

Computer Network Applications

(29:623:375:01)
Fall 2008

Instructor: Dr. Hui Xiong
<http://datamining.rutgers.edu>

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Ask for Help

• *Instructor: Dr. Hui Xiong*

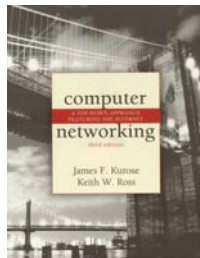
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Required Text Book



Computer Networking: A Top Down Approach Featuring the Internet, 3rd edition.
Jim Kurose, Keith Ross
Addison-Wesley, July 2004.

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Why this book?

• **A Top-Down Approach**

1. Emphasis on the application layer - important network applications, such as the web, p2p file sharing, and media streaming, have taken place at the application layer.

2. Enables introduce network application development at an early stage.

• **Rarely uses any mathematical concepts that are not taught in high school.**

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Course Motivations

• **Data communication technologies have a central role in the economic and social structures of the modern society.**

They have the impact on business processes, organizational structures, and the way people do business, work, and communicate with each other. Examples like Google, Amazon

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Google has acquired YouTube

□ \$1.65 Billion



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Course Objective

- The course is an introduction to the fundamentals of data communications technologies and to the business opportunities and challenges presented by these technologies.
- The course covers a balanced mix of data communications fundamentals, emerging data communications technologies and business and IT management concepts.
- The course aims to develop a coherent understanding of the fundamental data communications concepts and technologies.

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Course Web Site

• <http://datamining.rutgers.edu/teaching/fall2008/CNA/375.html>

This web site is the location for course documents, assignments, announcements and other information. You should check it frequently to remain updated. **You are responsible for keeping aware of the announcements on the course web site.**

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Grading Policy

In-class work (including attendance)	20%
Assignments	20%
Projects	20%
Midterm Exam	20%
Final Exam	20%

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Attendance

Regular attendance is compulsory. You are **not** allowed to check your emails, access Web sites not related to the course or work on something that is beyond the scope of this course during the class time.

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Assignments

You may have discussions with your class members, but you have to submit your own work. Please be sure to keep a copy of the assignment by yourself in case that there is any problem with your hand-in or you have to use it later this semester.

Assignments have to be submitted **before** the beginning of the class on the specified due day. **No late submissions will be accepted.** For assignments and project reports, you are encouraged to **type your work**.

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Exams

There will be **no make-up exams**. You are required to present a written proof for situations such as going on to an emergency room due to unexpected and serious illness.

Chatting during the exam is **not** allowed. **Email communication during the exam will be considered cheating.** **No** collaboration between class members will be allowed during any exam.

There will be **no** extra-credit project.

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Scholastic Dishonesty Policy:

The University defines academic dishonesty as cheating, plagiarism, unauthorized collaboration, falsifying academic records, and any act designed to avoid participating honestly in the learning process. Scholastic dishonesty also includes, but not limited to, providing false or misleading information to receive a postponement or an extension on assignments, and submission of essentially the same written assignment for two different courses without the permission of faculty members.

The purpose of assignments is to provide individual feedback as well to get you thinking. Interaction for the purpose of understanding a problem is not considered cheating and will be encouraged. However, the actual solution to problems *must* be one's own.

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Helpful Comments

To get full benefit out of the class you have to work regularly. Read the textbook regularly and start working on the assignments soon after they are handed out. Plan to spend at least 10 hours a week on this class doing assignments or reading.

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Good luck!

