Introduction to Web Development

Coding Blocks – Arnav Gupta

The Internet

Some facts and history

Internet by the Numbers

- 4.5 billion users
- >50% of all world population has access
- 1.5 billion websites
- 10x increase from 1999 to 2013

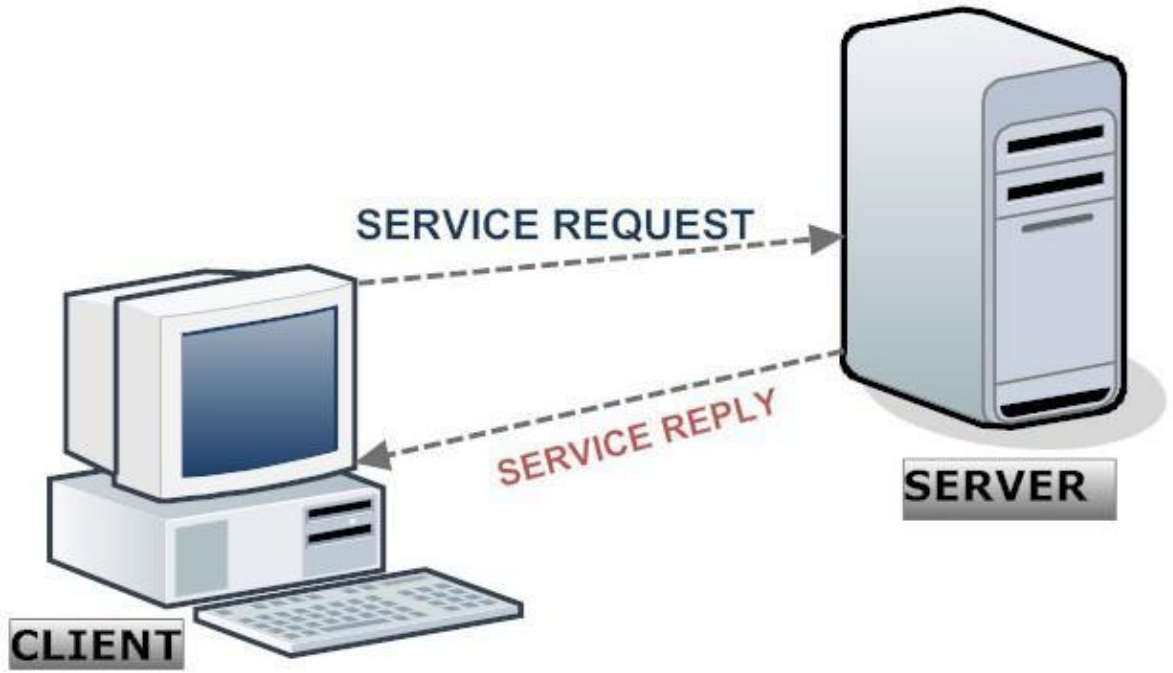
Internet History

- 1958 – Bell Labs – Modem
- 1961 – MIT – Packet Switching
- 1968 – ARPANET
- 1972 – University Internet Nodes, UCLA Chat
- 1974 – Vint Cerf – TCP

