

MODULE 2

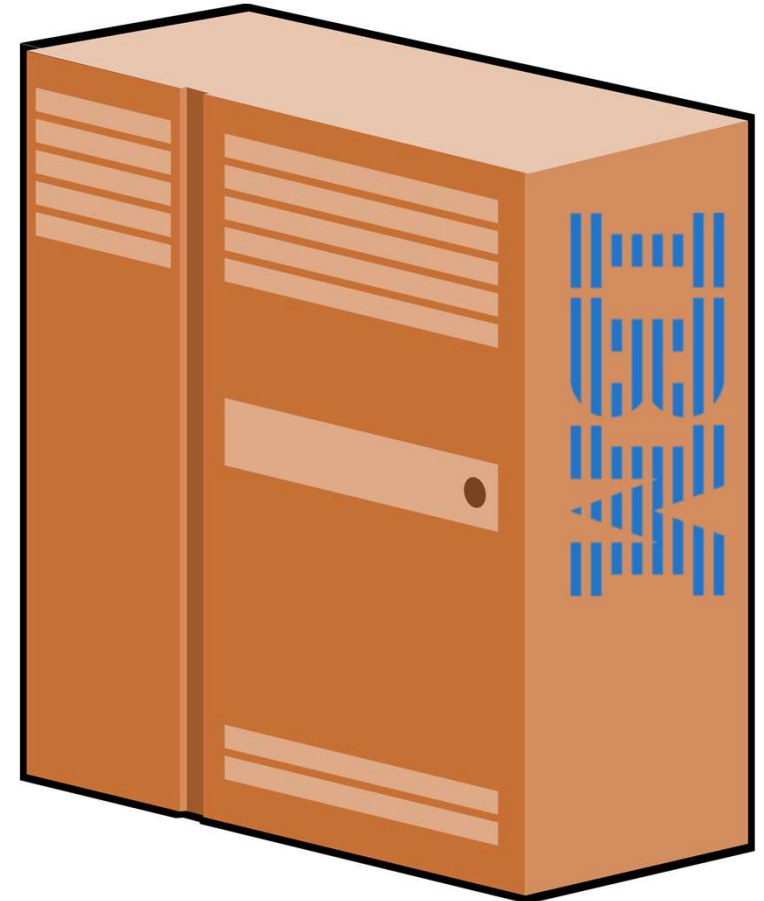
Application Architecture and Introduction to Networks



