

# **CSC4200/5200 - COMPUTER NETWORKING**

## **INTRODUCTION**

**Instructor: Susmit Shannigrahi**  
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# Welcome

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- 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](mailto: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](mailto: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](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

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- 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

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- **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

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

# Programming Assignments

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- Must run on Google Cloud Vms – Use the latest Ubuntu
- 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

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- **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

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- Most of the classes will be online.
- Zoom recordings will be posted for all classes.
- Sign-up sheets for in-person classrooms.
- **Masks are mandatory, no exceptions of any reason!**
  - You need to talk to Accessible Education Center (AEC)



**Questions so far?**

# Chapter 1: Fundamentals

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- 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

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- 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

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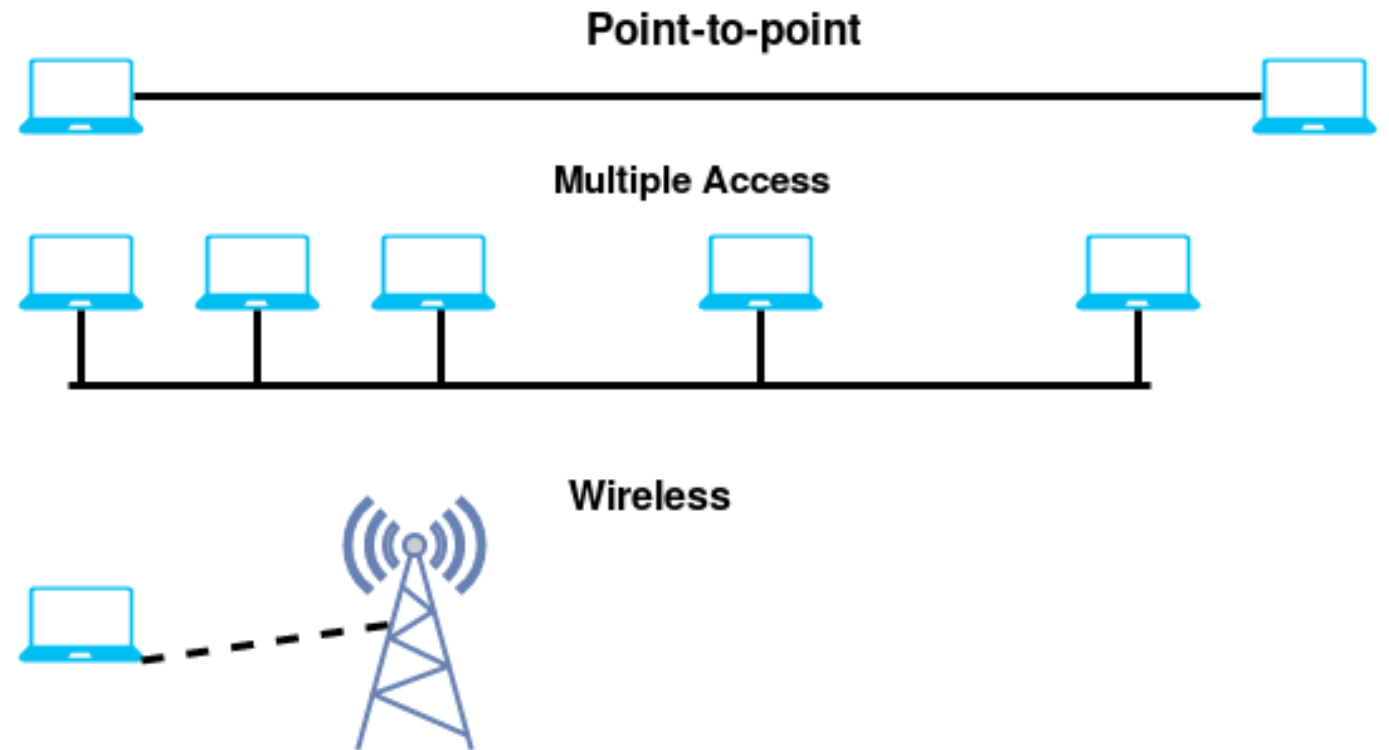
# Client and Server

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- 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