How the Web works

- Servers
- Clients
- ISPs
- DNS
- Datacenters

Client Server Model



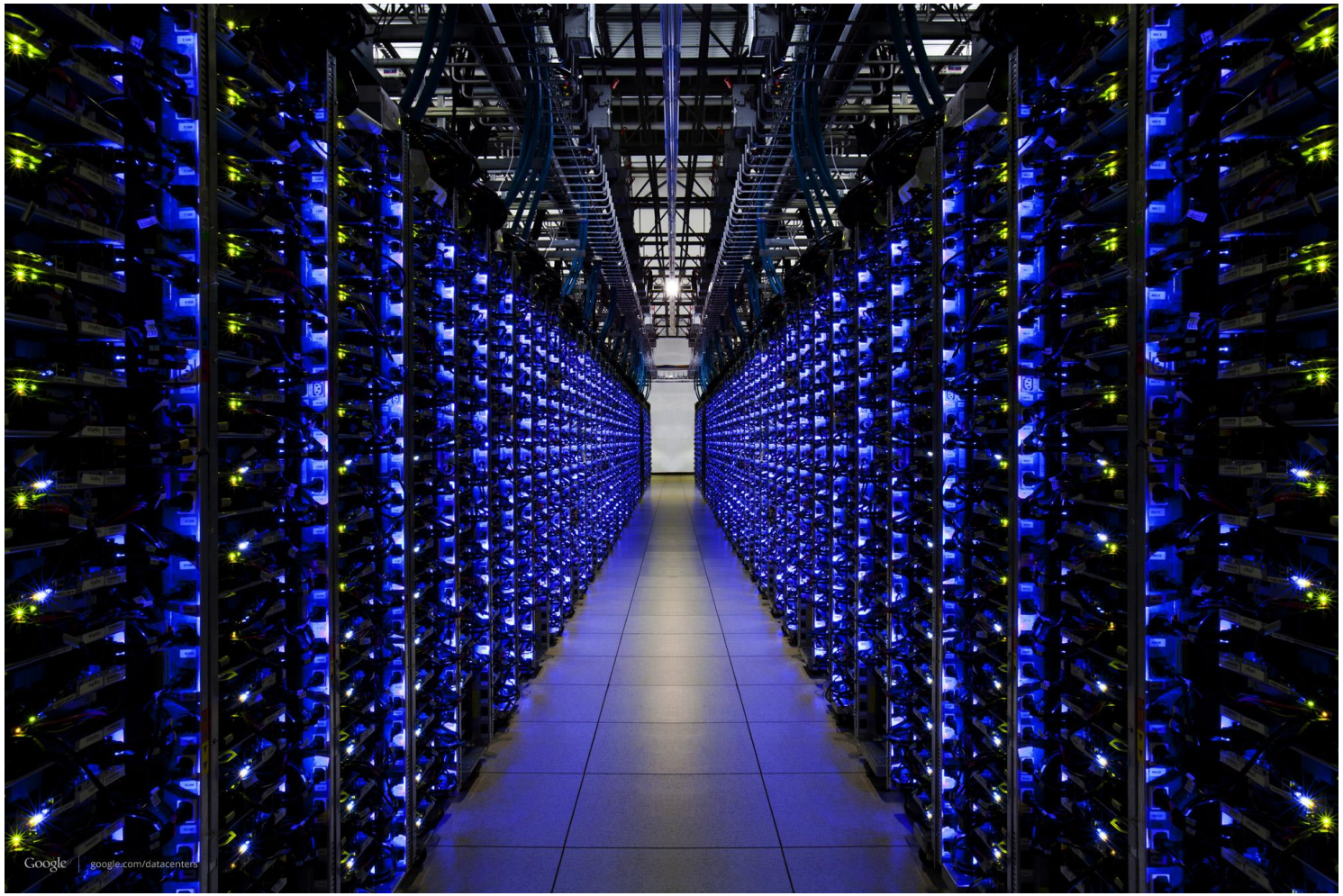
Domain Name Server

- Phone book of the Internet
- Maps domains (www.google.com, www.yahoo.com) to IP addresses (112.123.21.22, 8.8.22.56)
- Humans remember domains
- Computers work with IP

Internet Service Provider

- Company that provides access to user
- Internet can be over DSL, Phone Line, Cable, Fibre, Wireless and other medium

Datacenters



Datacenters

Web terminologies

- Protocols
- Addresses
- Packets

Web Protocols

- TCP/IP
- HTTP
- DHCP
- FTP
- SMTP
- SSH
- Telnet

Web Addresses

- Domain Names
- IP Address
- MAC Address

Domain Names

- Human-readable web address
- <subdomain>.<domain>.<TLD>
- TLD – Top level domain
  - .org
  - .com
  - .net
  - Country based - .uk, .in,
  - Purpose based - .edu, .aero, .info