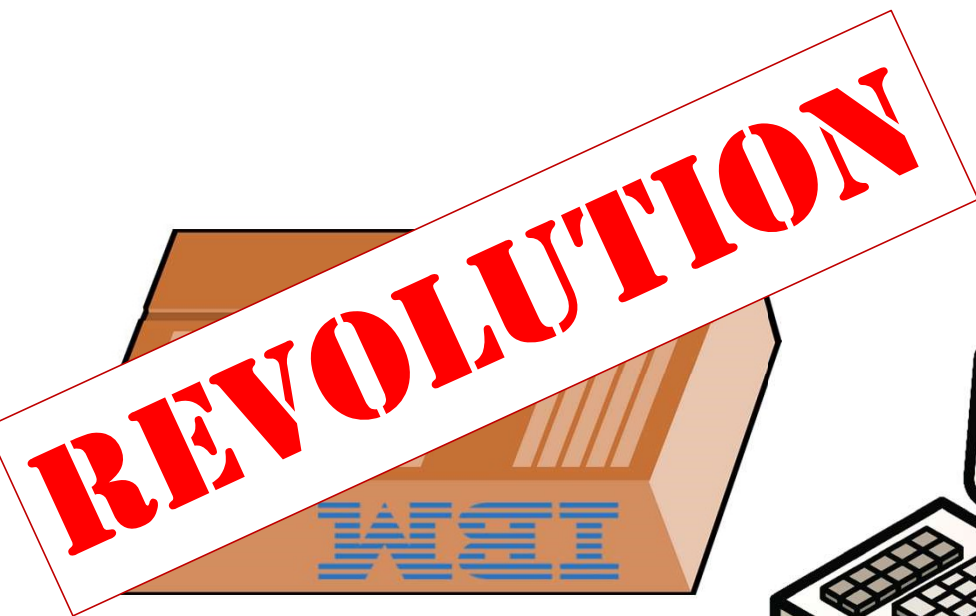
Before the PC Revolution

```
Processes: 218 total, 2 running, 9 stuck, 199 sleeping, 901 threads 23:00:00
Load Avg: 1.40, 1.75, 1.00 CPU usage: 4.15% user, 4.40% sys, 91.44% idle
SharedLibs: 1640K resident, 00 data, 00 linkedin
MemRegions: 31278 total, 1093M resident, 117M private, 564M shared,
PhysMem: 5893M used (1191M wired), 10G unused.
VM: 523G vsz, 1820M framework vsz, 0(0) swappins, 0(0) swappouts.
Networks: packets: 12185/8921K in, 11907/1964K out.
Disks: 88156/7205M read, 21235/425M written.

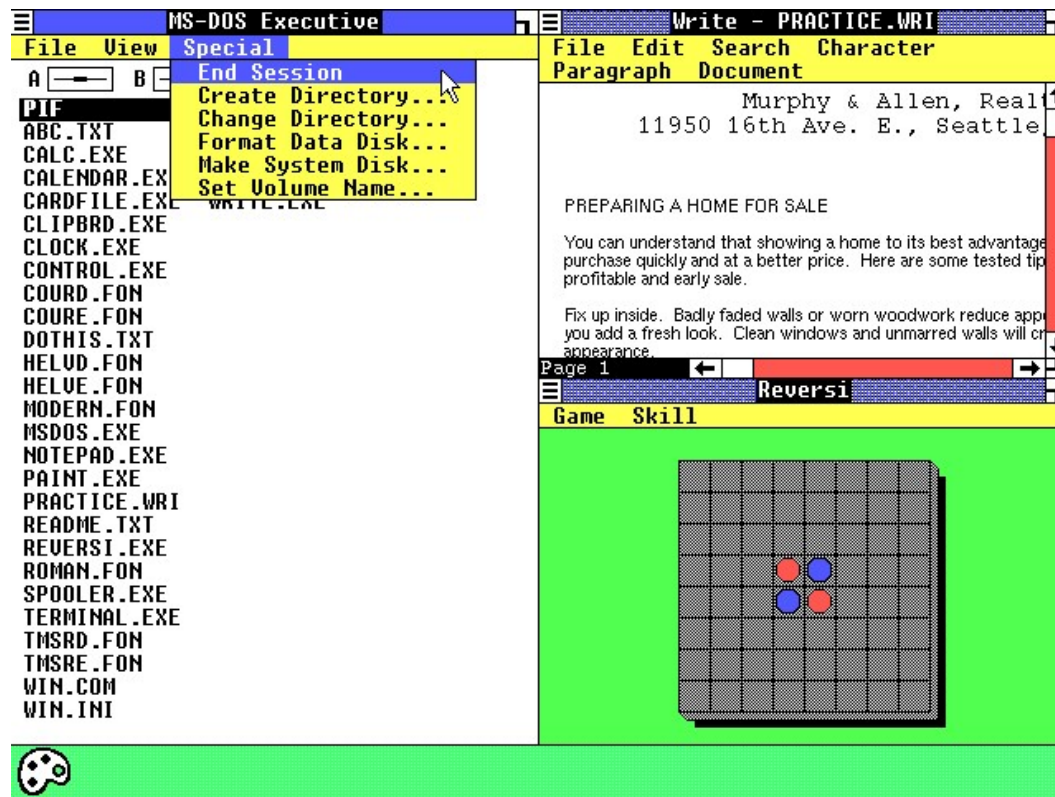
PID COMMAND %CPU TIME #TH #WO #PORT MEM PPG CPM PGAP PPID
592 screencapt 0.0 00:00:02.7 5 55+ 1952K+ 20K+ 00 262 262
590 mdworker 0.0 00:00:01.3 0 44 2832K 00 00 590 1
589 mdworker 0.0 00:00:01.3 0 44 1572K 00 00 589 1
588 top 1.7 00:00:51.1/1 0 22+ 2860K 00 00 588 584
584 bash 0.0 00:00:00.1 0 15 580K 00 00 584 583
583 login 0.0 00:00:01.3 1 20 1278K 00 00 583 482
574 sshd 0.0 00:00:00.2 0 25 560K 00 00 574 1
567 system Prefe 0.0 00:03:23.3 0 270 19M 8364K 00 567 1
561 systemstatd 0.0 00:00:01.2 1 19 1040K 00 00 561 1
560 com.apple.We 0.0 00:01:42.9 0 229 25M 00 00 560 1
558 com.apple.We 0.0 00:05:07.15 3 224 151M 1716K 00 558 1
555 bash 0.0 00:00:00.1 0 15 604K 00 00 555 554
554 login 0.0 00:00:01.3 1 20 1176K 00 00 554 482
550 bash 0.0 00:00:00.1 0 15 600K 00 00 550 549
```



