

# Internet Services

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**Internet Short Course**

# What really is a Service?

- On internet (network of networks), computers communicate with one another. Users of one computer can access services from another.
- You can use many methods to communicate with a computer somewhere else on the Internet.
- These **methods used to communicate are called services because they service your requests.**
- There are a wide variety of services, and each can give you many kinds of information.
- In summary the internet is a:
  - way to move data
  - a bunch of protocols

# Available Services

- **Some most popular services on the Internet are:**
  - » **E-mail**
  - » **Telnet**
  - » **FTP**
  - » **WWW**
  - » **Others** (Archie, Wais, Gopher, News and News Groups, Internet Relay Chat, Internet Phone, Video Conferencing, & Internet Collaborative Tools)

# Available Services

- » **Email:** Electronic mail
- » **Telnet:** Remote login into computer networks
- » **FTP:** File Transfer Protocol for transferring computer files
- » **WWW:** World Wide Web
- » **Gopher:** Searchable index, selectable index of documents
- » **USENET:** Newsgroups with different subjects enable people with common interest to share information
- » **Chat:** Real-time communications between people on the Internet

# Clients and Servers

- All that we speak of internet fall into three categories:
  - » Clients
  - » Servers
  - » Content
- Software/Hardware that we use to browse the web, send mail, download files, etc are called clients.
- Servers respond to clients requests.

# E-mail

- Most popular and widely used internet service (over 70 million users).
- Has become a de-facto standard of communication within the corporate and beyond.
- Works between disparate systems like PC, Unix, Mac, etc.
- Latest e-mail standards let users attach files (audio, video, animation, etc).
- Volume of data transferred is billions of bytes/day.

# E-mail

- It is easy to send, read, reply to, and manage.
- It is convenient, global, economical and very fast.
- It has many advantages over regular methods such as postal service or fax technology.
- Studies have shown that recipients are more likely to reply to an e-mail message than a written request.
- E-mail can be read or written at any time, independent of time zones and business hours.

# E-mail

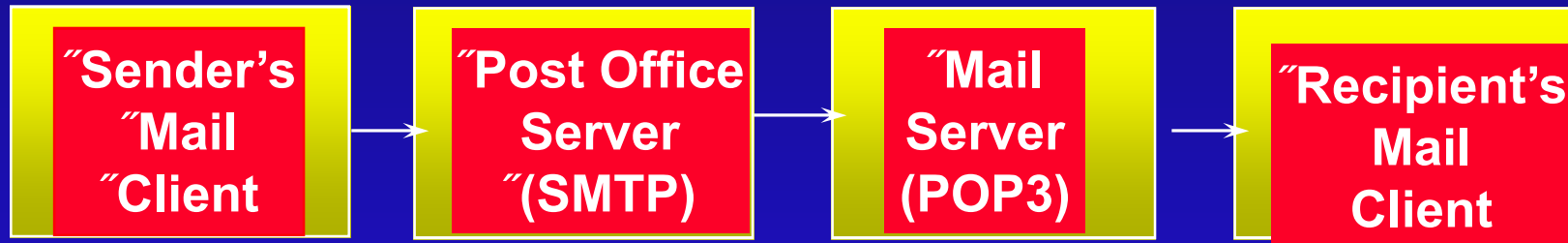
- Advantages:
  - » Standard way of communication for corporations
  - » Less interference or interrupts between work
  - » Reply with a number of options
  - » No cost within the environment
  - » Less chance of miscommunication
  - » Can save messages for future retrieval and records
- Disadvantages
  - » You need to have a computer and a network connection
  - » Less personal than voice (although now we can also have voice mail, with some extra cost)



# How e-mail works?

- Like other internet services e-mail is yet another client-server system, called SMTP (simple message transfer protocol).
- You use a mail client program to send a message to the post office server (an SMTP server).
- The post office server identifies the recipient's address and send the message through the internet to the mail server that handles mail for each recipient's address.
- The mail server stores the message in the recipient's mailbox.
- The recipient uses an e-mail client program to request new messages from the mail server.
- The mail server sends the message in the recipient's mailbox back to the mail client.

