Tishk International University
Faculty of Applied Science
Department of CBS and AI
CBS 111 and AI 115 Intro to IT

2026 Feb 10

Introduction to Fundamental of Network

Lecture 4

yasameen.sami@tiu.edu.iq

•**Define a computer network** and explain its importance in modern communication and computing systems.

Learning Outcome

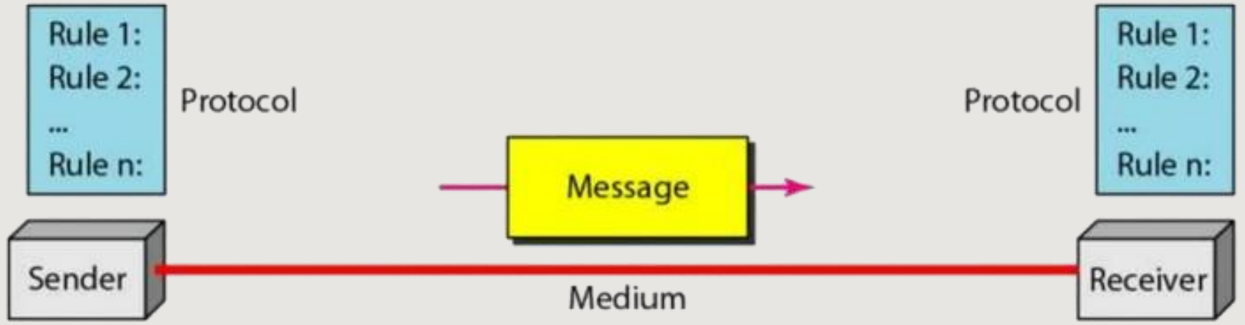
- Define a computer network and explain its importance in modern communication and computing systems.
- Identify and describe the components of data communication, including sender, receiver, message, transmission medium, and protocol.
- Describe the OSI Model layers and summarize the function of each layer:

Outline

- What is a Network?
- Component of Network
- Type of Network
- Introducing CISCO Packet Tracer

Data Communication

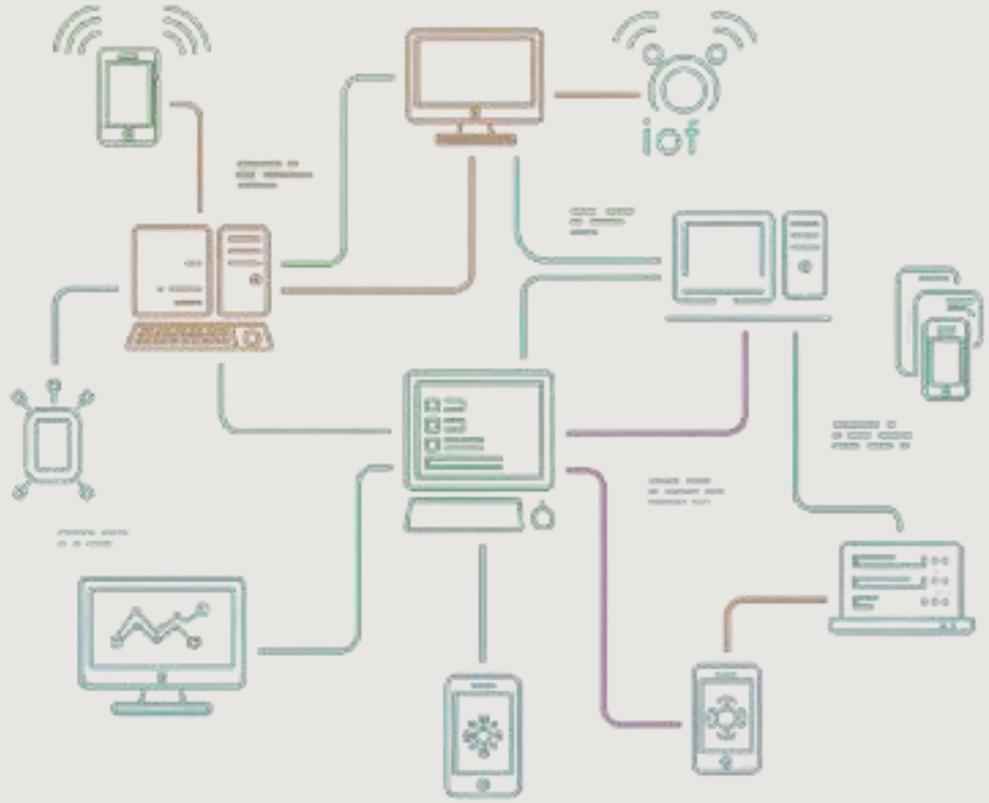
- Data Communication are between two devices via some form of transmission medium such as a wire cable.
- **Component of Data Communication**
    - Sender
    - Receiver
    - Message
    - Medium
    - Protocol



