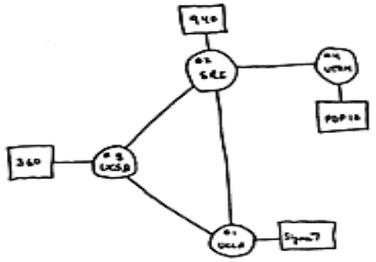
CS144 Course Intro (Spring 2023)

Keith Winstein

Wireless Communications: 1964

Four nodes connected (UCLA, SRI, UCSB, Utah)



"*A network to survive nuclear attack*."

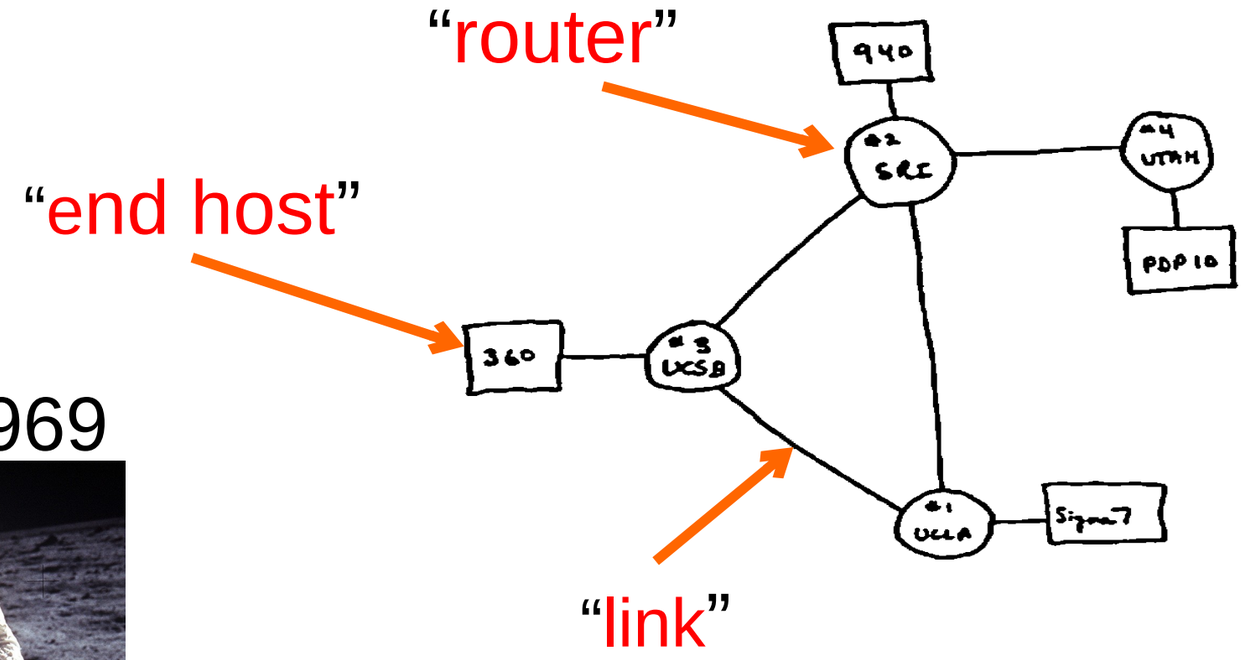
