

CSC4200/5200 – COMPUTER NETWORKING

INTRODUCTION

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Welcome

- Class website: <https://csc4200.github.io/>
 - Syllabus
 - Grading policies
 - Homework and assignments
 - **First homework and programming assignment already posted**
- Instructor: Susmit Shannigrahi
 - Office hours: Monday 2:30-4:30 PM, Wednesday 11-12AM
 - Email : sshannigrahi@tnitech.edu
- GTA: David Reddick
 - Office hours: TBA
 - Email: dereddick42@students.tnitech.edu

Grading

- Homework – 10%
- Project 1 – 5%
- Project 2 – 15%
- Project 3 + Demo – 20%
- Midterm – 25%
- Final (Comprehensive)– 25%

5200 – Extra reading and presentation requirements.

- Pick a topic, read research papers, prepare a presentation
- **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
- 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

- One midterm, one final.
- Final is comprehensive.
- **One double sided cheat sheet is allowed for both the midterm and the final**
 - Is not going to help if you don't understand the fundamentals

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
 - You will need to buy one. We will provide the exact specification.
- C++/Python
 - C is allowed
 - **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.tnitech.edu/content.php?catoid=18&navoid=3312>

To the more exciting stuff....

Questions so far?

Chapter 1: Fundamentals

- Networking is ubiquitous
 - 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