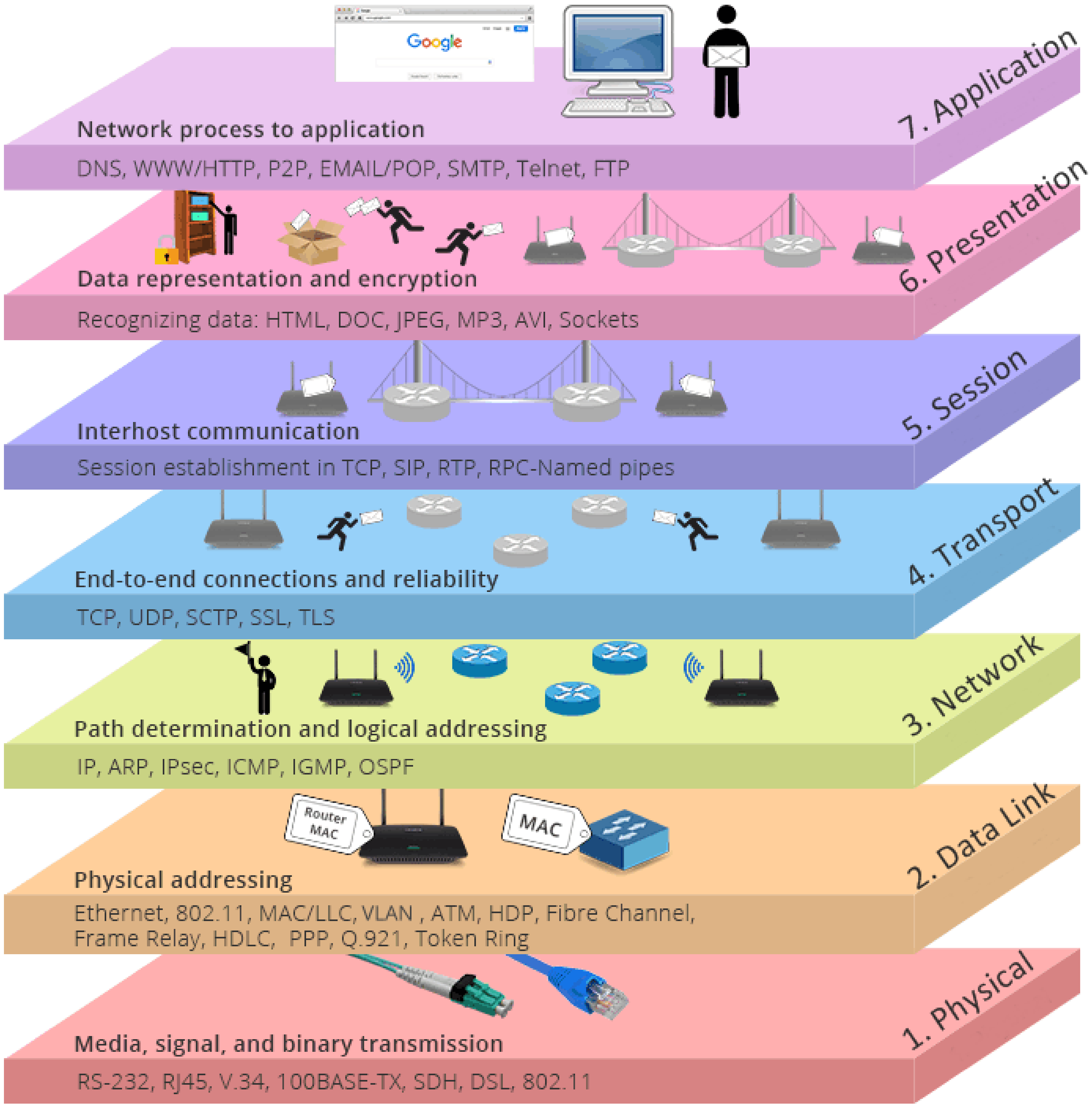
What is computer network?

