



# Computer Fundamentals





# Today's Topics

- ▶ Servers
- ▶ Databases
- ▶ Big Data
- ▶ Clouds



# Kahoot!

# Server

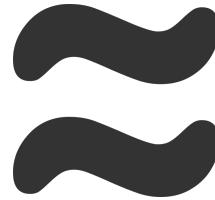
- What is Server



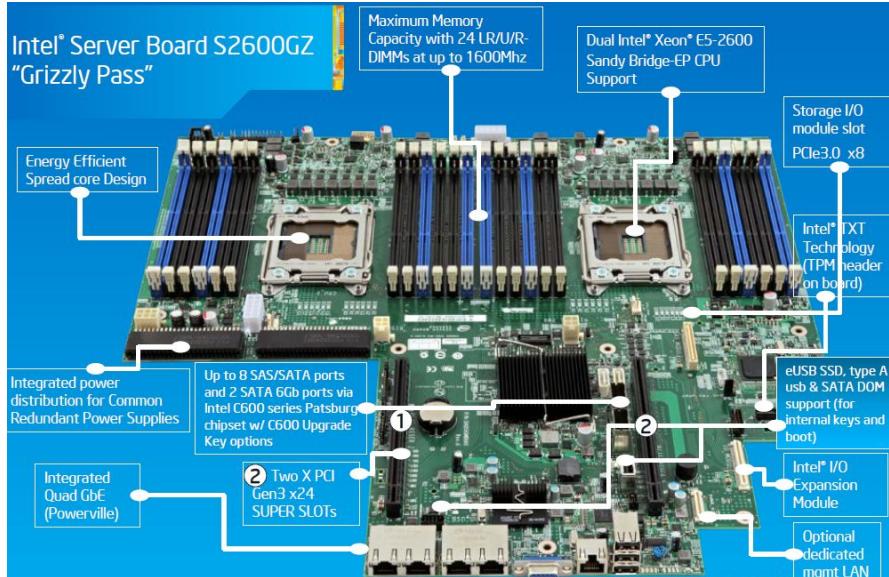


# Server

- What are the differences?



# Server



# Server Mainboard



## PC Mainboard



# Server





# Server

Non  
ECC



ECC



Error-checking and Correcting  
(ECC)

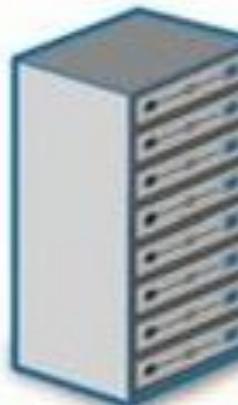
# Server



## Types of Server



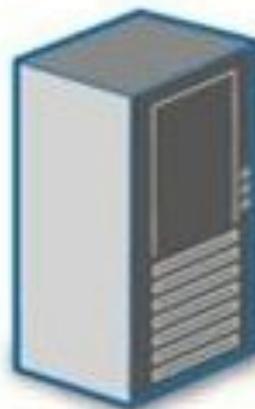
**Blade Server**



**Rack Server**



**Tower Server**



# Server



## Types Of servers

Web Server

Email Server

Fax Server

FTP Server

News Server

Internet Relay Chat Server

Application Server

Streaming Server

Proxy Server

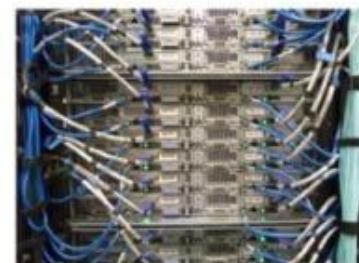
Database Server

Telnet Server

File Server

List Server

Groupware Server



# Server

- High internet connectivity
- Air conditioning
- Backup electrical power
- Fire protection
- Security
- Maintenance





# Databases

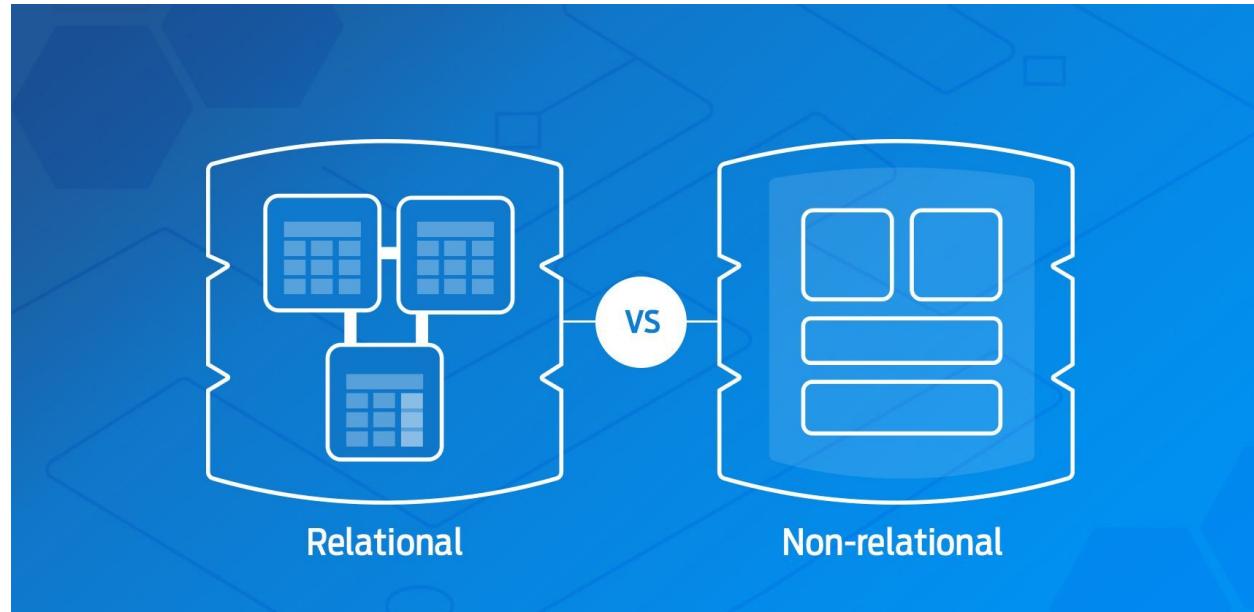
Databases are collections of data, usually organized under a schema, and stored in a format that is efficient for storing and retrieving the data.





# Databases

- Types of Databases





# Databases

- Relational Database (SQL)

EMPLOYEE			
ID	NAME	AGE	MANAGER_ID
E101	Libinus Xavier	37	M123
E102	Gautham Bhonsle	35	M555
E103	Aravind	45	M404
E104	Shazil	28	M800
E105	Manisha Shah	34	M555



MANAGER		
ID	NAME	DEPT_ID
M123	Ravindranadh	D1011
M404	Shripad Karambelkar	D1011
M555	Meenu Dutta	D2022
M800	James Xavier	D1099
M999	Ibrahim Sheik	D1099



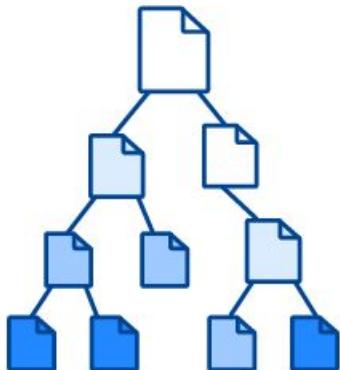
DEPARTMENT			
ID	NAME	DESCRIPTION	LOCATION
D1011	FINANCE	Finance Operations	Mumbai
D1099	HR	Human Resource	Bangalore
D2022	IT	Information Technology	Bangalore
D3033	ADMIN	Administrative Operations	Bangalore



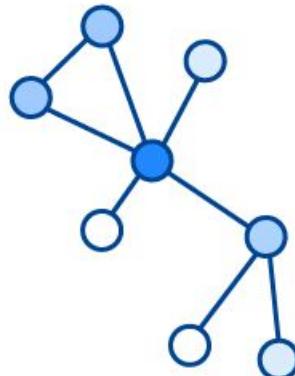
# Databases

- Non-Relational Database (NoSQL-Not Only SQL)

