



COMP 150: Basics of Computer Organization

Week 03, Lecture 04



Agenda

1. Computers through history
2. The internet!
 - a. History
 - b. Functionality

Review: Computers through the years

Types:

- Purpose-built machines
- Mainframes
- Supercomputers
- PCs

Traits:

- Interface/Input
- Interconnect
- Compute
- Scale

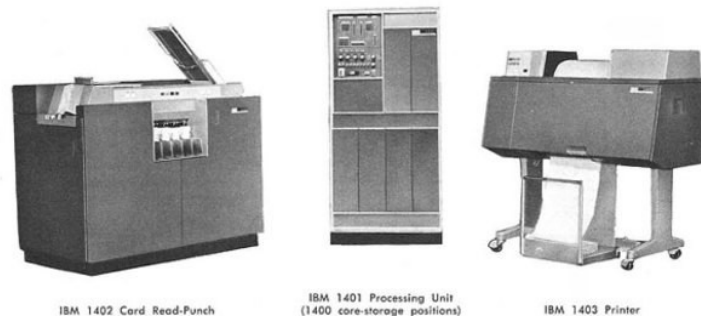
Review: Purpose-Built Machines

- Interface:
 - Manual
 - Users had to be engineers
- Interconnect:
 - Bespoke
- Compute
 - Vacuum tubes or early transistors
 - Not necessarily general-purpose
- Scale
 - Need more? Build another room.



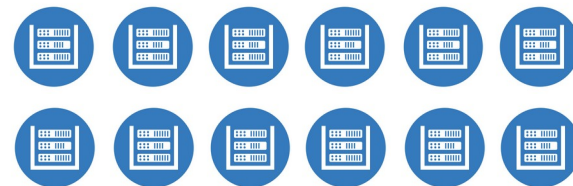
Review: Mainframes

- Interface:
 - Impression of single-user
 - In reality, the computer was shared
 - Allowed users to specialize/generalize
- Interconnect:
 - Terminals route “to the basement”
 - Modules connected together - depended on the specific system
- Compute
 - Shared!
- Scale
 - Wheel in another module, or buy another mainframe (and hire staff)



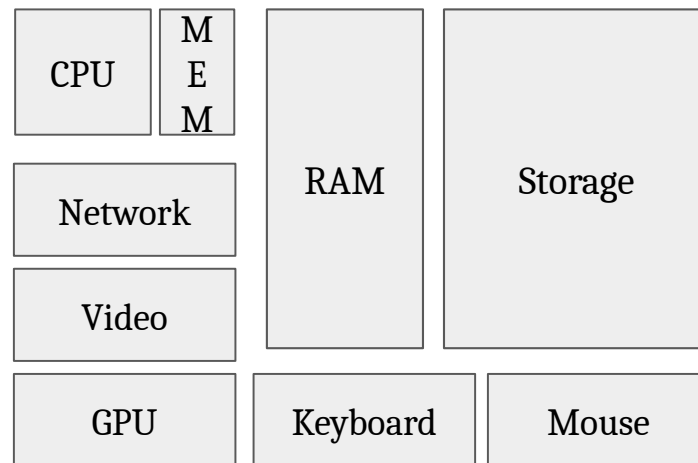
Review: Supercomputers

- Interface:
 - Depends on generation
 - In general, submit a “job”, wait, and get results
- Interconnect:
 - Generally, lots of individual computers networked together
- Compute
 - Lots of it
 - Some general-purpose, some more specific
- Scale
 - Add another row
 - Build the next one bigger/better/faster/stronger



