



ACIT 2620

Principles of Enterprise Networking

By: Yves Rene Shema

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

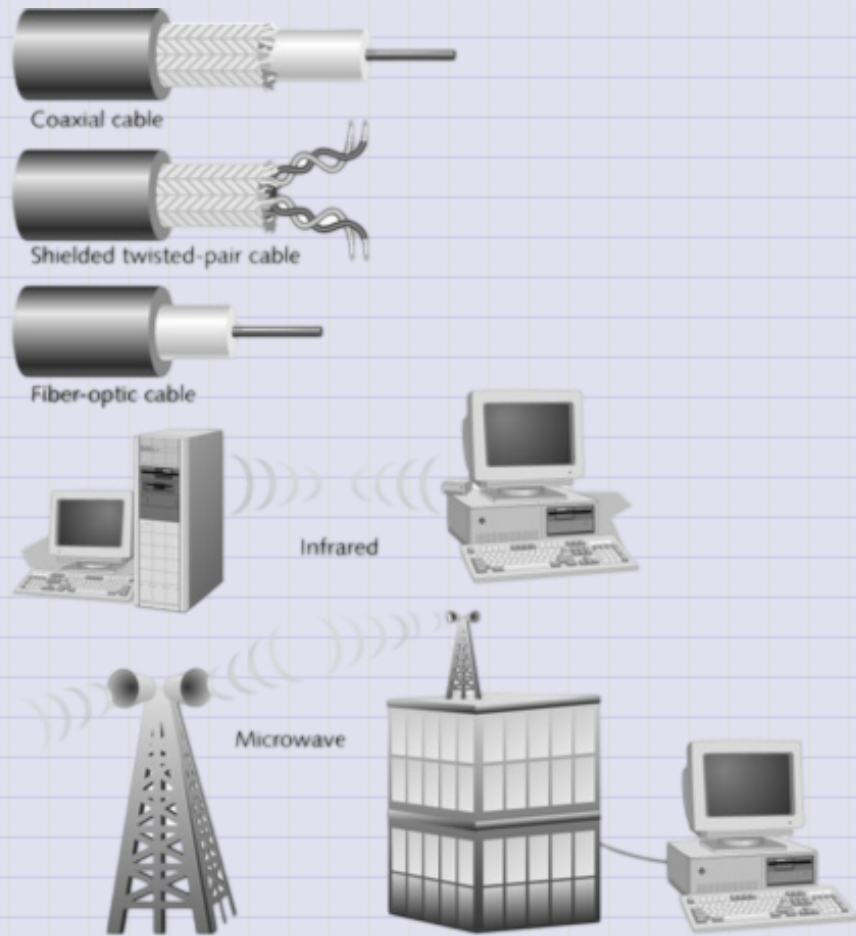
Network

- 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**)