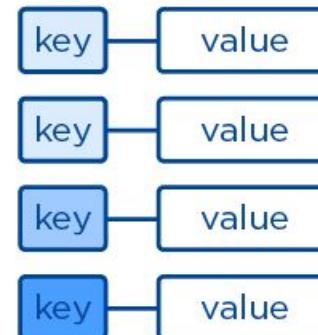
**Document**



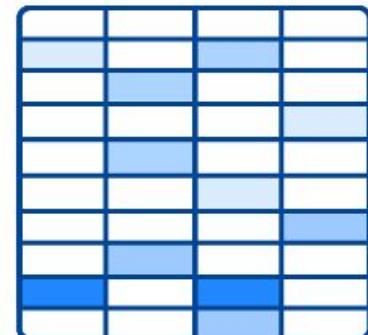
**Graph**



**Key-Value**



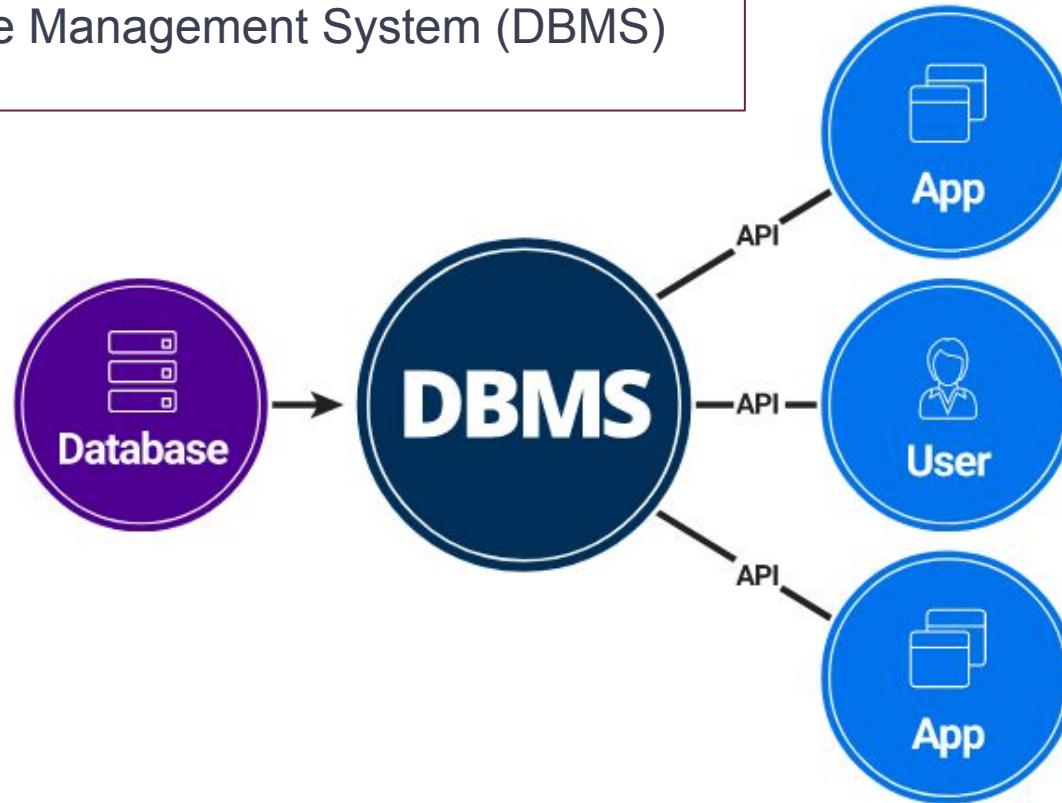
**Wide-column**





# Databases

- Database Management System (DBMS)



# Databases

## Database Management System (DBMS)

- Creates the complex structures required for data storage.
- Transforms entered data to conform to the data structures.
- Creates a security system and enforces security within that system.
- Allow multiple user access to the data within the computer network environment.
- Performs backup and data recovery procedures to ensure data safety.
- Promotes and enforces integrity rules to maintain data consistency.
- Provides access to the data via utility programs and from programming languages interfaces.



# Databases

## Database Management System (DBMS)

- MySQL
- Microsoft Access
- Oracle
- PostgreSQL
- dBASE
- FoxPro
- SQLite
- IBM DB2
- LibreOffice Base
- MariaDB
- Microsoft SQL Server

DBMS - Some Commonly Used DBMS



# Big Data

## 3 V's of Big Data and How They Sum Up The Whole **Big Data Schematic**

**Volume**

Data Quantity

**Velocity**

Data Speed

**Variety**

Data Types

# Big Data

## 2019 *This Is What Happens In An Internet Minute*



## 2020 *This Is What Happens In An Internet Minute*



# Big Data



## Pros of Big Data

- Better decision-making
- Increased productivity
- Reduced costs
- Improved customer service
- Fraud detection
- Increased revenue
- Increased agility
- Greater innovation
- Faster time to market



## Cons of Big Data

- Data quality
- Need for talent
- Cultural change
- Compliance
- Cybersecurity risks
- Rapid change
- Hardware needs
- Costs
- Difficulty integrating legacy systems

# Big Data



**My wife asked me why I was speaking so softly at home.**

I told her I was afraid Mark Zuckerberg was listening!

She laughed. I laughed.

Alexa laughed. Siri laughed. Cortana laughed.



Please write your  
ideas about Big Data



Pear Deck



Students, write your response!