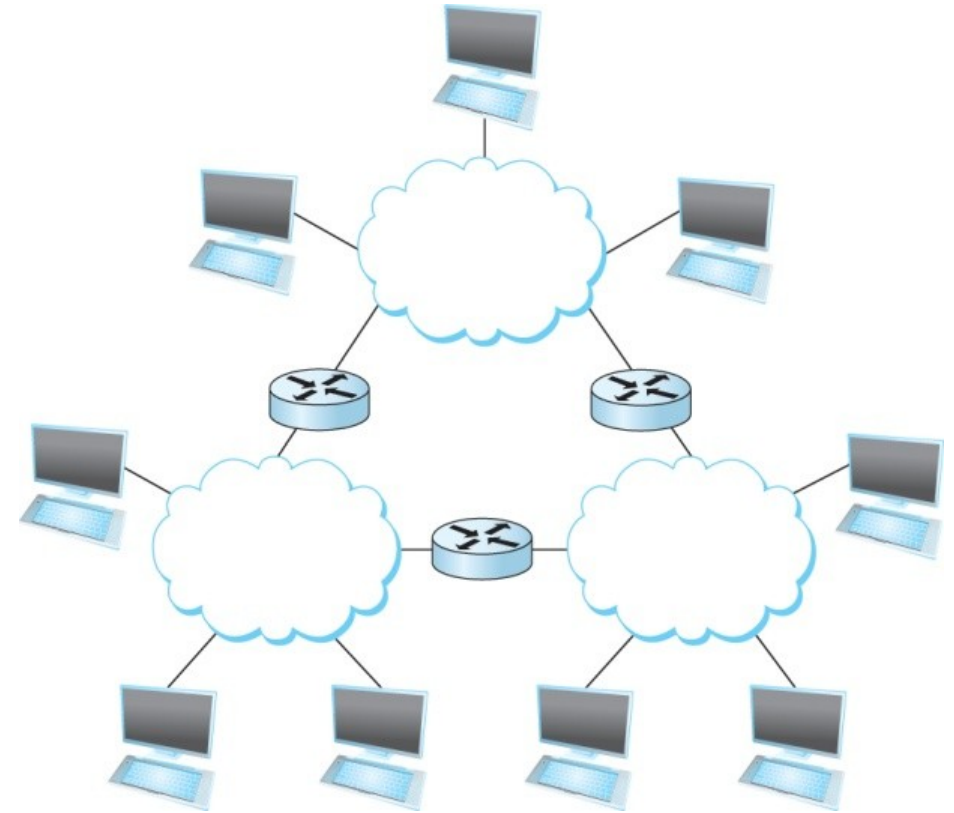
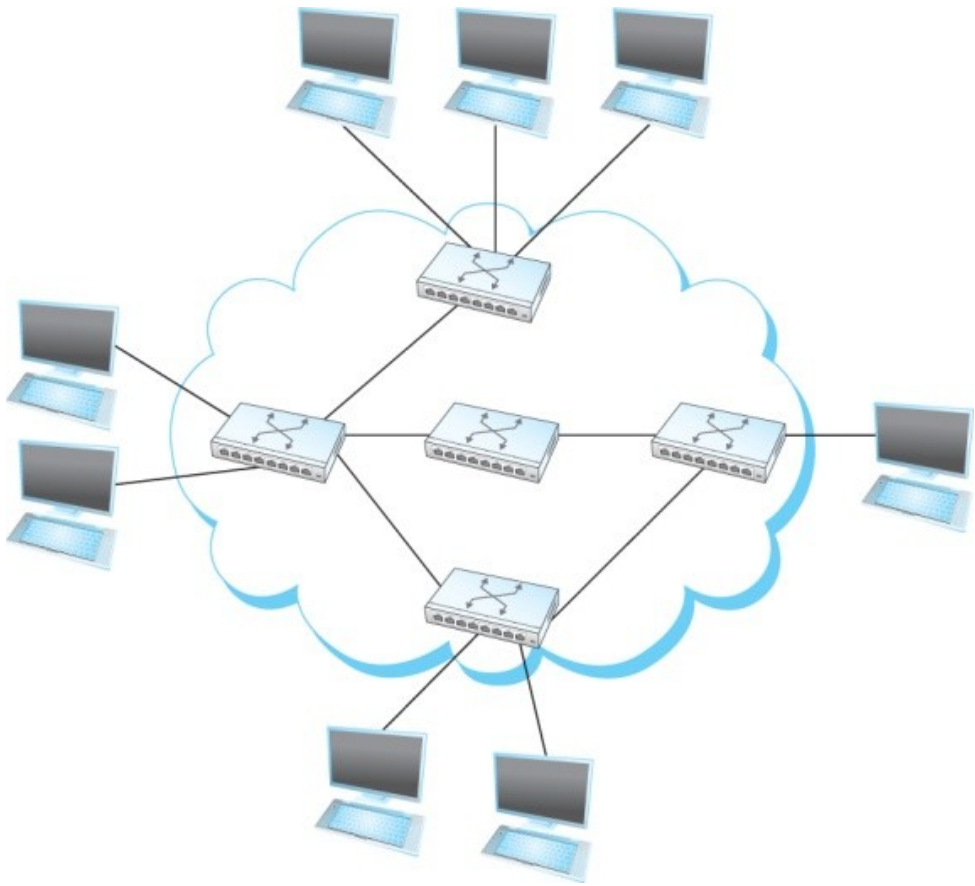
# Connectivity