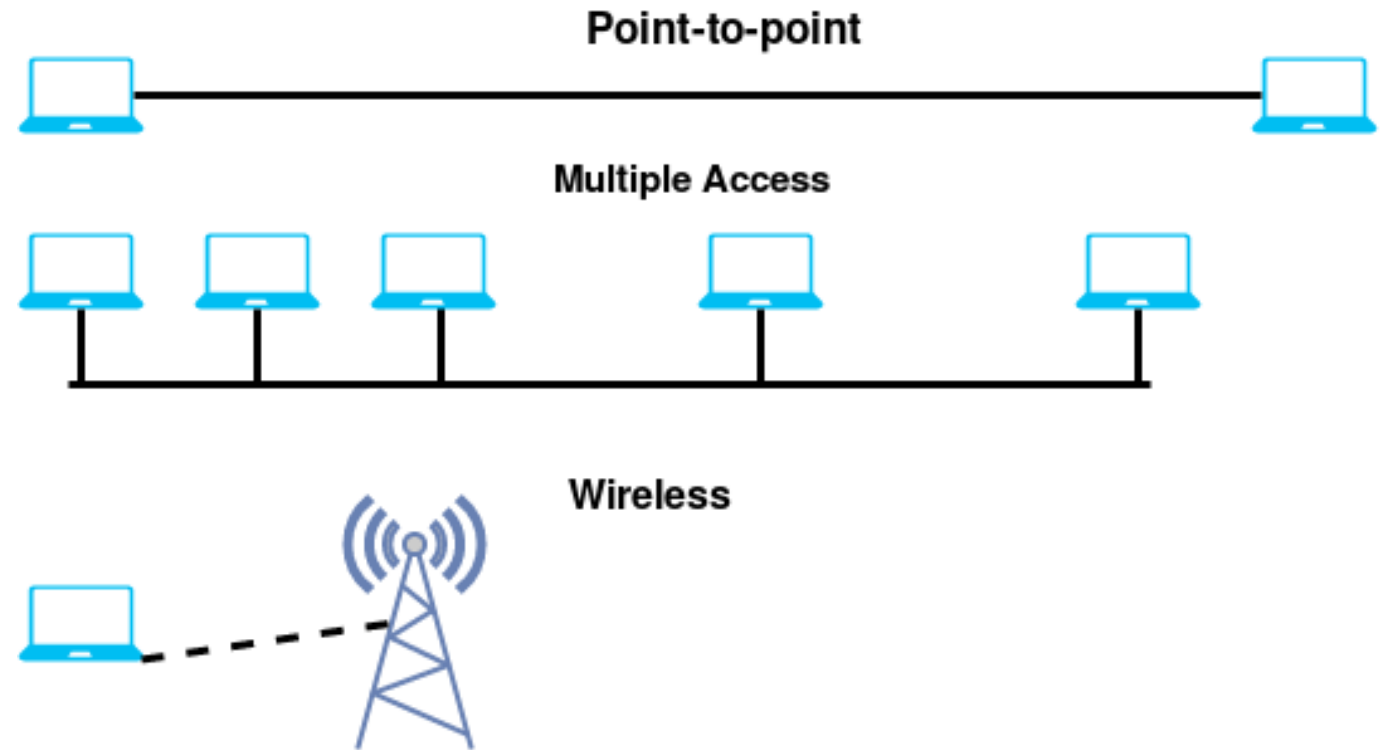


Client and Server

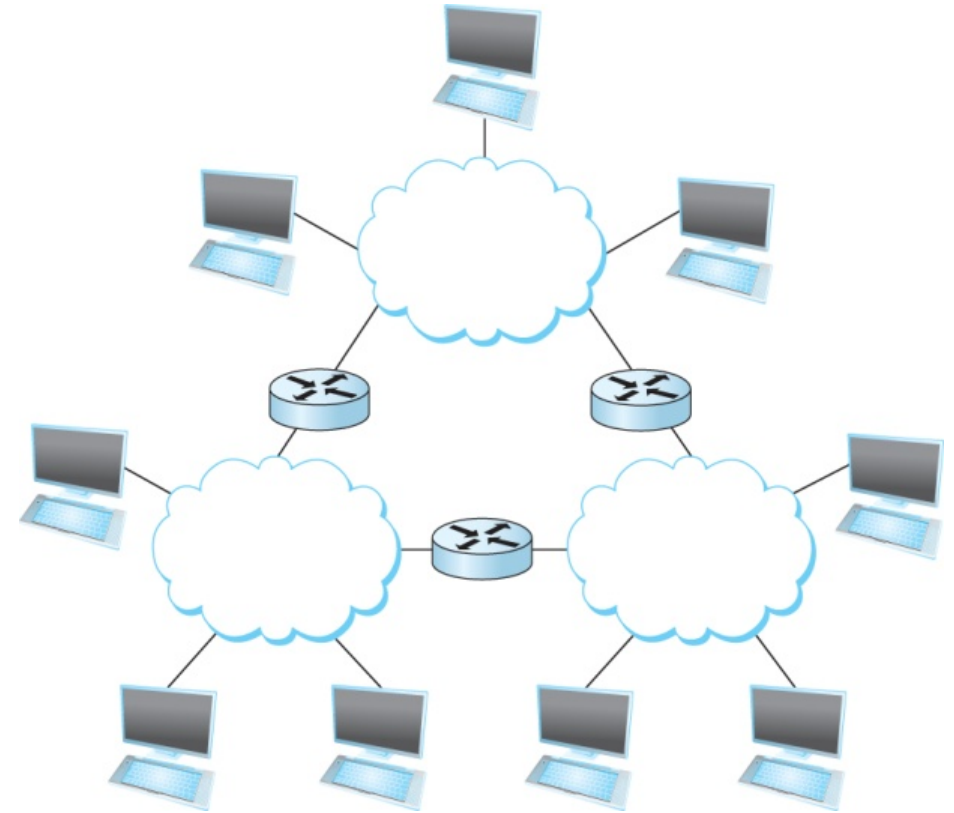
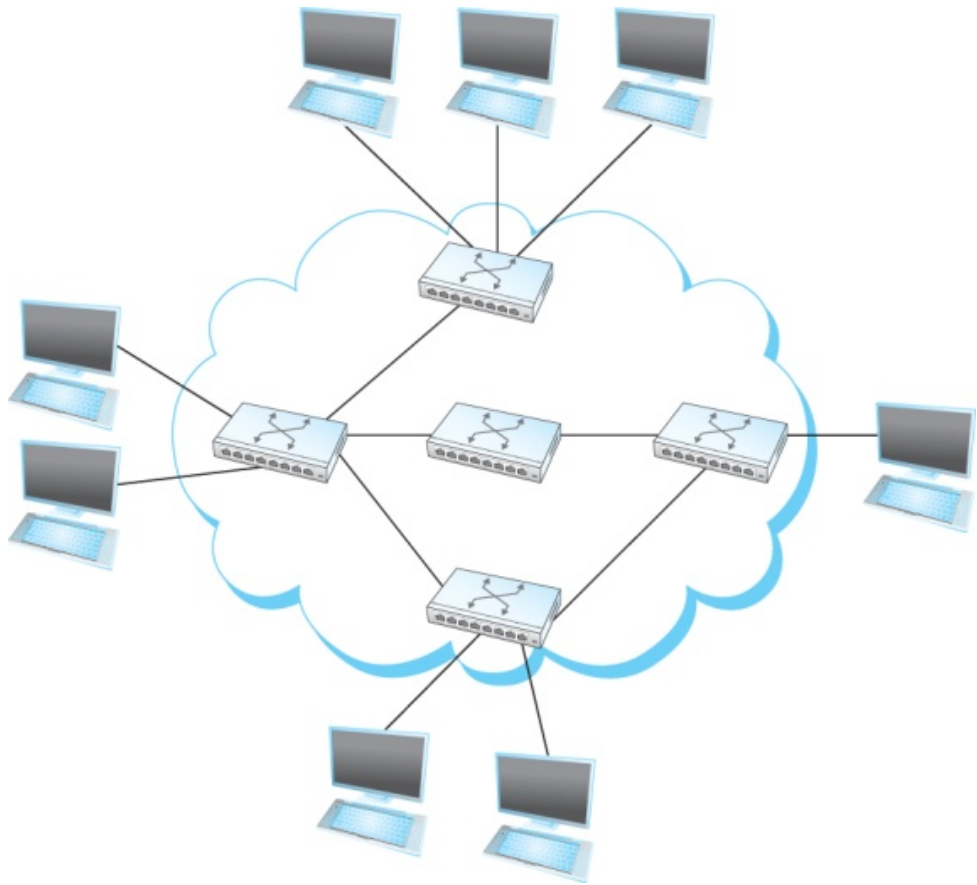
- My laptop with a browser = client
 - It requests a service
 - Email, chat, video, youtube
- A node running a program that serves the requests = server
 - Runs a service
 - Chat, video, messaging
- A node can both be a client and a server

