Introduction to Web Applications

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Overview

- The Internet.
- The World Wide Web.
- Client-Server Architecture.
- Domain Resolution.
- Load Balancing.

- Demo - Deploy and Serve a Static Website.
- Demo - Deploy and Server two Static Websites.
- Demo - Add (fake) Domain Names to the Applications.
- Demo - Enable Load Balancing.

What is Everything and why

The Internet

- Global Network.
- Allows connection between devices.
- Devices connect to the internet using the TCP/IP protocol.

The World Wide Web

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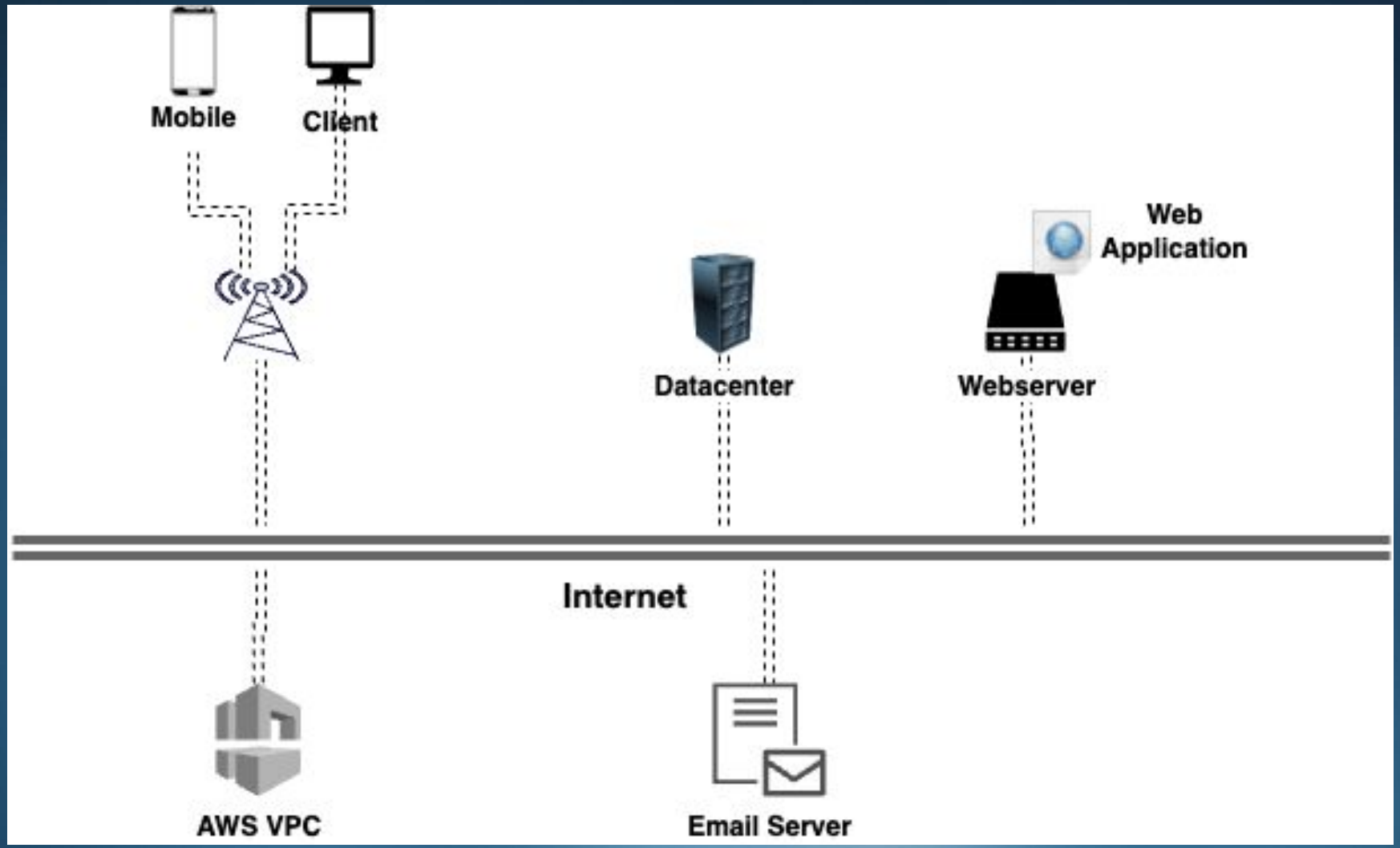
- It is not the Internet!!!
- A global collection of documents and resources linked together.
- Can be accessed through HyperText Transfer Protocol (HTTP)
- Made out of several components: HTTP protocol, URLs, URIs, HTML.

