



**ACIT 2620**

# **Principles of Enterprise Networking**

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# Objectives

- Course logistics
- Overview of networking concepts and terminologies
- Layered networking model
- Project introduction
- Packet capture

# Course logistics

## Software and equipment

- Software: Python 3, Virtualbox, Wireshark
- Equipment:
  - Windows 10 or higher, preferably Pro or Education editions
  - Limited support for Mac, especially the new Apple Silicon generation (i.e. you may need to get a different computer for this course. Older Macs are fine.)
  - Linux: I'll suppose you know what you're doing

## Assessment

Criteria	%	Comments
Quizzes	40	Four equally weighted quizzes. No midterm
Project	20	Cumulative. 5 milestones
Final exam	40	Practical, based on project

- Quizzes are in person. If you miss a quiz, it's gone; there are no makeovers!
- Late project submissions (more than 1 week after deadline) will not be graded.

# What is the internet

- What is it made of?
  - catalog the different components that make up the internet infrastructure and describe the role of each
- what is its purpose?
- How does it work?
  - how do the different networking components interface with each other
  - what governs communication between them

# Network

- Collection of **nodes** connected by some type of transmission media or **link** , for the purpose of sharing services, devices or data (i.e. networked **resources** )



# Node

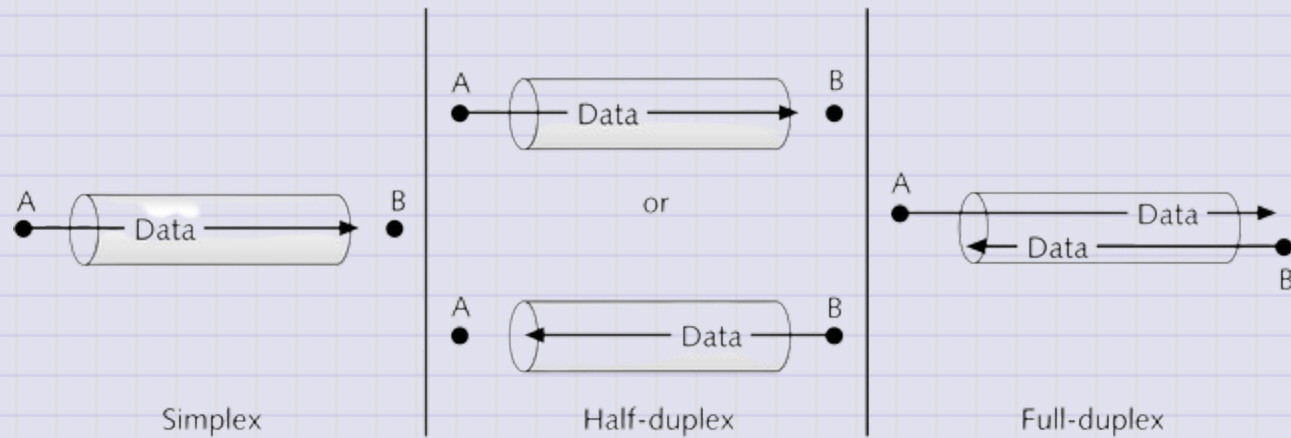
- Any device that can communicate over the network and is identified by a unique identifying number, known as its network address .

