CSC4200/5200 – COMPUTER NETWORKING

INTRODUCTION

Instructor: Susmit Shannigrahi
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Tennessee TECH

Welcome

- Class website:
  - Syllabus
  - Grading policies
  - Homework and assignments
  - **First homework and programming assignment already posted**

- Instructor: Susmit Shannigrahi
  - Office hours: MWF after class (zoom) or by appointment
  - Email : sshannigrahi@tntech.edu

- GTA: David Reddick
  - Office hours:
    - Tuesday and Thursdays - 2:00-3:30
    - Wednesday - 12:30-2:00
  - Email: dereddick42@students.tntech.edu

Resources

- Class website:
  - https://tntech-ngin.github.io/csc4200/
- Slack: CSC4200-fall2020
  - https://join.slack.com/t/tntechhq/shared_invite/zt-gwbjtydw-xXfMJY4~pcjqohY9mXWreg
- Zoom (you need a password sent separately):
  - https://tntech.zoom.us/j/93613648609

Grading

- Homework – 15%
- Projects + Demo – 35%
- 3 exams – 35%
  - **approximately once every month (Sept, Oct, Nov) – 35%**
- Class participation – 15%
  - **Participate in breakout sessions and discussions.**
  - **Each student will need to lead a breakout session.**

5200 – Extra reading and presentation requirements.

- **Discuss with the instructor by end of the first week - (08/30)**

Policies

- **One late submission allowed (programming assignment), no questions asked. Homeworks due on time.**
  - Use it wisely
  - Max 7 days late
  - Submit to iLearn
- Other late submissions
  - Flat 50% deducted
  - No exceptions!
- No make-up exams.
  - Your responsibility to find conflicts and work with the instructor to resolve them

Exams

- 3 exams.
- **Open book**
  - **Will be challenging**
  - Memorizing will not help, you need to understand the topics

Programming Assignments

- Must run on Google Cloud Vms – Ubuntu-18.04
- First assignment is individual. Second and third are group projects.
- Third assignment would require a Raspberry PI
  - We are trying to set this up.
- C/C++/Python
  - **If you want to use other languages, talk to the GTA/Instructor**

Cheating Policy

- **If you cheat, you will fail the class!**
  - Regardless of what you cheated in
  - Don’t do it.

- **You will also be reported for academic misconduct**
  - http://catalog.tntech.edu/content.php?catoid=18&navoid=3312

In-person Class

- How many of you want to attend in person?
- Details are still being worked out but most of the classes will be online.
- Zoom recordings will be posted for all classes.
- **Masks are mandatory, no exceptions of <u>any</u> reason!**
  - You need to talk to Accessible Education Center (AEC)

Questions so far?

Chapter 1: Fundamentals

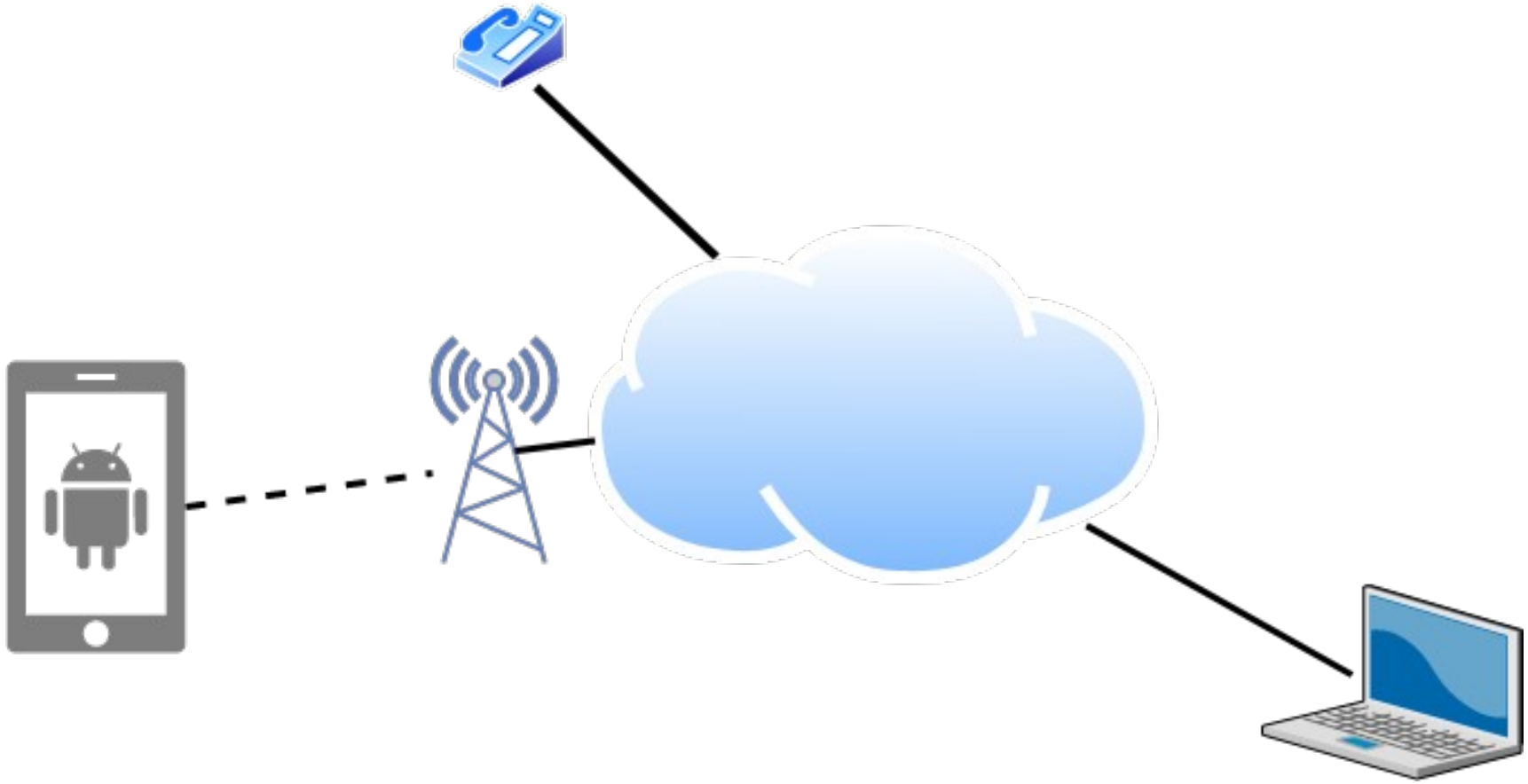
- Networking is ubiquitous
  - **(Breakout)** What did you use it for today?