Web Application

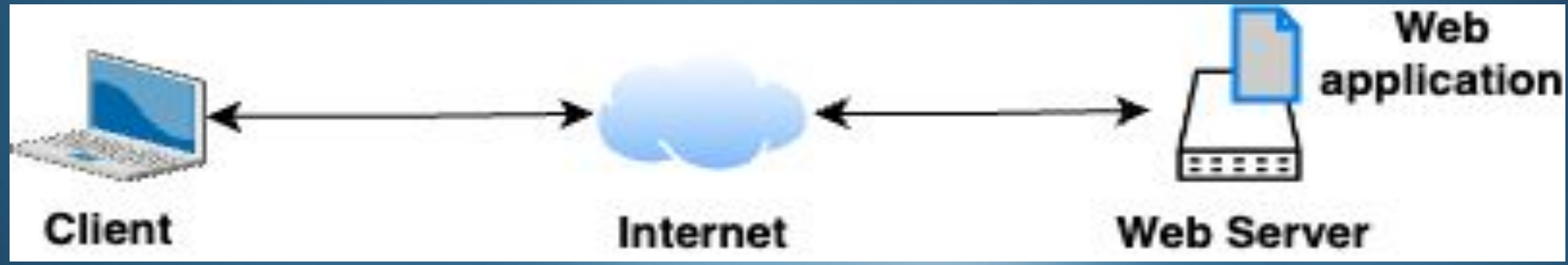
- An application served through the internet and consumed by a client
- Platform agnostic
- Examples: Gmail, Facebook, Whatsapp, etc.

Connecting the Dots



Client – Server Architecture

- A computing model to serve and consume resources.
- Clients: Mobiles, Browsers, IOT Devices, etc.
- Servers: Mail servers, File servers, etc.
- Servers are reached by IPs, and serve applications using ports.