- A network is a set of devices (often referred to as nodes) connected by communication links.

- A node can be a computer, printer, or any other device capable of sending and/or receiving data generated by other nodes on the network.




1

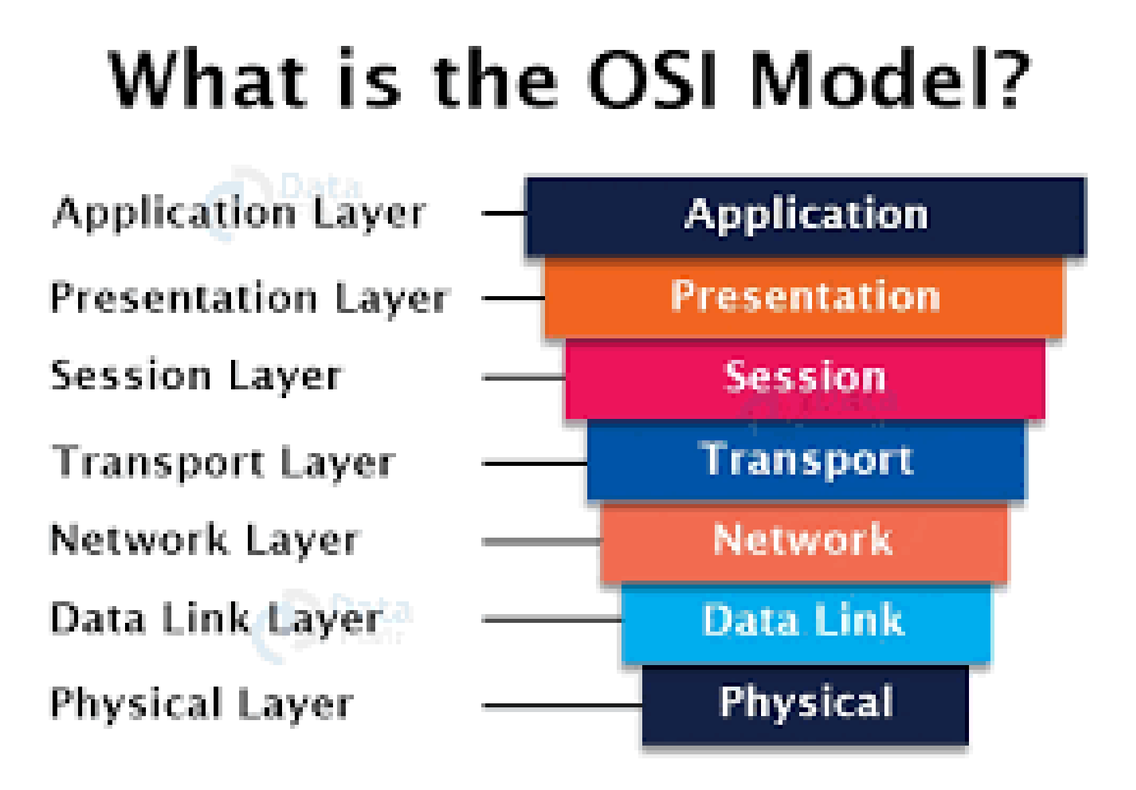

Google
7. Application
Network process to application
DNS, WWW/HTTP, P2P, EMAIL/POP, SMTP, Telnet, FTP
6. Presentation
Data representation and encryption
Recognizing data: HTML, DOC, JPEG, MP3, AVI, Sockets
5. Session
Interhost communication
Session establishment in TCP, SIP, RTP, RPC-Named pipes
4. Transport
End-to-end connections and reliability
TCP, UDP, SCTP, SSL, TLS
3. Network
Path determination and logical addressing
IP, ARP, IPsec, ICMP, IGMP, OSPF
2. Data Link
Router MAC
MAC
Physical addressing
Ethernet, 802.11, MAC/LLC, VLAN , ATM, HDP, Fibre Channel,
Frame Relay, HDLC, PPP, Q.921, Token Ring
1. Physical
Media, signal, and binary transmission
RS-232, RJ45, V.34, 100BASE-TX, SDH, DSL, 802.11

Remembering the Layers

***A**pplication*	***A**ll*
***P**resentation*	***P**eople*
***S**ession*	***S**een*
***T**ransport*	***T**o*
***N**etwork*	***N**eed*
***D**ata Link*	***D**ata*
***P**hysical*	***P**rocessing*

OSI MODEL

- OSI stands for Open System Interconnection model.
- The seven layers of the OSI model are:
    - Application Layer
    - Presentation Layer
    - Session Layer
    - Transport Layer
    - Network Layer
    - Data Link Layer



Application Layer

- The Application Layer is the top most layer of the OSI and TCP/IP models. It provides network services directly to end users and applications.
- **Main Functions of the Application Layer**
  - Provides User Interface
  - Provide different Protocols
    - HTTP
    - FTP
    - STMP

Presentation Layer