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Chapter 1: Introduction

Our goal:

- ❑ get "feel" and terminology
- ❑ more depth, detail *later* in course
- ❑ approach:
 - use Internet as example

Overview:

- ❑ what's the Internet
- ❑ what's a protocol?
- ❑ network edge
- ❑ network core
- ❑ access net, physical media
- ❑ Internet/ISP structure
- ❑ performance: loss, delay
- ❑ protocol layers, service models
- ❑ network modeling

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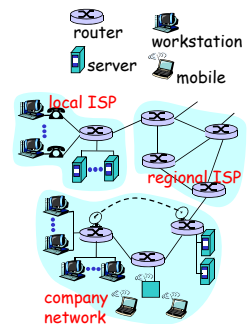
Chapter 1: roadmap

- 1.1 What *is* the Internet?
- 1.2 Network edge
- 1.3 Network core
- 1.4 Network access and physical media
- 1.5 Internet structure and ISPs
- 1.6 Delay & loss in packet-switched networks
- 1.7 Protocol layers, service models
- 1.8 History

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What's the Internet: "nuts and bolts" view

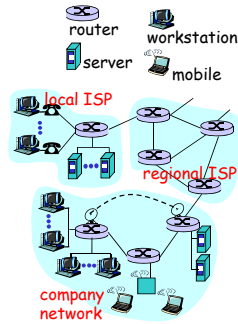
- ❑ millions of connected computing devices: *hosts = end systems*
- ❑ running *network apps*
- ❑ *communication links*
 - fiber, copper, radio, satellite
 - transmission rate = *bandwidth*
- ❑ *routers*: forward packets (chunks of data)



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What's the Internet: "nuts and bolts" view

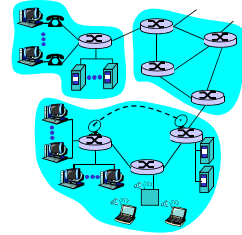
- **protocols** control sending, receiving of msgs
 - e.g., TCP, IP, HTTP, FTP, PPP
- **Internet: "network of networks"**
 - loosely hierarchical
 - public Internet versus private intranet
- **Internet standards**
 - RFC: Request for comments
 - IETF: Internet Engineering Task Force



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What's the Internet: a service view

- **communication infrastructure** enables distributed applications:
 - Web, email, games, e-commerce, file sharing
- **communication services provided to apps:**
 - Connectionless unreliable
 - connection-oriented reliable



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What's a protocol?

human protocols:

- "what's the time?"
- "I have a question"
- introductions

... specific msgs sent
 ... specific actions taken when msgs received, or other events

network protocols:

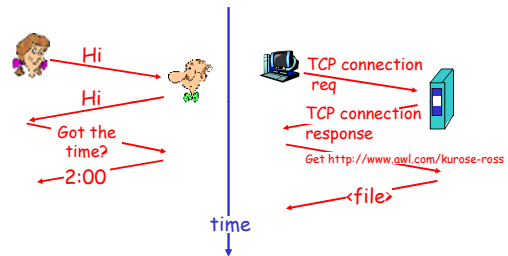
- machines rather than humans
- all communication activity in Internet governed by protocols

protocols define format, order of msgs sent and received among network entities, and actions taken on msg transmission, receipt

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What's a protocol?

a human protocol and a computer network protocol:



Q: Other human protocols?

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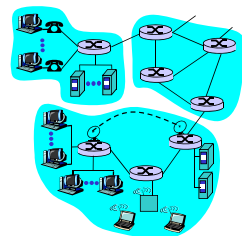
Chapter 1: roadmap

- 1.1 What *is* the Internet?
- 1.2 **Network edge**
- 1.3 Network core
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A closer look at network structure:

- **network edge:** applications and hosts
- **network core:**
 - routers
 - network of networks
- **access networks, physical media:** communication links



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The network edge:

□ end systems (hosts):

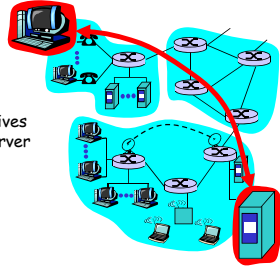
- run application programs
- e.g. Web, email
- at "edge of network"

□ client/server model

- client host requests, receives service from always-on server
- e.g. Web browser/server; email client/server

□ peer-peer model:

- minimal (or no) use of dedicated servers
- e.g. Gnutella, KaZaA



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