- First things first:
  - Terminology
  - Basic tools
  - What does it take to build an Internet?

Links, Nodes, Network, Internet

- You can view the network as a graph
- Each device (a phone, a computer) is a node
- Each connection is a link
  - Wires = real links
  - Bluetooth, Radio, Infrared = virtual links
- Nodes + links = a network
  - Many connected networks = Internet

Links, Nodes, Cloud, Routers, Switches

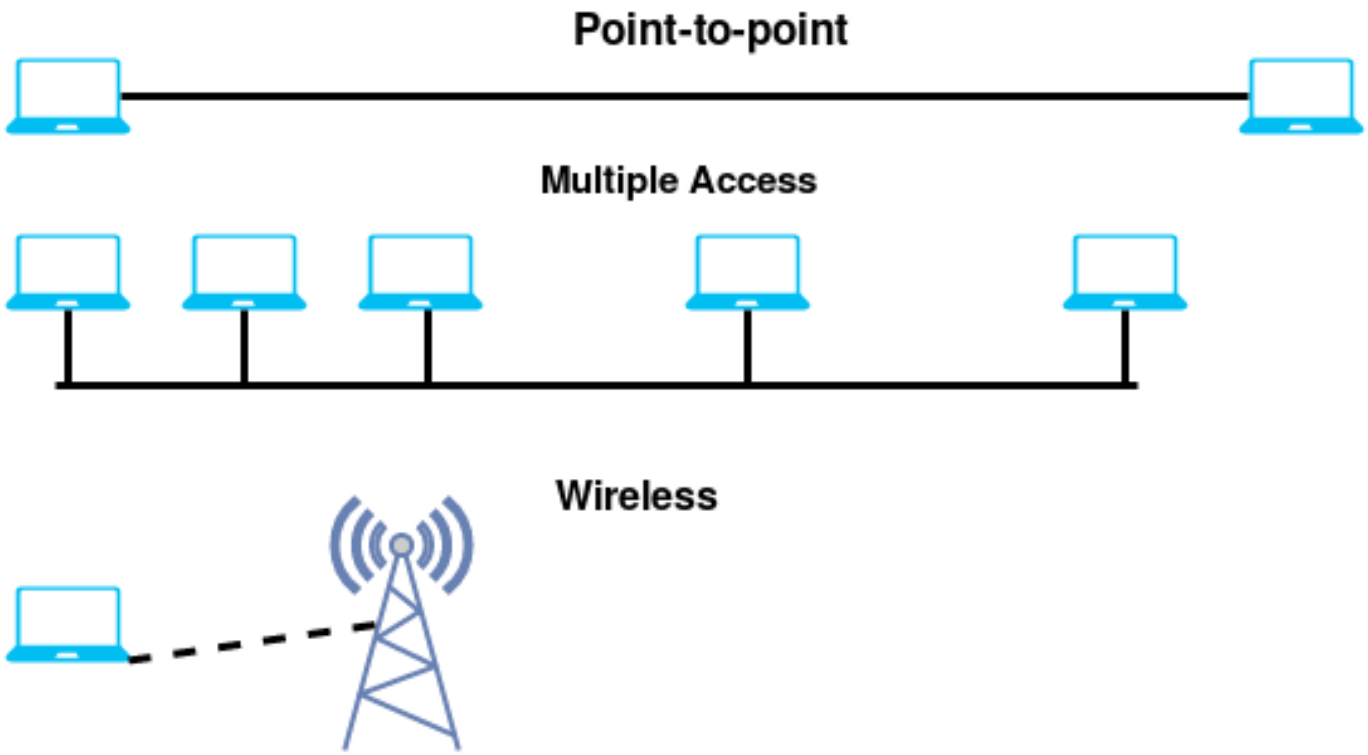


Client and Server

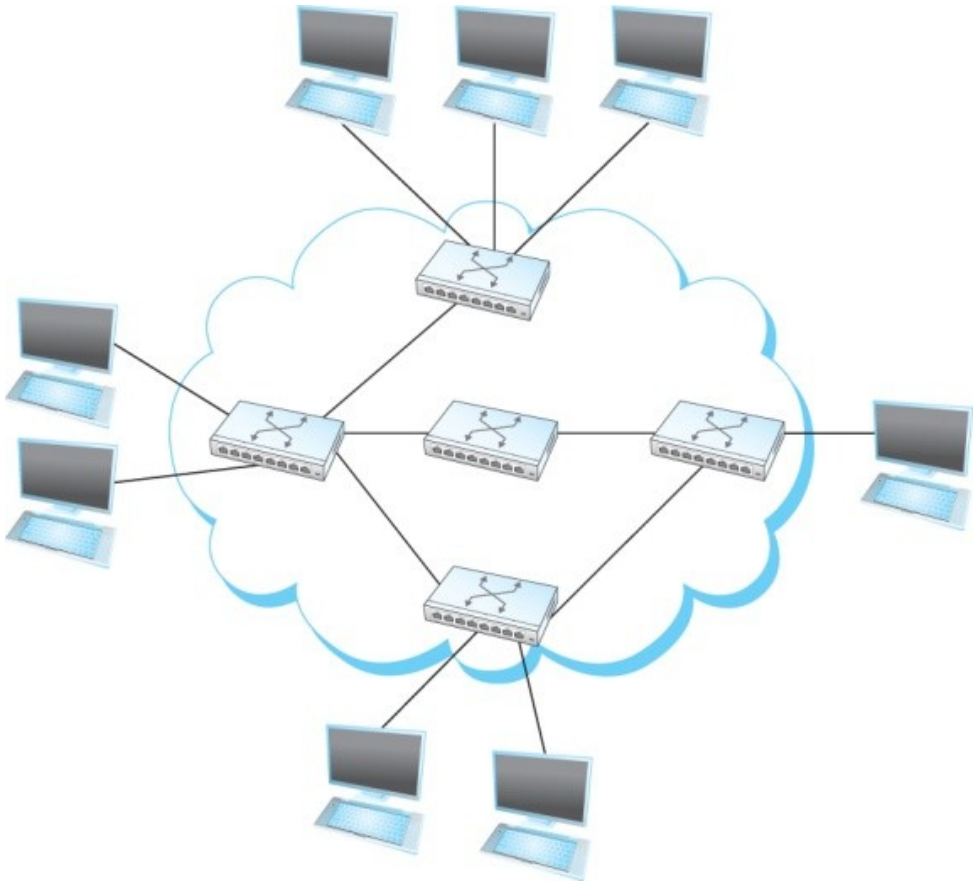
- My laptop with a browser = client
  - It requests a service
  - Email, chat, video, youtube
- A node running a program that serves the requests = server
  - Runs a service
  - Chat, video, messaging
- A node can both be a client and a server