- Point to Point
- Multiple access
- Wireless



# A Network and the Internet

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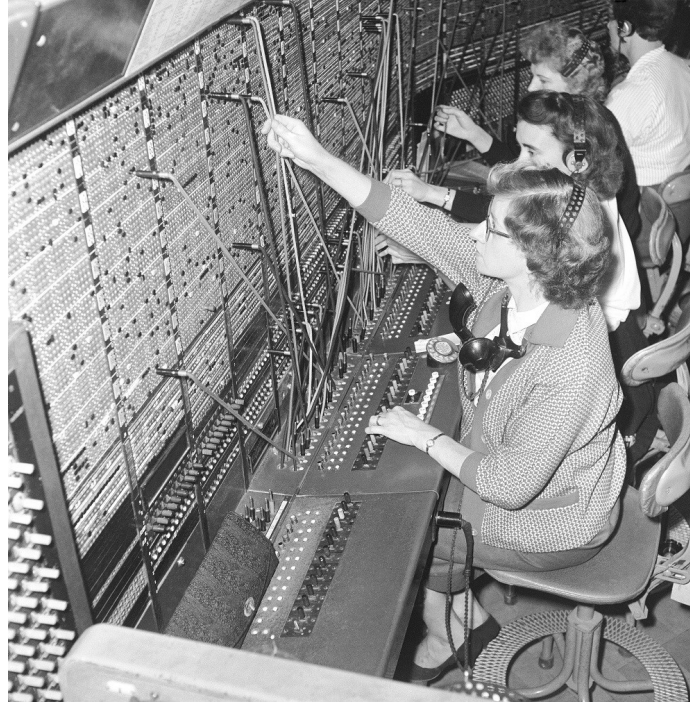