Review: The PC

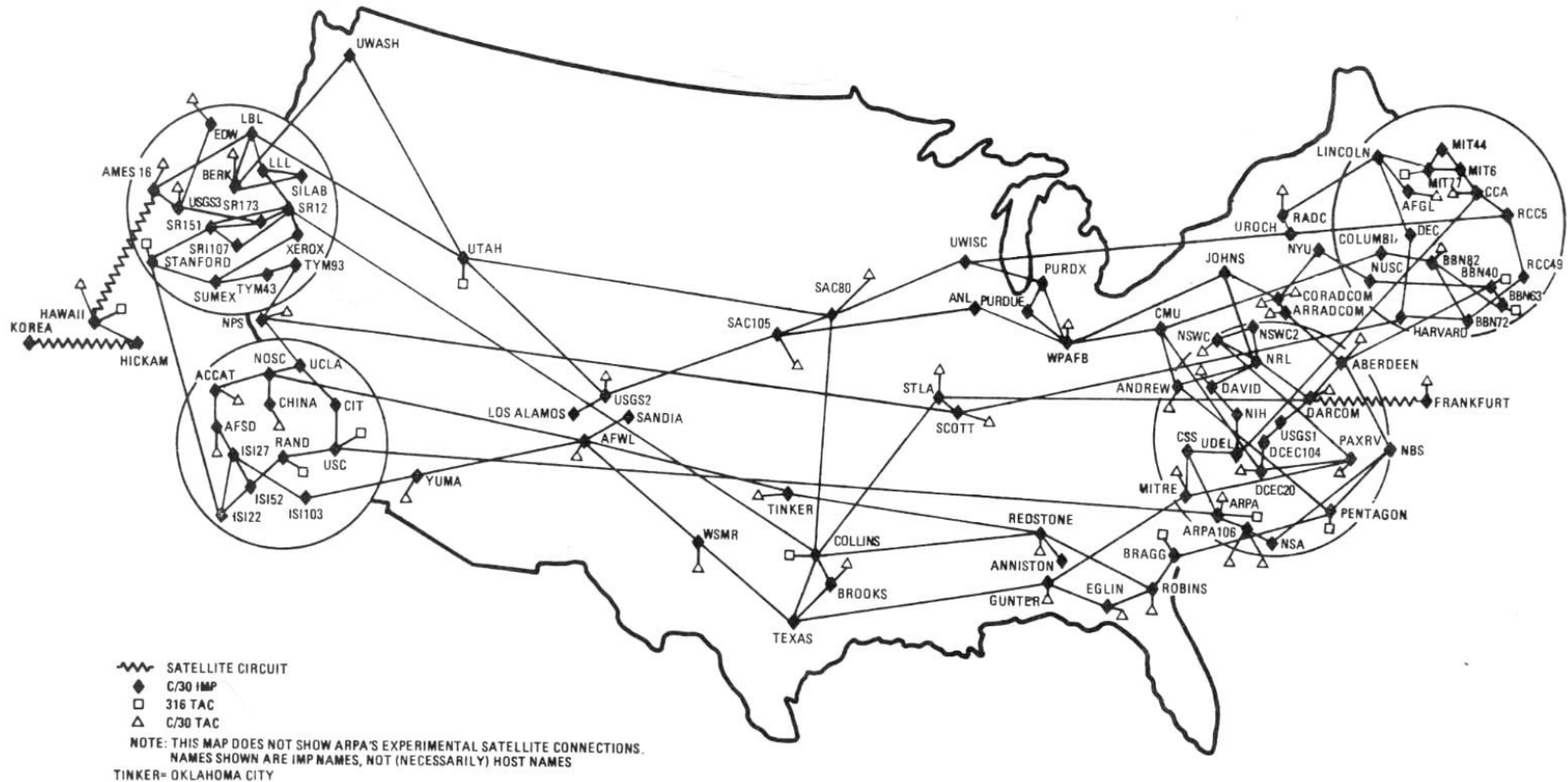
- Interface:
 - Devices (keyboard, mouse, etc)
- Interconnect:
 - Today: motherboard
 - Network - LAN, Internet
- Compute
 - General-purpose
- Scale
 - Upgrade