# Link



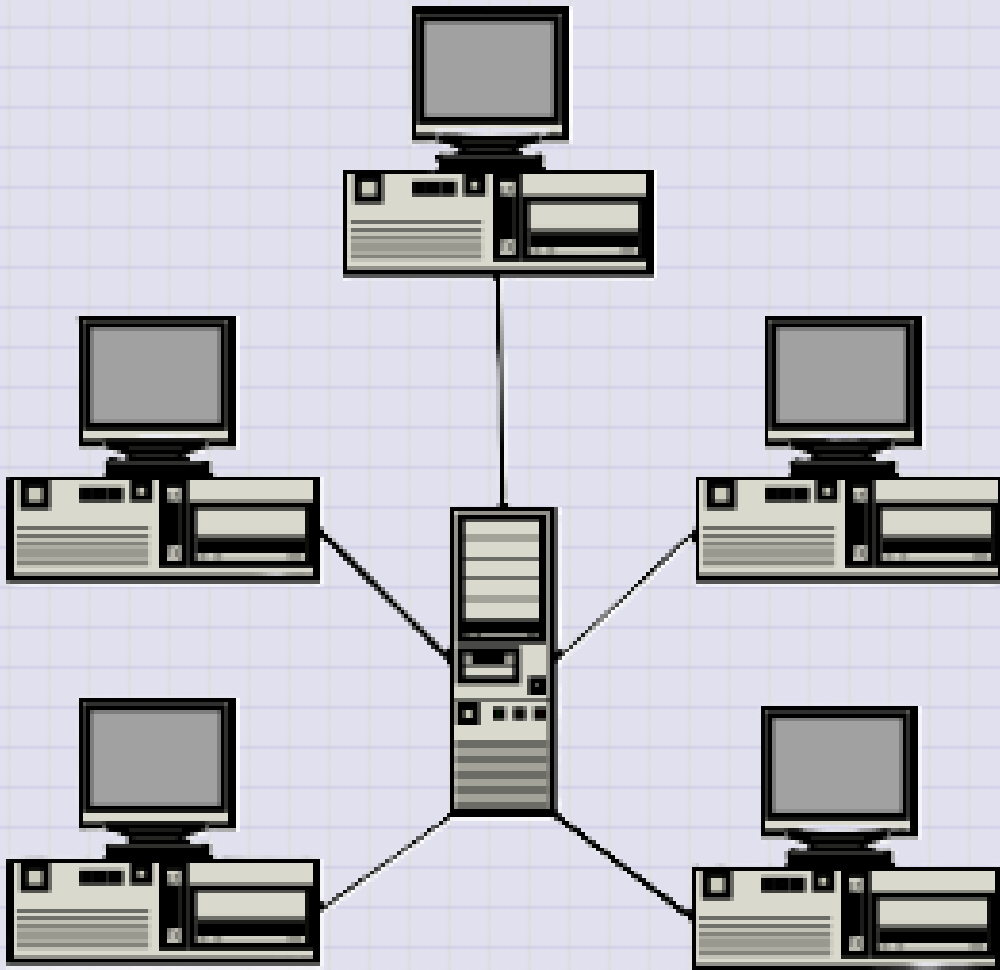


# Media concurrency and direction



# Resource Control

# Client-server Networks



# Peer-to-peer