Pear Deck Interactive Slide  
Do not remove this bar

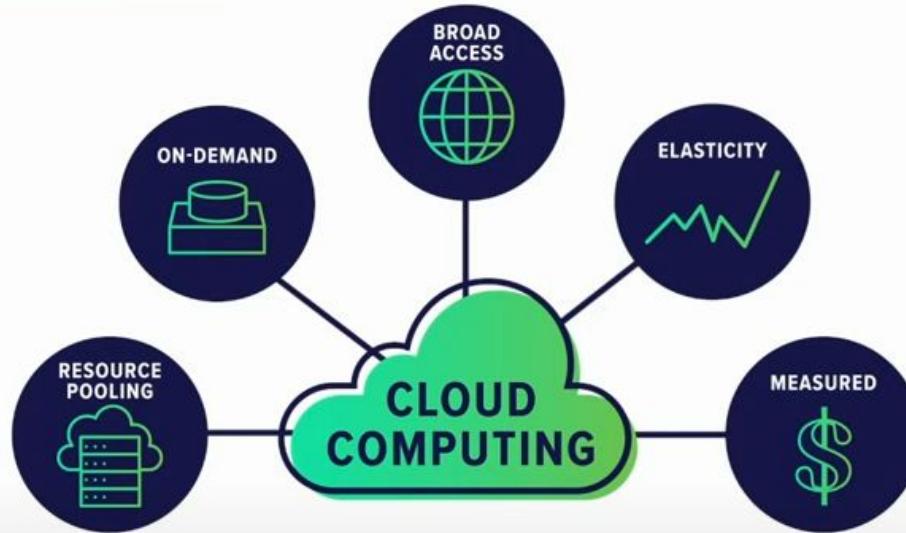
# Clouds



# Clouds



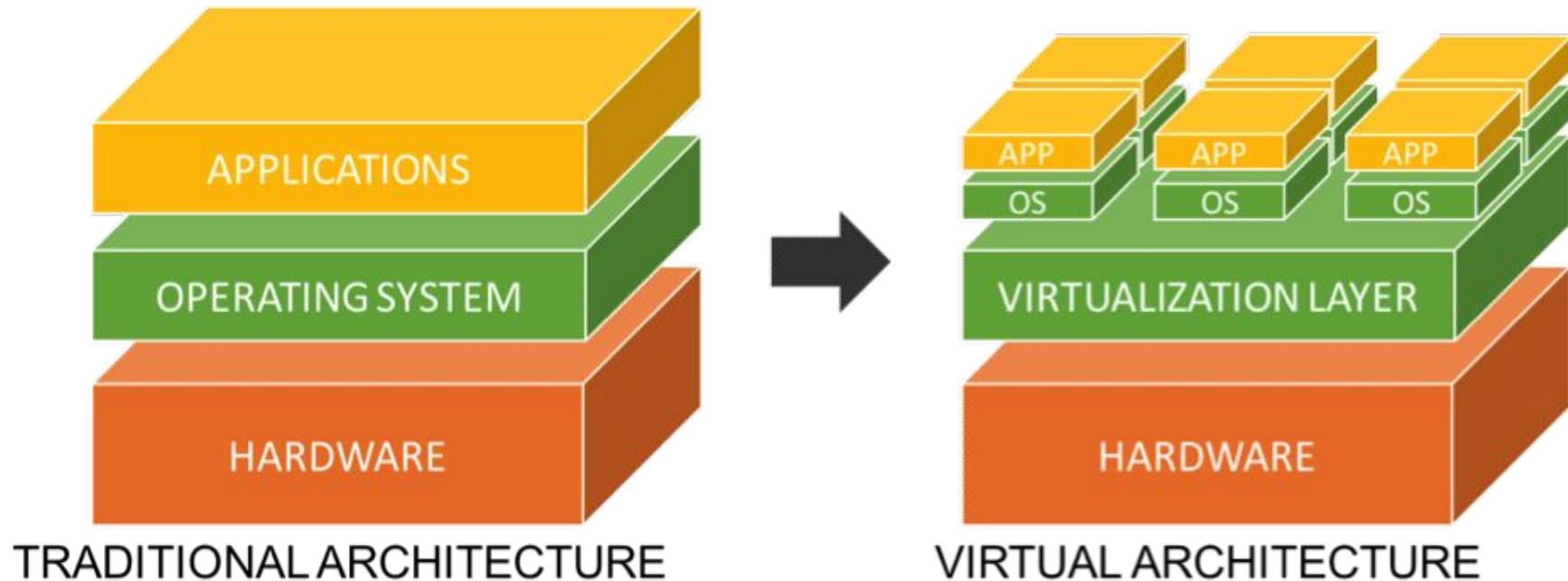
## The Cloud Infrastructure



# Clouds



## Virtualization



# Clouds



# Clouds



## Public Cloud

Typically have massive amounts of available space, which translates into easy scalability. Recommended for software development and collaborative projects.

## Hybrid Cloud

Combine public clouds with private clouds to allow the two platforms to interact seamlessly. Recommended for businesses balancing big data analytics with strict data privacy regulations.



## Types of Cloud Deployment

## Private Cloud

Usually reside behind a firewall and are utilized by a single organization. Recommended for businesses with very tight regulatory requirements

## Community Cloud

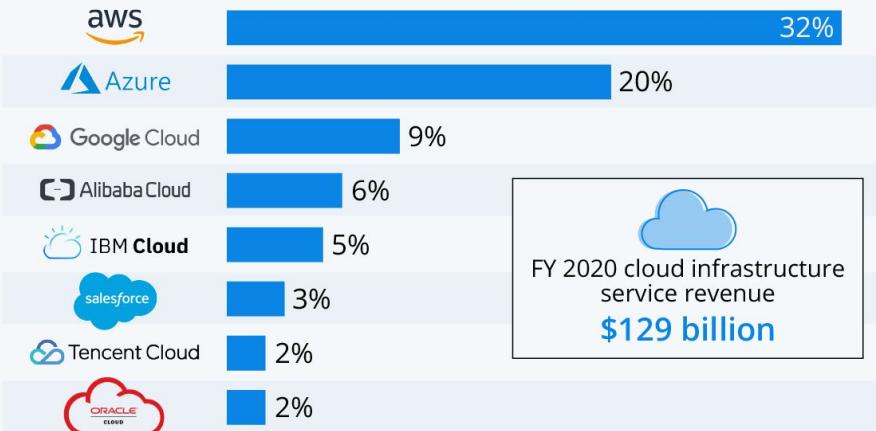
A collaborative, multi-tenant platform used by several distinct organizations to share the same applications. Users are typically operating within the same industry or field.

# Clouds



## Amazon Leads \$130-Billion Cloud Market

Worldwide market share of leading cloud infrastructure service providers in Q4 2020\*

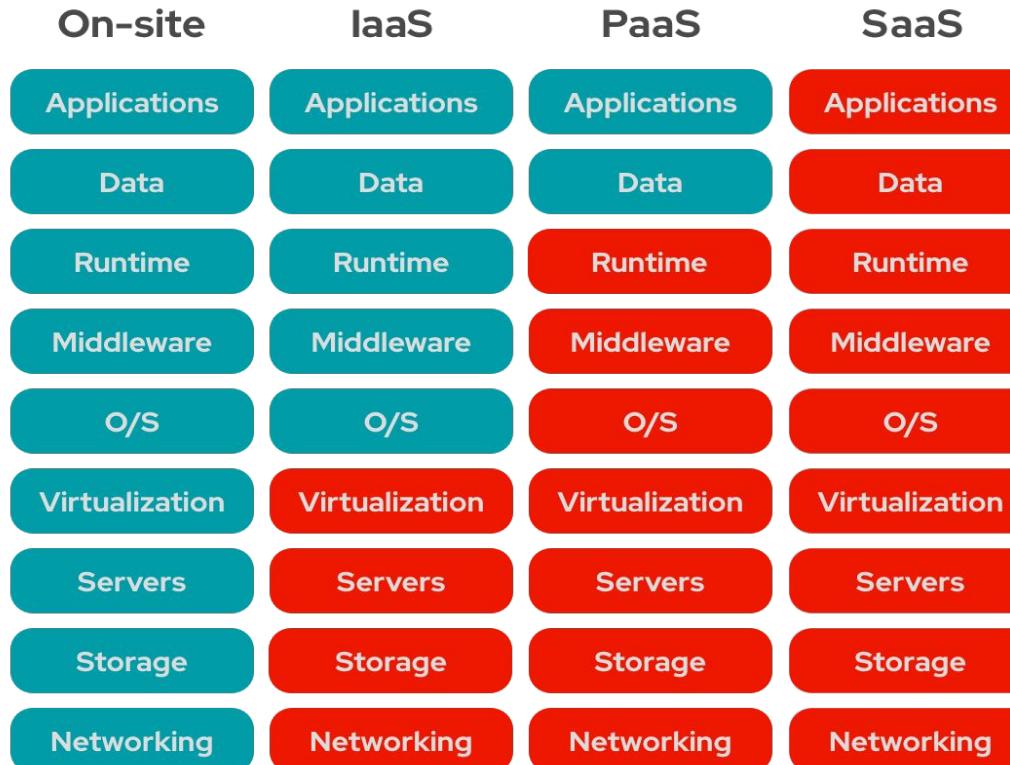


\* includes platform as a service (PaaS) and infrastructure as a service (IaaS)  
as well as hosted private cloud services

Source: Synergy Research Group



# Clouds



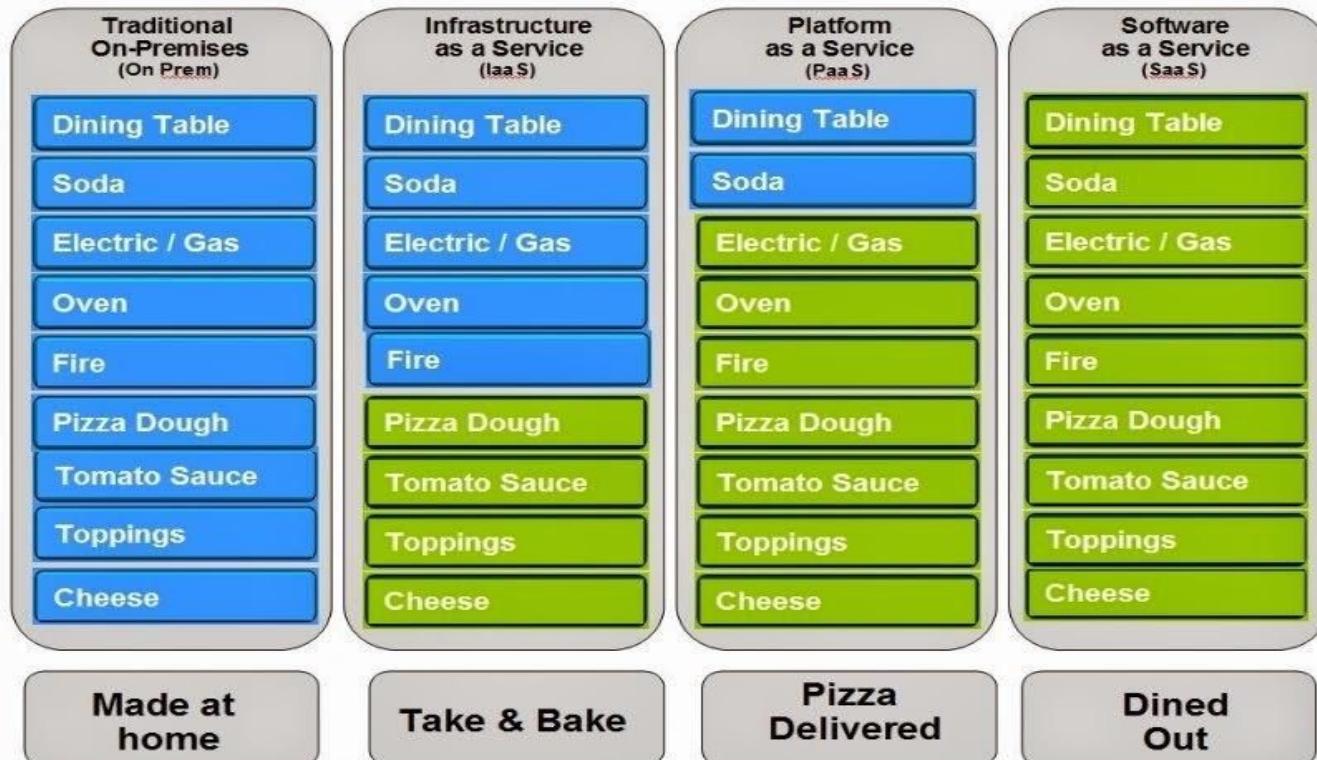
■ You manage

■ Service provider manages

# Clouds



## Pizza as a Service



# Circle how you are feeling:



Students, draw anywhere on this slide!