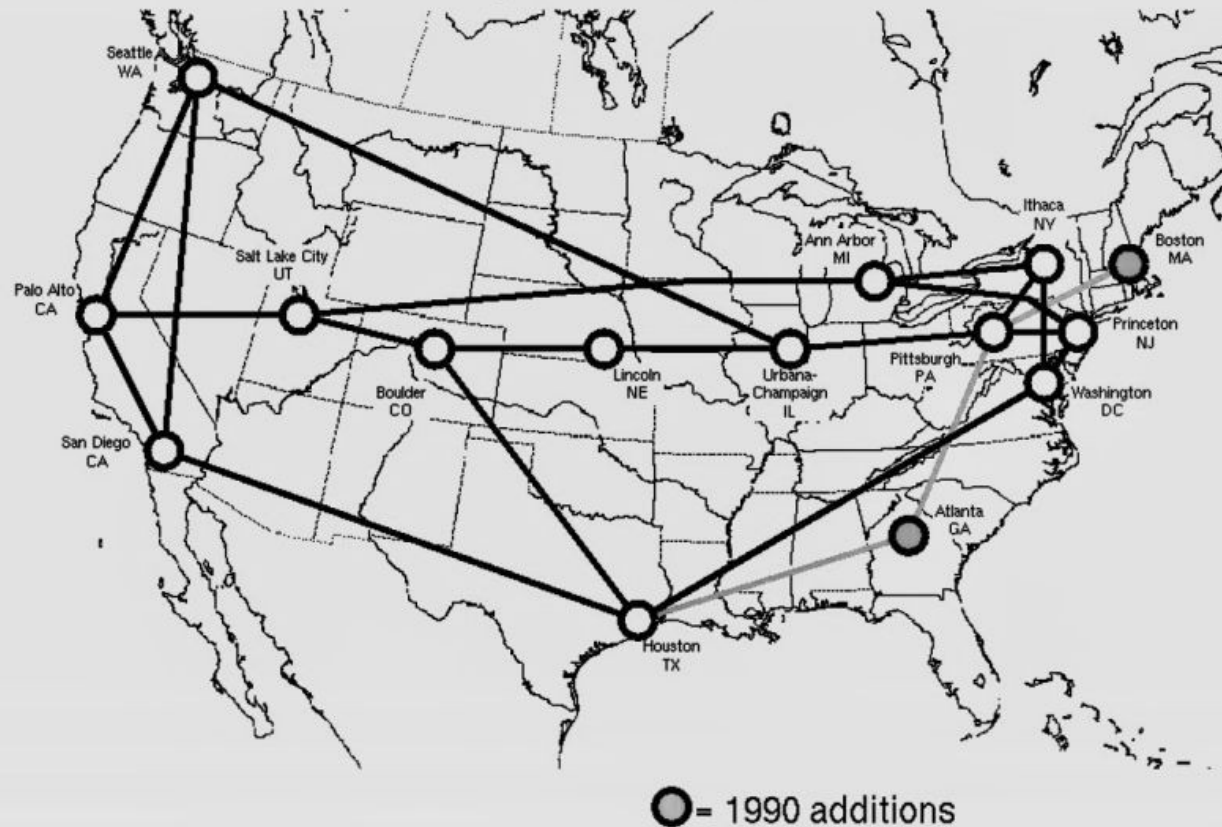
And now: The Internet!

- ARPANET: 1969
 - DoD ARPA
 - Idea of “packets” of information
 - Concept of a massive interconnect
 - Protocols emerge (and TCP/IP have stayed)
- NSFNET: 1986
 - National Science Foundation
 - Major arteries interconnect supercomputers across mainland USA
 - Internet Service Providers (ISPs) start up, offering inlets
- World Wide Web: 1989
 - CERN
 - Hypertext documents shared across a file-folder-like system
 - Optical cables laid across the ocean in 1990 enabled true global traffic
- Then: web was transport, local machines were workers
- Now: nearly *everything* is web-based

ARPANET/MILNET GEOGRAPHIC MAP, APRIL 1984

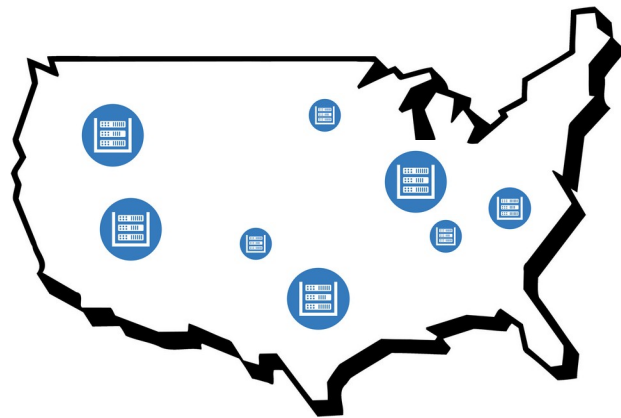


NSFNET Backbone network
IBM NSS nodes, 1.544 kbps (T1) topology
July 1989 - November 1992

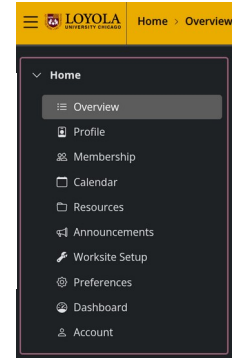
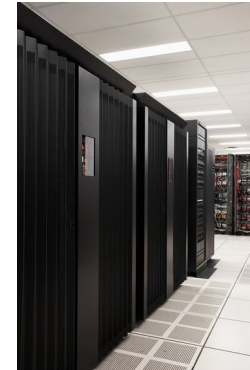