Networks



# Types of Networks

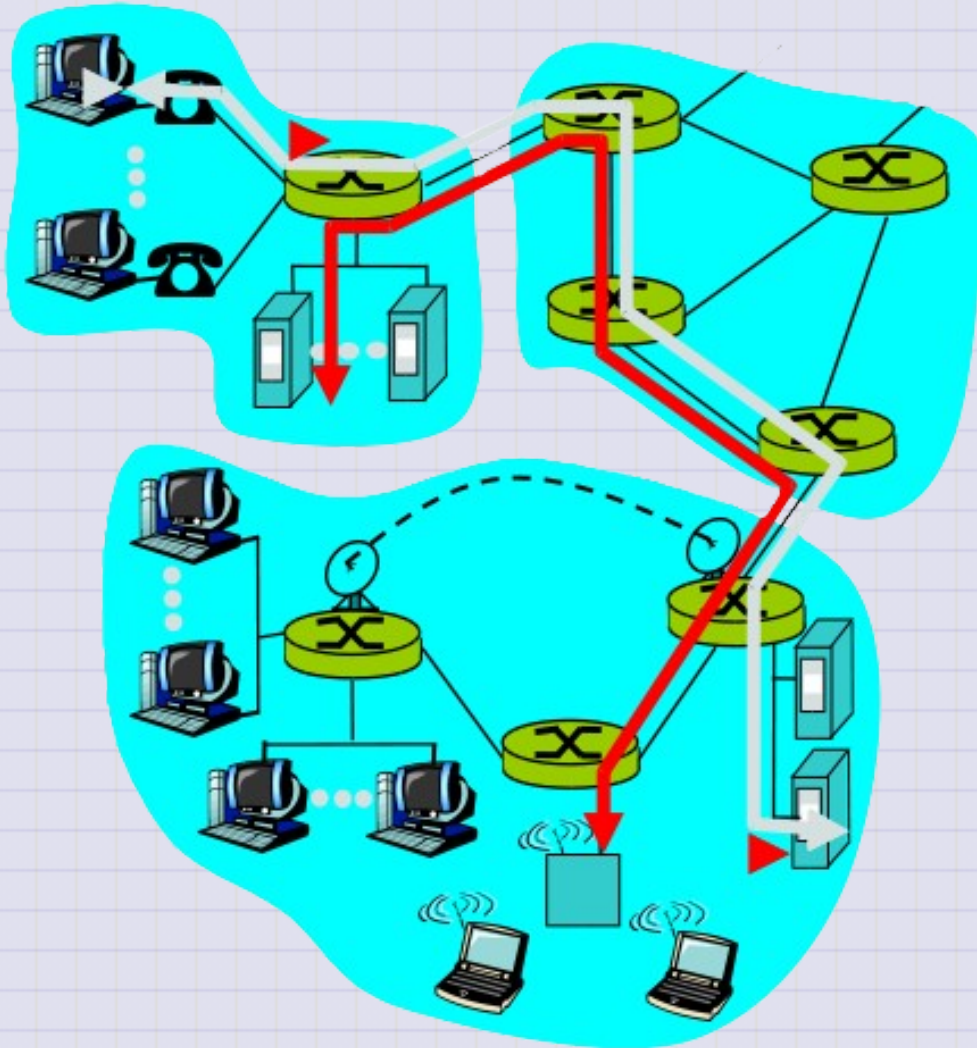
- LAN
- WLAN
- PAN
- CAN
- MAN

- WAN
- SAN
- EPN
- VPN
- [Learn more](#)

