

# Components of the Internet

- World Wide Web (WWW)
- Hypertext Transfer Protocol (HTTP)
- E-Mail and E-Mail discussion groups
- Usenet News
- Chat and instant messaging
- FTP
- Telnet
- E-Commerce

# The World Wide Web

- Like an Internet library with millions of books and documents
- Non-Linear structure (documents read in any order)
- Navigate by clicking on Hypertext links

# Features of the WWW

- Graphical
- Easy to use
- Cross platform
- Distributed
- Dynamic
- Interactive

# Hypertext and HTML

- Hypertext – method of presenting information. Selected words can be expanded using **links** to other documents
- HTML (Hypertext Markup Language) – used to create WWW pages and links

# Hypertext Transfer Protocol (HTTP)

- Set of rules governing transfer of hypertext between computers
  - Based on client/server principle
  - Allows “computer A” (client) to establish connection to “computer B” (server). Server accepts connection and returns a response
  - HTTP request identifies what client wants and instructs server on “action”
- WWW encompasses all information available via HTTP

# URL (Uniform Resource Locator)

- URL – address of www pages

For example: <http://www.computing.dcu.ie>

# Web Browser

- Needed to view WWW pages
- Application program enabling user to view and interact with information on WWW
- Client program using HTTP to make requests to Web servers and display pages by interpreting the HTML

# Web Server

- Program that runs on web sites, responsible for replying to requests from web browsers
- Required to publish and deliver information on the WWW

# Client/Server model

- Client software (Browser) runs on local computer
- Server software runs on web host
- Launch browser
  - Type in URL
  - Browser makes connection using HTTP
- Server then
  - Accepts connection
  - Sends file contents to browser
  - Closes connection

# Web Browser

- Interpret HTML pages, display them, display programs, animation, graphics, video-conferencing, download files etc.
- Create and publish web pages
- Entire suites built around browsers
- Multimedia files – helper applications

# Client/Server model

- All machines on the internet are either servers or clients
- Servers – provide services to clients
- Web servers, E-mail servers, FTP servers etc. serve needs of Internet users

# Ports

- Servers make services available using numbered ports – one for each service
  - E.g. server running Web server and FTP server, web server typically available on port 80, FTP on port 21
- Clients connect to service at specific IP address on specific port number

# Web Browsers

- Mosaic – first graphical browser
- Mosaic Navigator – first commercial browser, became Netscape Navigator
- Internet Explorer (Microsoft)
- Mozilla Firefox
- Lynx – text only
- .....and there are others

# Browser Errors

- ‘Server Does Not Have A DNS Entry’
- 503 Service Unavailable
- 403.9 Access Forbidden
- Spinning hourglass
- 404 Not Found
- 401 Unauthorised and 402 Forbidden

# Search Engines – index based

- Lycos, AltaVista, Google etc.
- Built by robot programs (“Spiders” or “Web Crawlers”) – not run by human selection
- NOT organised by subject categories – pages ranked by algorithm
- Contain full-text of pages they link to
- Often retrieve a lot of information – for complex searches, use sub-searching

# Meta Search Engines

- Meta crawler
- Copernic
- Search more than one engine and/or subject directory – compile results in uniform list.  
Some allow customised searching

# File Transfer Protocol (FTP)

- Used to transfer files (any type) from one computer to another
- FTP sites all use Login and Password
  - Anonymous FTP sites (anonymous login and E-mail address as password) or automatic logon
  - FTP runs on Client/Server model
    - Windows has a client command-line FTP program, but there are other, easier to use, programs

# FTP

- FTP Daemon runs on FTP server, handling all FTP transactions, asks for account name and password
- Connection command link opened
- Downloading opens second link – **data connection link**
  - Data connection link closes automatically after data uploaded/downloaded
- File compression used for large files

# Electronic Mail (E-mail)

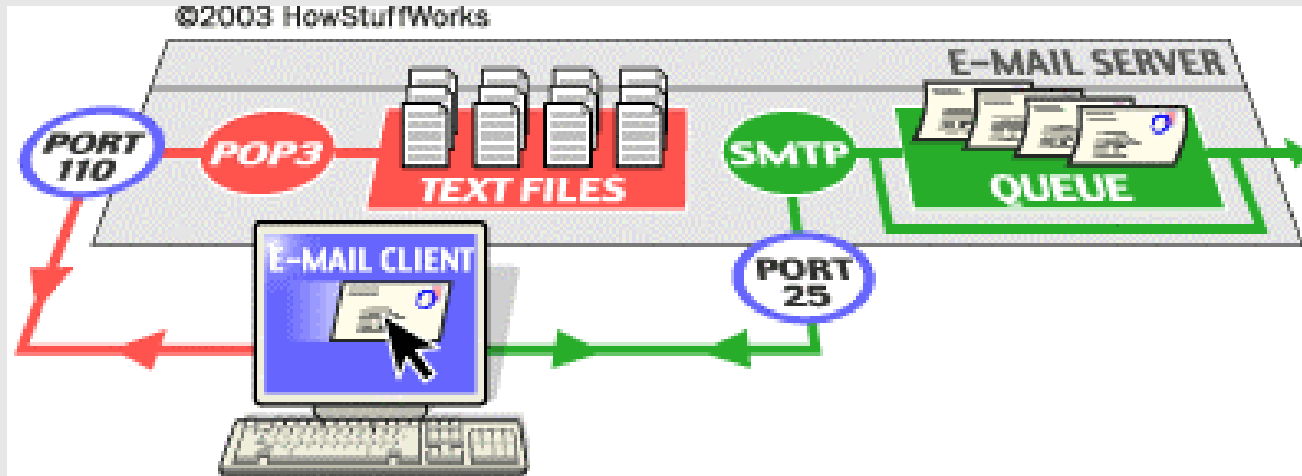
- Email uses TCP/IP
- SMTP (Simple Mail Transfer Protocol)
  - File attachments
    - MIME (Multipurpose Internet Mail Extension)
    - Uuencode