# How e-mail works?



# How e-mail works?

- The Internet uses a TCP/IP-family protocol called **Simple Mail Transfer Protocol (SMTP)** as the standard method for transferring electronic mail.
- SMTP handles messages in **queues** (also called **spools**).
- When a message is sent to SMTP, it places it in an outgoing queue.

# How does it work?

- SMTP attempts to forward the message from the queue whenever it connects to remote machines.
- Usually, if SMTP cannot forward the message within a given amount of time, it is returned with an error message, or simply dropped.
- When a connection is established between two computers that use SMTP, the two systems exchange authentication codes.

# How does it Work?

- Each system sends a command to the other to identify the first mail message's sender and provides basic information about the message.
- The receiving system returns an acknowledgement, after which the message is transmitted.
- SMTP is smart enough to handle multiple destinations for the same message in an efficient manner.

# Structure of Email

- A typical e-mail system, such as the one in a company office, usually consists of a mail server, a post office, and the clients.
- The mail system is tied directly to the local area network of the organization.

# Yahoo Mail, Rocket Mail



- Hotmail and its cousins are all getting to be very popular because
  - » they offer free e-mail accounts,
  - » basically use Web-technology
- The disadvantage is that you have to
  - » wait longer; frustrating experience if the mail is plenty and the lines are slow--which they are anyway, most of the time!
- The major advantage, however,
  - » is access to mail from virtually anywhere they can access the WWW on the Internet
  - » there is privacy, since mail is left on the server

# Finding an E-mail Address:

- **Finger and Whois**
- **Finger** is a standard utility supplied with the TCP/IP protocol family that lets you determine who is a valid system user and who is logged into a system you have access to.
- Finger can be used to find out a person's **username** if a mail recipient is logged in on the destination machine.
- Finger shows you how long a user has been logged in, where they're logged in from, and what their login names are.



# Whois

- The Whois program and its accompanying database is maintained by the Internet Network Information Center.
- The system is meant to be a database of all Internet users, but it is far from complete.
- One of the easiest ways to use the Whois service is to telnet to a Whois server and access the database directly.
- Alternatively, you can send an e-mail request to the Whois server and let it perform the search and mail back the results.

# E-mail Formats

- Most e-mail systems do not impose limitations on the **type** of files that can be sent, as long as the network protocol can handle the characters.
- It is also common practice to **compress** large files for transmission.
- The Internet e-mail system handles binary files by converting them to 7-bit ASCII characters.

# Mailing Lists

- A mailing list is a **group of e-mail addresses** that can be reached by sending a message to one address: the list address.
- Mail sent to that address is redistributed to all subscribers.
- Subscribers can have a discussion by sending messages to the list address (often called **posting** to the list).
- The list of addresses can be maintained by hand or with an automated list server system like **Majordomo** or **ListProcessor**.

# Mailing Lists

- Mailing lists are good for many things such as:
  - » distributing information from a central source to lots of people
  - » Discussing a project among participants.
  - » Exchanging questions and answers with other users of a product or service, or perhaps company technical-support personnel.
- To join just send mail to `listserv@domain.name`. where `listserv` is commonly the account through which messages are distributed

# Telnet

- **Telnet** is a program that lets you log into to a remote computer directly through the internet, and to compute on the remote computer
- Why Use Telnet?
- Telnet takes advantage of the way computers are linked in the network by passing your commands from the computer where you're located, onto another computer, which sends it to a third computer, and so on until it reaches the computer you want to access.

# Telnet

- Technically **telnet** is a **protocol**.
- Telnet to Non-Standard Ports.
- This is accomplished by assigning each server a particular **port number** as identification.
- Telnetting a particular port enables you to log on to a remote system for a particular purpose.
- Connection can be established by using SLIP, PPP or dedicated lines.
- Usually available in the universities and Internet Service Providers.