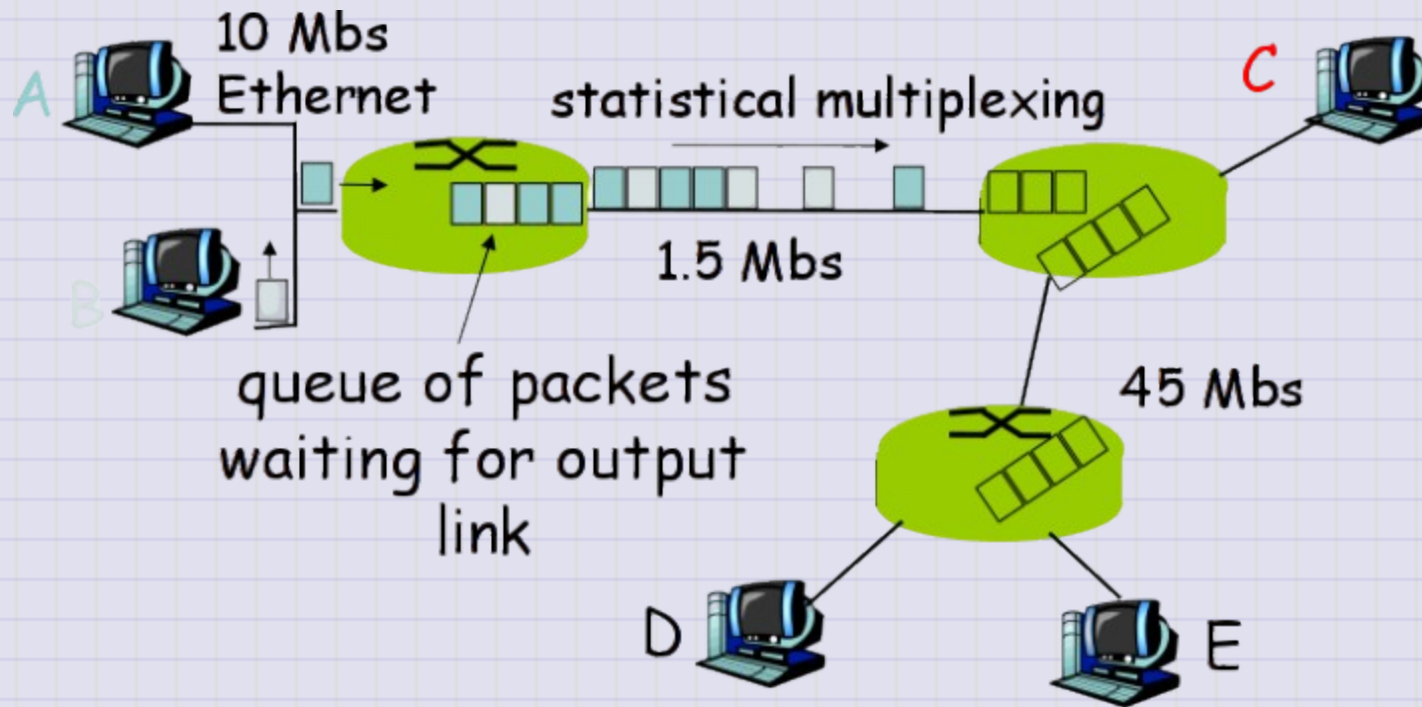
# Switching Methods



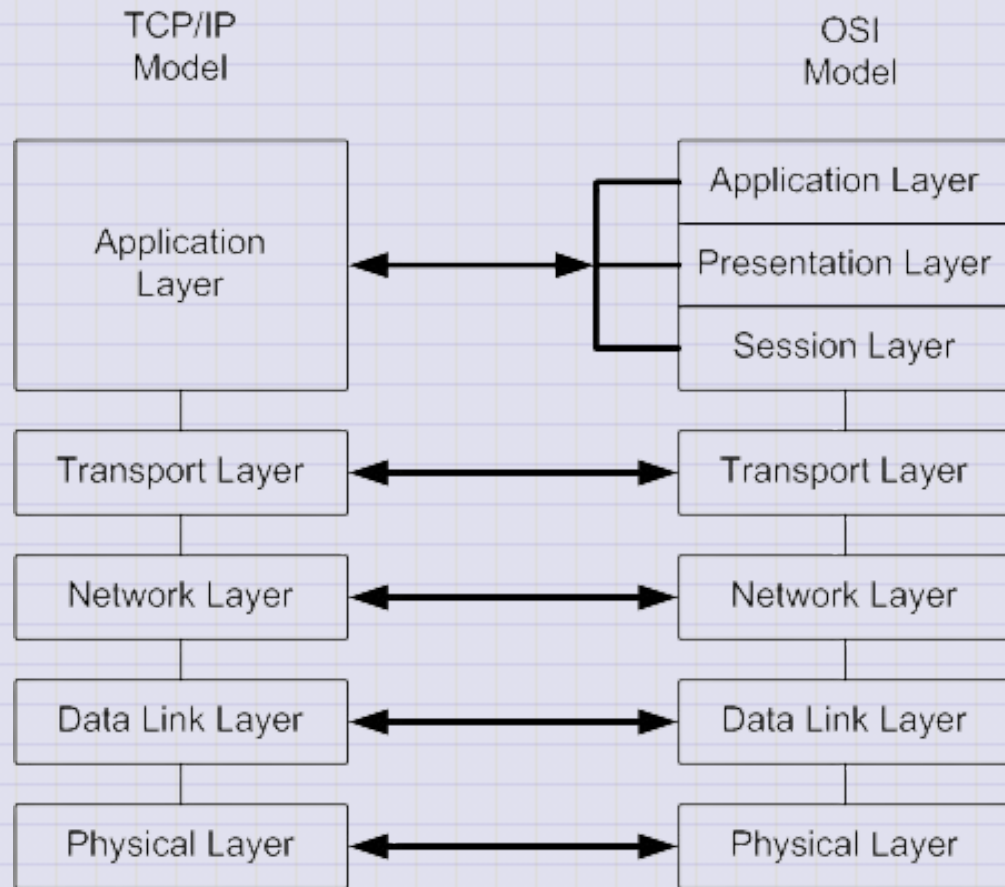