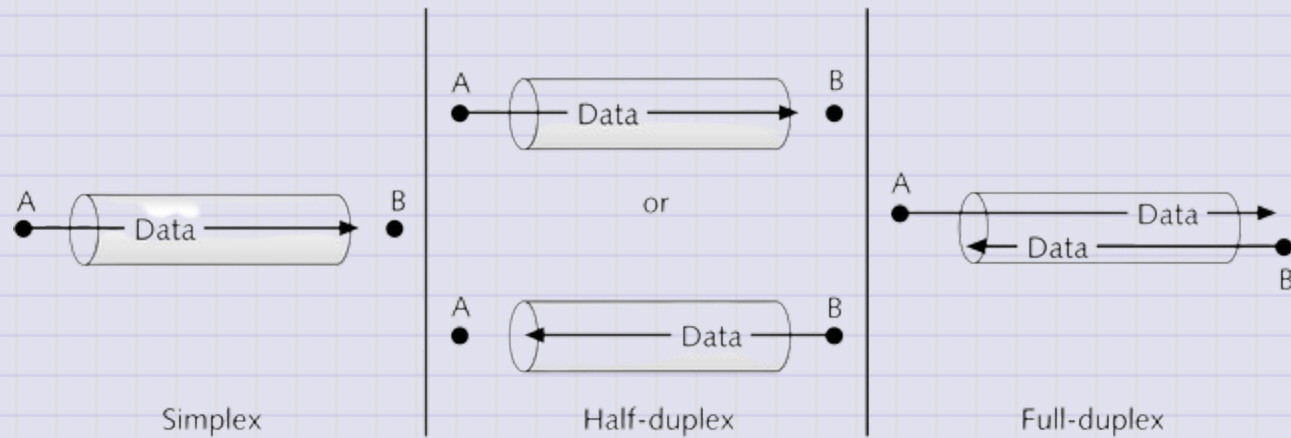
Node

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

Link

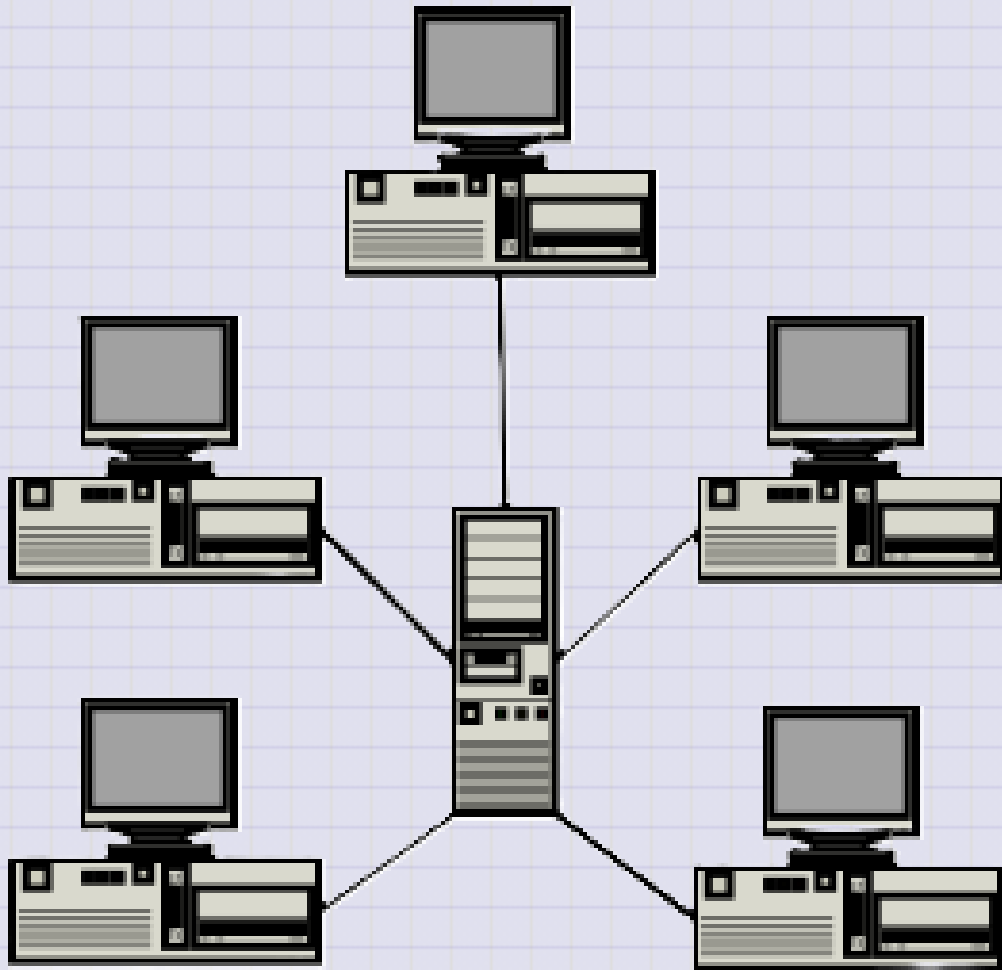


Media concurrency and direction



Resource Control

