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# Internet Messaging Applications and the New World Order

Gralla chap. 13-16

# Web 2.0

- Web 2.0 is a phrase used to describe the current state of the Internet
  - Anybody can be and is a content producer
  - Social networking and collaboration
  - A bunch of technologies to assist this, mostly WWW based
- "Web 2.0" and "Social Web" are really hype terms
  - Might be forgotten in a few years
  - Or might be remembered as a mile post
  - The change in technologies and user behavior is however real and detectable!

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# History Overview

- We go through some common services from the 1970's to today in chronological order

- FTP
- E-mail
- News
- IRC
- WWW
- Wiki
- RSS

- Blogging
- P2P
- VoIP
- Skype
- Web 2.0

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# FTP

- File Transfer Protocol
  - Early 1970's
- An early way to copy files from one host to another
- Supports user accounts, passwords, directory listings etc.
- Both ASCII and binary data formats
- Uses one TCP connection as a control channel
- Opens a new TCP connection for each file transfer

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# E-Mail

- E-mail technologies were covered in last lecture
- Predates Internet, is the oldest of the messaging technologies
  - Created in 1970's for the ARPANET
- Provides person to person communications
- Also group communications
  - Mailing lists for private communication among several participants
- Still one of the important services
  - Provides asynchronous messaging (non- real-time)
  - Used with different front ends, including WWW

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# Mailing Lists

- A mailing list is one e-mail address which is redirected to many recipients
  - Usually a long file of addresses which the e-mail server expands
- In the 1970's and 80's this was the killer application for ARPANET and Internet
  - People got on to the net just to have e-mail
- Mailing lists were started on all possible subjects in the academic community
  - The net was very research-oriented
  - Lists were managed manually, then via e-mail, now web-based management interfaces
  - Now being somewhat replaced by WWW-based technologies like chat forums
- Aliased mailing lists also provide good service interfaces
  - E.g. T-110.1234@tml.hut.fi, orders@company.com

# News

- Network News is an asynchronous service for public discussion
  - A.k.a. Usenet News
- Developed in the 1980's
- Discussion is organized in named groups
- Messages look like e-mail
- The messages are stored in news servers and exchanged between the servers
  - The goal is to flood a particular message to all the servers in the world, which carry that particular group
  - Each message has a unique ID to prevent duplicates to be received
  - The servers form a mesh network with duplicate paths between the servers
- Clients connect to a server and read the messages stored in that server

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# How News Works?

- Each server is configured with the addresses (names) of some neighboring servers
- One server contacts another at selected times
  - Designed by assuming that all connections were not up full time, e-mail and News was typically batch-processed and took a day or two to reach its destination
  - The protocol is called NNTP, Network News Transport Protocol
- The contacting server requests a list of articles from the another server and checks the *message-id*s against its own store, new articles are then requested
- There are some variations on this technique, servers can be configured to *push* or *pull* the articles

# IRC

- Internet Relay Chat is a tool for real-time (synchronous) discussion
  - In the 1980's in Finland
- Discussion is organized in channels
  - Messages may be sent to individual users, too
- Like News, clients connect to a network of servers and read messages
  - Servers do not store messages
  - If a client is not connected, it will miss the messages
- The network is without loops, thus if a single connection is broken, the network splits to two
- IRC-gallery is a web site for IRC users

# Instant Messaging

- There are other instant messaging solutions besides IRC
- Many of them are proprietary
  - America Online, Microsoft etc.
- Proprietary technologies typically have a central server to which everybody connects to
  - Actually an internal network that looks like one server

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# The End of the Academic Internet

- Until 1992-1995 the Internet was mostly an academic network connecting universities and research organizations
- A culture of non-commerciality and openness had developed
- Useful concepts were developed
  - Moderation and discussion practices (netiquette)
  - Frequently Asked Questions -lists
  - "Rough consensus and running code" mentality for standards development (if it exists and works and most people agree it is good, accept it)

# WWW

- WWW is a technology divider, time-wise
  - Before it text-based messaging over slow connections
  - With WWW and after it graphical services over fast connections
  - NCSA Mosaic 1993 made the difference
    - Graphical
    - Fast user request implementation cycle in the development team
    - For Windows and Mac
- Besides providing access to data files, World Wide Web is now used as an interface to many other systems
  - Basically re-write the software user interface to use HTML over HTTP
  - WWW browsers support also other technologies besides HTML/HTTP