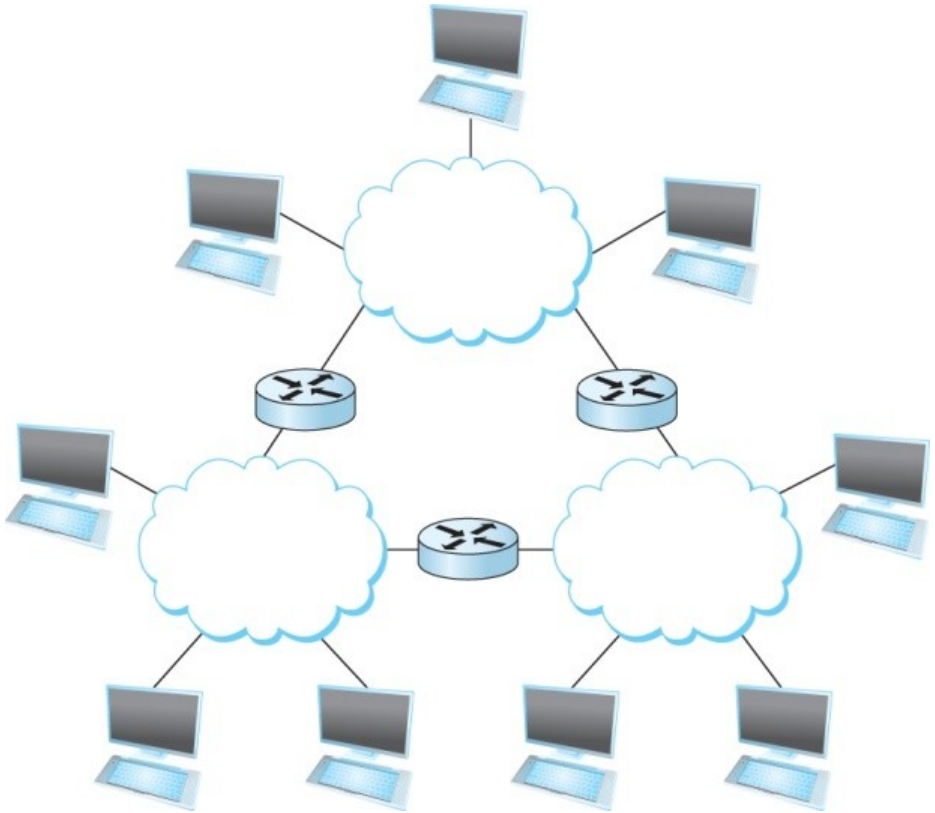
Connectivity

- Point to Point
- Multiple access
- Wireless



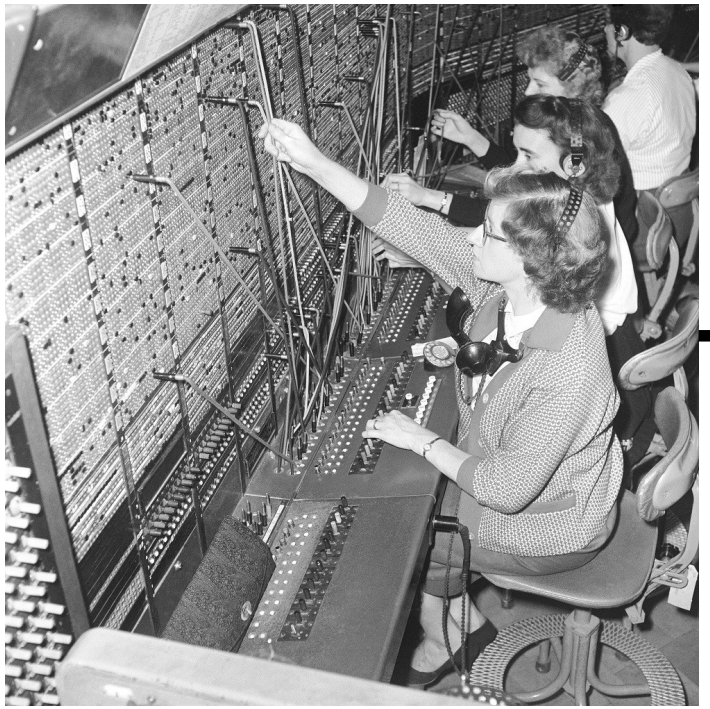
A Network and the Internet





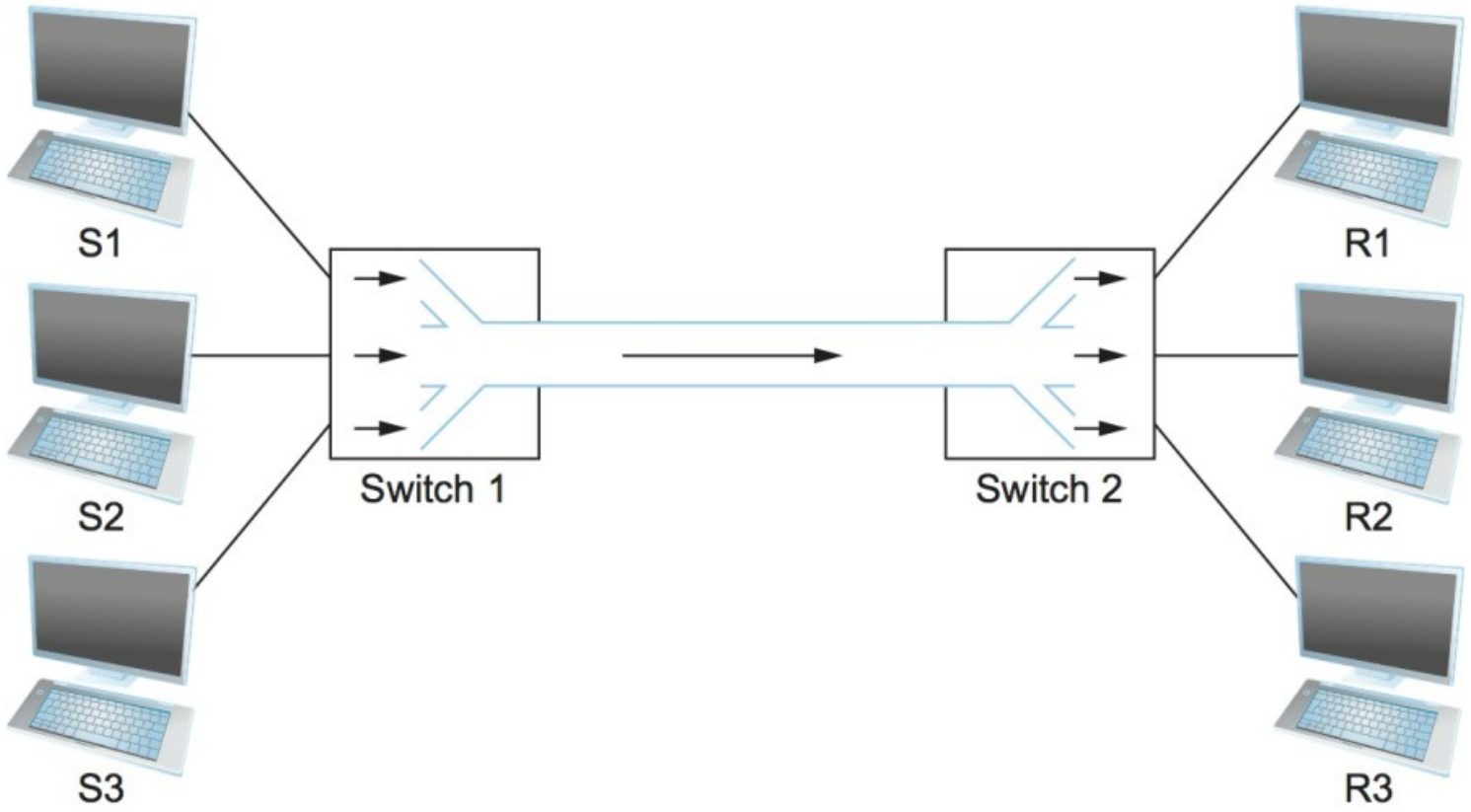