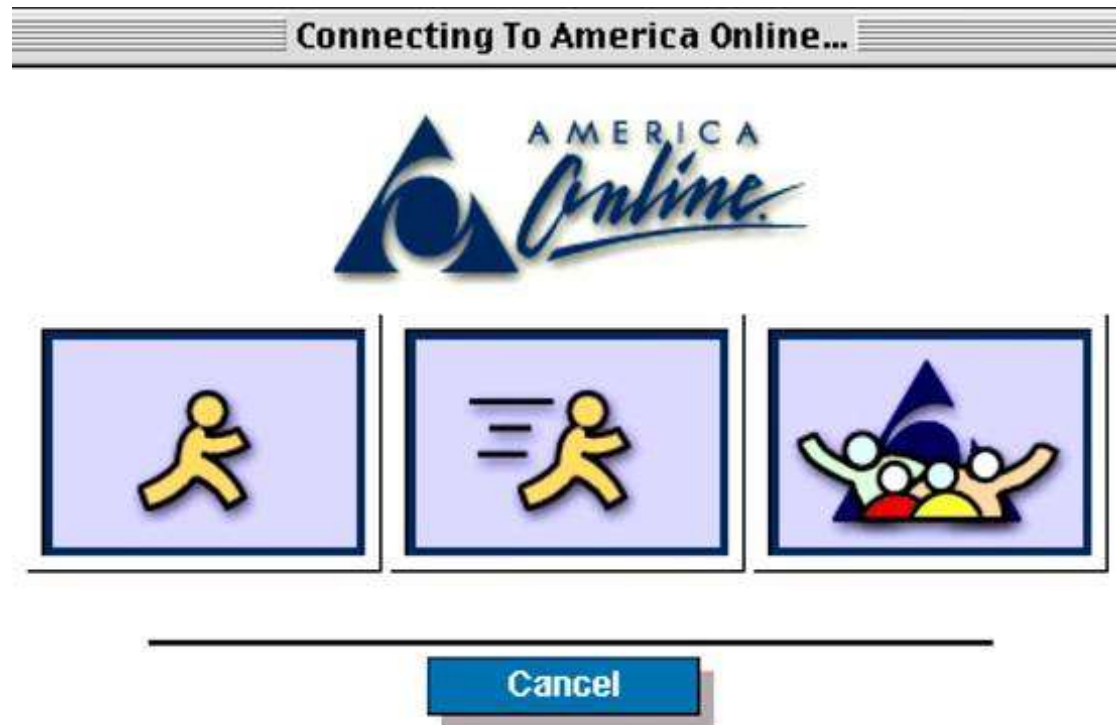
PC Revolution!