Connectivity

- Point to Point
- Multiple access
- Wireless



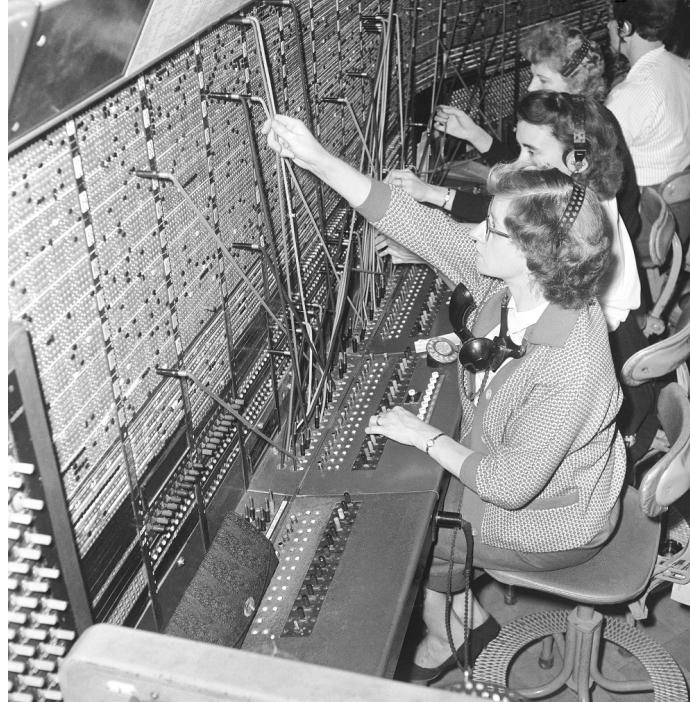
A Network and the Internet



Circuit Switching – Old telephone networks



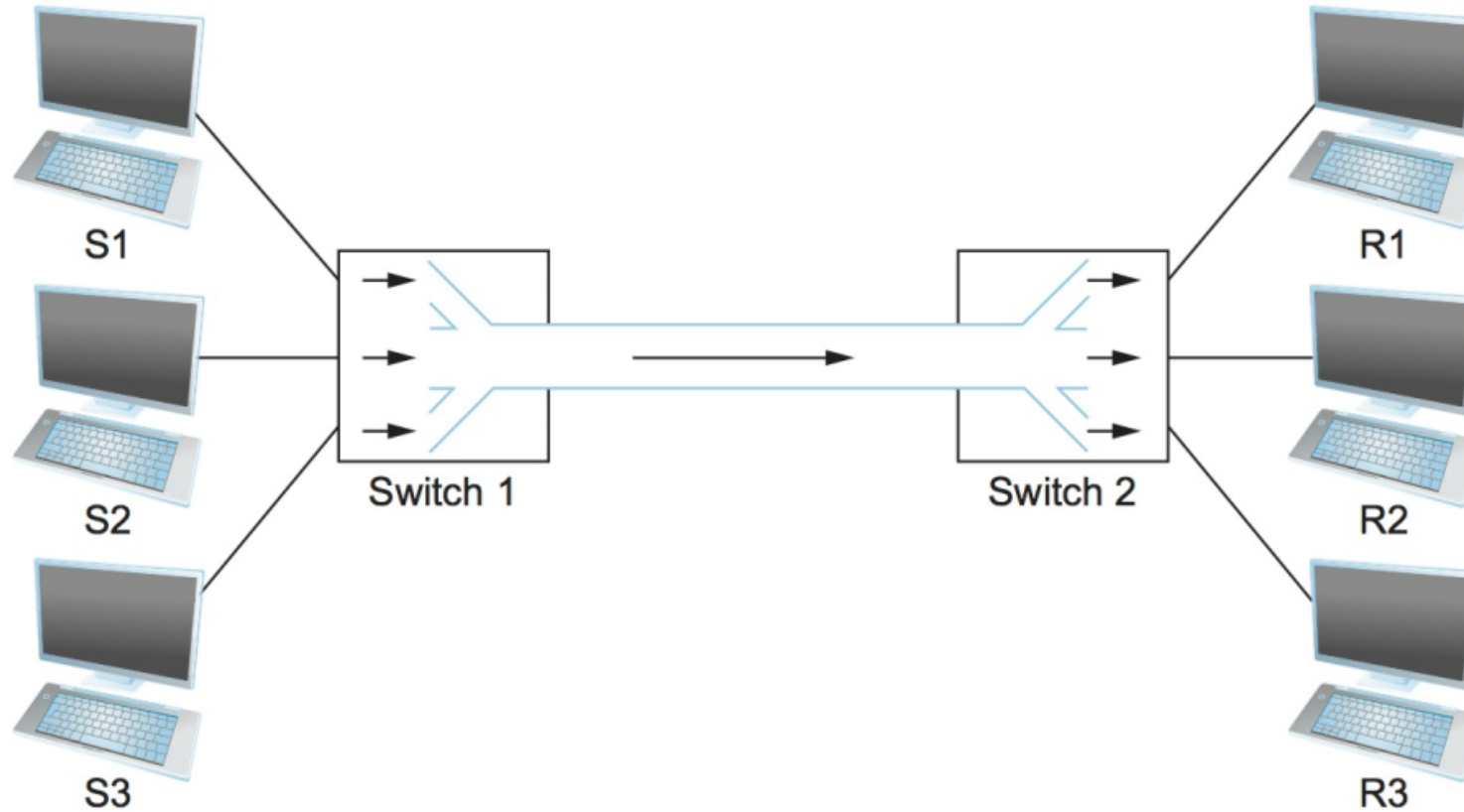
Operator, get me
the navy



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

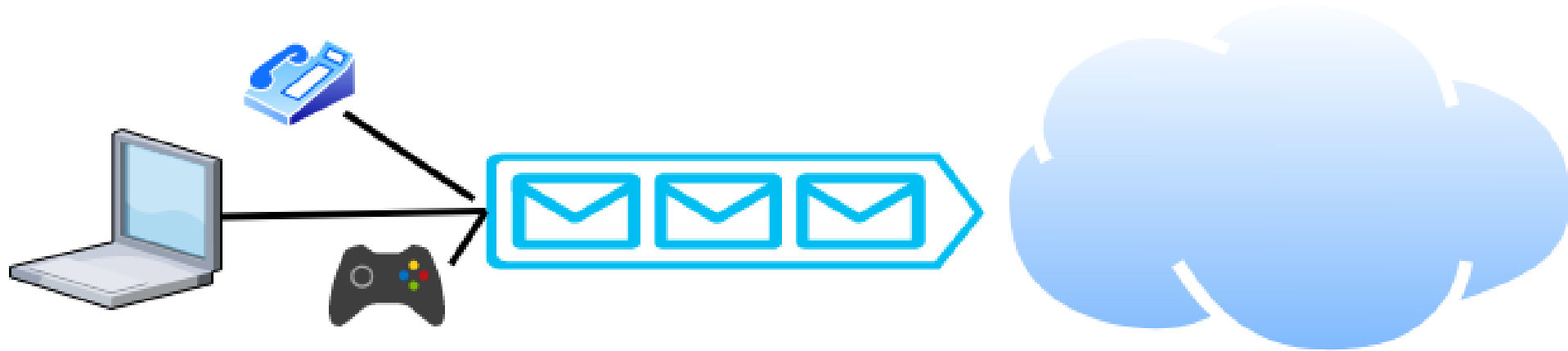
Why change?