# Telnet

- Weakness
  - Only console applications can run. No GUI support unless X terminals are used.
  - Security risk because hackers can trap the IP address of the network.
- Least used part of the Web
- All ports numbered 80 will have Web sites; likewise all port 23s will be used for telnet, and multi-user games will always be found on 4201, etc.

# FTP and Archie

- FTP is the short for **File Transfer Protocol**
- One of the oldest services on the internet and a common way for sending/receiving files.
- Allows you to examine the files of remote hosts on the Internet, and transfer files between your host and those hosts
- Companies provide FTP for downloading of evaluation software, demos, and beta software.
- Runs on all popular platforms, can run either via console, GUI or a browser
- One common type of FTP service is an **anonymous FTP**.



# Anonymous FTP

- They are called anonymous because they accept the word `%anonymous+` as a login name, and your e-mail address as the password.
- With this kind of service, you can download or upload files without having an account on the machine. Most often used to download files.
- If the FTP server is not anonymous, when you connect to the server you must provide a user name and password, just as though you were logging in to the machine.
- Anonymous FTP servers are one of the major means of distributing software and information across the Internet.

# Anonymous FTP

- FTP servers are fairly straightforward. When a server receives a file request from an FTP client, it sends a copy of that file back to the client.
- Other commands instruct the server to send the client a directory of files, or to accept an upload from the client, etc.

# FTP

- A large amount of software, mostly free, is available on anonymous FTP servers for many different types of computer systems.
- One of the most frustrating problems with the Internet is the difficulty of finding information such as FTP sites, host resources, sources of information, and so forth.
- Most FTP sites don't have a listing of all their available files, although some do.
- However, if you have access to WWW, there are services (both free and fee-based) that provide a WAIS based search from inside a WWW browser, helping in locating information.

# Archie

- The archie service is a collection of resource discovery tools that together provide an electronic directory service for locating information in an Internet environment.
- Archie creates a central index of files available on anonymous FTP sites around the Internet.
- The Archie servers connect to anonymous FTP sites that agree to participate and download lists of all the files on these sites.
- These lists of files are merged into a database, which users can then search

# Archie

- Users can access an archie server either through interactive sessions or through queries sent via electronic mail messages.
- The archie server automatically updates the listing information from each site about once a month.
- In addition to offering access to anonymous ftp listings, archie also permits access to the `%whatis+description` database.

# WAIS

- **WAIS** stands for **Wide Area Information Server** and is pronounced *ways*.
- **WAIS** searches for words in documents.
- The core of the software is an indexer, used to create full-text indexes of files fed to it, and a server that can use those indexes to search for keywords or whole English expressions among the files indexed.

# WAIS

- The server allows the user to specify that a particular document is similar to the one he wanted and uses the contents of the document to find more like it.
- This feature is called **relevance feedback** and is one of the most useful features **WAIS** has.
- The index contains the information the server needs to find a particular word in the database.

# WAIS

- The clients simply build queries for the server in the appropriate format, display search results to users, and allow users to retrieve documents from the server.
- Sophisticated clients support many different document types, from plain ASCII text to graphical file formats like GIF and JPEG.
- Most of the WWW browsers nowadays have native support for WAIS, meaning that the browser can communicate directly with a WAIS server.



# Gopher

- The term **Gopher** refers to:
  - A network protocol
  - A server type
  - One of the many **Gopher** client applications.
- **Gopher** protocol and software allow for browsing information systems so that one doesn't need to know exactly where the needed information is before looking for it.
- You do need to know the address of a **Gopher** server to get started, after you are there, the server software presents information in a clear, structured, hierarchical list.

# Gopher

- Most **Gopher** sites have links to others, so after connecting to one, it is quite easy to jump to another.
- **Gopher** user interface is very simple.
- Since the **Gopher** service is text-oriented, it performs well over slow links and can be used by people who only have dial-in access to a machine on the internet.