# Wiki

- Wiki is a popular technology that allows a (limited) set of users to edit a web site using the WWW as the user interface
  - Instead of editing HTML files or having a single webmaster
- Wikis are being used for all kinds of co-operative group work
  - Actually, this was the original idea of the WWW which was lost along the way
- Wikipedia is an open source encyclopedia that uses Wiki technology
  - Wiktionary is a similar dictionary

# RSS

- "Really Simple Syndication" and couple of other names that form the same acronym
- An XML based format for describing up-to-date information on a web site
  - XML is a language for designing task-specific languages to describe data
- When content is updated on a web site, the administrator or a piece of software updates an XML-description
- The user's client program monitors the RSS description of the server and notifies of the updates
  - Like an e-mail or news reader
- The RSS' XML description can hold a short description of the content and usually links to a web page

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# Blogging

- Blogging is a social media phenomenon
- Individual users maintain a personal web site where they post regularly
  - By hand or with blogging software
  - There can be a reader forum or not
- As the bloggers post irregularly, RSS and blog lists is useful to find new posts

# P2P

- Peer to Peer architecture
- Really a paradigm change
  - E-mail, news, IRC, WWW etc. require a server
    - Thus the client-server architecture
  - P2P assumes no server, users' computers connect to each other
    - Actually the software implements both the client and server features for the actual protocols
- P2P network can contain information (files)
  - Files can divided to pieces and the pieces stored in different hosts
  - The trick is to find a right file
    - Often files are represented by file description files
  - Many implementations use a *distributed hash tree* as an index to files or piece of files
- Most famous for illegal media content sharing

# VoIP

- As the quality of Internet connections has developed, Internet can be used for real time data with tighter requirements than instant messaging
- Internet telephony is usually called Voice over IP
- Most public VoIP architectures have two protocols
  - A signaling protocol (e.g. Session Initiation Protocol)
  - A voice carrier protocol over UDP (e.g. Real Time Protocol)
  - This emulates the two tier system of POTS (Plain Old Telephone System)

# Skype

- Skype is a proprietary voice over IP product
- The protocol is not public
- Skype is popular, because the IETF (Internet Engineering Task Force) solution was not compatible with the real world
  - Skype can pass firewalls and NAT/PAT translations
  - SIP/RTP based solutions have problems with those
- Usage requires registration
- When making a call the recipient is searched by name or nickname
- Skype has central servers that store the information and log-in status of all the users
- Call data is sent directly or routed through other Skype users

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# About That Web 2.0

- So, we have a trend
  - Software breaking the "private client – corporate server and content" paradigm
  - Technology savvy end users expressing themselves
  - People start to generate new services
    - Mashups, e.g. combine Google Maps with 112 alarm information
- What does this mean?
  - Writing, Gutenberg's movable type, typewriter, copying, photocopying, desktop publishing software have already allowed anybody to become a media publisher
  - More likely evolution than revolution
  - Still, things are changing, fortunes will be made and lost

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# User Interfaces

- If you write a piece of software, how are people going to use it?
- WWW
  - Nice for occasional users, Operating system free, limited in capabilities
- GUI
  - Platform/OS specific, more control on the UI than with WWW
- Protocol (IRC, IMAP, NNTP, FTP, HTTP...)
  - Users design their own clients
- API, Applications Programming Interface
  - Good if integration is going to be the main case
- Library
  - Really deep integration, not a complete solution but just algorithms

# Accessibility

- When designing services one should remember that we have people who
  - Are blind or can see poorly
  - Are colorblind (test on grayscale monitor)
  - Are deaf
- User devices are also very different
  - Mobile telephones, PDAs...
- For any major service accessibility is an issue
  - Web and graphics based GUIs are more difficult in this regard
  - Providing some programming interface like a protocol can sift the issue to the user side (build your own)

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# New Challenges

- Social or Private?
  - Do you want people to know everything about you?
    - Future employers?
  - As more and more information flows to the Internet security and privacy become important requirements
- Identity management
  - Who or whom are you on the net?
  - One or more identities, what information do they have associated?
- Finding information
  - News and web pages are already being archived
  - Search engines are fairly efficient

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# Summary

- The Internet has many kinds of different services built using many protocols and architectures
  - WWW is just one service and platform and not the best one for all needs
- A low cost global network with user supplied content is a strong transformational force