Paul Baran

US Government starts "ARPANET" project

1st network connects two computers

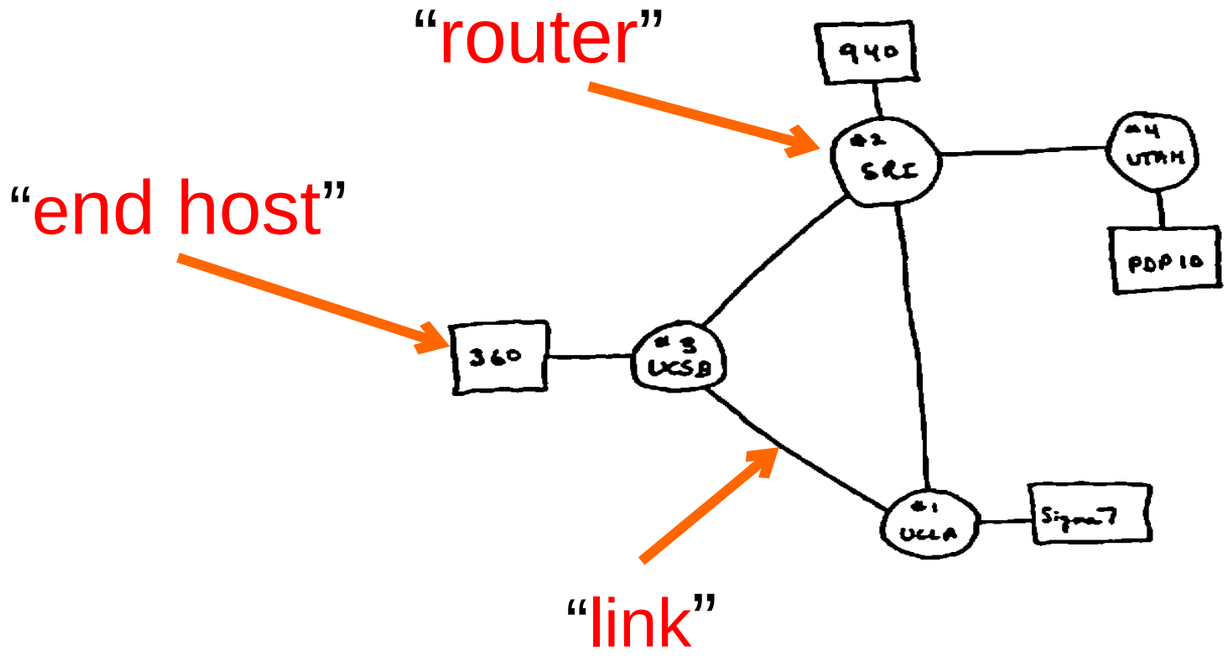
1964 1965 1966 1968 1969

The Internet in 1969



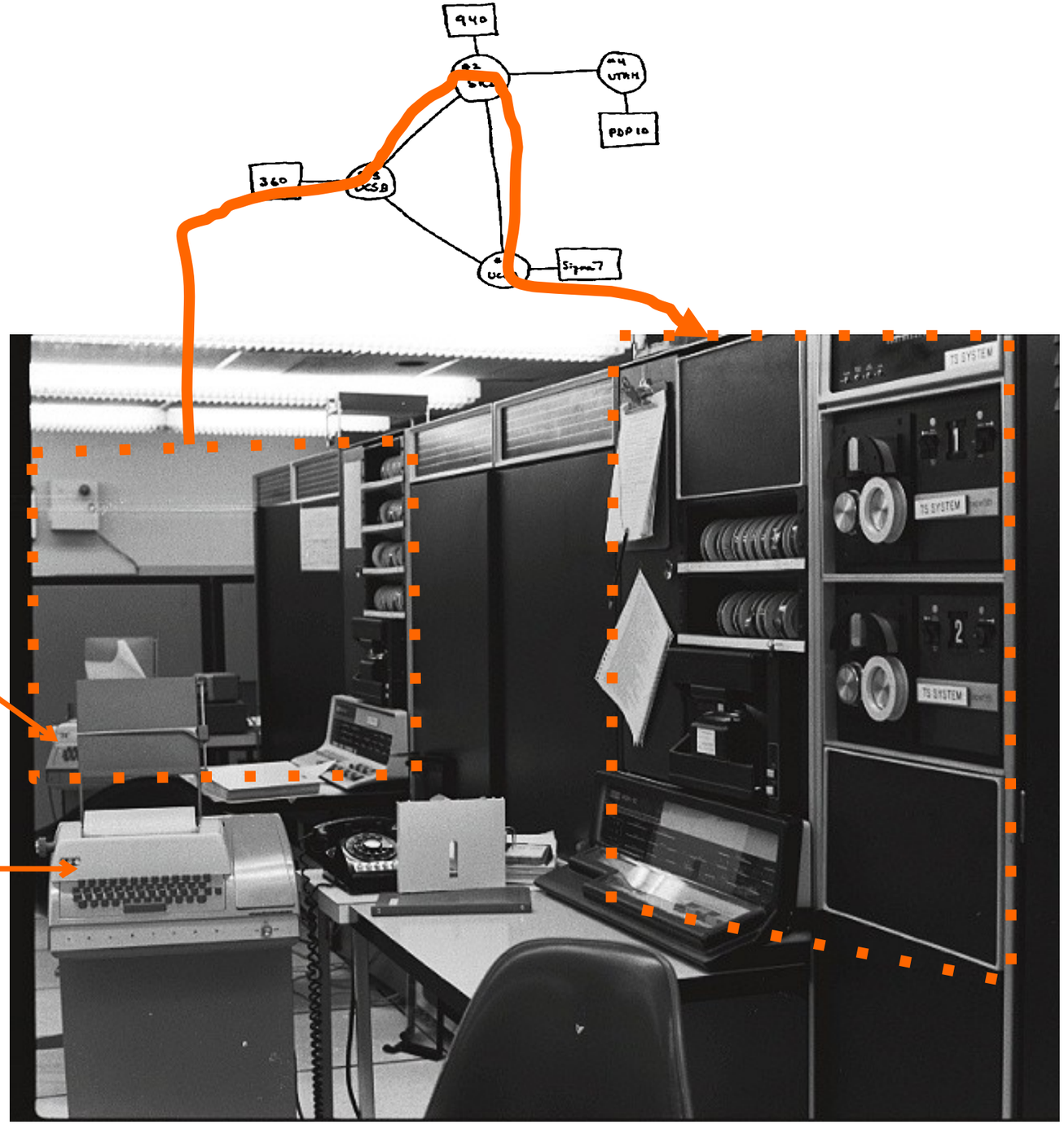
Also in 1969

What did they use it for?