Circuit Switching – Old telephone networks

Operator, get me the navy



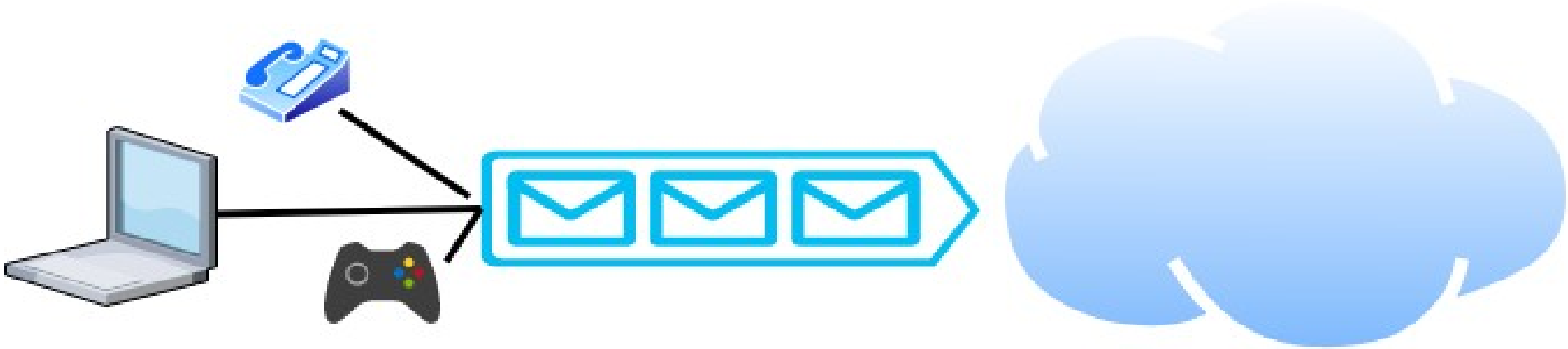
- Build physical wire:
  - Guaranteed resources
  - Great for voice

