Introduction

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COMP 249 — Multimedia Networking
Course outline

♦ Introduction to multimedia
  » Multimedia applications
  » Audio and video as a data type

♦ The Multimedia Networking problem
  » Technologies for wide-area & real-time dissemination of multimedia streams
  » The effects of Internet pathologies today

♦ Best-effort networking
  » Audio and video transmission on the Internet today

♦ Quality-of-service based networking
  » Technology for integrated & differentiated services on the Internet
Course Outline
1. Introduction to multimedia

◆ Multimedia applications
  » What are they and why do we want them?
  » User and application requirements

◆ Audio and video as a data type
  » Audio & video coding and compression technologies
  » Audio/Video “protocols”

Course Outline
2. The multimedia networking problem

◆ Technologies for wide-area & real-time dissemination of multimedia streams
  » Multicast routing and data transport
  » Multicasting on the Internet today
    ❖ The MBONE multicast backbone
  » Real-time transport protocol RTP

◆ The effects of Internet pathologies today
  » How “real” is “real-time” transmission on the Internet today
Course Outline
3. Best-effort multimedia networking

◆ Application-level protocols for best-effort real-time communication
  » Trading-off buffering for delay-jitter control
  » Adaptive media scaling and packaging
  » Forward error correction

◆ Do we really need a “better than best effort” service?
  » The limits of best-effort communication

Course Outline
4. Quality-of-service based networking

◆ The Integrated Services Architecture for the Internet
  » Service models
  » Service components
  » Resource reservation on the Internet
    ❖ RSVP
  » Packet scheduling and admission control

◆ The Differentiated Services Architecture for the Internet
  » Service models
  » Active queue management
  » The Qbone quality-of-service backbone
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Course prerequisites

- I assume you now *something* about...
  - UNIX & C programming
  - Distributed systems design & implementation basics
  - IP addressing and routing
  - Congestion and flow control
  - Operating system design

- If you’ve had UNC courses...
  - COMP 142 — Introduction to Operating Systems
  - COMP 143/INLS 186 — TCP/IP Networks & Network Programming
  - COMP 243 — Distributed Systems

… then you’re all set!

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Course Materials

- Papers and RFCs
  - There is a mandatory, non-refundable course fee of $30 for copies of these

- Optional texts

- Remedial reading
Laboratory exercises

- Goal: Build a low-bandwidth, interactive, distributed, multimedia, Internet-capable application
  » A simplex audio-phone

- A progressive project...
  » Audio transmission over a UDP socket
  » Silence detection/Adaptive compression
  » Simplex communication over RTP
  » Simplex communication with feedback
  » Multicast transmission
  » Adaptive, best-effort congestion control
  » Internet performance trials

Laboratory facilities

- We will use a PCs running FreeBSD on a “semi-private” network in the Colab (SN 156)

- These are not departmental maintained machines
  » You are responsible for backing up your files
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Grading

- Homeworks
  » 50%
- Midterm(s)
  » 15%
- Final examination
  » 25%
- Class participation
  » 10%

These are only approximate!

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So can I audit the course?

- No!

- All attendees must register for either COMP 249 or COMP 226
  » 3 hours of COMP 249
  » 1 hour of COMP 226-040

- All class attendees must take the Midterm and Final examinations
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Cast of characters

◆ Your fearless leader...
  » Office hours by appointment
    (But do come and talk to me!)

◆ Your fearful lab manager...
  » Ping as needed via e-mail
    (Become a pest and your files disappear)

◆ Your very fearful grader…
  » The person to see when you’re pissed off