# How E-mail is delivered

- TCP/IP
- Gateways translate e-mail formats
- Routers internal/external
- E-mail software
  - Mail clients – Eudora, MS Exchange, Outlook etc.
    - Create folders – search messages, address books, mailing lists
  - Most e-mail software reads HTML based pages

# E-Mail Servers

- Two servers run on server machine
  - SMTP for outgoing mail
  - POP3 (Post Office Protocol) or IMAP (Internet Mail Access Protocol) for incoming mail
- Typical E-mail server:



# E-Mail Privacy

- Encryption – public and private key most common forms
- SPAM - Unsolicited junk e-mail
- Blocking SPAM
  - Write to spammer asking to be removed (perhaps!)
  - E-mail software to filter e-mail addresses
  - ISP like AOL blocks spammers from sending bulk mail to subscribers
  - Ensure your e-mail address is not added to spam list and when posting to newsgroups edit header to omit your e-mail address

# E-Mail

## Basic form:

username@hostname.subdomain.domain

- **Advantages**
- Convenience
- Speed
- Inexpensive
- Printable
- Reliable
- Global
- **Disadvantages**
- Misdirection
- Interception
- Forgery
- Overload
- Junk
- No response

# E-Mail Discussion Groups

- Way for groups of people to have public discussions
- Mailing list is database of e-mail addresses
- Mailing lists can be moderated (screened by moderator) or unmoderated
- Users must subscribe (by sending subscribe message to a 'list server') or unsubscribe.

# TELNET

- Provides facility for remote logins via the Internet.
- Client/Server model – client = your PC, server = host computer. When logged in to host, client becomes dumb terminal
- Examples – databases, library catalogues etc
- Note: **telnet** is old technology, text based. You need to know how to run programs on host.

# Newsgroups

- USENET – electronic forum enabling discussions throughout the Internet
- Global Bulletin Board
- Hierarchies of Newsgroups – sub-categories
- Special software to participate in newsgroups
- Moderated and unmoderated
- Subscribe/unsubscribe/read
- Files (all types) can be posted – files encoded, downloaded and unencoded (usually uuencode)

# Chat and Instant Messaging

- Instant Messaging (IM) – usually just between two people, but may be more – e.g. AOL Instant Messenger
- Internet Relay Chat (IRC) – requires software on client – many chat rooms (channels)

# Electronic Commerce (E-Commerce)

- Electronic Store – equivalent to local store or mail-order catalogue. Lower overhead costs (low inventory), higher distribution costs.
- Electronic Marketing Site – provides information about products. Inexpensive product promotion

# E-Commerce

- Information/Entertainment Provider – no physical product – purpose to help users – e.g. search engines – generate revenue by selling advertising
- Customer service site – after sales service information, FAQ's, software updates.  
Example: Federal Express or An Post for package tracking

# Other ways to communicate on the Internet

- VOIP (Voice over internet) – phone calls via the Internet – e.g. Skype, Google Talk
- Blogs
- Facebook

# Dangers of the Internet

- Spam – unsolicited e-mail
- Malware – general term for malicious software
- Viruses – software that can re-produce rapidly; may be designed to do damage
- Virus hoaxes – false warning of virus; may give ‘directions’ to remove files
- Worms – spread by infiltrating systems

# Dangers of the Internet

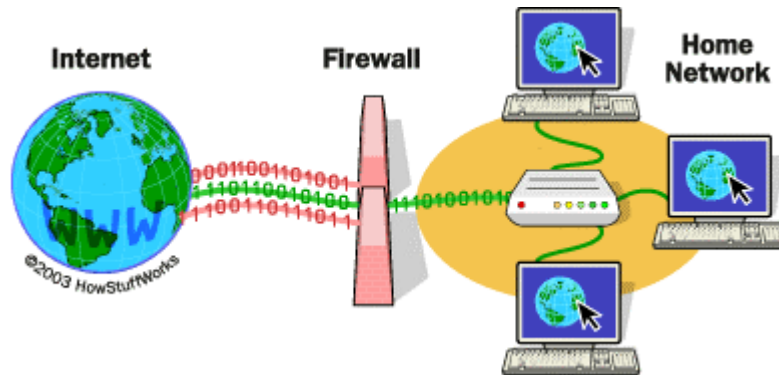
- Trojans – infiltrate computer without user's knowledge. May install 'keystroke logger' – capture usernames and passwords and other confidential information. Infected computer may get 'denial of service'. Trojans do not reproduce.
- Adware - software displaying advertising on your monitor. May be included in freeware/shareware.
- Spyware – Adware which includes information tracking
- Phishing – fraudsters sending e-mails requesting personal information

# Protection

- Treat unsolicited e-mails with suspicion.  
Do not respond
- Install latest version of anti-virus software.  
Download patches (Windows Update)
- Install firewall
- Ignore requests for personal details
- Do not transmit personal details by e-mail
- Check your bank/credit card statements

# System Protection

- Firewall - barrier, making you invisible. Filters data in and out of network



- Proxy server – keeps requesting computer separated from web server

# To fill in the gaps

- [www.howstuffworks.com](http://www.howstuffworks.com)
- Search engine – such as Google
- Wikipedia – online encyclopedia