# COMS3200 Study Notes

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# Internet?

- Collection of billions of connected devices.
- Connected via `communication links` such as fiber, copper, radio and satellites.
- Controlled by `packet switches` such as routers and switches.
- Standardized by `protocols` such as TCP, IP, HTTP, Skype, 802.11
- Standards are made by organizations such as `RFC: Request for comments` and `IETF: Internet Engineering Task Force`

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Actually a network of networks (ISPs connected together)

# Protocol?

`Protocols` define a guide for messages (packets) sent and received between network entities by defining the:

- `format` of messages
- `order` of messages
- `actions` taken when messages are transmitted or received

# Network Edge/Core

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`Frequency division multiplexing`: different channels transmitted in different frequency bands

# Application Layer

The Application Layer provides the interface between the end-user and network communication.

Implementation aspects of network protocols

- transport-layer service models
- client-server paradigm

# Network Applications

Network applications run on `different end systems` (network edges) and `communicate over the network.`

Network applications **do not** run on network cores.

Network applications allow for `rapid app development and propagation.`

# Network Architectures

- Client-server
- Peer-to-peer (P2P)

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Client-server Architecture is the classical architecture consisting of communication between multiple clients and a singular server.

The server is always-on with a fixed address that can be scaled to multiple devices.

Clients communicate with directly with the server and do not need to be always on or have a fixed address. Clients do not communicate with each other.

# Network Architectures

- Client-server
- Peer-to-peer (P2P)

`Peer-to-peer Architecture` is a form of network communication where clients (now peers) do not connect to an always-on server and instead `communicate directly with each other.`

Peers request service from other peer and provide service in return to other peers. Think torrents.

Peers are `intermittently connected and can change addresses.`

# Processes

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`P2P Applications have both client and server processes`

# Sockets

Processes send and receive messages to and from sockets.

`Sockets` are connections between host devices.

# Addressing Processes

Processes require identifiers so that messages can be sent back to the correct process.

Each host has a 32-bit IP address.

A host can have multiple processes so IP addresses are combined with port numbers as identifiers.