GUI Revolution



Internet Revolution



Separation of Concerns

User interaction
UI, UX



Business
Logic



Persistent
Storage



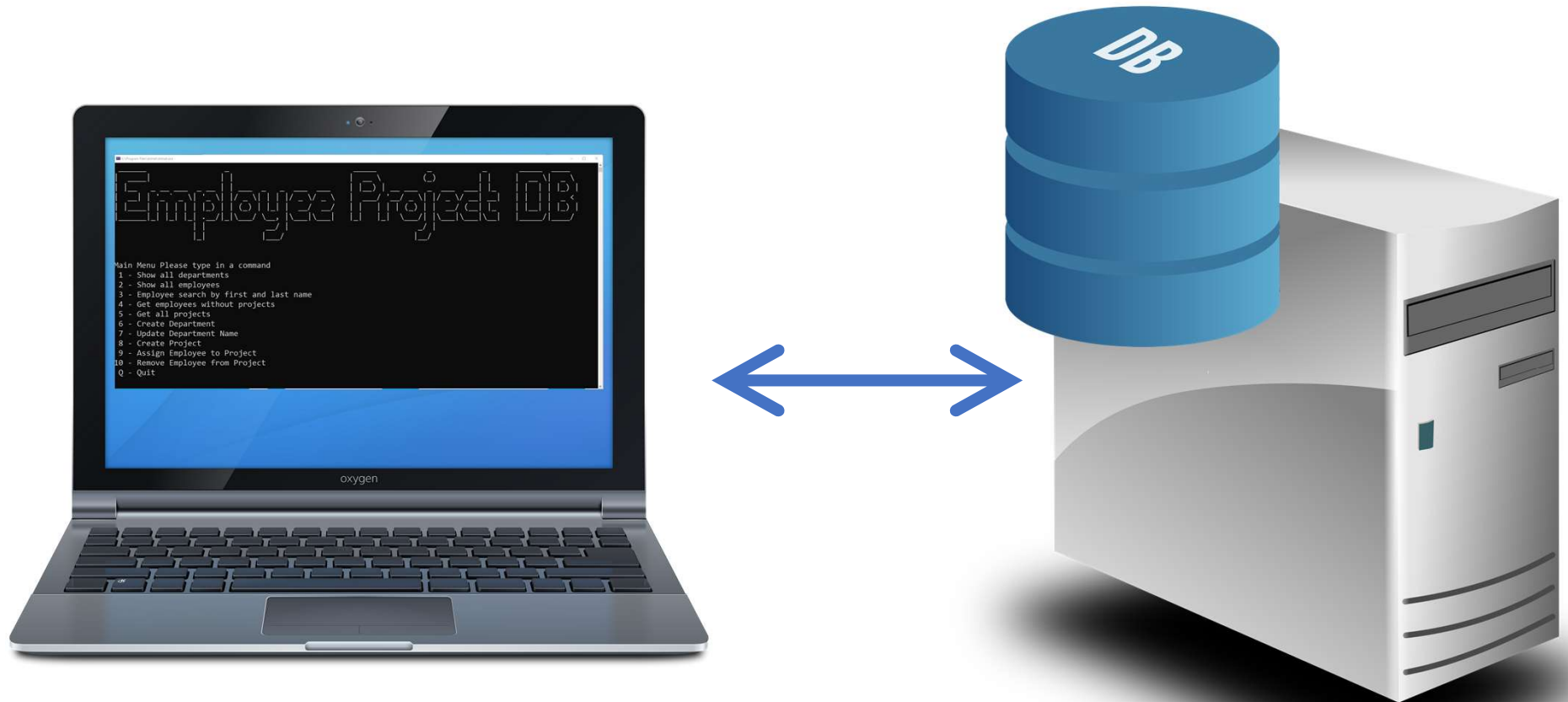
Our Application Evolution



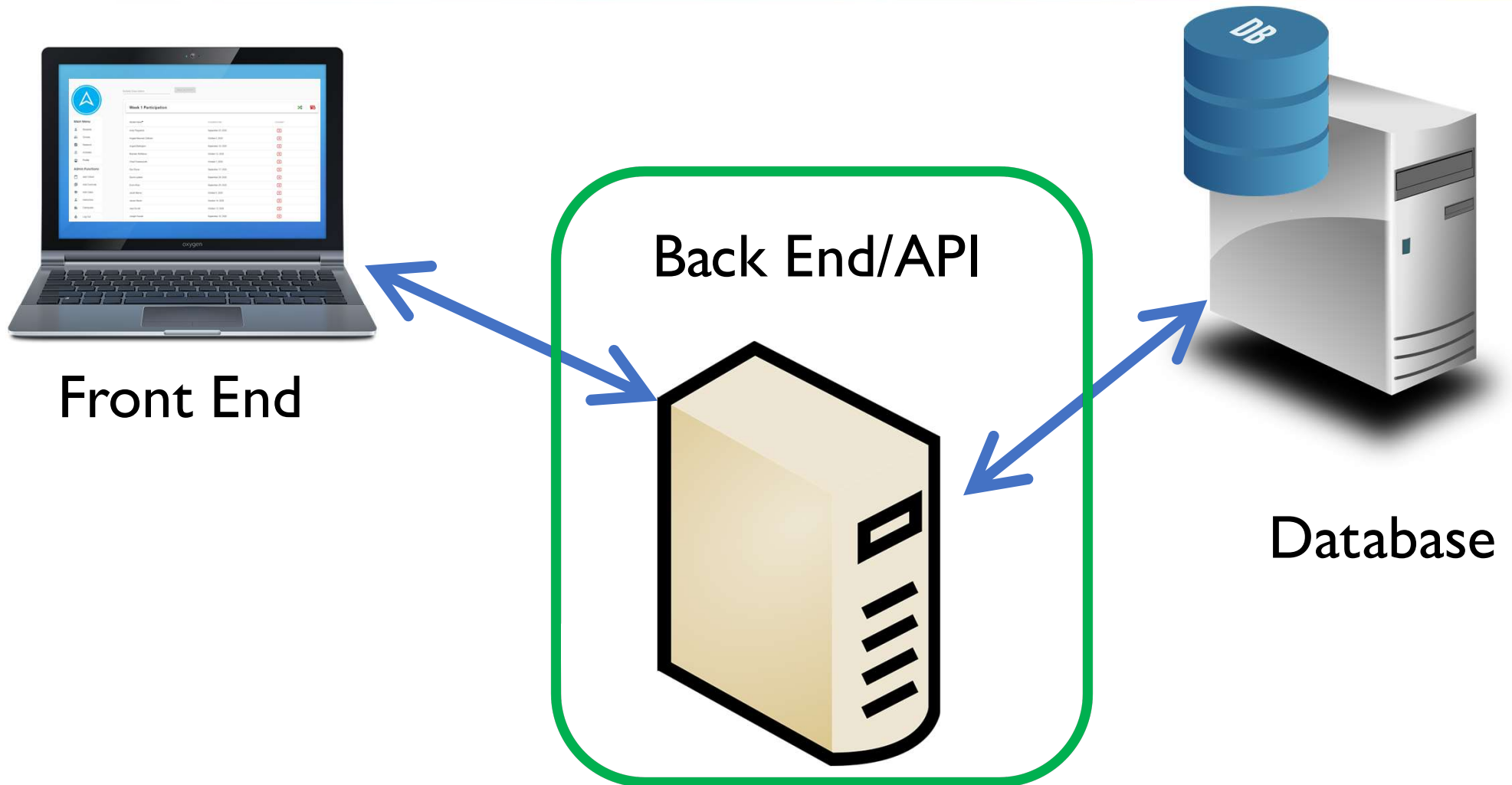
Our Application Evolution



Our Application Evolution



Our Application Evolution



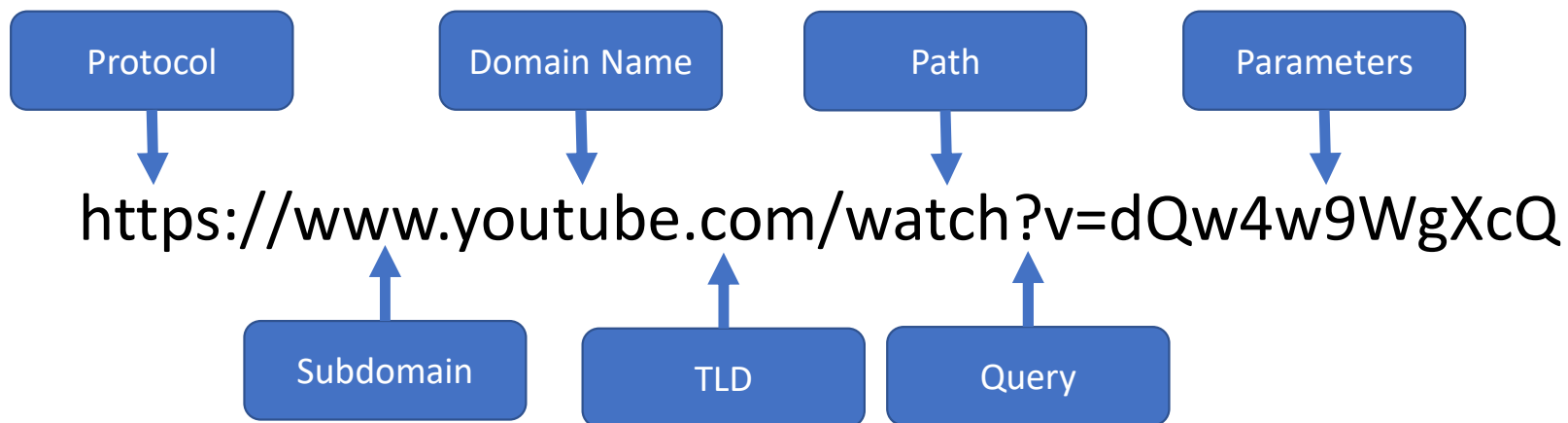
Internet

- Has anyone ever used the internet?



The URL

- What does URL stand for?