# Circuit Switching



# Packet Switching



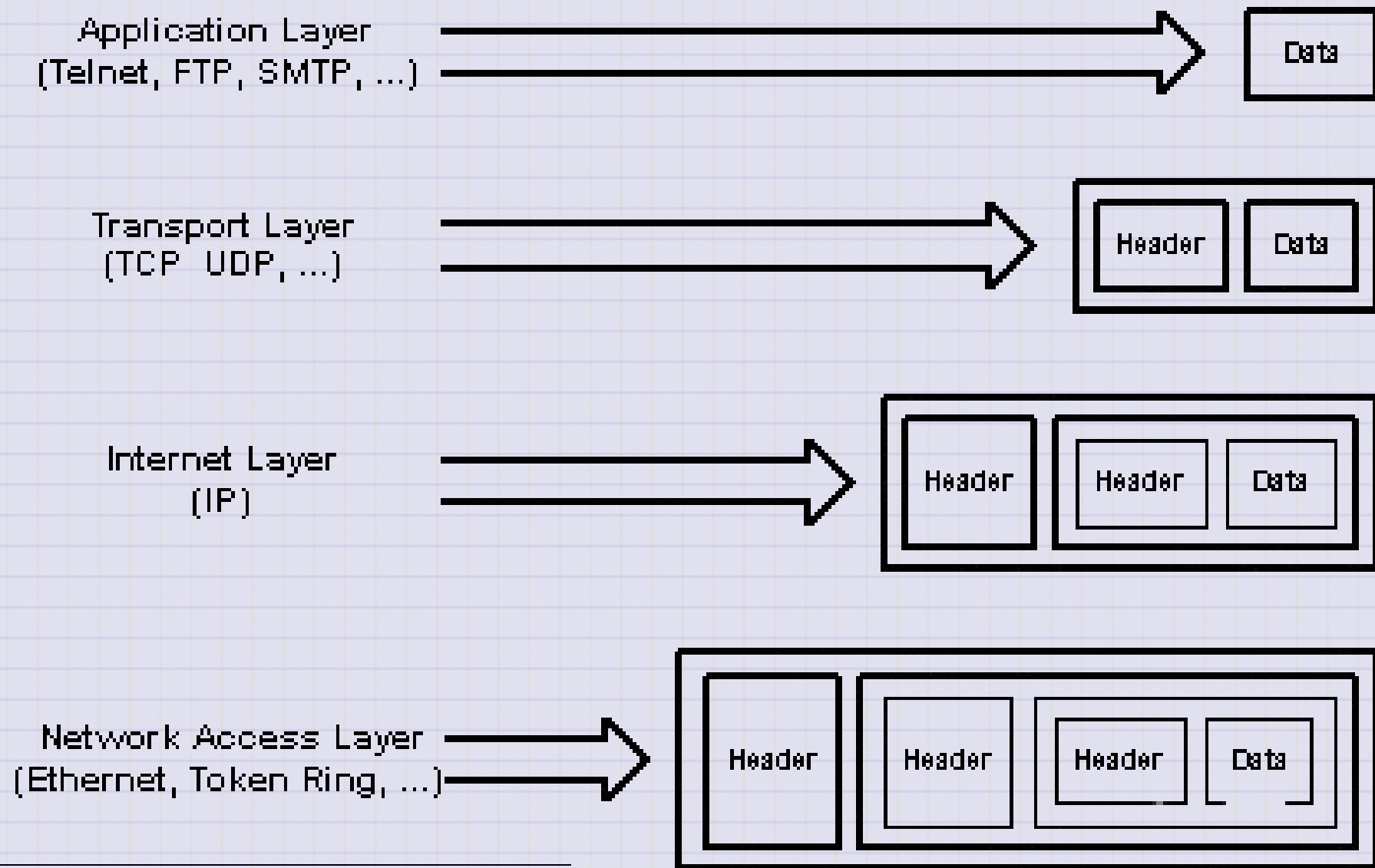