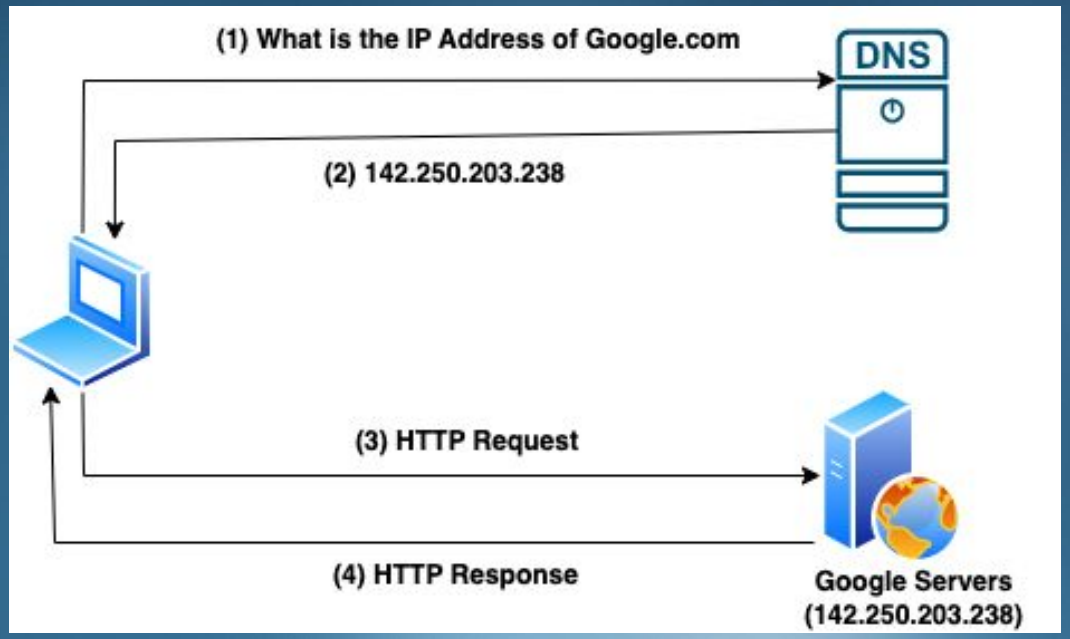
Domain Resolution

- Impossible to memorize the IP address of every server.
- Impractical on large scale.
- Domain Resolution is mapping a domain name to the servers IPs.

```
[devops-beyond-limits@DBL ~ % dig google.com

; <<>> DiG 9.10.6 <<>> google.com
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 20494
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 512
;; QUESTION SECTION:
;google.com.                    IN      A

;; ANSWER SECTION:
google.com.             113     IN      A       142.250.203.238

;; Query time: 99 msec
;; SERVER: 8.8.8.8#53(8.8.8.8)
;; WHEN: Tue Dec 27 07:08:41 EET 2022
;; MSG SIZE  rcvd: 55

[devops-beyond-limits@DBL ~ % dig facebook.com

; <<>> DiG 9.10.6 <<>> facebook.com
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 56334
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 512
;; QUESTION SECTION:
;facebook.com.                  IN      A

;; ANSWER SECTION:
facebook.com.           300     IN      A       157.240.195.35

;; Query time: 77 msec
;; SERVER: 8.8.8.8#53(8.8.8.8)
;; WHEN: Tue Dec 27 07:08:46 EET 2022
;; MSG SIZE  rcvd: 57
```

Domain Name System

- Database System containing domain names and their Corresponding IP addresses.



Load Balancing

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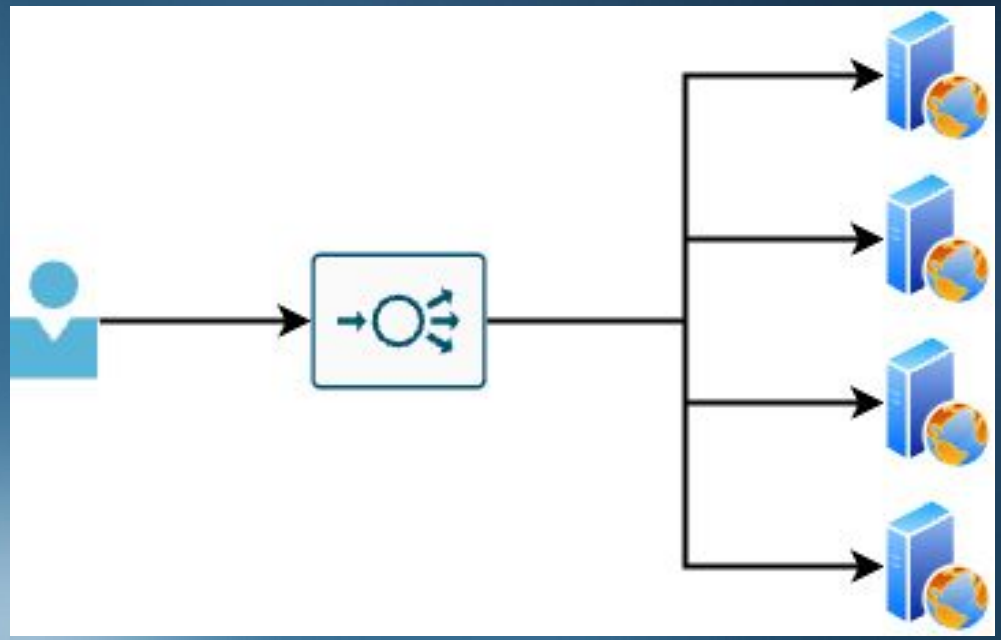
- The act of distributing traffic across multiple replicas of a service.
- Performance.
- Scalability.
- Availability.
- Security.