- The Presentation Layer ensures that data is properly formatted, encrypted, and compressed so that it can be understood by the receiving device.

- **Main Functions of the Presentation Layer**
  - Data Reformatting

Reformatting

Encryptting

Session Layer

- The Session Layer is the fifth layer of the OSI model that is responsible for establishing, managing, and terminating communication sessions between two network devices.
- **Main Functions of the Session Layer**
  - Create and Mange session
  - Add Check points after some page
  - Terminate session

Transport Layer

- The Transport Layer ensures that data is delivered accurately, in order, and without loss between devices.
- **Main Functions of the Transport Layer**
  - Convert data to segments
  - flow control
  - Error Control
- **Common Transport Layer Protocols**
  - TCP (Reliable delivery, error checking, ordered segments)
  - UDP (Fast delivery, no guarantee of reliability)

Network Layer

- The Network Layer is responsible for logical addressing, routing, and delivering packets across networks.
- **Main Functions of the Network Layer**
  - Logical Addressing
  - Routing
- **Common Network Layer Protocols**
  - IP
  - ICMP
  - ARP

Data Link Layer

- The Data Link Layer provides error-free data transfer, physical addressing, and flow control between devices on the same network.
- **Main Functions of the Data Link Layer**
  - Physical Addressing
  - Error Detection & Correction
- **Common Data Link Layer Protocols**
  - Ethernet
  - PPP
  - HDLC
  - ARP

Physical Layer

- The Physical Layer transmits raw bits over physical media and defines hardware, cabling, and signal types.
- **Main Functions of the Physical Layer**
  - Sends bits (0s and 1s) across the network medium.
  - Uses cables, wireless signals, fiber optics, or other transmission media.
  - Determines how fast data is sent (bandwidth).

2025 Dec 23

THANK YOU