Overview

- Networking Trends
- Applications of WWW in Research
- Multimedia over Internet
- MBone, Internet Phone, Internet Radio
Trend: Exponential Growth

- 4 Million hosts on the Internet.
- Exponential growth in traffic
- 16 to 17 TByte/month on ex-NSFnet = 2XLibrary of Congress/month
Networking in Social Fabric

- USENET: Ten million news articles/month
- 18 on-line coffee houses in San Francisco
- National Public Radio Program
- Supreme court decision within one day
- 137 countries reachable via Email
- Real estate, on-line catalogs
Technology is moving too fast

- Example: Fast (100 Mbps) Ethernet vs Distributed Queue Dual Bus (DQDB)

- Paper publication takes 1-3 years ⇒ No Impact
- Reading papers not sufficient for research
- World-Wide Web, Mailing lists, News Groups
WWW: A Case Study

- CIS788: Recent Advances in Networking and Telecommunications
- Research Seminar at OSU: Summer 1995
- 18 Graduate + 1 Undergraduate
- Lectures + Exams as usual
  + Student project reports
CIS788

- Lectures: High Speed networking, ISDN, Frame Relay, ATM, Multimedia, Wireless
- Student Projects: ATM Products, Multimedia Products, Wireless ATM, Fiber Channel, ...
- See http://cis.ohio-state.edu/~jain/CIS788.htm
Homework 1

Search 5 references on HTML from:

- Books in Print CDROM (All Books)
- Ohio-Link (Books easily available)
- COMPNDEX/INSPEC CDROMs (Technical Articles)
- Computer SELECT CDROM (Products and news)
- Web pages (Recent Info)
Web Search Starting Points

- Yahoo: http://www.yahoo.com/
- OSU Gopher: For OSU Libraries and Ohio-link
  - gopher://gopher.acs.ohio-state.edu/
- All-in-One Search Page:
  - http://www.albany.net/~wcross/all1srch.html
Other Assignments

- Search for references on their topic
- Collect references
- Summarize references
- Draft reports
- Common style rules
Common Style Rules

- Same Title and Header
- Two sentence abstract
- Table of Contents
- Pointer back to class page
- Pointer to Author's page/email
- All Pointers: down and up the web tree
MBone

- Internet Multicast Backbone
- A set of routers that implement IP multicasting
MBone (Cont)

- Uses radio/tv station paradigm: Sender is allocated a multicast address and it starts transmitting on that address
- Anyone can listen by tuning into the multicast address
- The router provides a connection to the nearest point
- Sender has no idea of listeners
First audiocast in March 1992: IETF meeting to 20 sites
Now over 600 hosts in over 15 countries
Programs include space shuttle, conferences, IETF,...
Clinton and Gore have appeared
Is a source of congestion and complaints
Internet Multimedia Tools

- vat - Visual audio tool (conferencing)
- nevot - Net voice terminal (conferencing)
- ivs - INRIA video conferencing system
- nv or NetVideo - network video
- vic - Video conferencing tool
- wb - White board (shared drawing space)
- imm - Image (JPEG) multicast client
- mmcc - Multimedia conference control
- media on demand server (Allows unicast replays of past Mbone sessions)
- CuSeeMe - Desktop video conferencing
- maven - Audioconferencing tool
- mmphone

Ref: http://www.lbl.gov/ctl/vconf-faq.html
Internet Talk Radio

- Like National Public Radio on the Internet
- Supported by Sun Microsystems and O'Reilly & Associates. Run by Carl Malamud
- Covers networking topics
- Does not use MBone. Audio files are distributed.
• Geek of the Week: Key Internet personalities
• The Incidental Tourist: Restaurant reviews
• Key sessions of conferences are rebroadcast
• For further info info@radio.com
• Ref: http://www.cmf.nrl.navy.mil/radio/ITRintro.readme.html
Internet Phone Servers

- Being designed by Multiparty MUltimedia SessIon Control (MMUSIC) group of IETF

The Ohio State University  Raj Jain
- Telephone servers (similar to routers)
- Receive local calls, determine the internet route and forward
- Accept remote calling requests

http://www.cnri.reston.va.us/
WWW for research and publication
Internet protocols are being extended to allow multimedia
Multicast backbone (Mbone)
Internet talk radio and phone
HTML Books

HTML On-line References

- Guides to Writing HTML Documents,

- Writing Web Pages,
  http://www.cs.buffalo.edu/pub/WWW/other/html.html

- Web Developer's Virtual Library: WWW Development,
  http://www.charm.net/~web/Vlib/

- Style Guide for Online Hypertext, http://www.w3.org/hypertext/WWW/Provider/Style/Overview.html
- The Bare Bones Guide to HTML, http://www.access.digex.net/~werbach/barebone.html
- Style Your Sheet, http://www.links.net/webpub/style.html
Multimedia

- MBONE FAQ, ftp://venera.isi.edu/mbone/faq.txt

The Ohio State University  Raj Jain
- Information Sources: the Internet and Computer-Mediated Communication,
  http://www.rpi.edu/Internet/Guides/decemj/icmc/top.html
- Video: An Overview of the Internet and World-Wide Web,
- Yahoo - Computers: Multimedia,
  http://www.yahoo.com/Computers/Multimedia/
- Index to Multimedia Information Sources,
  http://viswiz.gmd.de/MultimediaInfo/
- Distributed Multimedia Survey,
  http://cuiwww.unige.ch/OSG/MultimediaInfo/mmsurvey/
MBONE: References

- RFC 1112, "Host extensions for IP Multicasting"
  See also http://www.cs.ucl.ac.uk/mice/faq.html
M. Macedonia and D. Brutzman, "Mbone Provides Audio and Video Across the Internet," Computer, April 1994, pp. 30-36.

MBONE: List of available s/w and FTP sites
http://www.cs.ucl.ac.uk/mice/mbone-soft.html

MBONE Routers and Links

MBone interest group mailing list: mbone-request@isi.edu

Conference announcements mailing list:
rem-conf-request@es.net
Thank You!