CP 476
Internet Computing

Instructor: Masoomeh Rudafshani

Instructor Information

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Agenda

Course overview

Syllabus

The Internet

Course Information

Class Schedule	MWF 1:30 p.m. - 2:20 p.m.
Class Location	Bricker Academic Building BA208
Pre-requisites	CP 363: Database I CP 372: Computer Networks CP 364/ PC 364: Data Communications and Networks

What this course is about?

- Career growth/Job search
- An overview of how the internet works
  - Traditional internet applications/WWW
- Front-end development languages and frameworks
  - HTML5/CSS3/JavaScript/JQuery
  - Ajax/Rich Internet Application/Interactive web applications
- Server side development languages and framework
  - PHP/MySQL/Java Server Pages
- Web Services
- Security
- Cloud computing, peer-to-peer computing
- Building a fully functional web application (project)

Why these technologies are chosen?

Popularity of technologies

JQuery: the most popular JavaScript library

Background courses

PHP: server-side programming

Java Framework

Course Resources

- Course Website:
  - https://hopper.wlu.ca/~mrudafshani/cp476/
- Course page on MyLearningSpace
- Server and software to host your web page
  - hopper.wlu.ca
  - Development Environment

How the class is run

- Traditional Lectures
- Quizz
- Active learning
  - You get to do some problem solving in class (in groups of two or three)
  - You will be marked based on your work
    - It contributes towards your class participation mark
- Bring your laptop to each class
  - Fully charged laptop
  - If you don’t have a laptop come and see me.
  - Portable power outlet

Syllabus

- Assignment
  - Late assignment policy
  - Request for extension without penalty must be made in writing in advance of the assignment due date.
    - Valid medical document
    - personal/family emergency: with proof whenever possible
- You are responsible for your files
  - Losing files (computer/disk failures, printer problems, etc. are not valid reasons
- Project
  - Three phases, Github ,Team evaluation
- Course evaluation
  - Course passing requirement

Internet Architecture

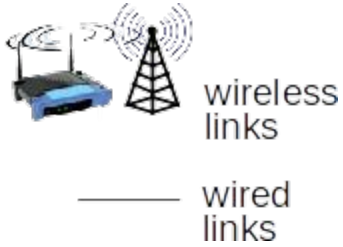
Learning Objective

To understand

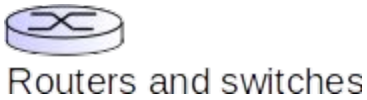
- What the Internet is?
- What it does?
- How it works?
- How it was designed?
- How it was implemented?

Internet Architecture

- Billions of connected computing devices:
  - Hosts = end systems running network apps



  - Communication links:
    - Fiber, copper, radio, satellite



  - Forwarding packets

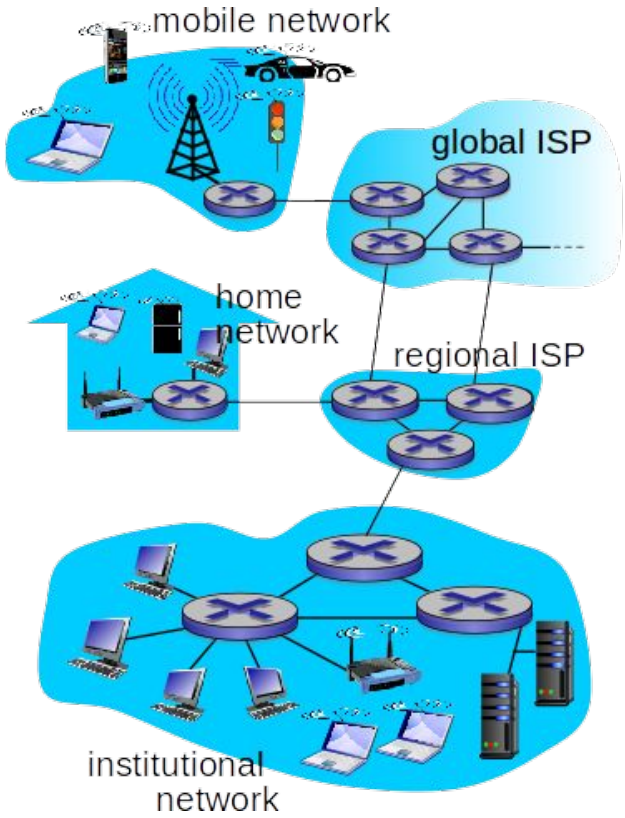


image taken from: Computer Networks: A top d
approach

Internet Architecture

- Network of Networks
- Communication is done through a set of protocols
- Client-server architecture

Internet of things

Toaster

Nest system

TV

Refrigerator

History of the Internet

- ARPAnet - late 1960s and early 1970s
  - Advanced Research Project Agency Network
    - a US defense department project
    - Used for connecting scientist and engineer to share information