Circuit Switching – TDM and FDM



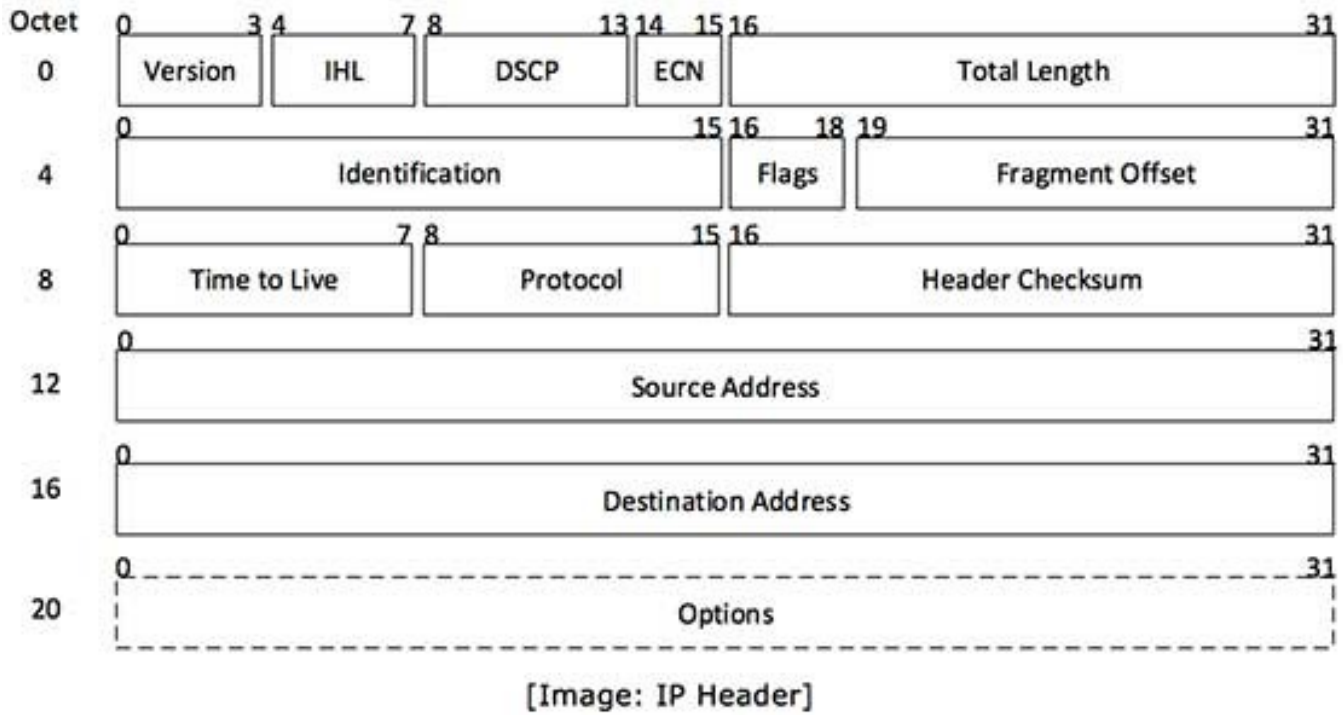
Breakout - What are the problems?

Packet Switching



- Packets are low level components
- Multiple kind of traffic with different requirements
  - Gaming vs Phone
- Dumb network – How do you ensure quality of service?
- End points must be smart

But What is a Packet?



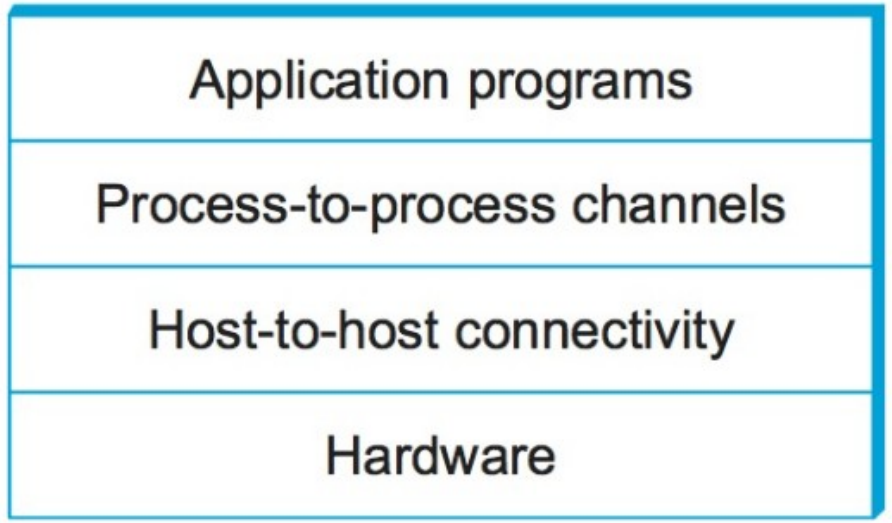
[Image: IP Header]

- Self-contained data unit
- Has two parts (generally)
  - Control information
  - Payload
- Breakout
- How do we transmit “Hello World?”
- How do we transmit a dictionary?

