Network Addresses

- Hostname – unique identification that specifies a computer on the Internet.
  - Generally readable words separated by dots.
    - example.example.com
    - localhost.localdomain
- IP address – An address made up of four numeric values separated by dots which uniquely identify a computer on the Internet.
  - 192.168.1.4
  - 10.0.0.2

Network Addresses

- An IP address is 32 bits.
- Each number corresponds to a byte in the IP address.
- Each number in the IP address is in the range from 0 to 255.

10010100 01001110 11111010 00001100

148 . 78 . 250 . 12

- No correspondence between the IP address and the hostname sections.

Network Addresses

- An IP address can be split into
  - Network address – specifies the network
  - Host number – specifies a particular machine on the network
- The split depends on the network “class” .
  - Class A – First byte for network address, last 3 for hostname.
  - Class B – First 2 bytes for network address, last 2 for hostname.
  - Class C -- First 3 bytes for network address, last byte for hostname.

Network Addresses

- Very few Class A networks with many hosts.
- Many Class C networks with a maximum of 256 hosts each.
- Class C networks are assigned to most organisations.
- Class A and B are for very large organisations and Internet Service Providers.
- Running out of address.
- IPV6 – 128 bit, not widely used yet.

Domain Name System

- A hostname consists of a computer name followed by the domain name.
  - server.example.com
    - Here server is the computer name and example.com is the domain name.
- A domain name is separated into two or more sections that specify the organization and possibly a subset of the organization, of which the computer is a part.

Domain Name System

- Domain names narrow in on a particular set of networks controlled by an organization.
- Two computers on can have the same name if they are on different domains since they can be identified by the full hostname.
- The last section of the domain name is called its top-level domain (TLD).
- Some TLDs have been around since the Internet was founded while many are new.

Domain Name System

- Original TLDs

Top-Level Domain	General Purpose
.com	U.S Commercial (unrestricted)
.edu	U.S Educational
.gov	U.S Government
.mil	U.S Military
.net	Network (unrestricted)
.org	Nonprofit organization (unrestricted)

Domain Name System

- Some TLDs based on Country Codes

Country Code TLD	Country
.au	Australia
.br	Brazil
.ca	Canada
.cn	China
.in	India
.uk	United Kingdom

Domain Name System

- Domain Name System (DNS) is chiefly used to translate hostnames into numeric IP addresses.
- DNS is a distributed database with no one organization responsible for maintaining the hostname/IP mappings.
- When a use specifies a hostname in a browser in a browser, a request is sent to a nearby domain name server.

Domain Name System

- If the server can resolve the hostname it does so.
- If not it asks another domain name server for help.
- If the second server can't resolve it the request propagates.
- Ultimately, either the request reaches a server which can resolve the name or the request expires taking too much time to resolve.

World Wide Web

- WWW – An infrastructure of information and the network software used to access it.
- WWW is distinct from the Internet – it runs on the Internet.
- The Internet allowed communication from the beginning.
- The WWW made communication easier.
- The Internet usage exploded after WWW arrived in the early 1990s.

World Wide Web

- Web Page – A document that contains or references various kinds of data.
- Link – A connection between one page and another.
- Website – A collection of related Web pages, usually controlled by a single person or company.
- Web Browser – A software tool that retrieves and displays Web pages.

World Wide Web

- Web server – A computer set up to respond to requests to web pages.
- Uniform Resource Locator (URL) – A standard way of specifying the location of a Web page.
  - Uniquely identifies the page from all the pages anywhere on the world.
  - Part of the URL is the hostname of the computer on which the information is stored.

HTML

- Web pages are built using a language called Hypertext Markup Language (HTML).
  - Hypertext – information is not stored linearly, links can allow user to jump from one place to another.
  - Hypermedia – amalgamation of text, images, audio and video.
- Markup Language – A language that uses tags to annotate the information in the document.
- Tag – The syntactic element in a markup language that indicates how information should be displayed.

HTML

- A HTML document consists of information that is annotated by tags that specify how a particular element should be treated and formatted.
- A web browser displays an HTML page without regard to extra spacing, blank lines or indentation.
- The tags alone guide the browser and a web page might look different in different browsers.

XML

- Extensible Markup Language (XML) – A language that allows the user to describe the content of the document.
  - Users can define their own tags unlike in HTML where the tags are fixed.
- XML is a metalanguage – it is used to define other languages.
- XML tags specify the nature of the data while HTML tags focus on the format of the displayed data.