IP Addresses

- 32-bit, 4-word address (IPv4)
- Uniquely defines a server, a client, a node, or a router.
- IPv6 Address – Default in future - 128-bit (16 octet)
- IP allows –
  - Subnets
  - Gateways
  - Private Ips

MAC Address

- Media Access Control
- An ID unique to a hardware Network Interface
- Is **not** dynamic like IP. Is fixed for a hardware device.
- Used by all IEEE 802 Network Technologies

Components of the Web

- Web Pages
- Web Sites
- Web Servers
- Search Engines

Web Page

- A document that can be viewed over web
- Transported over Internet
- Viewed on a browser
- Uses markup (HTML) and styling. Can contain scripts

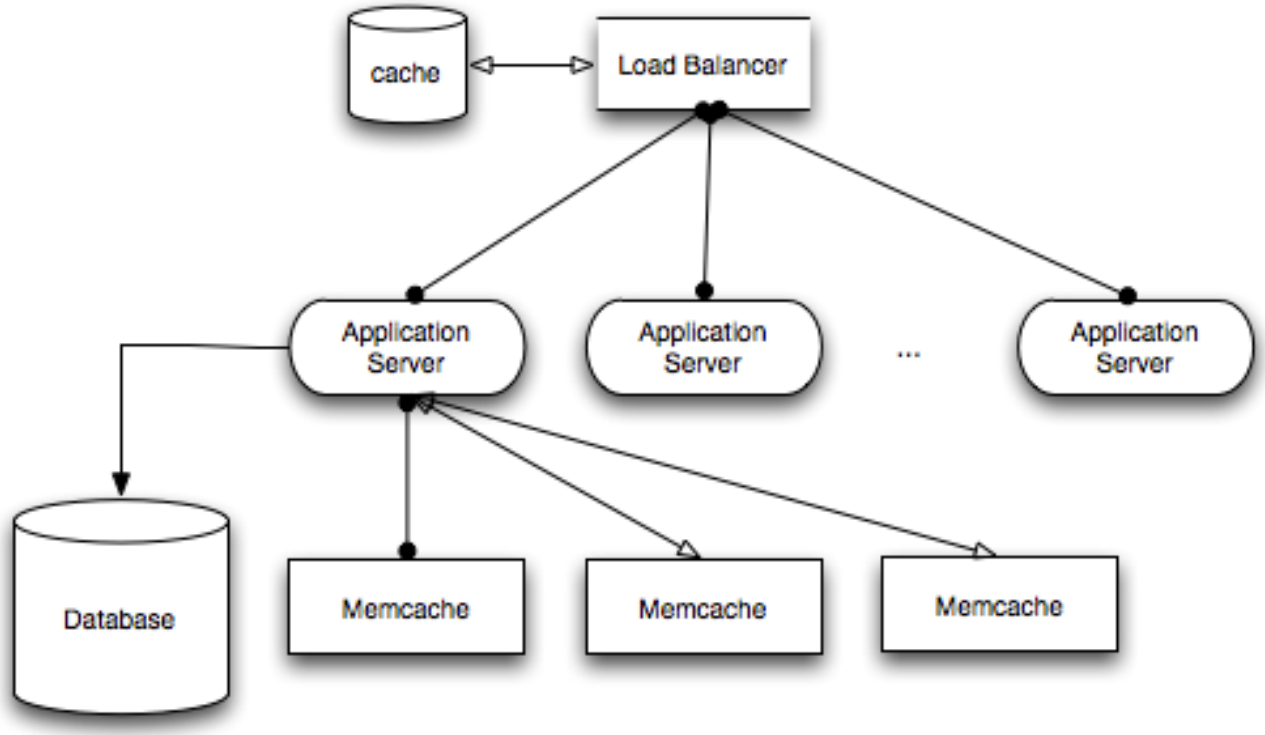
Web Site

- Collection of webpages
- Also can include other media (audio, images, video)