Client-server Networks



Peer-to-peer Networks



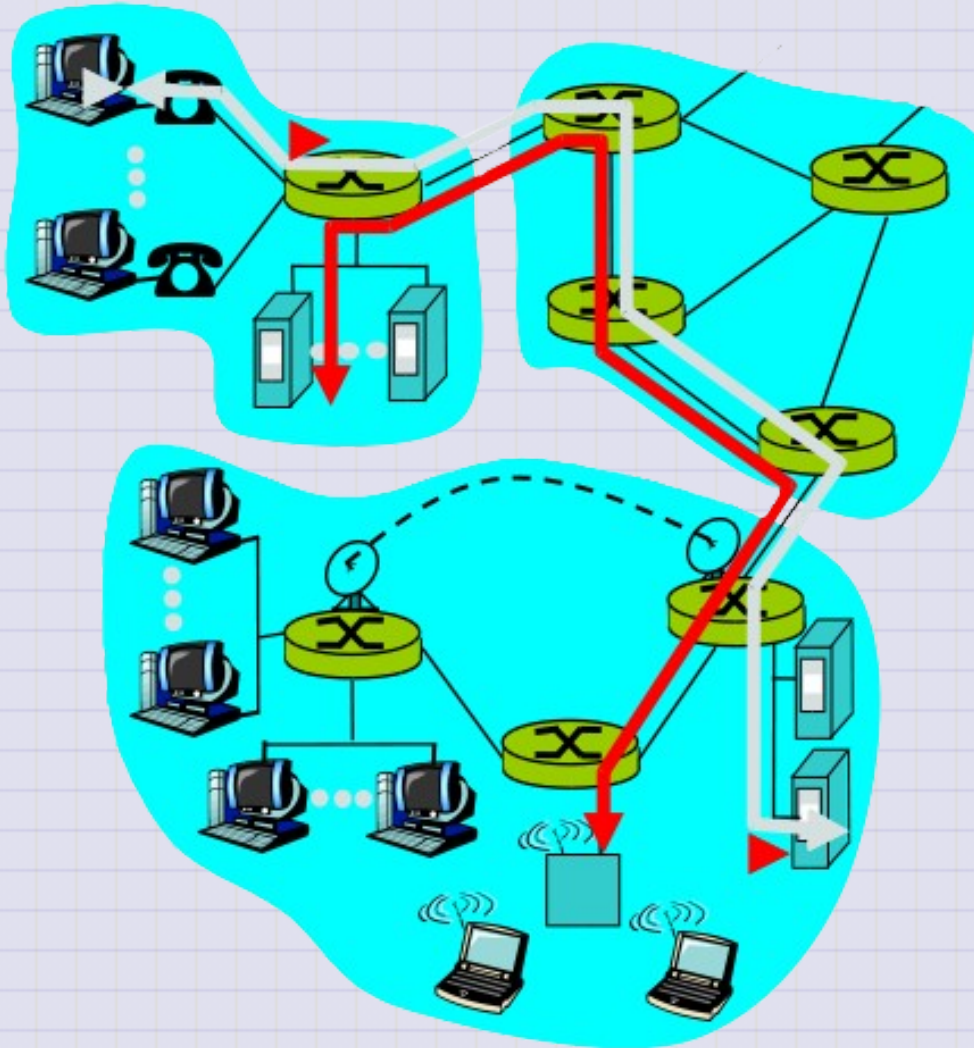
Types of Networks

- LAN
- WLAN
- PAN
- CAN
- MAN

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

Switching Methods