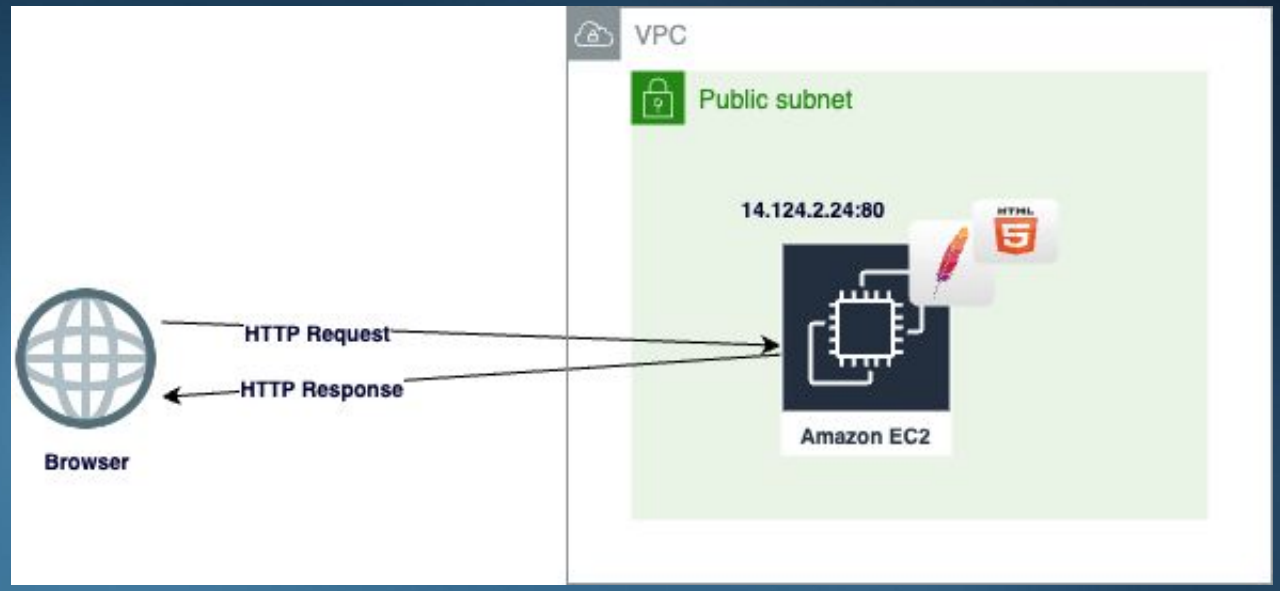
Load Balancing - Continued

- **Algorithms**: Round Robin, Least Connections, Least Response Time, Least Bandwidth.
- **Health Checks:** Protocol, Port, Path, HealthCheck Interval, Healthy Threshold Count