- Web Browsers
- Security





# Agenda

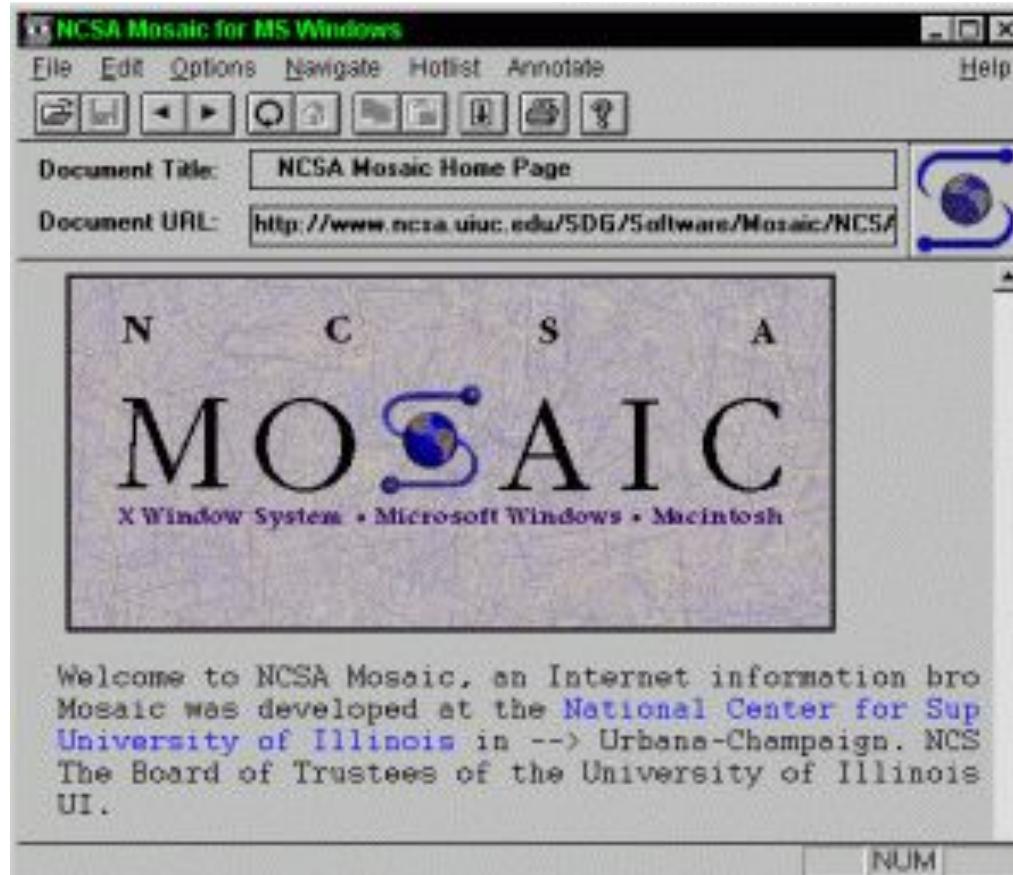
- ▶ Web Browsers
- ▶ HTTP
- ▶ Cyber Attacks
- ▶ Encryption/Decryption
- ▶ HTTPS
- ▶ VPN
- ▶ API



# Kahoot!



# Web Browsers





# Web Browsers



# Web Browsers



App | Certifier | EU-CF - Google Drive | EU\_CF\_S-3\_s2recaj | CF-Browser-Securi | Motivational Music | Course: ITF-08/21 | CF: What is a Web | + | - | X

lms.clarusway.com/mod/lesson/view.php?id=70

Uygulamalar Bitfinex - Bitcoin, Lit... Start Here With Ma... Gmail YouTube Appen Your Current... clarusway AWS\_Instances | EC... Quizlet Online Kurslar - Her...

## CLARUSWAY Way to Reinvent Yourself

CF Participants Badges Competencies Grades General Computer Hardware Operating Systems

### Computer Fundamentals

Dashboard / Courses / Miscellaneous / CF / How Does a Web Browser Work? / What is a Web Browser? / Preview Edit page contents

#### What is a Web Browser?

Preview Edit Reports Grade essays

#### Introduction

A browser is a software designed to find and display content on the World Wide Web. This content might be a web page, a pdf