Circuit Switching – TDM and FDM



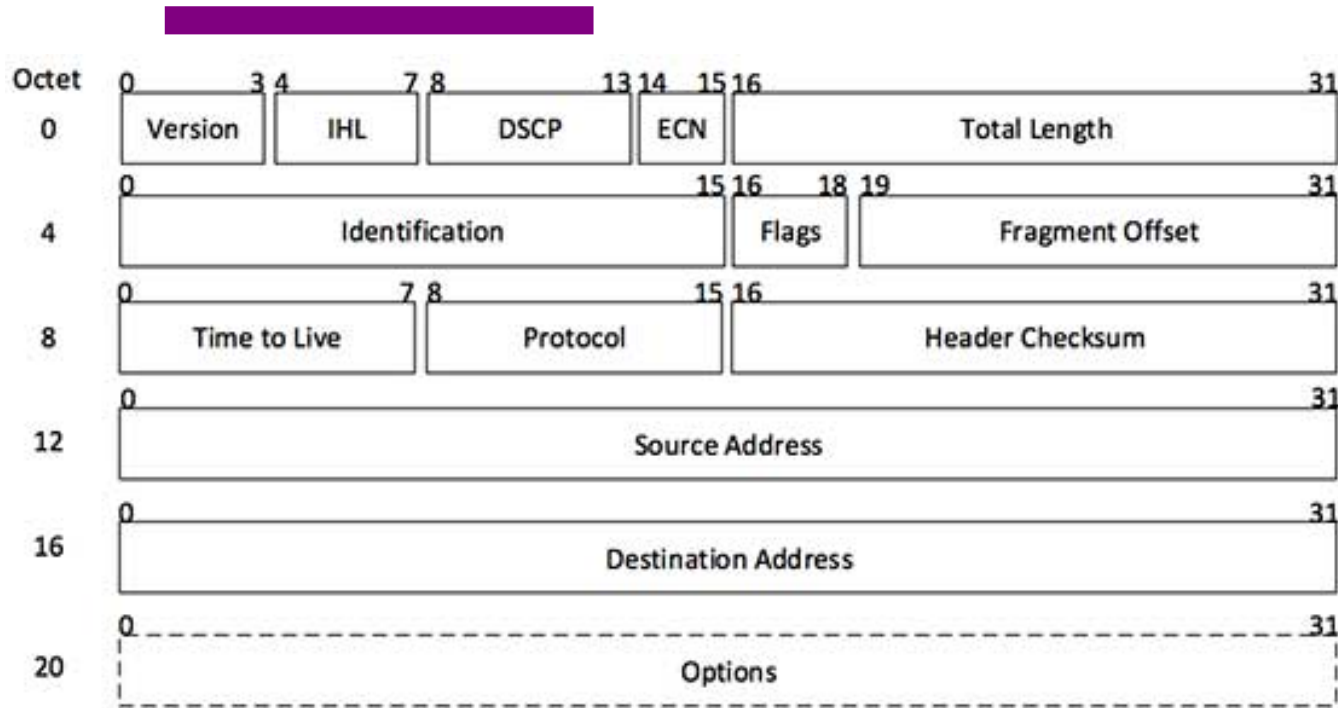
What are the problems?

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?