The ARPANET in December 1969

Taken from https://www.vox.com/a/internet-maps

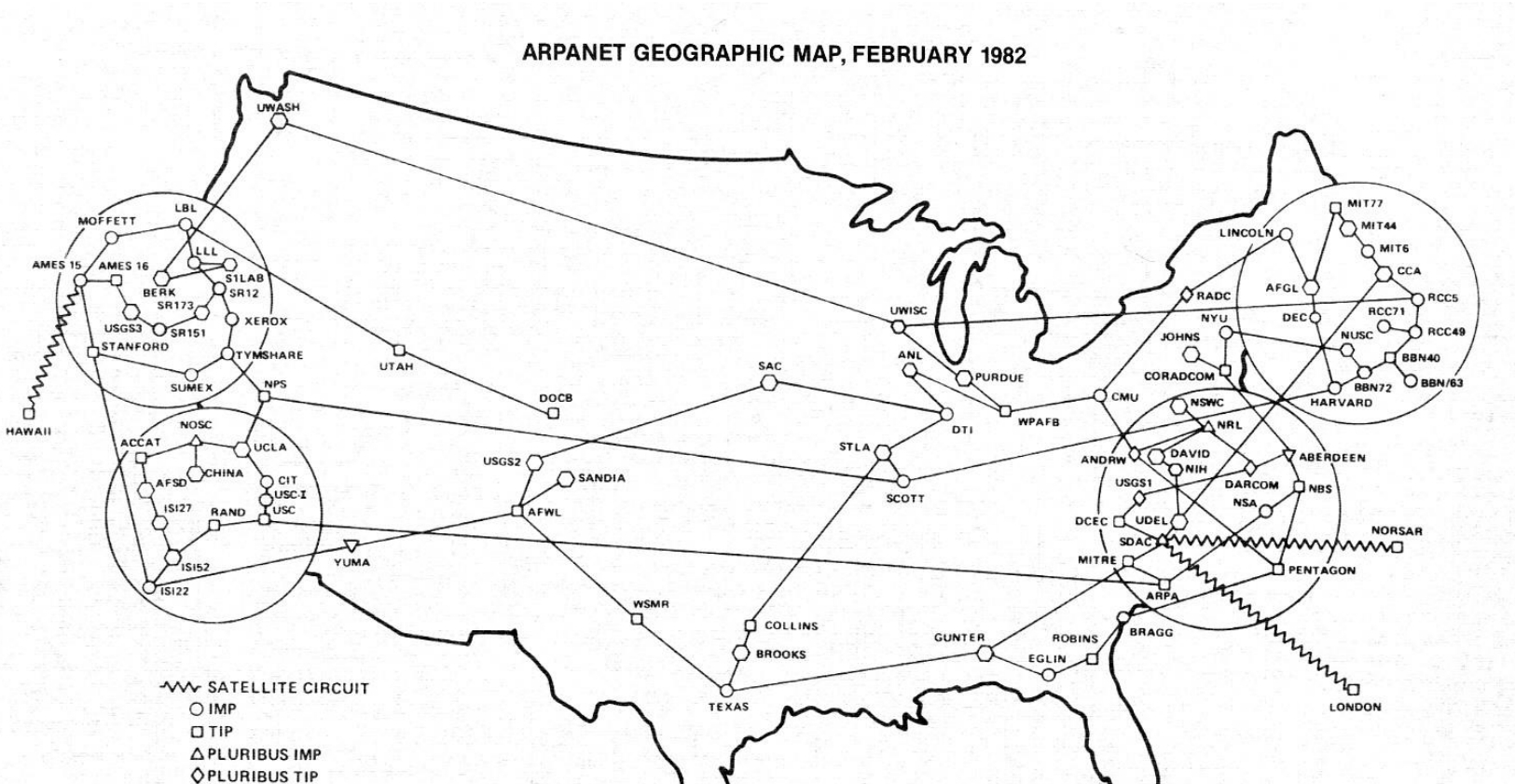
History of the Internet

- ARPAnet - late 1960s and early 1970s
  - Advanced Research Project Agency Network
    - a US defense department project
    - Used for connecting scientist and engineer to share information
  - Packet-switching innovation:
    - Breaks data into small packets so they can be transmitted efficiently across the network
    - Allowing more efficient use of expensive computing resources

History of the Internet

- ARPAnet - late 1960s and early 1970s
  - Applications:
    - Telnet
    - Email
      - invented in 1971 by an engineer named Ray Tomlinson, who also invented the use of the "@" symbol in email addresses.
    - FTP: File Transfer Protocol, which is still used today, allowed ARPANET users to send files to each other.
    - Usenet
      - A new bulletin board
      - Organized by topic
      - Allowing users to swap programming tips, recipes

ARPANET Grows (1982)



History of the Internet

BITnet, CSnet - late 1970s & early 1980s

- email and file transfer for other institutions

1984: ARPANET becomes Internet

- ARPANET switched to using TCP/IP
  - Birth of the modern internet
  - Didn’t make much difference from a user perspective
  - Applications like email and telnet worked about the same as they had before
- Different networks could easily connect to each other by following TCP/IP protocol

NSFnet: The first internet backbone

- NSFnet - 1986
  - National Science Network Funded the project
  - A TCP/IP based network
  - Initially connected five supercomputer centers
  - Originally researchers across country could use them
    - for non-DOD funded places
- By 1990, it had replaced ARPAnet for non-military uses
- Soon became the network for all (by the early 1990s)

What Internet does?

- Traditional Internet applications
- Electronic mail (email)
  - File transfer (FTP)
  - Remote log in (login, ssh) –
  - Usenet: News group
- Modern Internet applications
  - WWW mark as web 1.0
  - IP Phone, IPTV, P2P applications
  - Social networks, facebook, Wiki, Twitter mark as Web 2.0
  - Internet of Things
  - You name it

Who manages the internet?

- Internet Corporation for Assigned Names and numbers (ICANN)
  - Non-profit organization
  - decides top-level domain names and numbers
  - Internet protocols address spaces for IPV4 and IPV6
  - Google.ca, google.com, .gov (government websites in US)
- Internet Engineering Task Force (IETF): Internet protocol standards
  - Develops and promotes voluntary internet standard, e.g. TCP/IP

- World Wide Web Consortium (W3C): web standards
  - International organization