# Layered networking model



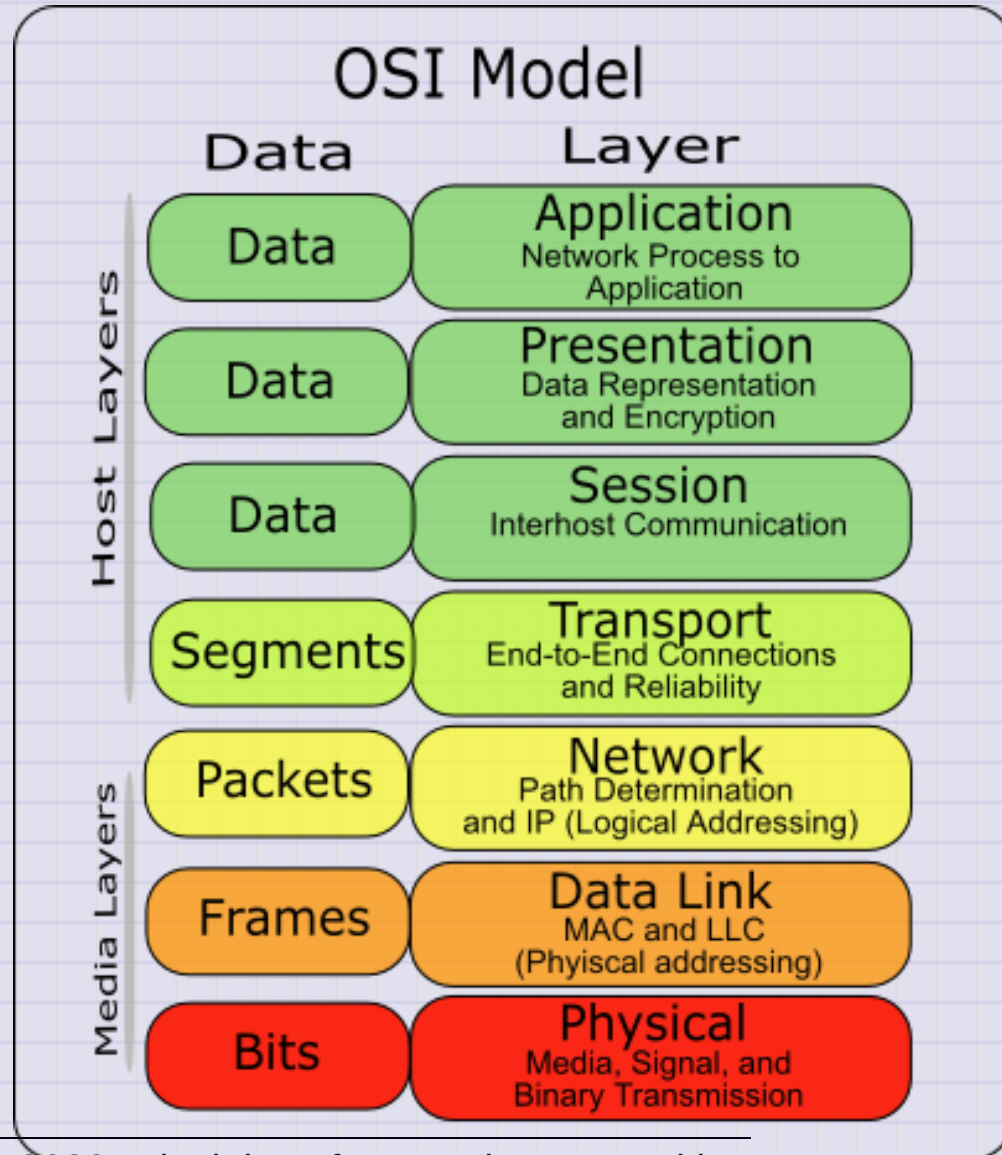
## Layered why?