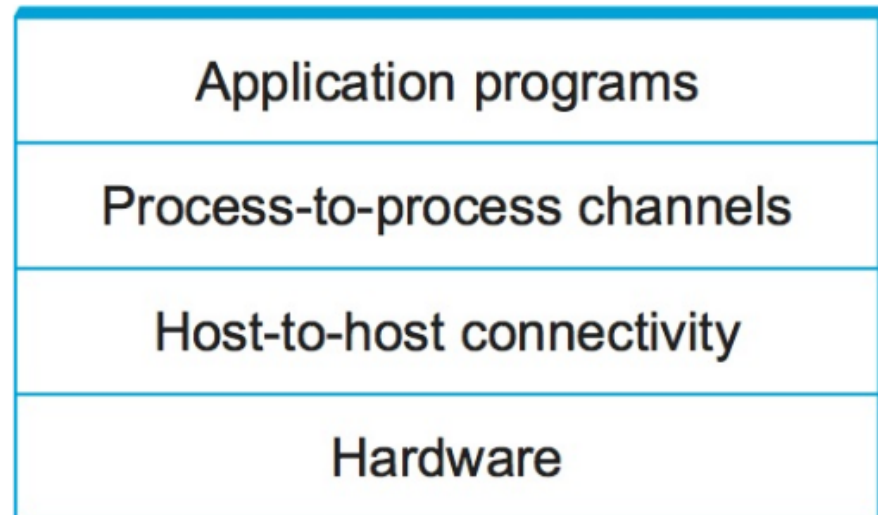


[Image: IP Header]

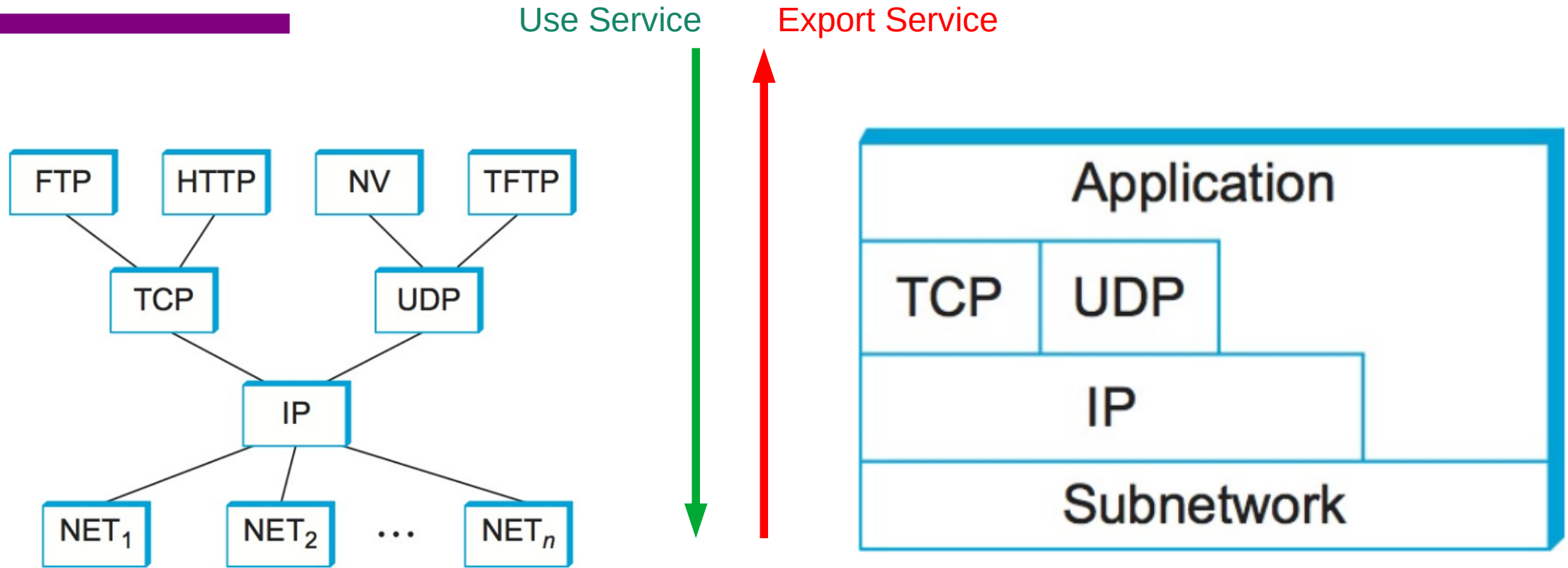
- Self-contained data unit
- Has two parts (generally)
 - Control information
 - Payload
- How do we transmit a dictionary?