1. Sending files between scientists: “*Here is a big file of astronomy data!*”
2. Email: “*Where shall we have lunch today?*”
3. Remote login to another computer.

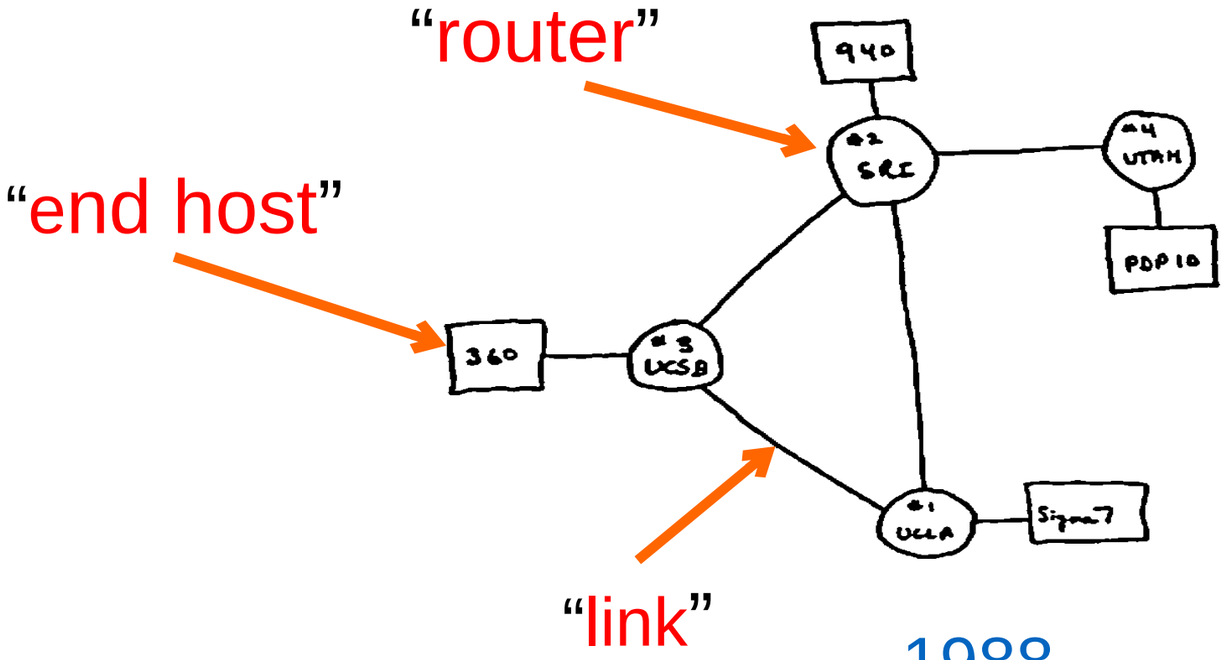
1971



First email typed here

“QWERTYUIOP”

