are connected to each other and can exchange data.
- ✓ **Partial mesh network**. Some nodes are connected to each other in a full mesh scheme, but others are only connected to one or two other nodes in the network.
- ✓ **Point-to-point network**. Network connectivity is limited to two endpoints.
- ✓ **Star network**. All network nodes are connected to a common central computer.
- ✓ **Tree network**. Two or more star networks are connected together.
- ✓ **Bus network**. Network devices are attached directly to a transmission line. All signals pass through all devices, but each device has a unique identity and recognizes signals intended for it.
- ✓ **Ring network**. Network devices are connected to each other in a ring format, where each device is connected to at least two other devices.

Network Topologies 1

1. Bus Topology

- All devices connect to a single central cable. Data travels in both directions.

2. Star Topology

- All devices connect to a central hub or switch. Most common in modern LANs.

3. Ring Topology

- Each device connects to two other devices, forming a circular pathway.

4. Mesh Topology

- Every device connects to every other device. Highly reliable but expensive

5. Router

- A device that forwards data packets between computer networks and directs traffic on the Internet.

Network Topologies 2

6. Switch

- A device that connects devices within a network and uses MAC addresses to forward data to the correct destination.

7. Hub

- A basic networking device that broadcasts data to all connected devices (less efficient than a switch).

8. Modem

- A device that modulates and demodulates signals for data transmission over telephone or cable lines.

9. Access Point (AP)

- A device that allows wireless devices to connect to a wired network using Wi-Fi.

Network Topologies 3

10. IP Address

- Internet Protocol address - a unique numerical identifier assigned to each device on a network.

11. MAC Address

- Media Access Control address - a unique hardware identifier for network interface cards.

12. Bandwidth

- The maximum rate of data transfer across a network path, typically measured in Mbps or Gbps.

13. Latency

- The time delay between sending and receiving data across a network.

14. Packet

- A formatted unit of data carried across a network.

Network Protocols

A protocol is a set of rules that govern how data is transmitted across a network.

Protocol	Full Name	Purpose
HTTP/HTTPS	HyperText Transfer Protocol (Secure)	Web browsing
FTP	File Transfer Protocol	File transfer
SMTP	Simple Mail Transfer Protocol	Sending email
TCP/IP	Transmission Control Protocol/Internet Protocol	Internet communication
DNS	Domain Name System	Translating domain names to IP addresses

Summary

Key Points:

- A **network system** connects multiple devices for communication and resource sharing
- Networks are classified by size: **PAN, LAN, MAN, WAN**
- **Network topologies** include bus, star, ring, and mesh configurations
- Essential devices include **routers, switches, modems, and access points**
- **Protocols** like TCP/IP, HTTP, and DNS enable network communication
- **Network security** is crucial to protect against threats and unauthorized access
- Understanding **IP addresses, bandwidth, and latency** is essential for network management

Important Technical Terms:

- Router, Switch, Protocol, Bandwidth, IP Address, Firewall, Topology, Encryption, VPN, Packet

Exercise 1

Match the words 1-8 to the descriptions a-g.

- | | |
|-----------------------------------|---|
| 1. a modem | a) is an entrance to another network |
| 2. a repeater | b) channels incoming data but maintains the bandwidth speed |
| 3. a bridge | c) allows wireless devices to connect to the network |
| 4. a router | d) modulates and demodulates the data into a digital or an analog signal |
| 5. a gateway | e) channels incoming data but shares the bandwidth among the devices present on a network |
| 6. a switch | f) sends the digital signal further on in the network |
| 7. a hub | g) connects networks and sends packages of data between them |
| 8. a wireless access point | h) connects networks that use the same protocol |

Exercise 2

Read Katharina's email to Agatha. Complete this email with the words in the box.

equipment

Internet

LAN

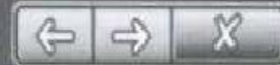
recommend

remote

should

VPN

WAN



Dear Agatha

Following our meeting last week, please find my recommendations for your business. I think you (1) _____ set up a LAN, or Local Area Network, and a WAN, or Wide Area Network, for your needs. A (2) _____ connects devices over a small area, for example your apartment and the shop. In addition, you should connect office (3) _____, such as the printer, scanner and fax machine, to your LAN because you can then share these devices between users.

I'd recommend that we connect the LAN to a (4) _____ so you can link to the Internet and sell your products. In addition, I'd (5) _____ we set up a Virtual Private Network so that you have a (6) _____ access to your company's LAN, when you travel.

(7) _____ is a private network that uses a public network, usually the (8) _____, to connect remote sites or users together.

Let's meet on Friday to discuss these recommendations.

Best regards

Katharina

Exercise 3

Complete this dialogue with the words in the box.

About

change

devices

necessary

problem

speed

should

user

what

Boris: I have a problem with the network download (1) _____. What can you suggest?

Ahsan: Why don't you (2) _____ the hub?

Boris: I don't think that will work. The hub is fine.

Ahsan: OK. How (3) _____ adding a repeater then?

Boris: Hmm, I'm not sure it will help. It's not a (4) _____ with the signal strength.

Ahsan: OK, then you should check the cables and network (5) _____ to make sure that they are compatible with your network.

Boris: (6) _____ about changing the modem?

Ahsan: I don't think it's (7) _____. I think it's a problem with the bridge, switch or the router. You (8) _____ look at the specifications.

Boris: OK, I will. Thanks for your help.

Ahsan: Why don't you check (9) _____ recommendations on the Internet as well?

Boris: Good idea. I'll do that.

Exercise 4

Fill in the blanks

Complete the sentences with appropriate terms:

1. A ____ connects devices within a single building or campus.
2. The ____ protocol is used for secure web browsing.
3. Every device on a network has a unique ____ address.
4. A ____ topology connects all devices to a central hub.
5. ____ is the time delay in data transmission.

Exercise 5

Written Assignment

Topic: Describe the network system in your university or workplace

Requirements:

- Write 600 words in English
- Include: network type, topology, devices used, and security measures
- Use at least 10 technical terms from this lesson
- Explain how the network benefits users

Exercise 6

Conversation Practice!

Work in pairs.

Make a conversation about Network System and then let's present In front of the class. I will take this part as first Quiz session. Don't forget to upload the script of the conversation in Google Classroom.

Exercise 7

Writing Practice!

Write by your hand 100 Words and their definition in Bahasa relation to the Network System.



Thank You

English for Information Technology