- Uniform Resource Locator



IP Address

- Internet Protocol Address (the phone number of the internet)
- Four numbers with 8 bits per number
 - 8 bits == 255 numbers
 - Example IPv4: 54.161.176.89
 - What's your IP address?
- IPv4 is 32 bit allowing for 4.26 billion addresses.

IP Address

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- IPv4 is 32 bit allowing for 4.26 billion addresses.



Network Routers



IPv6

- IPv6 is 128 bits allowing for 3.4×10^{38} addresses.
- Example of IPv6
 - fe80:0000:0000:0000:c0b5:30b7:3fd7:e2a4

Domain Name System

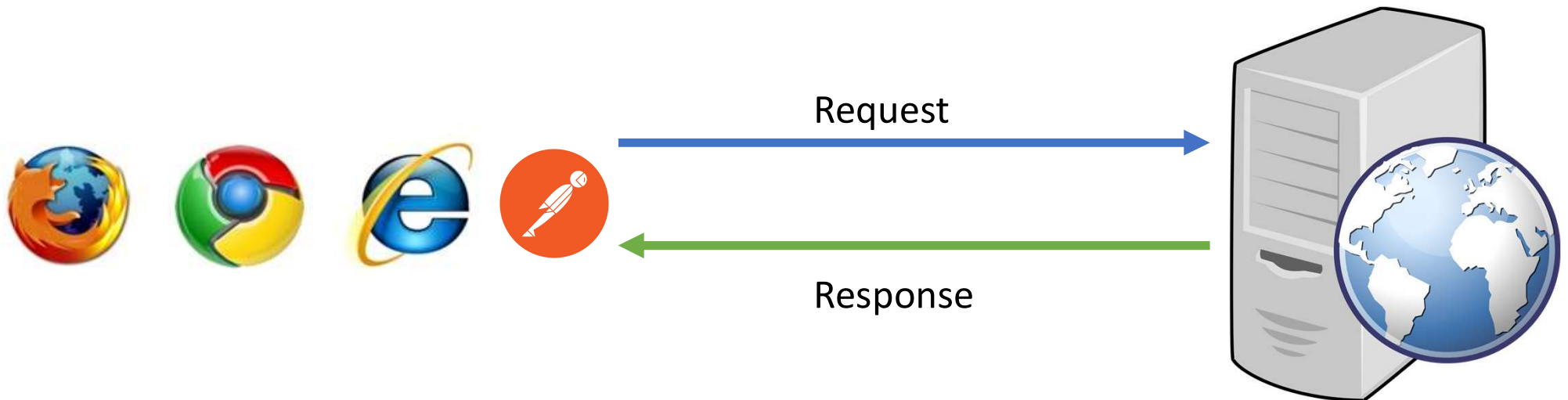
- DNS translates 198.185.159.144 to techelevator.com
- Start with the right most part of the domain: Top Level Domain:
 - .com
 - .net
 - .edu
- Next, is the domain name:
 - techelevator
 - espn
 - msn
- Then, the subdomain.
 - Each subdomain can point to a different IP