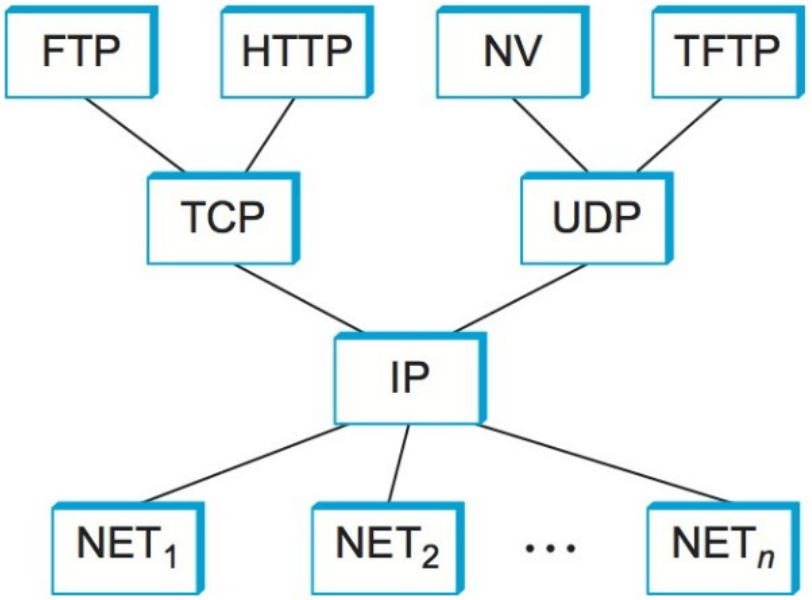
Network Architecture

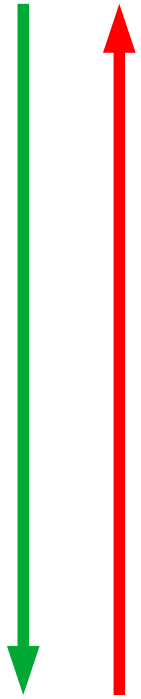
- What are the requirements from a network?

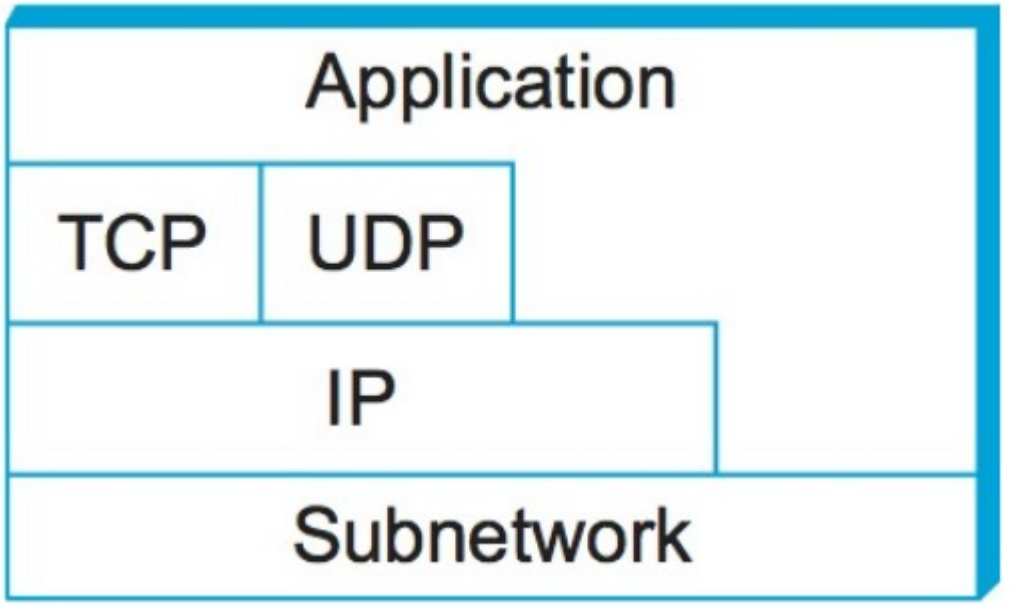
- Architecture = High-level blueprint
  - Protocols = Building blocks of the architecture
  - Layering = Break down the problem in smaller pieces