# Circuit Switching - Old telephone networks

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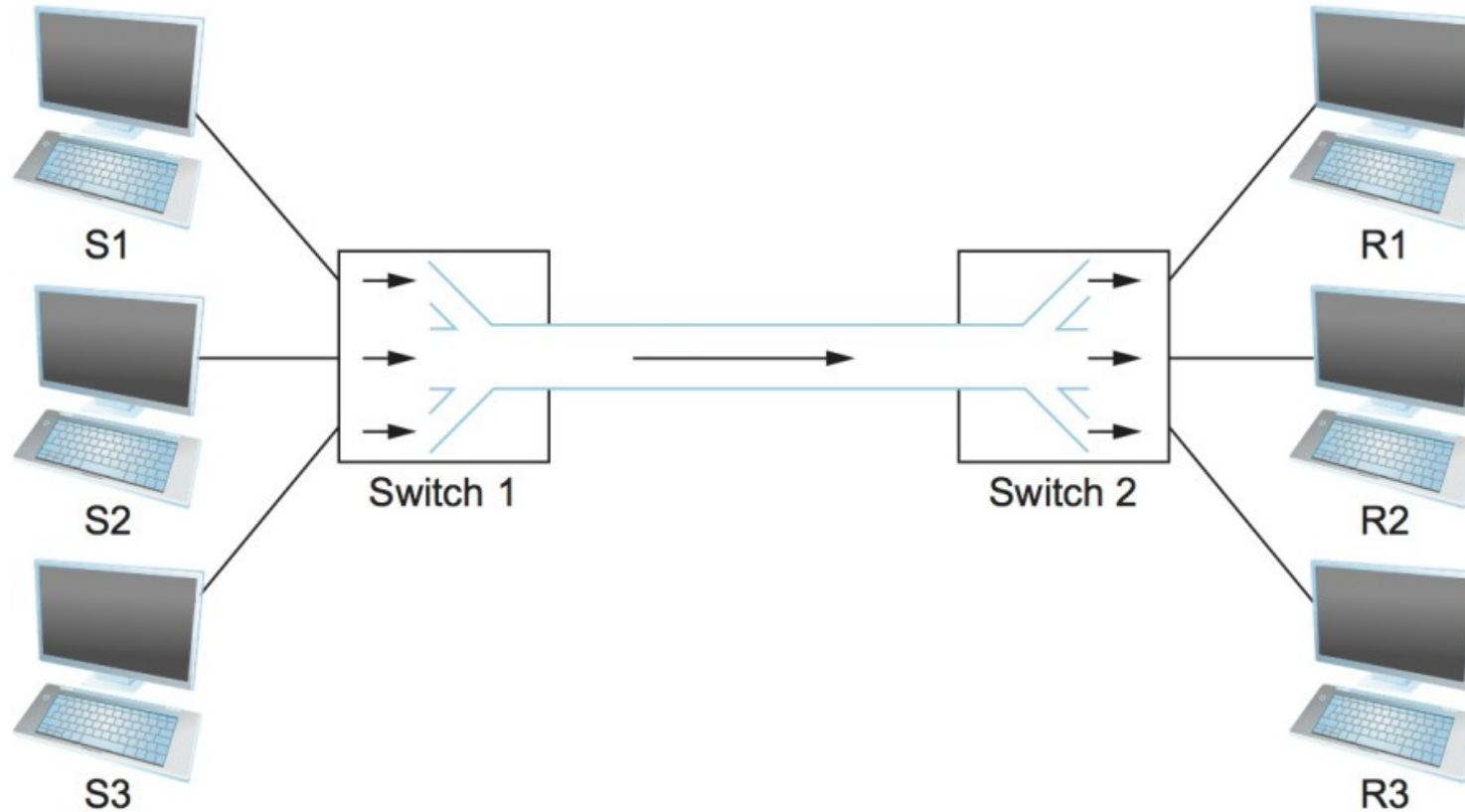
Operator, get me  
the navy



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

# Circuit Switching - TDM and FDM

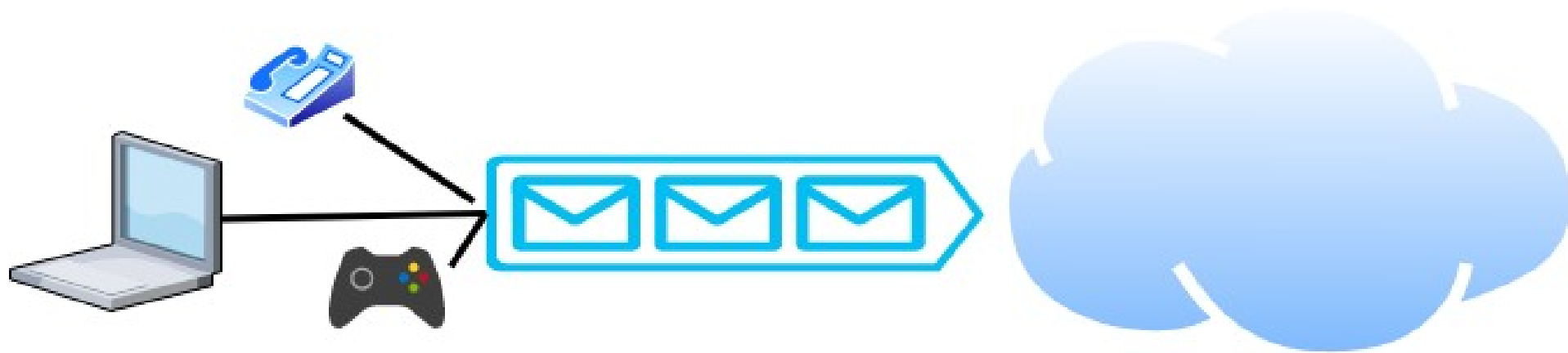
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**Breakout - What are the problems?**

