Internet, Web, browser, Client server architecture

Topic 1

CMPT 350

Internet

- Internet is a massive communication network that connects computers around the world.
- Internet conceptualized during the 1960s by the ARPA or Advanced Research Projects Agency and the first node was established at UCLA and then at Stanford.
- The internet is actually the network of networks.
- Internet Protocol (IP): a set of rules that indicate how data should be transferred over the internet. It is responsible for the addressing and fragmentation of data packets on the internet.
- Transmission Control Protocol (TCP): Defines the rules of exchanging data packets between devices over a network. It is a connection-oriented protocol that provides ordered delivery of a stream of bytes from one computer to another computer.
- TCP/IP: TCP and IP work together to defines how computers send packets of data over the internet. (Robert Kahn and Vinton Cerf 1970s)

IPV4 vs IPV6

- IPV4
- 32-bit address scheme allowing to store 2^32 addresses, which is more than 4 billion addresses.
- x . x . x . x where x is called an octet and must be a decimal value between 0 and 255.
- 18.137.72.156

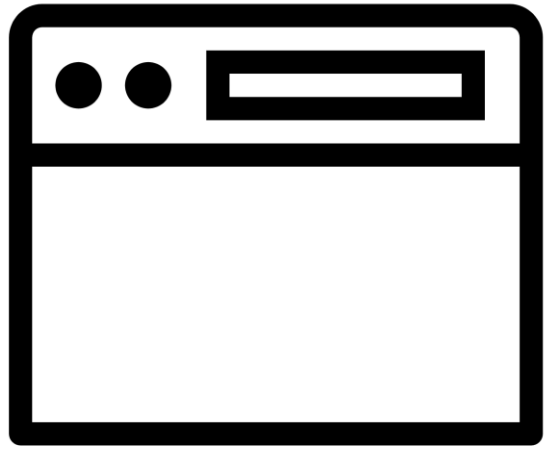
- IPV6
- 128-bit address space allowing to store 2^128 addresses, which is 340 undecillion unique address space.
- y : y : y : y : y : y : y : y where y is called a segment and can be any hexadecimal value between 0 and FFFF.
- 2901 : db9 : 3453 : 6666 : CABC : DDDD : EEEE : FFFF
- Hierarchical addressing and more efficient routing
- Support for quality of service (QoS)
- More Efficient Packet Processing

World Wide Web (WWW)

- World wide web is a collection of information that is accessed via *the Internet.*
- The World Wide Web represents a method of accessing content through the medium of the Internet.
- Invented by Tim Berners-Lee (1990s).

What is the difference between internet and web?

Browsers

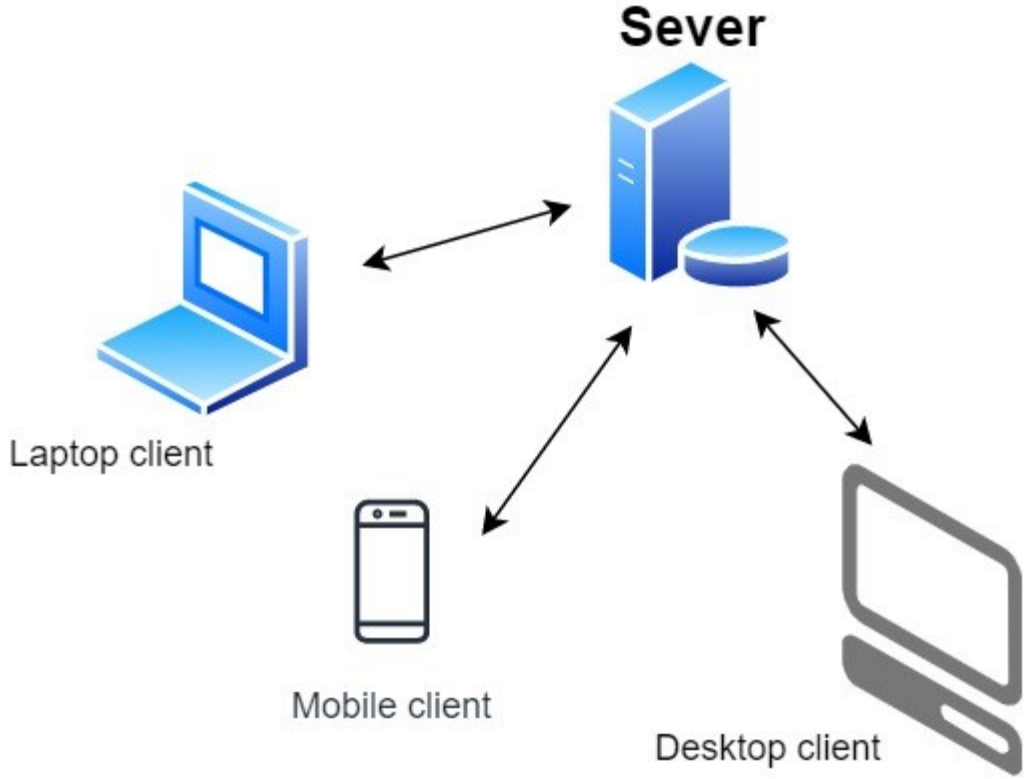


Browsers are applications used to display and interact with all content on the world wide web.

Web pages are written in HTML, which is a markup language, so browsers display a web page by reading and interpreting its HTML code.

Client-Server Architecture

Client-server architecture is a distributed application structure with two roles in the network: client and server.
Servers provide a resource or service, and clients initiate the communication by requesting a resource or service provided by servers.



- The web operated in this client-server model.
- The browser is the **client** that contacts the Web server and requests information or service.

Web servers

Web servers deliver web pages. A web server is a server responsible for accepting HTTP requests from clients, which are browsers, and serving them HTTP responses along with optional data contents, which usually are Web pages such as HTML documents, linked objects (images, etc.), and scripts.

HTTP (Hypertext Transfer Protocol) provides a standard form of communication between browsers and web servers.

HTTP

- Http consist of two phases: the request and response.
- HTTP starts with a client opening a connection to submit a request to a web server, then waiting until it receives a response from the webserver.
- Each request and each response include two parts: a header and a body. The header contains information about the communication, and the body contains the data, which could be empty.

HTTP request

1. HTTP method domain part of the URL HTTP version
   GET /docs/index.html HTTP/1.1
2. Header fields
   name:value pairs. Multiple values, separated by commas
   Host: www.w3.org
   Accept: text/html
   …
3. Blank line
4. Message body

HTTP request methods

- GET: request data from a specified resource.

  www.searchsomething.com/search?query=userquery

  ?query=Saskatoon

- HEAD: similar to GET, but without the response body
- POST: send data to a server to create/update a resource.
- PUT: similar to post, but calling the same PUT request multiple times will always produce the same result. In contrast, calling a POST request repeatedly have side effects of creating the same resource multiple times.
- DELETE: deletes the specified resource.

https://www.w3schools.com/

HTTP response

1. Status line

   HTTP version, three digit status code, short text explanation of the status code

   HTTP/1.1 200 ok

2. Response header field

   Accept-ranges: bytes

   Content-length: 364

   Server: Apache

   …

3. Blank line

4. Response body

First digit	Category
1	Informational
2	Success
3	Redirection
4	Client Error
5	Server Error