Lesson menu

- Introduction
- Let's Practice



# Which web browser do you use?



# Web Browsers

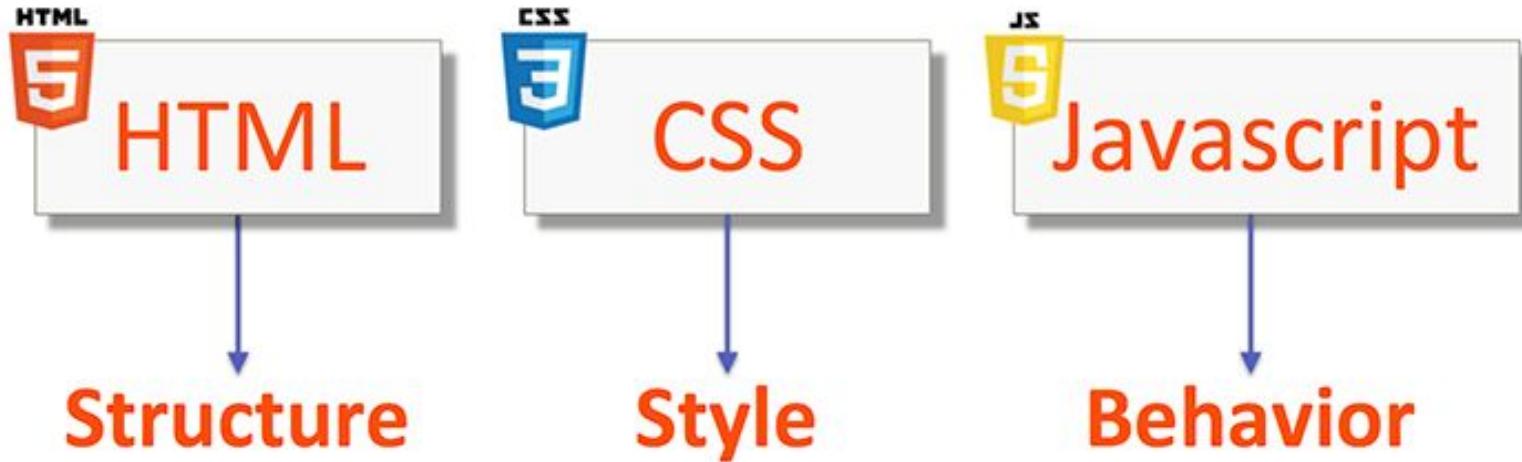
- HTML: Hypertext Markup Language





# Web Browsers

- CSS: Cascading Style Sheets



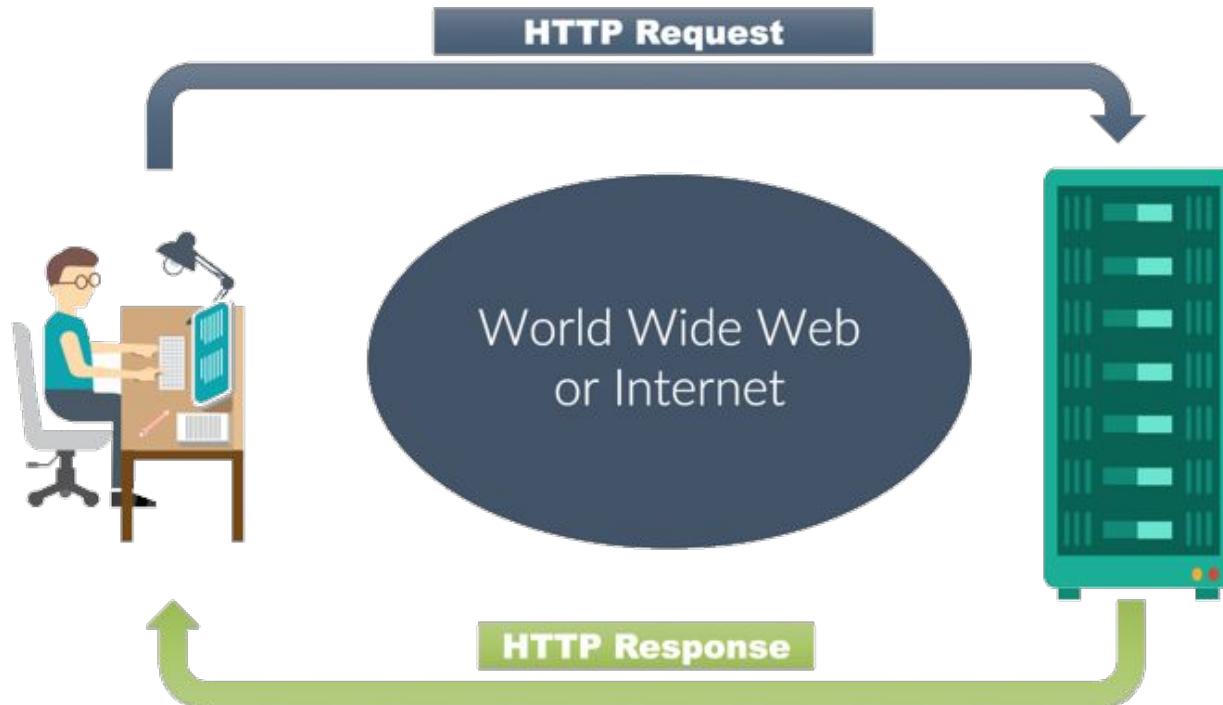
# Web Browsers



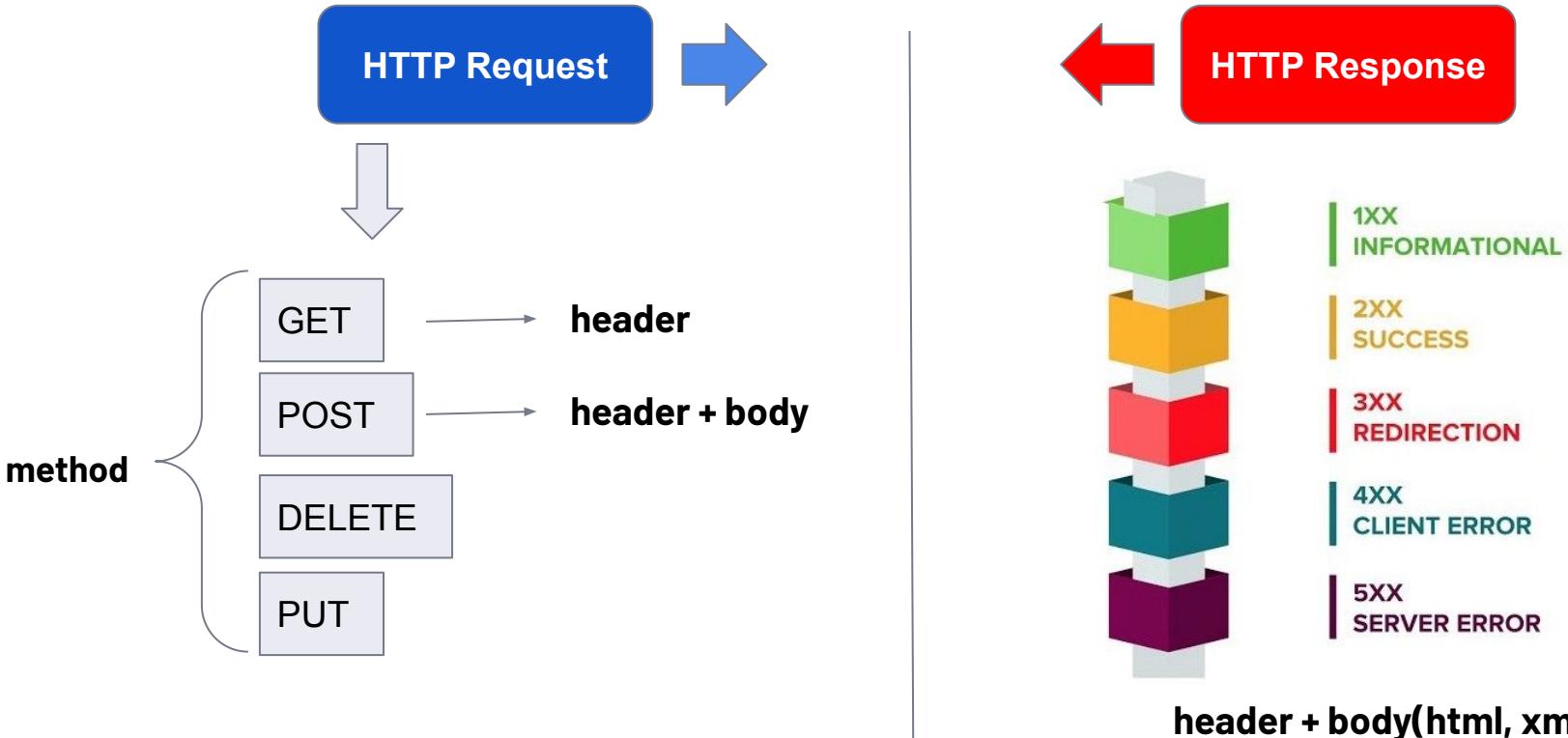
# HTTP



- HTTP: Hypertext Transfer Protocol



# HTTP



# HTTP

- Cookies



# Cyber Attacks



- Physical Security: Using physical barriers to prevent unauthorized access to data (like locking the door of the server room).
- Software Security: Fixing flaws in your application that could grant attackers unwanted levels of access to your systems.
- Network Security: Security of networked services (websites, [databases](#), etc).



