

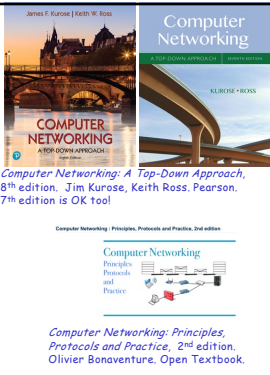
CS 655

Computer Networks

Abraham Matta
Computer Science
Boston University

Chapter 1

Introduction



Computer Networking: A Top-Down Approach, 8th edition, Jim Kurose, Keith Ross, Pearson. 7th edition is OK too!

Computer Networking: Principles, Protocols and Practice, 2nd edition

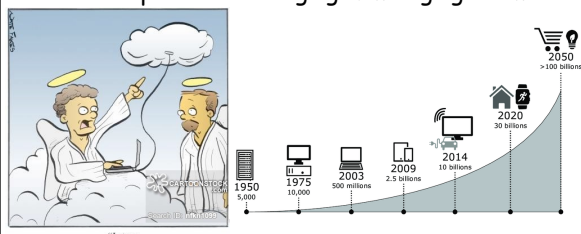
Computer Networking: Principles, Protocols and Practice, 2nd edition, Olivier Bonaventure, Open Textbook.

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Why is the subject important?

- Networks of processes are ubiquitous
 - To support a myriad of distributed applications
- They are getting larger and more complex
- Need experts in leveraging & managing them







"I store all my data in the cloud."

1950 5,000
1975 10,000
2003 500 millions
2009 2.5 billions
2014 10 billions
2020 30 billions
2050 > 100 billions

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OCCUPATION	JOB SUMMARY	ENTRY-LEVEL EDUCATION	2023 MEDIAN PAY
 Computer Network Architects	Computer network architects design and build data communication networks, including local area networks (LANs), wide area networks (WANs), and Intranets.	Bachelor's degree	\$120,520
 Network and Computer Systems Administrators	Network and computer systems administrators are responsible for the day-to-day operation of computer networks.	Bachelor's degree	\$80,600
 Computer Systems Analysts	Computer systems analysts study an organization's current computer systems and design ways to improve efficiency.	Bachelor's degree	\$99,270
 Computer and Information Research Scientists	Computer and information research scientists design innovative uses for new and existing computing technology.	Master's degree	\$131,490

<http://www.bls.gov/ooh/computer-and-information-technology/>

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Syllabus



- Available on
 - https://piazza.com/bu/fall2022/grscs655/home
 - Submissions (other than code) and grades on Gradescope: https://www.gradescope.com/courses/437717 (code: J366GE)
 - Code submission using gsubmit on csa{1,2,3}.bu.edu machines
- Basic prerequisites
 - strong programming & basic algorithms (CS 112)
 - basic architecture & OS (CS 210)
 - simple math (algebra & basic statistics)
- TFs: Lei Huang & Tianyi Chen
- Make sure you're registered to one of the discussion sections
- Grading
 - 2 exams
 - Assignments
 - 3 hrs (paper-and-pencil + hands-on)
 - 2 programming
 - 1 mini team project



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Hands-on Labs

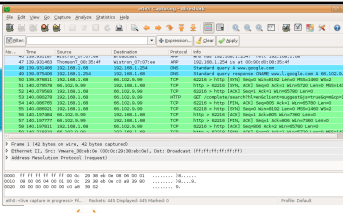




NETWORK PROGRAMMING

browser → web page

HTTP protocol

reliable virtual connection (TCP)





WELCOME TO GENI

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- Information for GENI experimenters
- Published research that used GENI resources
- Get help using GENI

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We're a stone's throw away from where many "networking" firsts originated ...

- First optical (light) "one-if-by-land-and-two-if-by-sea" signals
 - Used to signal that the British are coming in 1775
- First telegraph (Morse code)
 - Used in Boston for reporting fires in 1852
- First transatlantic radio message
 - From Nova Scotia to England in 1902
- First switches and email message
 - at BBN in 1967-1972



Paul Revere

S O S



Guglielmo Marconi

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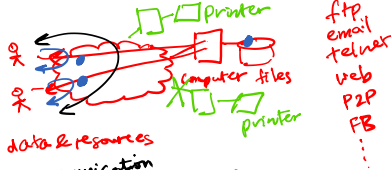
Expectations

- ❑ This class **IS** about...
 - ▣ Concepts, Principles, and Protocols
 - ▣ General-Purpose Computer Networks
 - ▣ Internet Perspective
 - ▣ Network Software
 - ▣ Designing, Building, and Evaluating a System
- ❑ This class **IS NOT** about...
 - ▣ Specialized networks (e.g., CATV, telephone)
 - ▣ ISO/OSI Perspective
 - ▣ Network Hardware
 - ▣ Advanced Theoretical Analysis

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Why Build a Computer Network?

- 
- 1) share data & resources
 - 2) improve communication
 - 3) improve availability & reliability
- CDN (Content Distribution Net)

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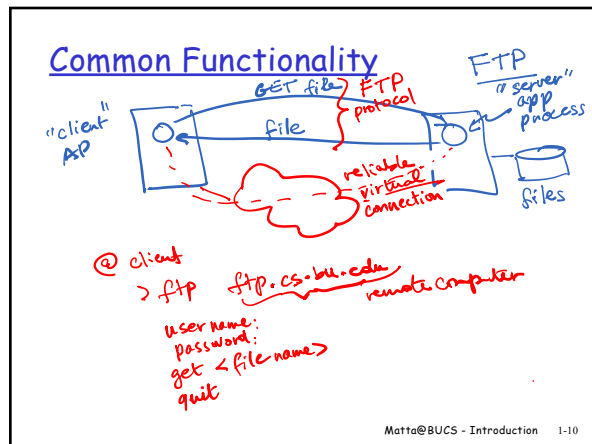
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Why Build a Computer Network?

- ❑ To support distributed applications (e.g., FTP, WWW, ...)
- ❑ Most functionality in software
- ❑ General-purpose computers
- ❑ New functionality easily added ``inside'' the network (e.g., CDN=Content Distribution Net)
- ❑ Computers are increasingly faster

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