Knowledge Application

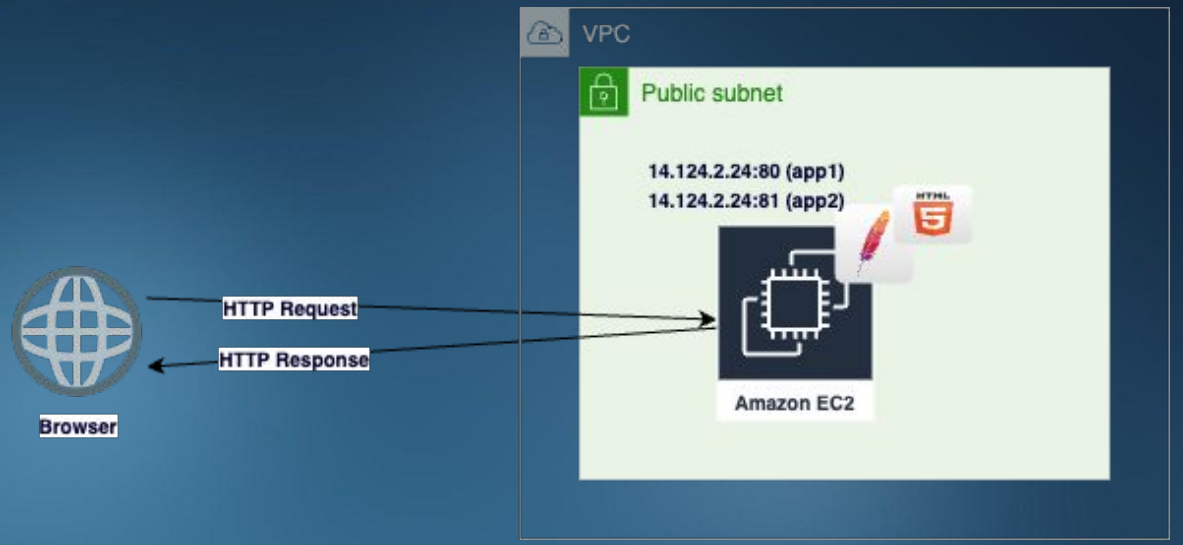
Demo – Deploy and Serve a Static Website

- Create an AWS EC2 machine.
- Install a Web Server (Apache2).
- Deploy a simple HTML application.
- Configure the webserver.



Demo – Deploy and serve two static websites

- Create a second HTML page.
- Serve the application on port 81.
- Configure the webserver.

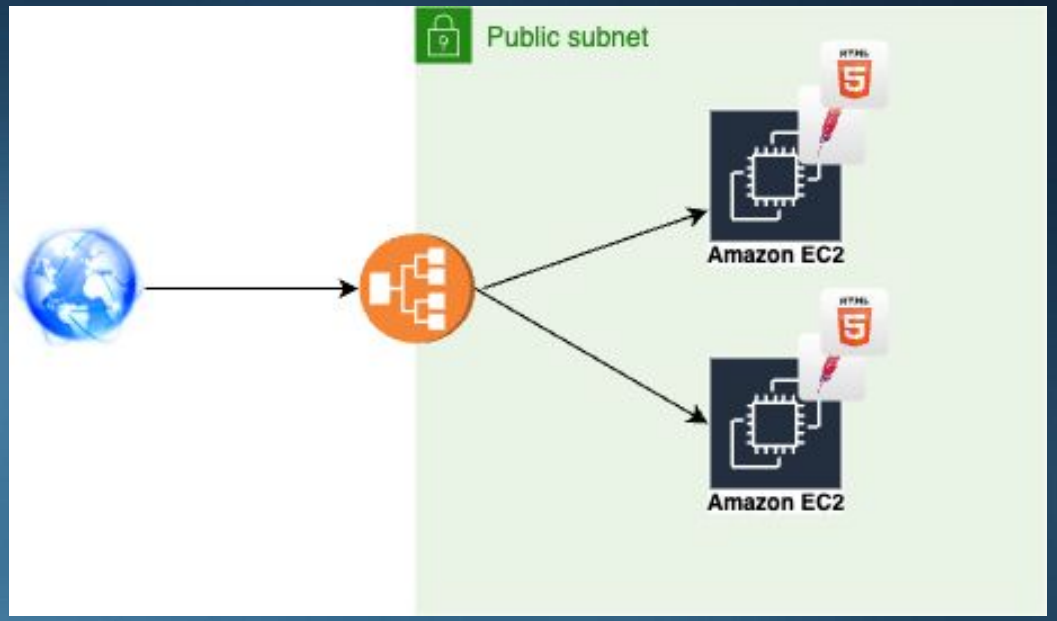


Demo – Add (fake) domain names to the applications

- First app served through: myfirstapp.com
- Second app served through: mysecondapp.com
- Serve both apps on port 80 (default HTTP port).

Demo – Enable Load Balancing

- Create two webservers.
- Deploy the applications on each webserver.
- Create and configure a load balancer.



Thank You