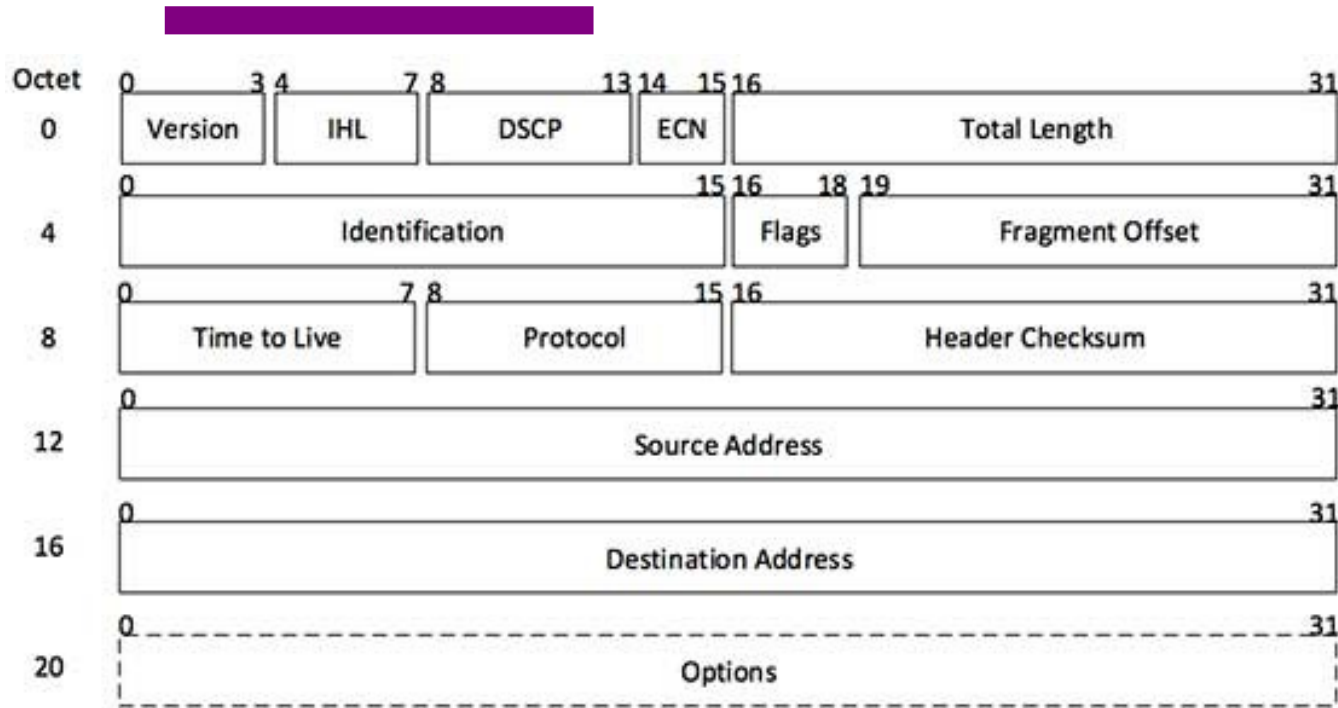
# Packet Switching

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- 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?



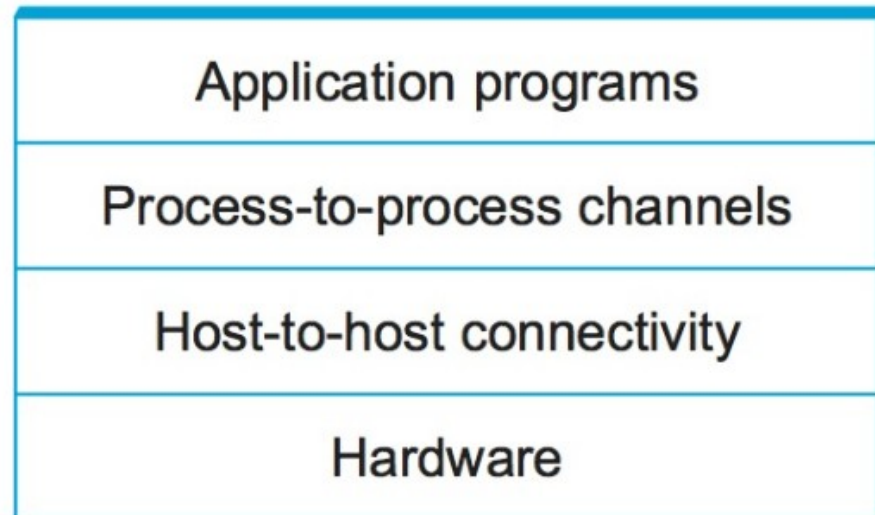
[Image: IP Header]

