Topics Covered:

Principles of network applications

Web and HTTP

Email (SMTP, IMAP)

Domain Name System (DNS)

Peer-to-Peer (P2P) applications

Video streaming and Content Distribution Networks (CDNs)

Socket programming with UDP and TCP

Network Layering

layering means to break up the sending of messages into separate components and activities with each component handling different parts of the communication.

TCP/IP Model:

Application Layer: Encodes/decodes messages e.g HTTP, TLS, DNS.

Transport Layer: Breaks messages into packets e.g TCP, UDP.

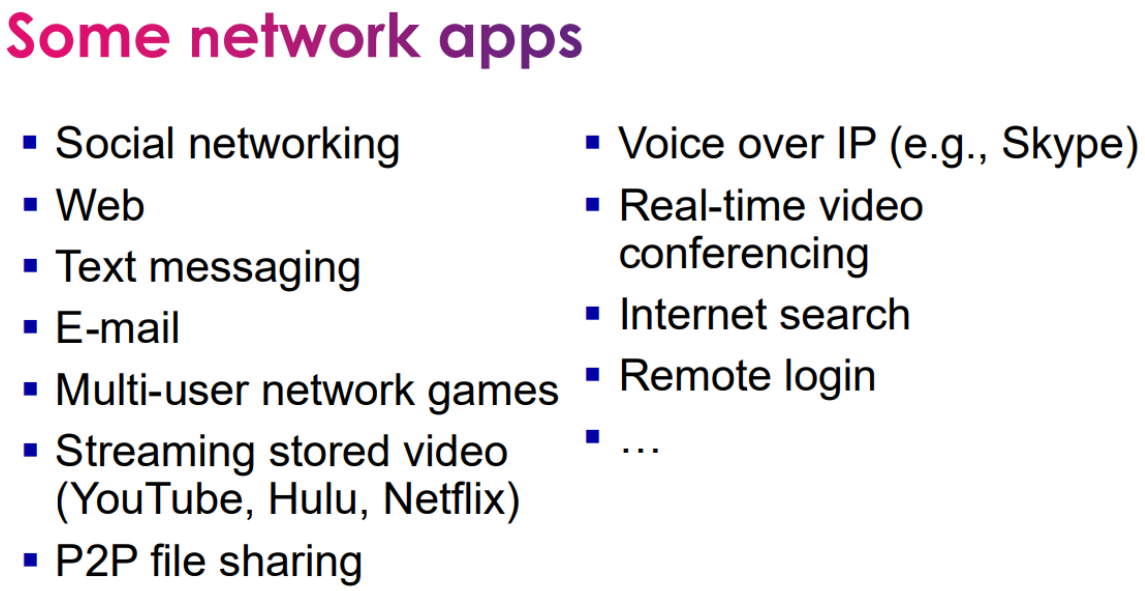
Network Layer: Adds sender and recipient IP addresses e.g IPv4, IPv6.

Link Layer: Transfers packets between nodes e.g Ethernet, Wi-Fi.

Why Layering

Allows for standardization and adaptation over time.

Different applications can use the same transport, network, and link layers but have unique application layers.



Network Applications:

Examples: Web browsing, email, video streaming, P2P file sharing, VoIP e.g Skype.

Client-Server Model:

Server: Always-on host with a permanent IP address.

Client: Initiates communication with the server.

Peer-to-Peer (P2P) Model:

No central server; peers communicate directly.

Examples: BitTorrent, Skype.