# Cyber Attacks

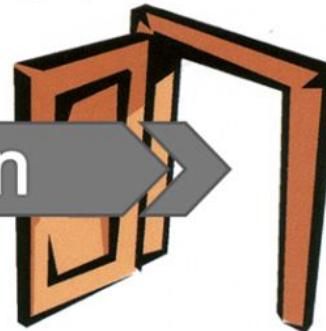


## THE GAINING ACCESS PROCESS

Identification

Authentication

Authorization



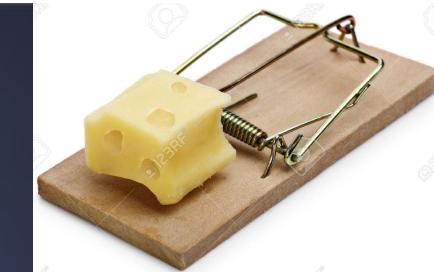
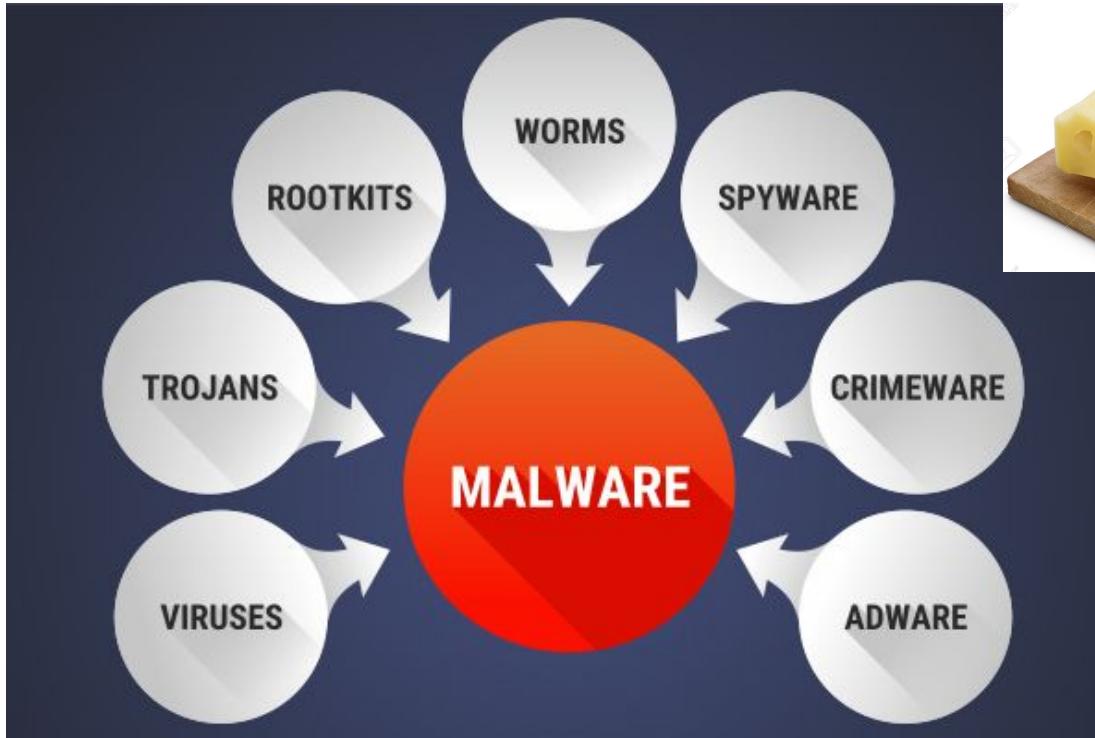
# Cyber Attacks