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

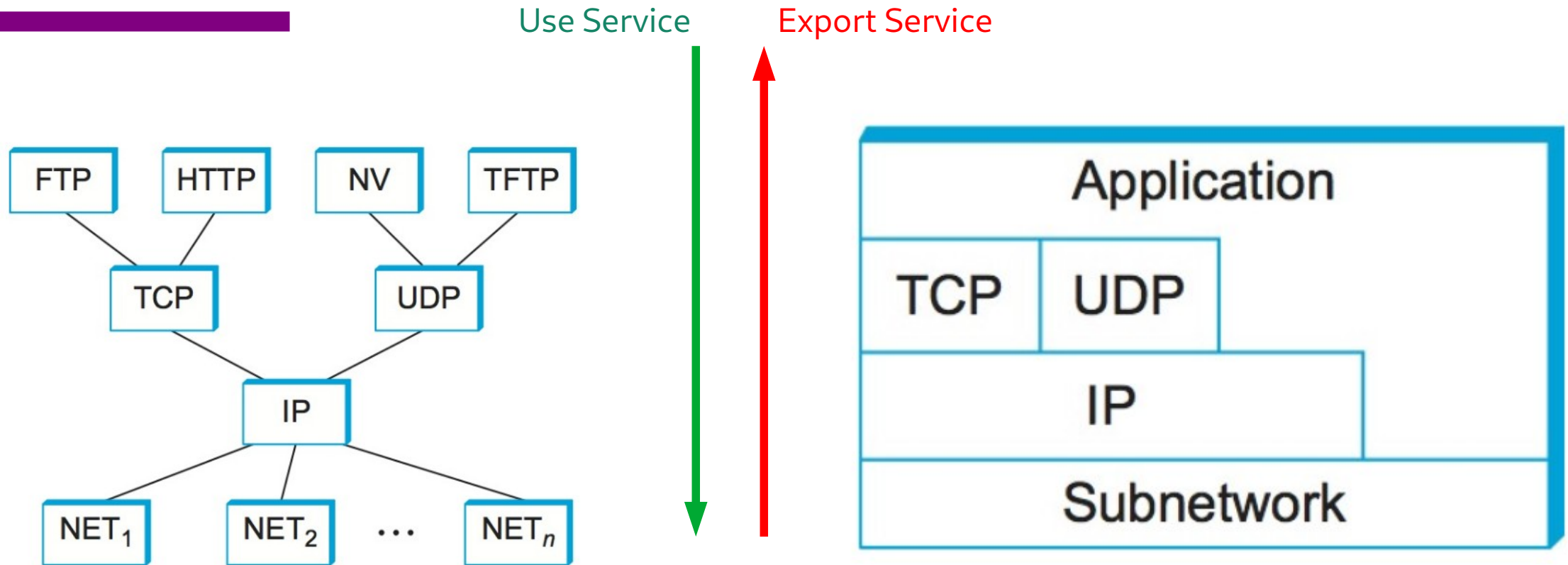
# Network Architecture

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- 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