Network Layers

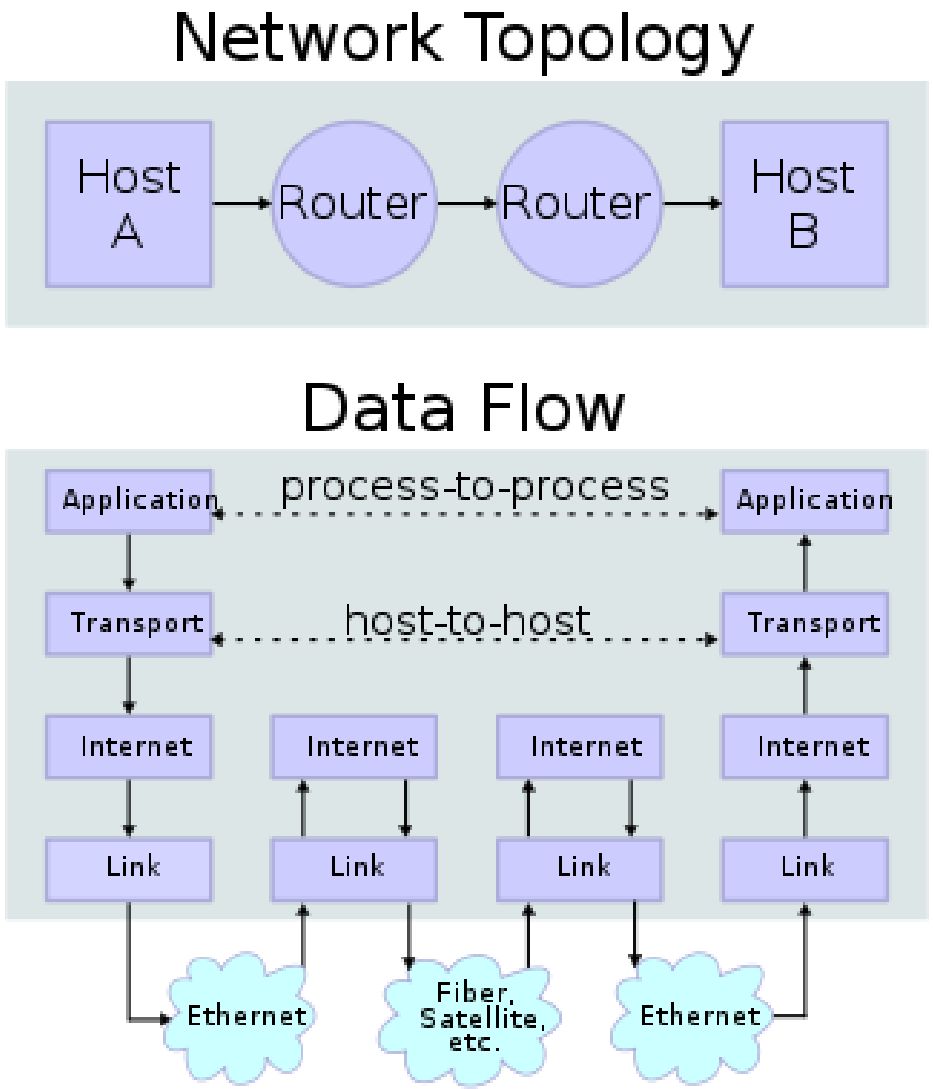


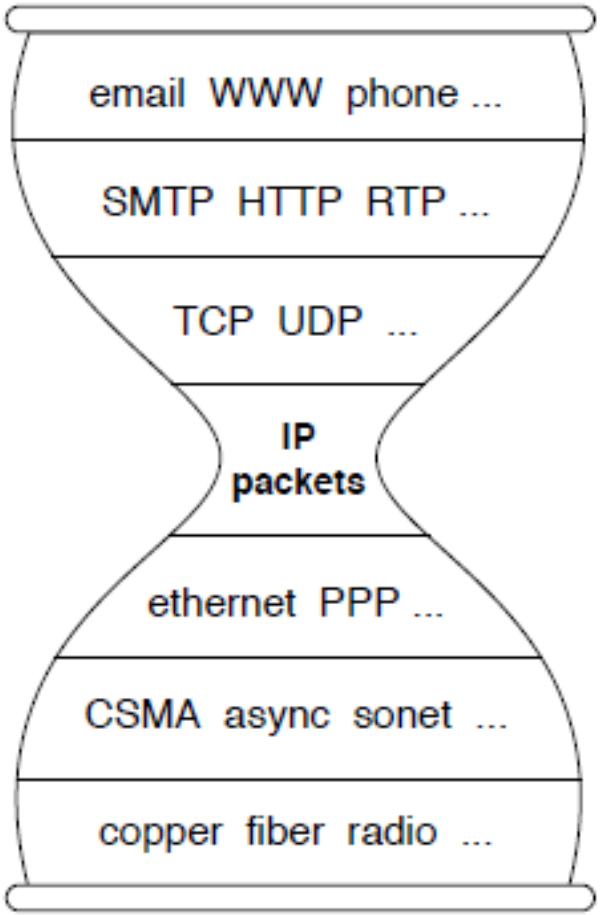




- Makes it easier to divide functionality
- Hides implementation details
- Breakout – few other reasons?

IP Suite





We reject kings, presidents, and voting. We believe in rough consensus and running code. (David Clark, IETF, July 1992)

Next Steps

- Read Chapter 1
- Homework 1 has posted – due on next Monday – 09/07
  - Substantial hands-on component, start ASAP
- Project 1 has posted – due on 09/15
- Next lecture – Network performance basics