# Limitations of Gopher

- Gopher currently displays only ACSII text data, although you can transfer binary data and display it with other software.
- Most of the time, the menu-item descriptions are brief, sometimes **too** brief.
- Compared with **WWW**, **Gopher** can only provide links from menu items, whereas the **Web** can link from anywhere in the document.

# Gopher Protocol

- The client connects to a server.
- The client sends the server a selector string (a string of characters that describes the location of a document on the server).
- The server responds by sending the requested file or directory.

# Gopher+

- An extended method of fetching the attributes of a **Gopher** item.
- Multiple formats of a document associated with a single menu item.
- A method of attaching a short description to a **Gopher** item.
- Forcing a client to fill out a form before retrieving an item and access control.

# Veronica

- **Veronica** is a service that provides a (very large) index of titles of Gopher items from most servers throughout the Internet.
- The result of a **Veronica** search is a set of **Gopher** items whose titles contain the keyword that the user was searching for.
- The **Veronica** index is accessed via a normal **Gopher** search item.

# Jughead

- Another Gopher directory search is **Jughead**.
- Jughead, like Veronica runs as a server on the Gopher site, and provides a pre-built table of directory information that can be searched.
- Unlike Veronica, Jughead is usually implemented for a particular Gopher site.

# Other Services

- WWW
- News and NewsGroups
- Usenet
- Internet Relay Chat
- Internet Phone
- Internet Collaborative Tools



# News & Newsgroups

- Network news is another way to take part in a lot of discussions over the internet, yet keeping them organized and separate from your mail.
- You don't have to subscribe to a mailing list, and you won't receive lots of mail.
- The news reader helps you keep everything in order.

# UseNet

- UseNet is a service carried over the Internet that supports newsgroups.
- The messages everyone using the UseNet sends to a newsgroup, become available for anyone who accesses the newsgroup.
- Newsgroups are organized hierarchically, with the broadest grouping first in the name.

# Newsgroups

- There are seven major news categories:  
  
comp, news, rec, sci, soc, talk, misc
- Servers can also get newsgroups by creating them locally.
- Server administrators can create whatever groups they like,  
  
corresponding to the interest of the users.

# News Item

- A news item is very similar to an electronic mail message.
- It has the same general parts as an e-mail message; a header and a body.
- The body of a news item is the message's text.
- The header tells the news software how to spread the item throughout the Internet.

# Internet Relay Chat

- IRC (Internet Relay Chat) allows you to talk (write) to people from all over the world about a variety of topics, simultaneously and on-line.
- It is mostly used as a recreational communication system.
- It is again a client-server design.
- The client software allows you to connect to the IRC server, which accepts connections from many IRC clients at the same time.
- The various IRC servers across the Internet are interconnected.

# Internet Relay Chat

- There are a number of IRC servers running on the Internet, some of them are:

irc.netsys.com

irc.caltech.edu

irc.indiana.edu

csa.bu.edu

irc.nada.kth.se

- When you connect to an IRC server, you will usually be asked for a port number in addition to the Internet address.
- Most of the time, this port number is 6667
- Some IRC Terms: Nicknames, IRC Channels

# Internet Phone

- Internet phones let you talk (literally talk, with voice not in writing) to people all over the world, just for the price of your Internet connection.
- It demands a reasonably fast machine with support for audio devices.
- Internet phones are essentially for point-to-point communications.
- The heart of any Internet phone tool is the **codec**, the software that compresses/decompresses the digitized voice data
- Most Internet Phones offer more than just telephony, e.g., voice mail, answering machines, and similar features.

# Video Conferencing

- Internet Video Conferencing offers a low-cost alternative to traditional proprietary systems.
- It demands high bandwidths.
- It requires a video camera and related hardware card.
- Video-conferencing is largely point-to-point.
- Only very few packages support true multi-conferencing.



# Internet Collaborative Tools

- Internet collaborative products deliver a host of interactive technologies that bring workgroups closer together.
- Multiple users can work together in an application, sketch out ideas, chat, and pass files back and forth.