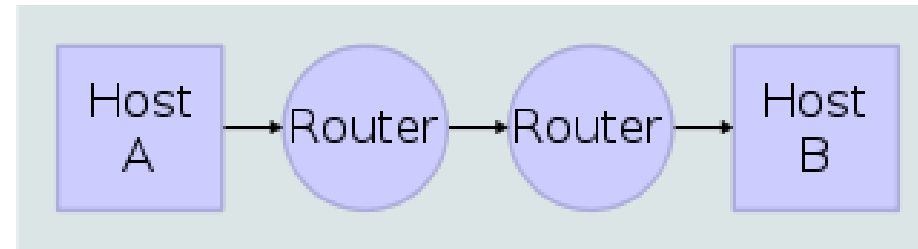
# Network Layers



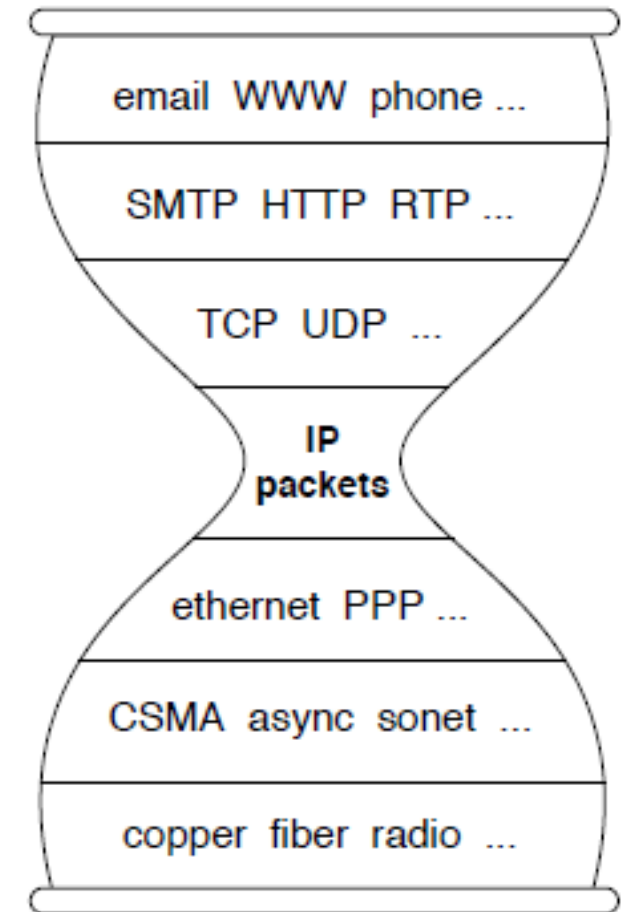
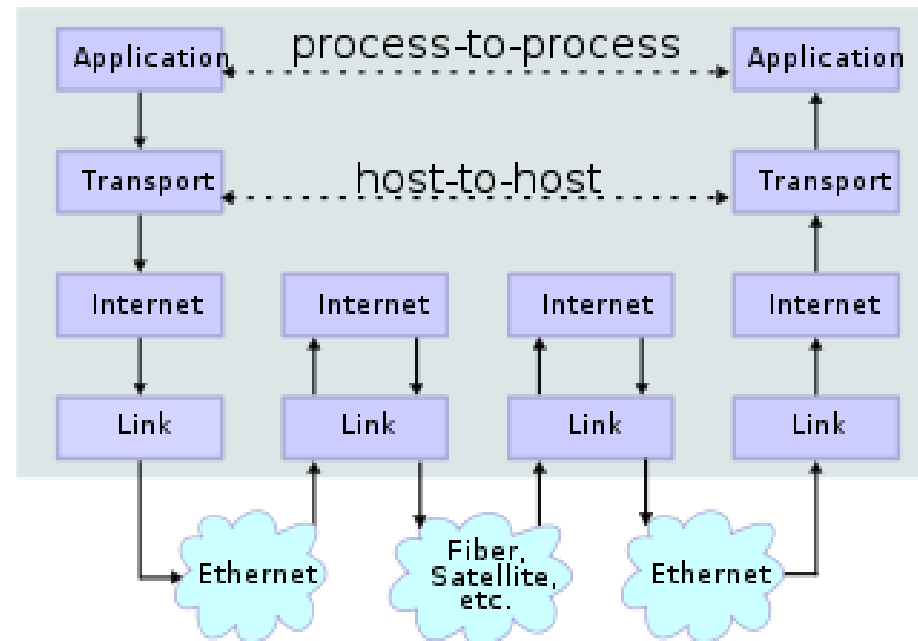
- Makes it easier to divide functionality
- Hides implementation details
- **Breakout** – few other reasons?

# IP Suite

## Network Topology



## Data Flow



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

wikipedia

# Next Steps

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- 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