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



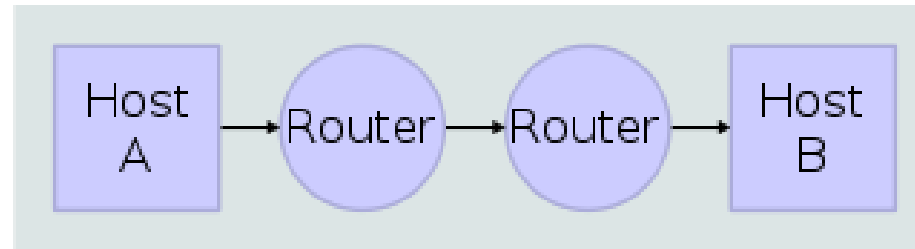
Network Layers



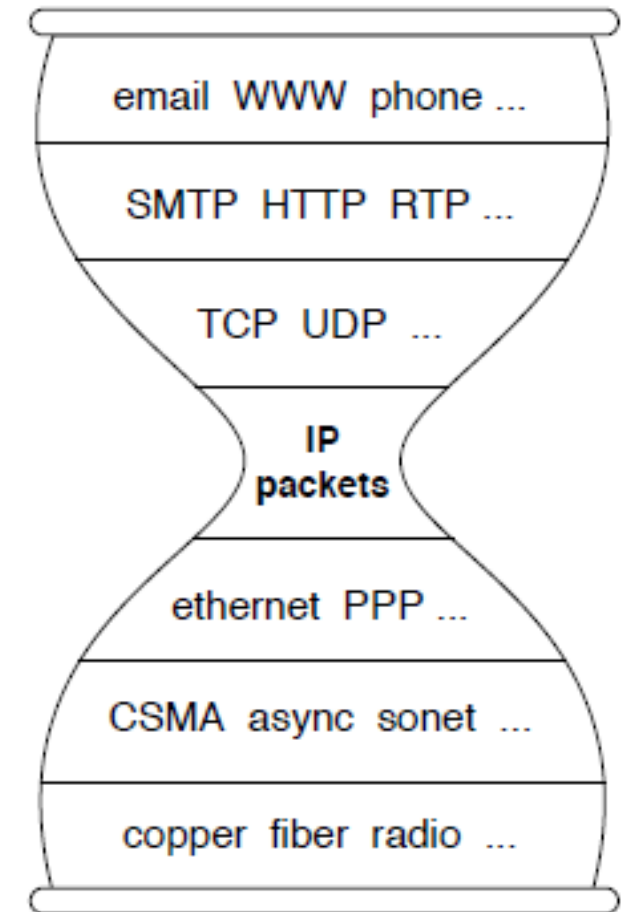
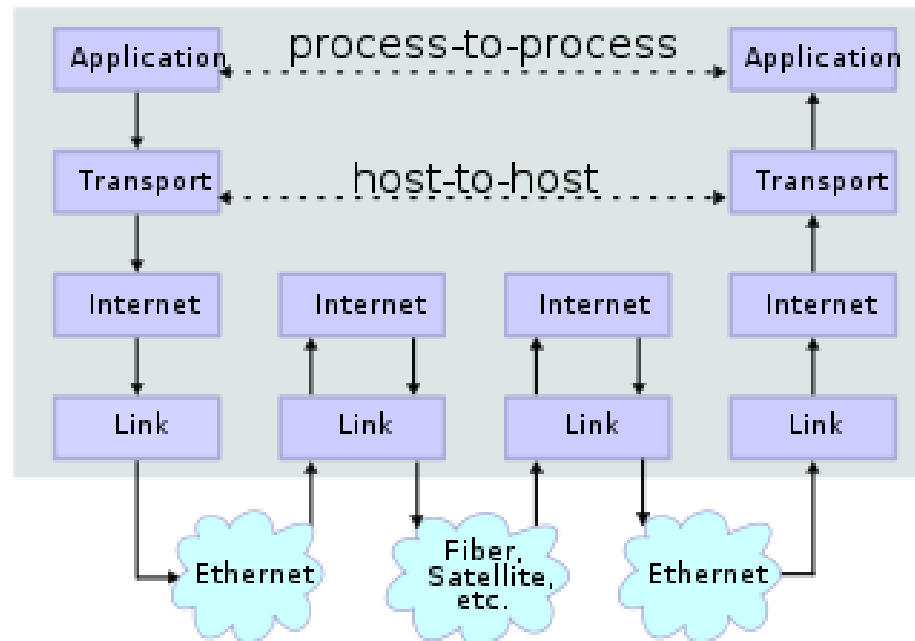
- Makes it easier to divide functionality
- Hides implementation details
- What else?

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

- Read Chapter 1
- Homework 1 has posted – due on next Monday – 09/02
 - Substantial hands-on component, start ASAP
- Project 1 has posted – due on 09/15
- Next lecture – Network performance basics