- Phishing



# Cyber Attacks

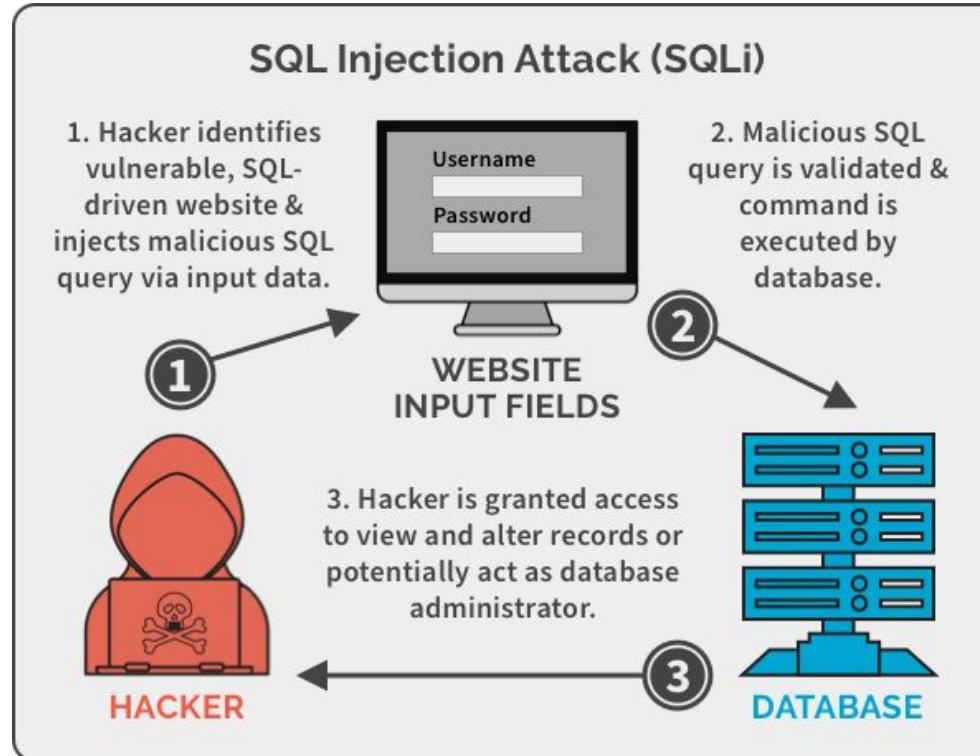
- Malware: Malicious Software



# Cyber Attacks



- SQL Injection



# Cyber Attacks



- SQL Injection

**SQL INJECTION FOOLS SPEED TRAPS AND CLEARS YOUR RECORD**

by: James Hobson      107 Comments

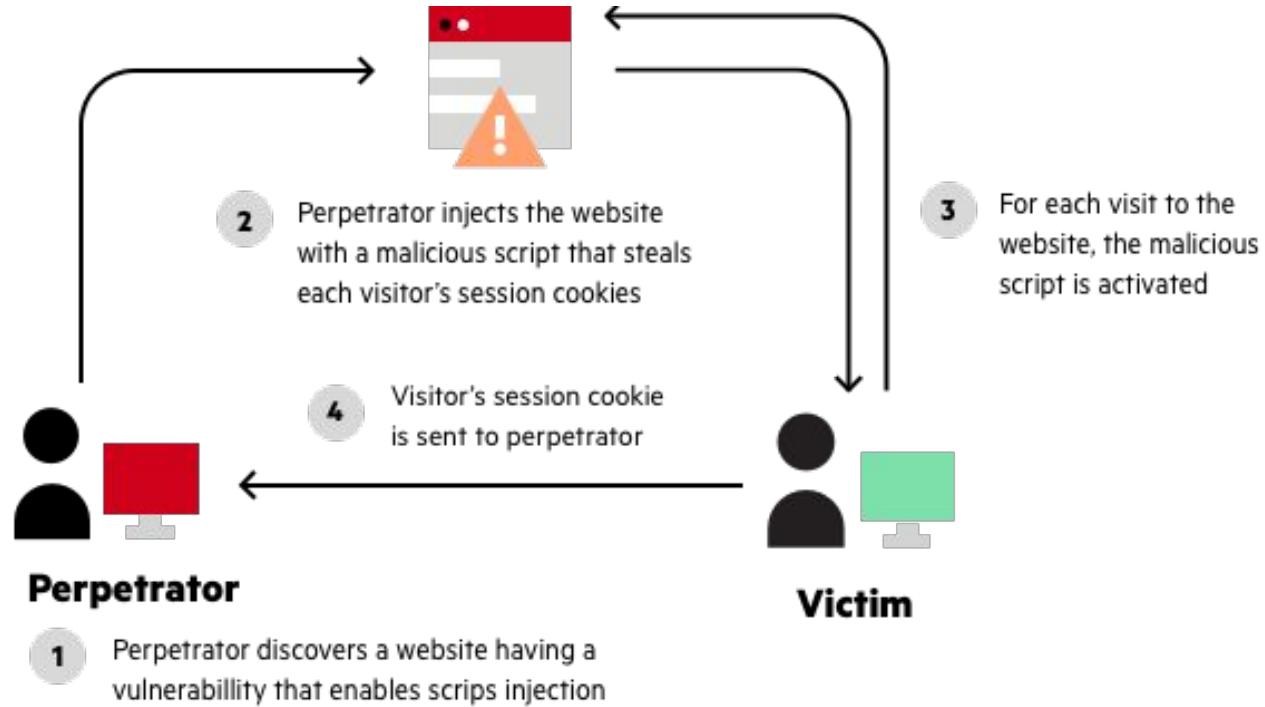
[f](#) [t](#)      April 4, 2014





# Cyber Attacks

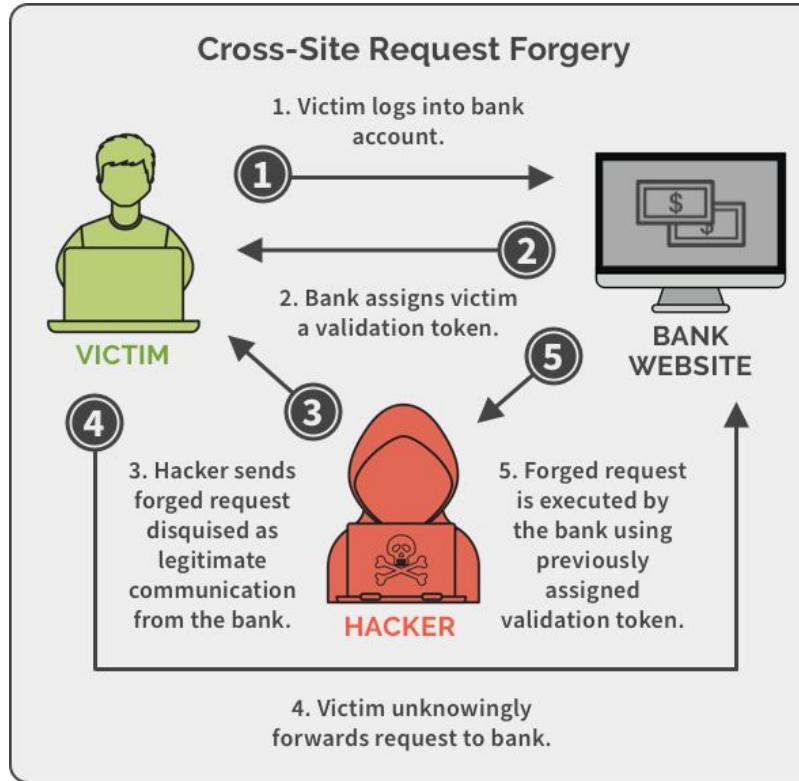
- XSS: Cross-Site Scripting





# Cyber Attacks

- CSRF: Cross-site Request Forgery





# Encryption/Decryption

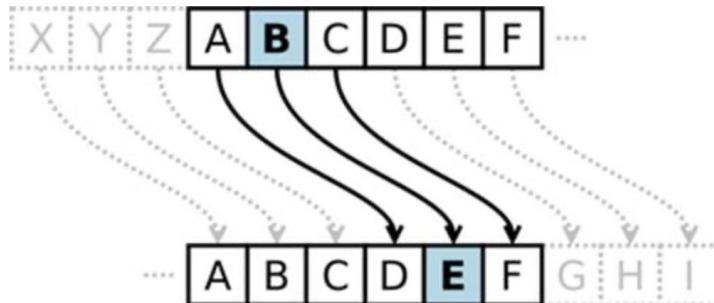


Figure 14-1: Shifting over letters by three spaces. Here, B becomes E.

"Hello"

plaintext

encryption

"SNifgNi+uk0="

ciphertext

# Encryption/Decryption



John → Caesar Cypher +3

Mrkq

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C

Alphabet shifted by 3 spaces.

# Encryption/Decryption

Mike → Caesar Cypher -3



Students, write your response!

REINVENT YOURSELF

Pear Deck Interactive Slide  
Do not remove this bar

# Encryption/Decryption



Key Size	Possible combinations
1-bit	2
2-bit	4
4-bit	16
8-bit	256
16-bit	65536
32-bit	$4.2 \times 10^9$
56-bit (DES)	$7.2 \times 10^{16}$
64-bit	$1.8 \times 10^{19}$
128-bit (AES)	$3.4 \times 10^{38}$
192-bit (AES)	$6.2 \times 10^{57}$
256-bit (AES)	$1.1 \times 10^{77}$

Key size	Time to Crack
56-bit	399 seconds
128-bit	$1.02 \times 10^{18}$ years
192-bit	$1.872 \times 10^{37}$ years
256-bit	$3.31 \times 10^{56}$ years



# Encryption/Decryption



## Public Key Encryption (Asymmetric)



# HTTPS

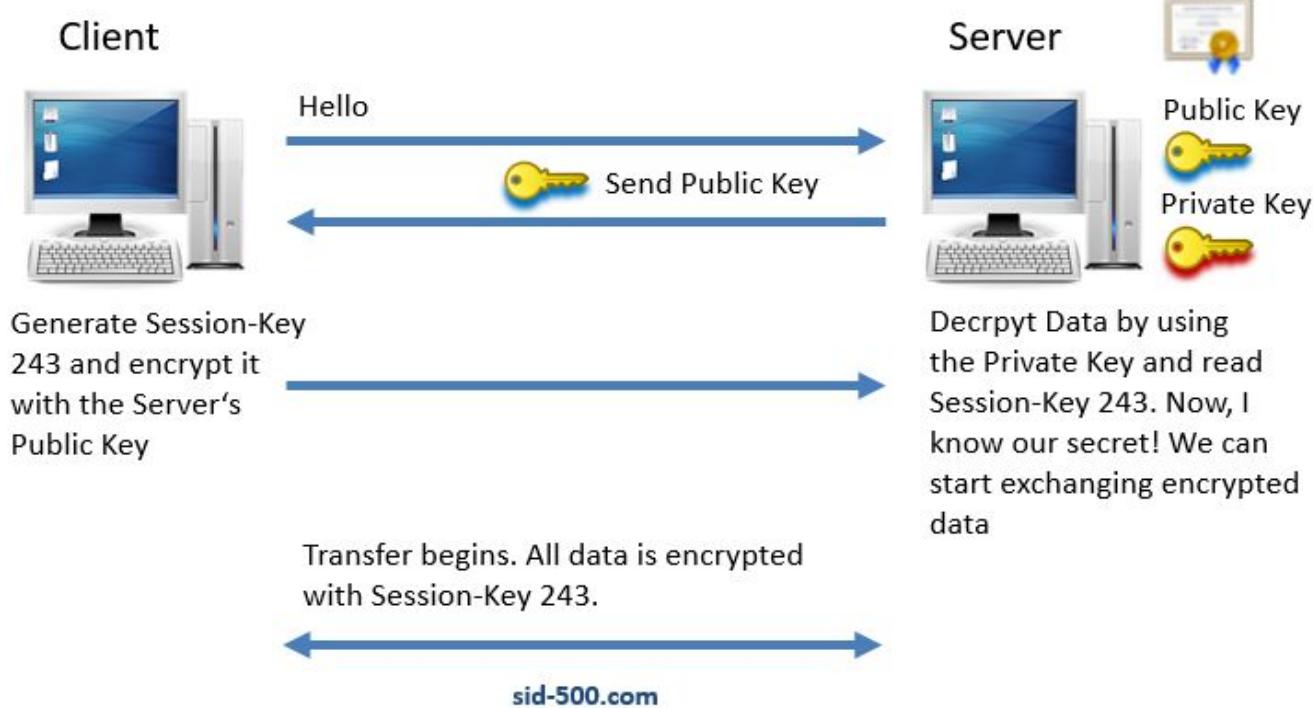


- Popular Certificates and HTTPS:
  - SSL : Secure Sockets Layer
  - TLS : Transport Layer Security





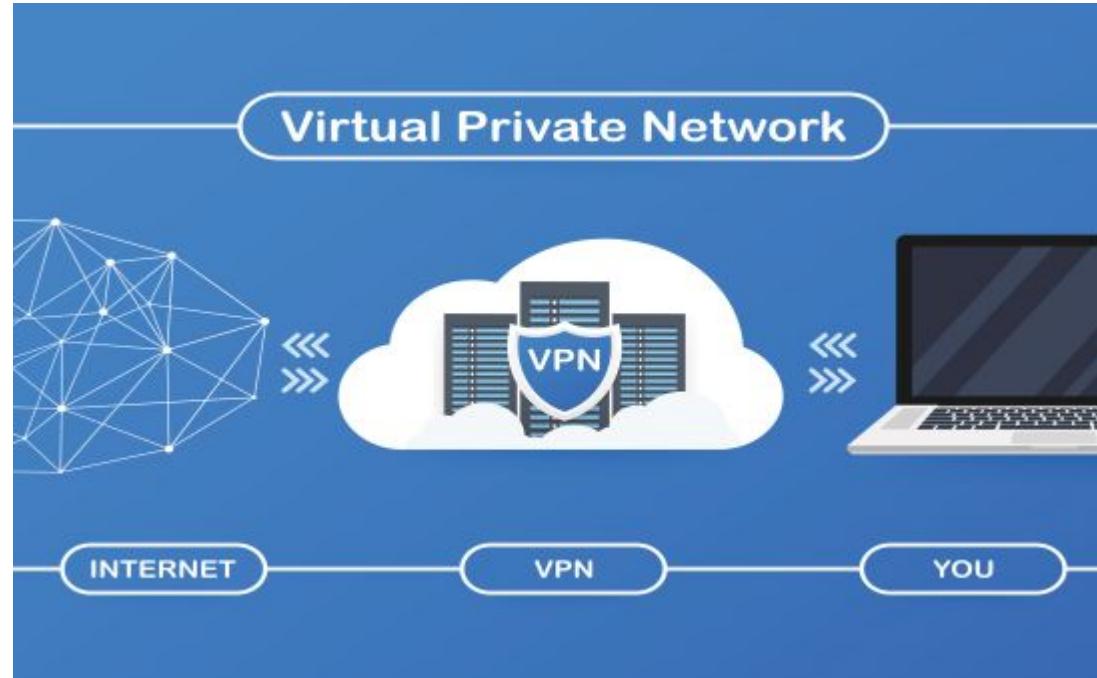
## SSL Encryption (HTTPS)