Web Servers

- A hardware (or software) that hosts the website.
- One website can be spread over multiple servers
- One server can host multiple websites

Web Server Architecture



Search Engines

- A website that indexes other websites/webpages
- Helps you find websites
- Uses techniques like ‘crawling’ to cache content for searching
- Google.com, Bing.com, Yahoo.com

How web technologies work

Server

- Hardware
- OS
- Server Framework
- Containers/Servlets
- Server Applications

Server Side Frameworks

- Java
  - Spring
  - Play
  - Jboss
- Python
  - Flask
  - Django
  - Bottle

Server Side Frameworks

- Ruby
  - Rails
- PHP
  - Codeigniter
  - Laravel
- Node.js
  - Express
  - Hapi.js

Client Side Techologies

- HTML (Markup)
- CSS (Styling)
  - SASS
  - LESS
- Javascript (Scripting/Events)
  - jQuery
  - Angular
  - React
  - Backbone
  - Knockout

Server-side Databases

- RDBMS
  - MySQL
  - Postgres
  - Oracle
  - MS Database
- NoSQL
  - MongoDB
  - CouchDB
  - Memcache
  - Redis

Client-side Storage

- localStorage
- sessionStorage
- Cookies
- indexedDB
- cache

Types of websites

- Static Websites
  - All HTML content is created and saved on server
- Dynamic Website
  - Content is generated on demand for each user
- Responsive
  - Reacts to user, and his screen size

RESTful APIs

- A contract between servers and clients
- GET
- POST
- PUT
- DELETE
- PATCH

Data exchange formats

- JSON
- XML

Website design principles

- Reactive websites
- Single-Page Applications
- MVC, MVP, MVVM and MV* architectures
- Web Application Frameworks

Latest developments

- VirtualDOM, ShadowDOM
- Sockets
- Pub/Sub, Push Notifications
- Browser Native APIs (Locations, User data)

Course Schedule

Web Development Live Class, September 2017 Batch

Live Webinars

Date	Lecture
25 Sept	Introduction to Web Developlent
28 Sept	Using Git and Github
02 Oct	HTML Basics
04 Oct	HTML Advanced
10 Oct	CSS Basics: Class, ID, Selectors, Combinators
12 Oct	CSS Advanced: Transforms, Animations
17 Oct	Javascript Introduction
24 Oct	Javascript: Numbers, Strings, Arrays operations
26 Oct	Javascript: Closures, Prototypes, Classes

Live Webinars

Date	Lecture
31 Oct	Introduction to NodeJS
02 Nov	NodeJS: File Operations, HTTP Servers
07 Nov	ExpressJS: REST APIs, Server Side Rendering
TBD	ExpressJS: Routing, Middlewares, Common Libraries
TBD	Databases: MySQL, SequelizeJS
TBD	Databases: MongoDB
TBD	Socket.IO: Realtime communication
TBD	PassportJS: Authentication and Authorisation
TBD	Unit Testing, Deploying, Devops and Maintenance

Tools

- Recommended IDE / Editors –
  - Visual Studio Code (frontend – HTML/CSS/JS)
  - Jetbrains Webstorm (NodeJS / Backend / Large projects)
    - Free Unlimited License available for Students
    - 3 months limited license available for Coding Blocks students
- Operating System
  - Windows/Mac/Linux all works
    - Recommended : Unix-based (Linux / MacOS, esp for backend)
- Assignments / Progress Tracking
  - Submit frontend projects via bitballoon.com
  - WakaTime Extension for IDE/Editor to track time spent
  - Submit Code via Github Repos

Logistics

- Contact Me on : a@cb.lk,
- Whatsapp Group : Scheduling and informal discussion
- Slack Channel : Doubts in code, chat with me / TA
- Teaching Assistants :
  - Rishabh Khanna - rk@cb.lk
  - Bhavya Agarwal – b@cb.lk
  - Apoorvaa Gupta – ag@cb.lk
  - Manish Mittal

Questions ?

Feel to follow up later via Slack / Whatsapp either