Circuit Switching



Packet Switching



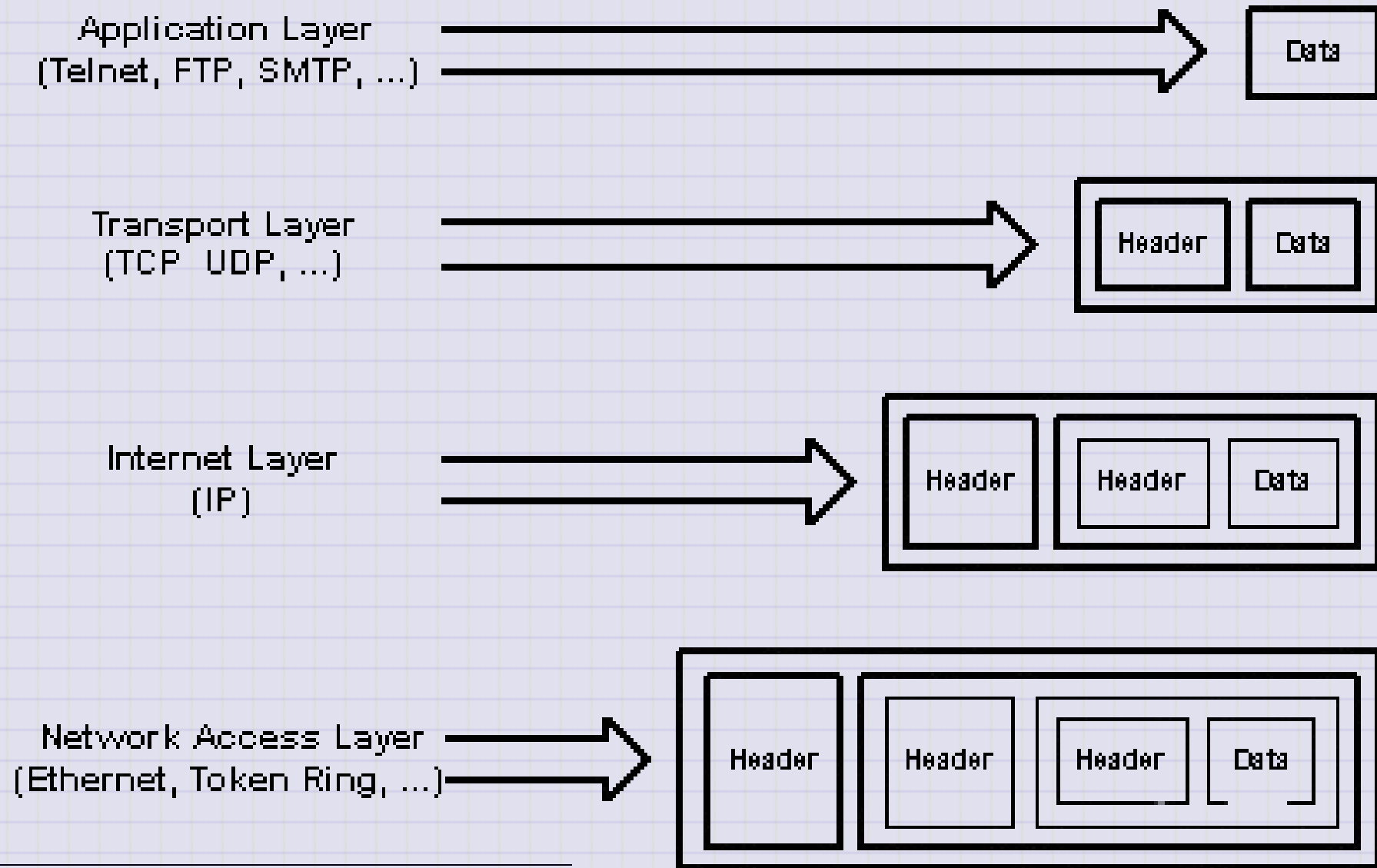
Layered networking model



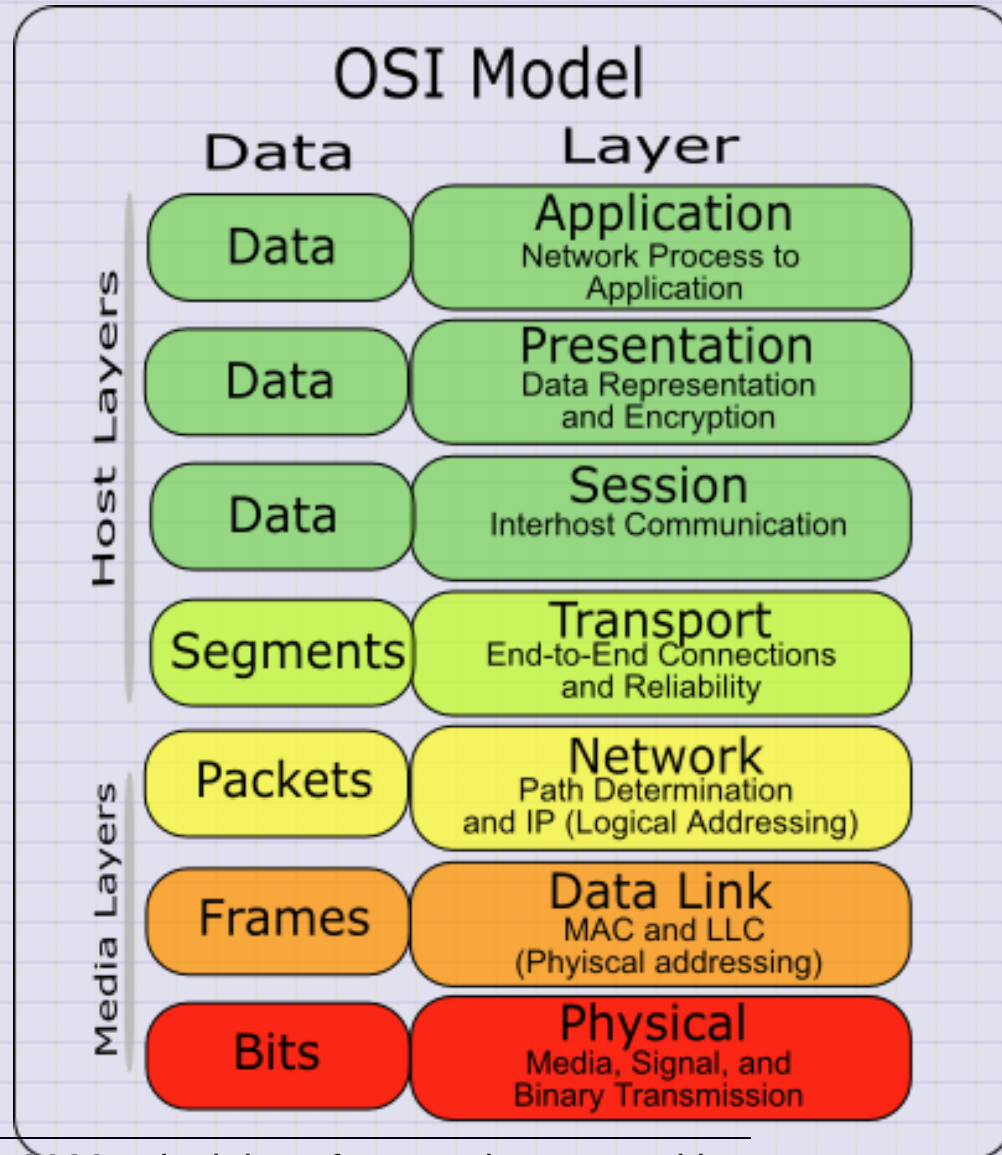
Layered why?

- 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)