The Internet - WWW

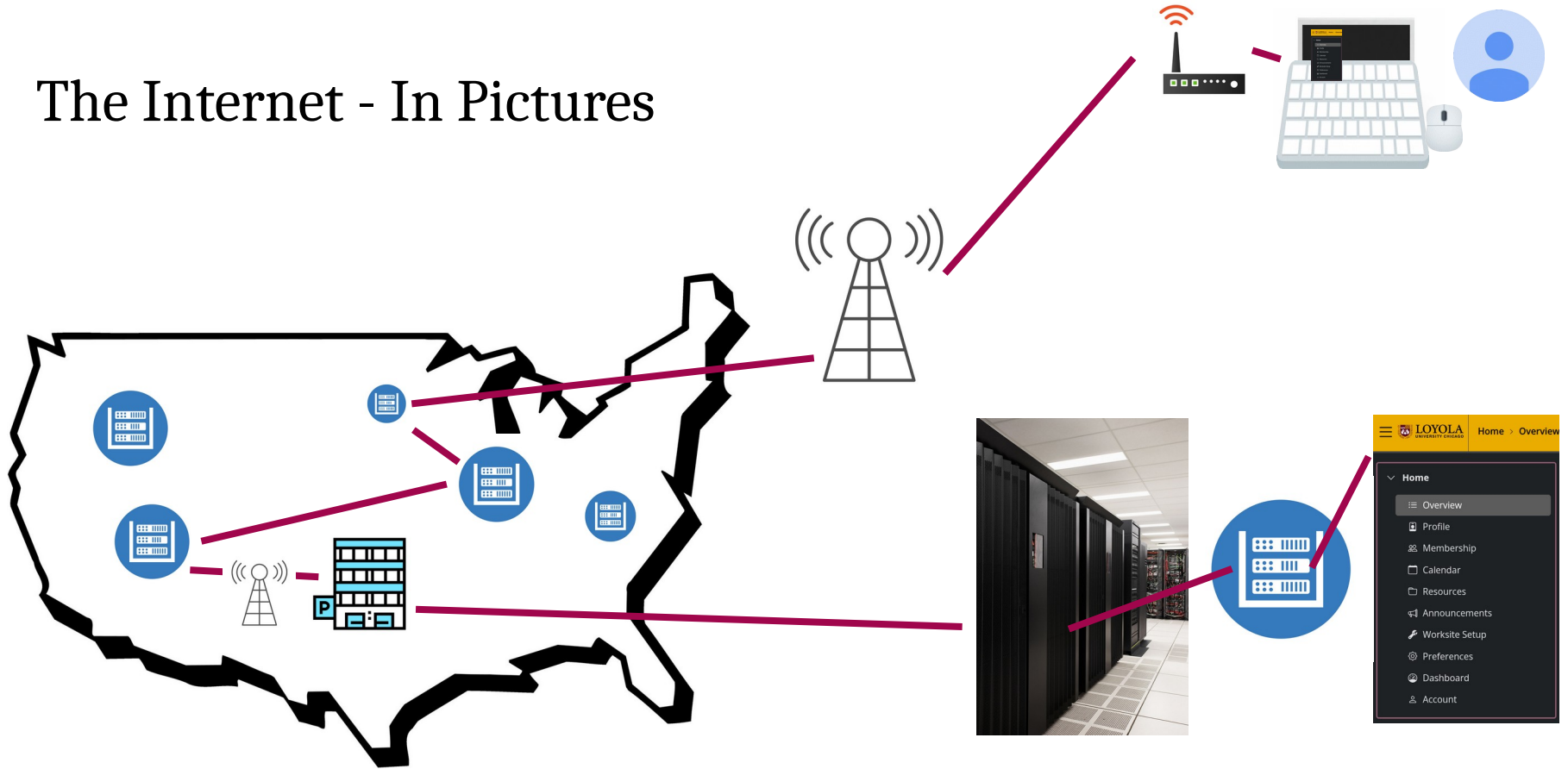
- Global (very)
- Project at CERN
- HTTP
 - Data format - basically a template
 - Made it easy to put up non-interactive “pages” on the internet for anyone to access
 - Link them together - like reference books
 - First website: <https://info.cern.ch/hypertext/WWW/TheProject.html>
- ISPs explode in popularity - tollway entries onto the road
- DNS (domain name servers) - navigation hubs
- Data gets formatted and sent in packets along connections



The Internet - In Pictures



The Internet - In Pictures



Links

- [Mainframes](#)
- [Transistors, through the years](#)
- [Vacuum tubes](#)
- [Early PCs](#)
- [Supercomputers through the years](#)
- [ARPANET](#)
- [NSFNET](#)
- [WWW](#)
- [Early websites](#)
- Internet protocols ([TCP IP](#), [HTTP](#))