- Managing complexity: explicit structure allows identification and makes explicit the relationship of complex system's pieces
- Modularization: changing of an implementation of a specific layer's service is hidden from the rest of the system

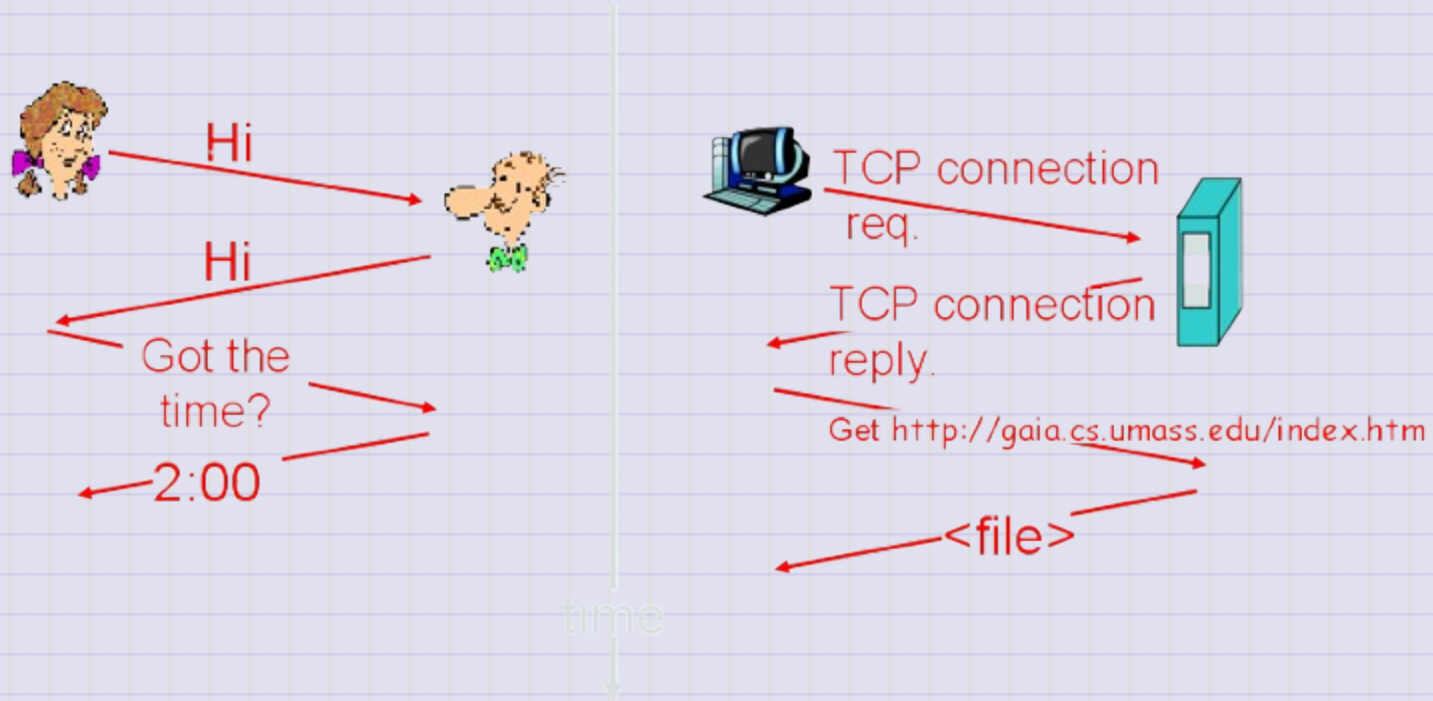
# Encapsulation



# Protocol Data Units (PDU)



# Protocols

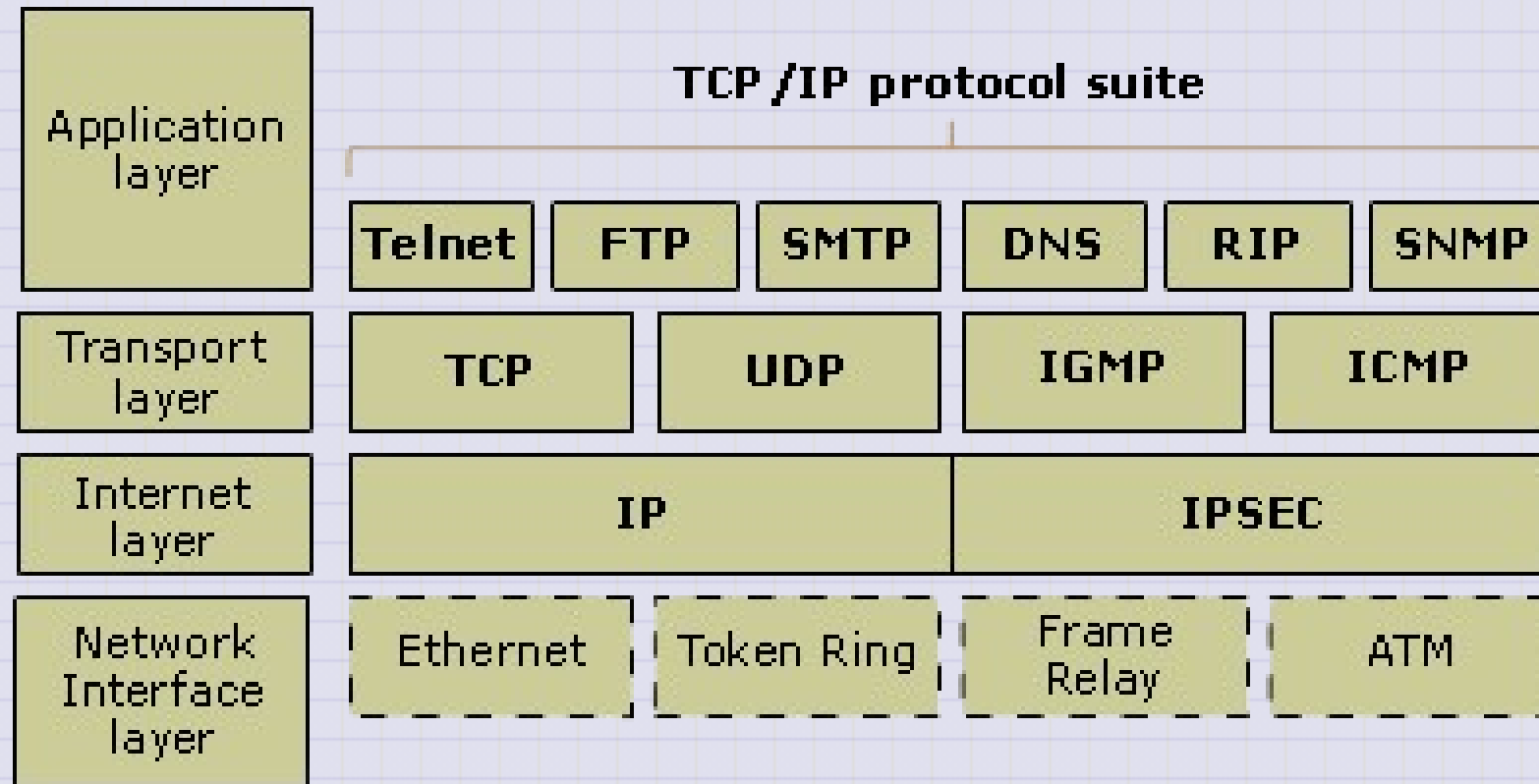




- Mutually agreed upon rules for communication
- Define the format, order of messages sent and received among network entities, and actions taken upon transmission, receipt, and timeout
- Govern all communication activity on the internet

# TCP/IP protocol suite

## TCP /IP model



# Wireshark

- A tool for capturing network traffic for analysis
- [Grab the installer](#) and install it on your system

# Reading list

- This week
  - [OSI Model](#)
  - Optional reading:
    - [Wireshark: filtering while capturing](#)
    - [Capture filters](#)
    - [Display filters](#)

- Week Two (read/watch these before next class)
  - Common Network Infrastructure devices
  - Network devices
  - Network Topologies
  - Overview of networks
  - Optional (but highly recommended):
    - Linux command line (recommended for beginners)