Port Numbers

- If IP addresses are your phone number, port numbers are the extension
- Range from 0 – 65535
- Common port numbers:
 - 80 == default http
 - 443 == default https
 - 25 == SMTP (email)
 - 21 == FTP

HTTP and HTTPS

- HTTP: Hypertext transfer protocol
 - How browsers and servers communicate with each other
 - Defines a simple request/response protocol



Key Elements of HTTP Request

- Method: GET, POST, PUT, DELETE, PATCH
- The page to access
- Form parameters

Querystring Parameters

- Querystring parameters allow us to add additional inputs.
- Parameters are represented in key/value pairs with the & symbol.
<https://www.google.com/search?source=hp&ei=67uWX9noGMHF1QGr2KmwDw&q=techelevator&oq=techelevator>
- Anchor is a specific part of the resource and represents a bookmark in the document. Also abstracted by front end frameworks, much like the file path.
<http://www.yahoo.com#headlinenews>

Key Elements of the Response Stream

- HTTP Status code
 - 1xx Informational
 - 2xx Success (200 OK)
 - 3xx Redirect (301 Moved Permanently)
 - 4xx Client Error (400 Bad Request, 401 Unauthorized, 403 Forbidden, 404 Not Found)
 - 5xx Server Error (500 Internal Server Error, 501 Not Implemented)

Response Data

- JSON (JavaScript Object Notation) is a lightweight data-interchange format.

```
{
  "id": 1,
  "name": "Aloft Cleveland",
  "address": {
    "id": "69006b81-7f58-4acc-a10e-f9f87affae5f",
    "address": "1111 W 10th St",
    "address2": "",
    "city": "Cleveland",
    "state": "Ohio",
    "zip": "44113"
  },
  "stars": 3,
  "roomsAvailable": 48,
  "costPerNight": 274,
  "coverImage": "aloft-cleveland.webp"
}
```

Where to host?

- A hosting provider is used to allow us to serve up content over a network.
 - Self Host
 - Shared Hosting Provider
 - Dedicated Host
 - Cloud Host
- What are the upsides/downsides?
- What are some examples?
 - Amazon, Azure, Google, GoDaddy, HostGator, Wordpress, SquareSpace

Web Server vs Application Server

- Web Servers are good for serving up web resources that are static content
- Application Servers are for generating dynamic web pages
 - IIS, Tomcat, Apache

Registering Your Own Domain

- A domain name can be leased from a DNS Registrar.
 - Popular and easy to use registrars are godaddy.com, hover.com or Google's domains.google.
- What you lease is a subdomain of the TLD you choose.
 - Tech Elevator leases the domain techelevator.com.
- You create the subdomains...as many as you like.

WHAT QUESTIONS DO
YOU HAVE?



Reading for tonight:
HTTP and Web APIs
Consuming Web APIs with GET