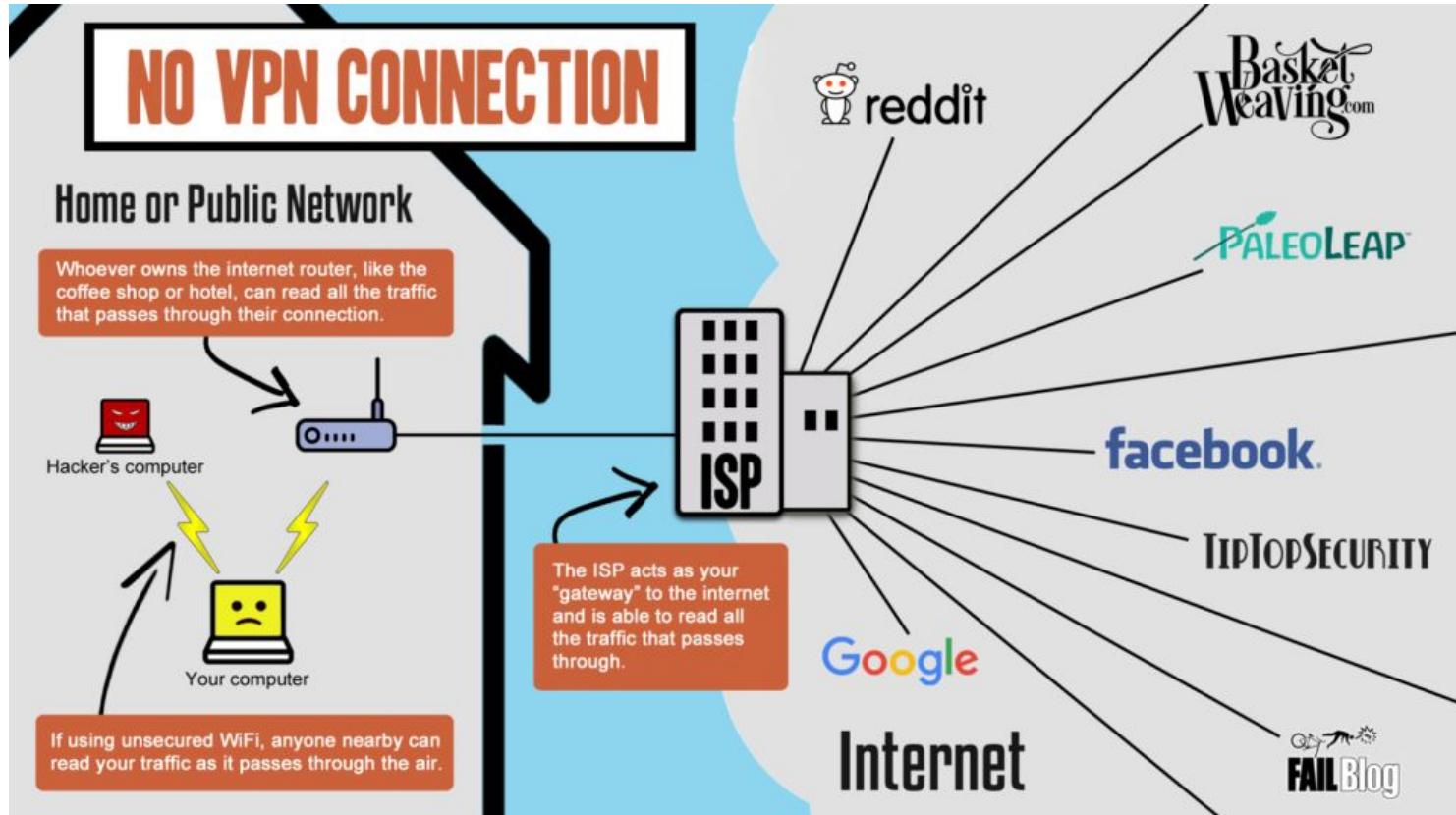
# VPN



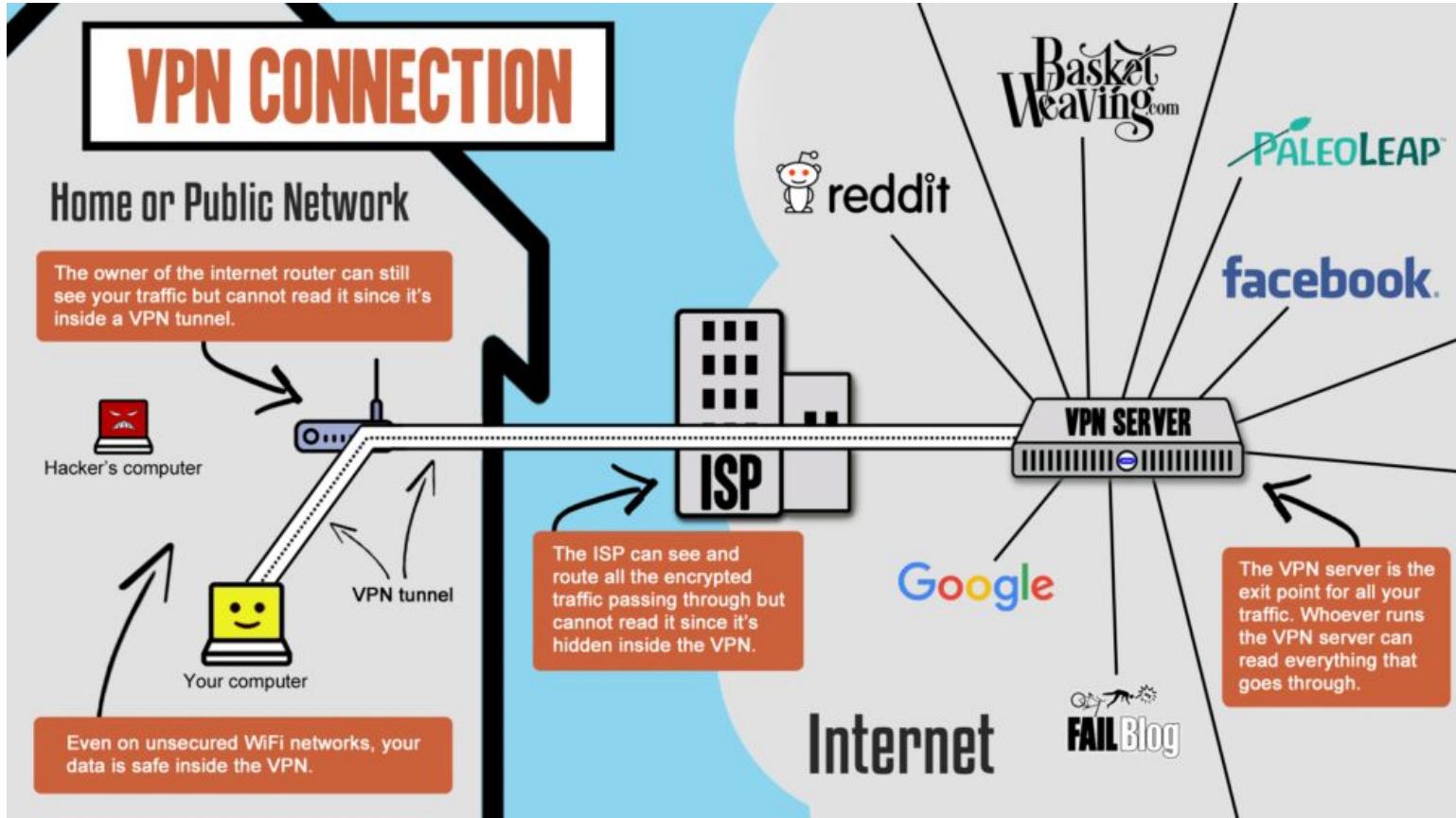
- VPN: Virtual Private Network



# VPN



# VPN



# API



- API: Application Programming Interface



# API





# Select how you are feeling on the right:



Students choose an option

REINVENT YOURSELF

In one or two minutes,  
write the most important thing from today's lesson.



Students, write your response!



# THANKS!

## Any questions?

You can find me at:

- ▶ @Raymond
- ▶ raymond[clarusway.com](mailto:clarusway.com)
- ▶ @Tomy
- ▶ tomy@clarusway.com