…and printed here



1969

4 “end hosts”

1988

10,000 “end hosts”

1993

1,000,000 “end hosts”

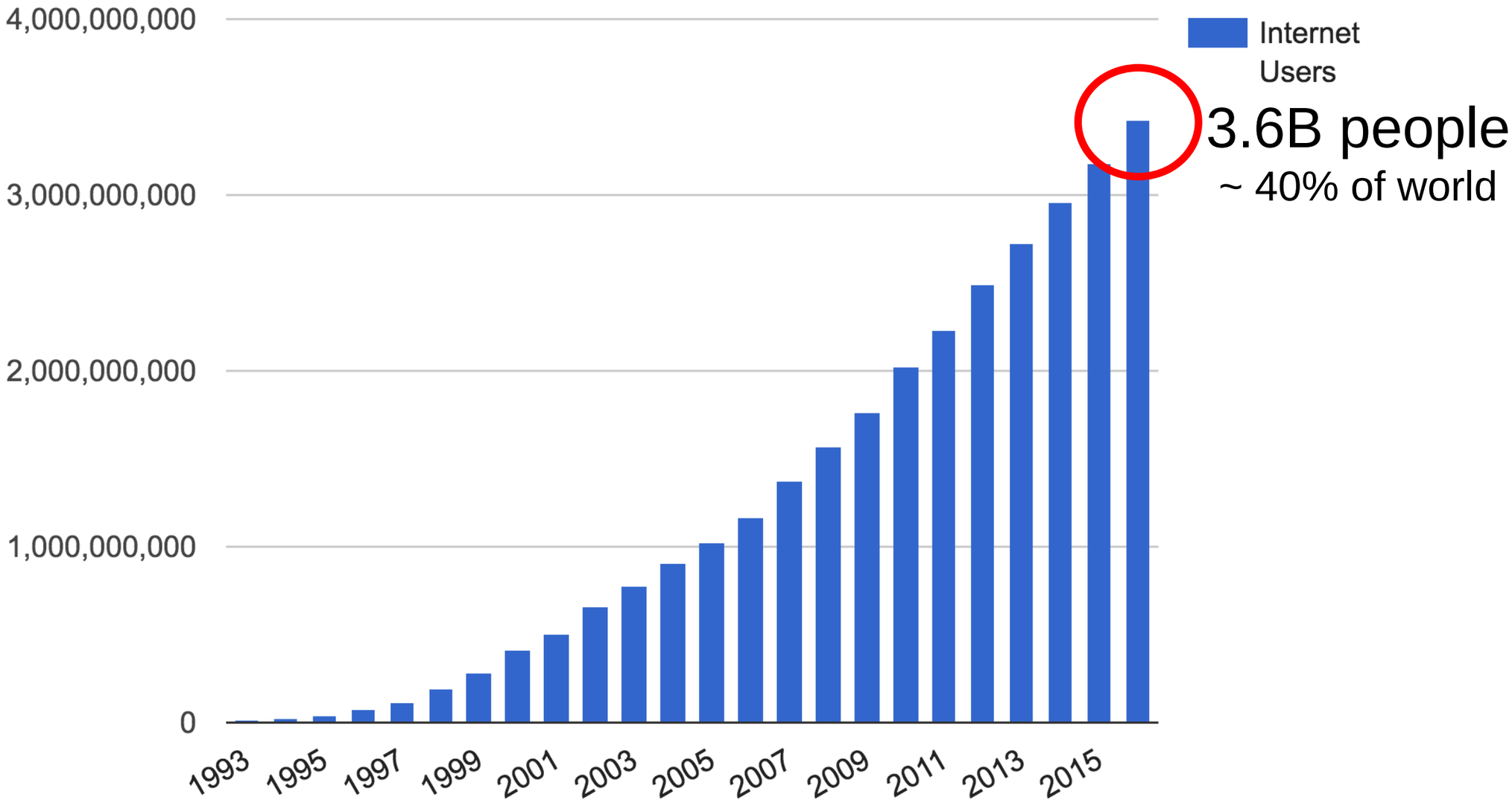
Network Systems: 1984

Then in 1993 something
even BIGGER happened!!!

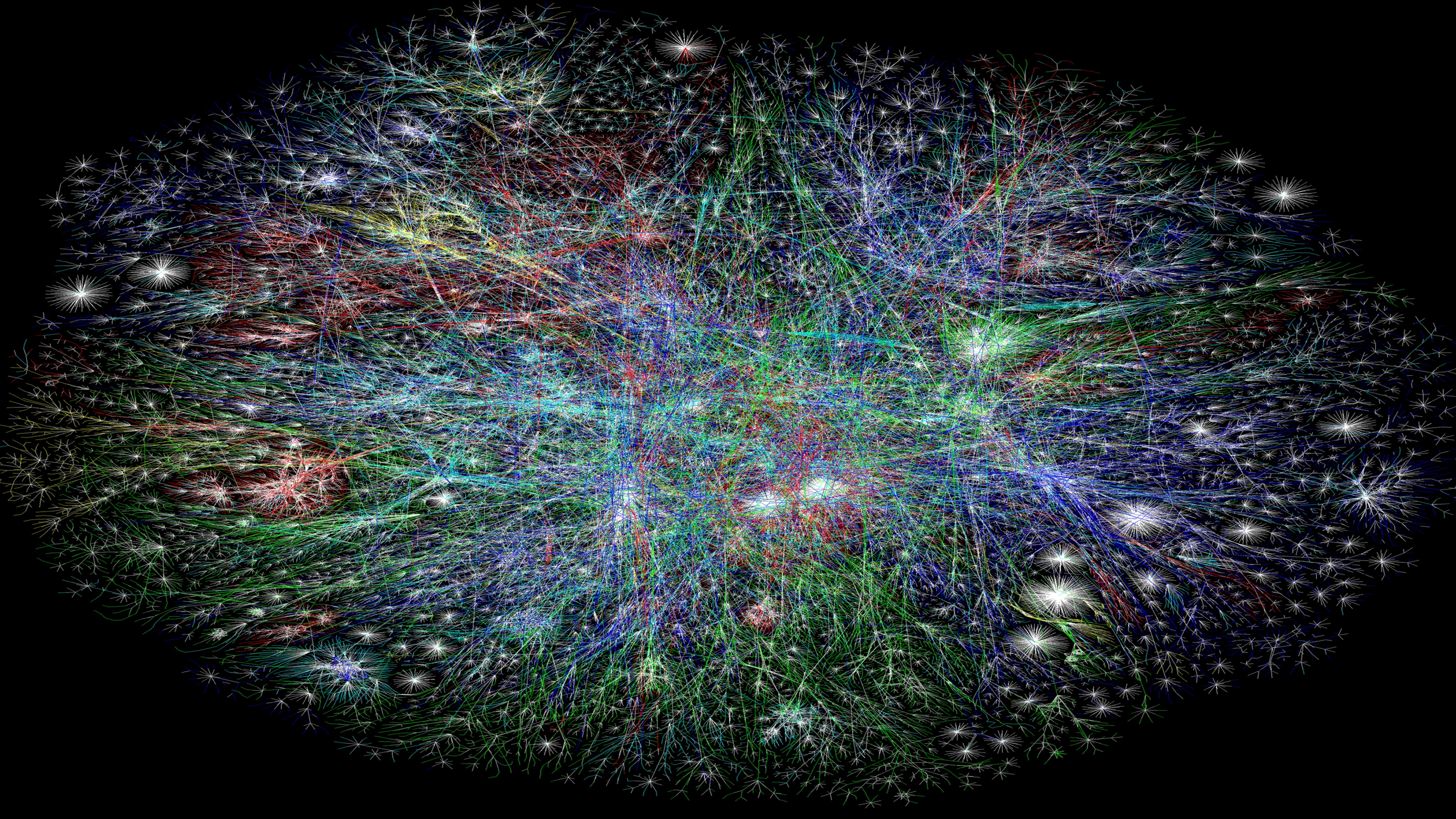
1993: The first web browser (Mosaic)

Marc Andreessen

The number of Internet users in the world



Source: http://www.internetlivestats.com/



How does it all work?

Why was it designed this way?

CS144

Isn’t it really difficult….?

Goals

1. To learn how the Internet works.
2. To learn why the Internet was designed this way.
3. To learn how to use the Internet.
4. To build some significant pieces of the Internet.
5. To learn the underlying principles and technologies of networking.

Class overview

CS144 is a fast-paced lab class.

Each week has THREE lectures and TWO lab sessions.

11:30-12:20 p.m. (Please no distracting laptop usage!)

The is divided into week-long units, devoted to a particular topic.

e.g. the 1st week is about Basic Principles, then (2) Transport, (3) Packet Switching, (4) Congestion Control, (5) Routing, (6) Lower Layers, (7) Applications, ...

There is ONE BIG LAB ASSIGNMENT (“you build most of the Internet”) with 8 “checkpoints,” #0 through #7.

Laptops

- We discourage laptop use in class, especially use that will distract others behind you.
- Except for specific in-class exercises (we will ask you to bring your laptop).

How we calculate your grade

1. Participation/lecture 15%
   - Helping others on Ed or in the lab sessions
   - In-lecture exercises and occasional quizzes
   - Good questions in lecture

2. The lab 45%
   - Correctness (as of end of class): 36%
   - Checkpoints 0-7 subjective grades: 9%

3. Quizzes & Exams 40%

   Midterm (Nov. 3): 20% (~50mins, in-class)

   Final: 20% (~120mins, in scheduled slot)

   Q: “What does it take to earn an A?”

Exam Policy

Exams are closed-book, closed-note, closed-laptop etc.

But you may bring 2 double-sided sheets of 8.5” x 11” paper of your own design to the Midterm and Final.

COVID

This quarter may ~~suck~~ present lousy circumstances. :-(

My job is to help you learn. I really want that to happen.

We’re going to have to react to curveballs and we will do our best.

If you have to quarantine, we will be there for you (online) to help you avoid falling behind.

Lab

- Programming is in modern C++
- CS110 is a prerequisite.
- You really want to go to the lab sessions

  … and have started the lab before you go.
- Late policy:
  - Final correctness deadline is end of term (but **don't wait**)
  - Checkpoint deadline each week (first one: next Tuesday)
  - To receive a subjective/style grade **and feedback**, need to submit checkpoint by deadline. This is for the CAs' sanity.
  - You can submit any checkpoint up to 2 days late, with subjective grade capped at 67%.

Win Certificates!!!

For each Lab:

1. Certificate for BEST submission,
2. Certificate for FIRST CORRECT submission.

Workload

- This is a 4-unit workload, which means a workload of about 12hrs/week
- Our estimate based on previous years
  1. Class time: 3hrs/week
  2. Labs: Avg 6hrs/week
     - *wide variance between checkpoints and between students*
     - *read the whole checkpoint BEFORE coding*
  3. Average overall ~12hrs/week

Contact

For anything non-private: **Ed**

If private: Private Ed posting, or
email cs144-staff@cs.stanford.edu

If it's personal (e.g. a medical emergency):
email Keith keithw@cs.stanford.edu

(If it's a mega-emergency, Keith's cell phone number is on his Web page.)

The Honor Code

- We take it seriously and we expect you to take it seriously too.
- Last year was a bad year with several CS144 students getting into a lot of trouble ㅗㅏ
- None of them had set out to cheat: At the last minute, they copied an assignment off the web, then tried to modify it. Or they colluded on an exam. It doesn’t work!
- We use special tools to compare solutions against current and previous years and solutions we find on the web.
- Please, let’s have a zero-violation year.

The Honor Code

Permitted Collaboration: The following items are encouraged and allowed at all times for all students in this class:

- Discussion of material covered during lecture, problem sessions, or in handouts
- Discussion of the requirements of an assignment
- Discussion of the use of tools or development environments
- Discussion of general approaches to solving problems
- Helping others at the lab session (**without** looking at code!)
- Discussion of general techniques of coding or debugging

The Honor Code

Unpermitted Collaboration: All submissions must represent **original, independent work**. Some examples of activities that do not represent original work include:

- Copying solutions from others or knowingly allowing others to copy your solution.
- Use of solutions posted to websites is prohibited.
- Placing your source code in a public repository where others can copy it is unpermitted collaboration.
- Debugging code for someone else.
- Collaborating on or discussing the online graded quizzes before you have completed them.

- *Honor code exercise: can you stump the teaching staff?*

What to do next

- Look around and get familiar with https://cs144.stanford.edu
- Start setting up your VM for Lab 0! It is due next Tuesday.
- See you tomorrow @ 5:30 p.m. at the lab session.

TCP/IP Header Formats in Lego