



Computer Fundamentals



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Today's Topics



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

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► Server

- What is Server

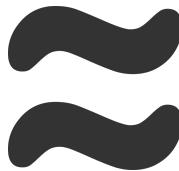


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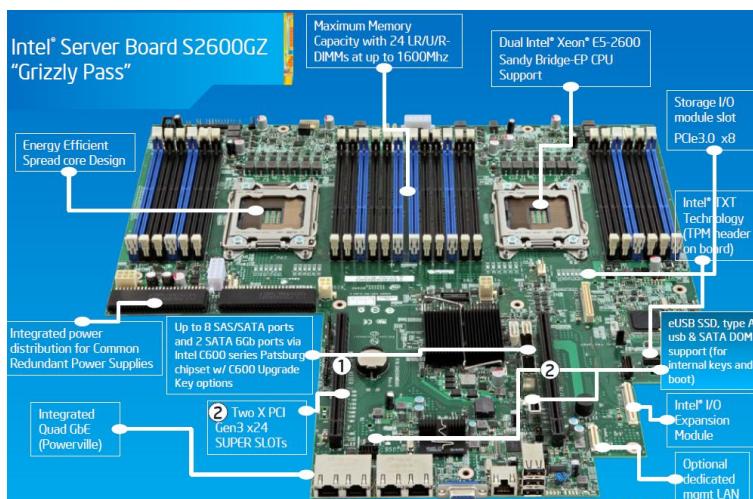
Server

- What are the differences?



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Server



Server Mainboard



PC Mainboard

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Server



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Server

Non
ECC



ECC



Error-checking and Correcting
(ECC)

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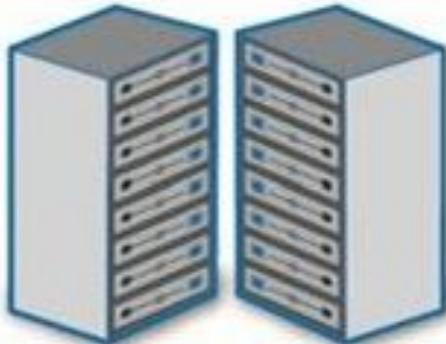


Server

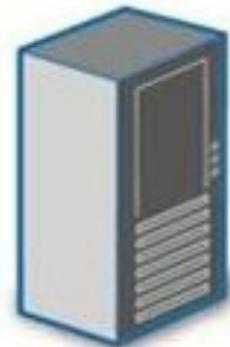
Types of Server



Blade Server



Rack Server



Tower Server

Server



Types Of servers

Web Server

Email Server

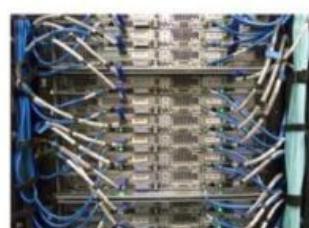
Fax Server

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

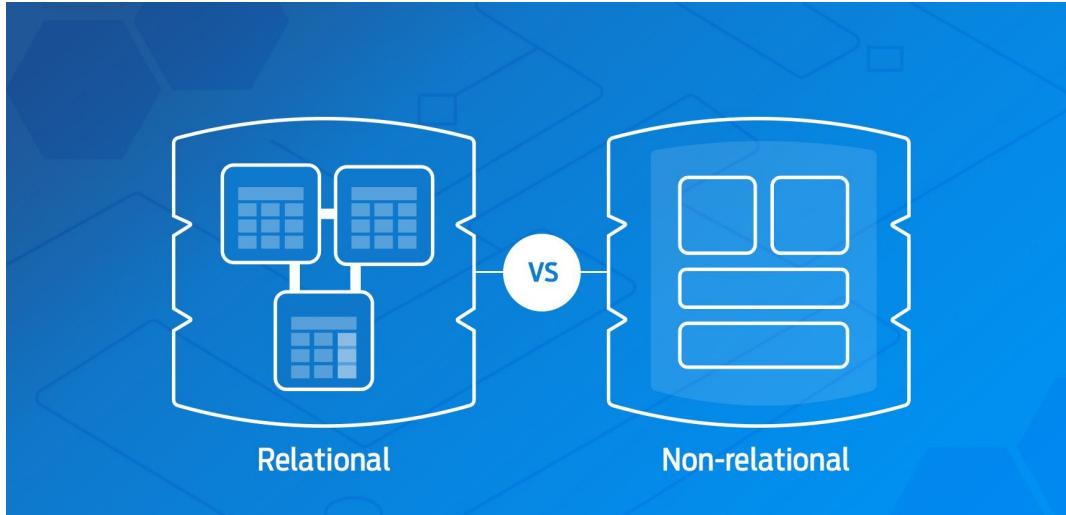
Databases are collections of data, usually organized under a schema, and stored in a format that is efficient for storing and retrieving the data.





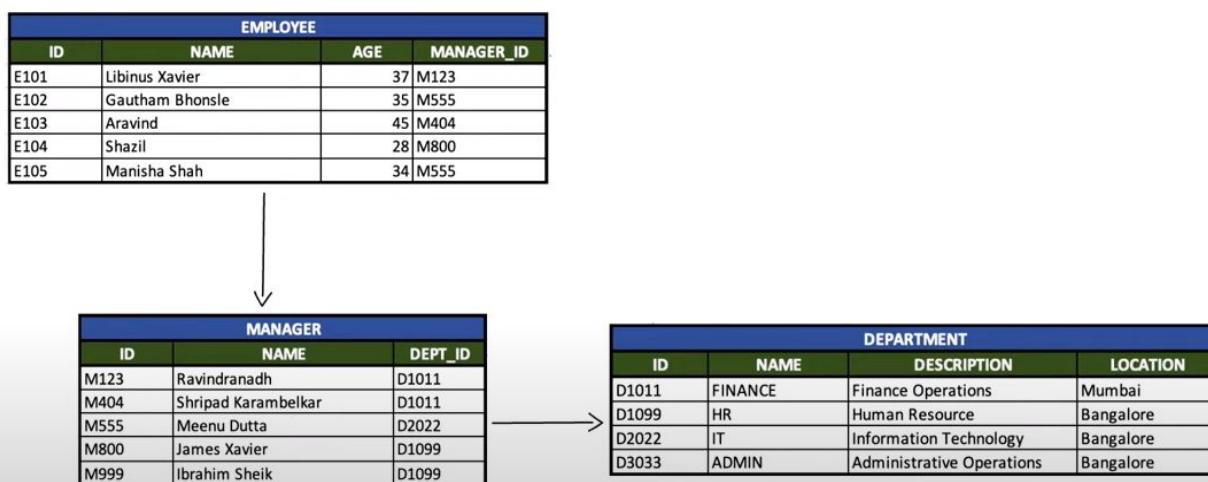
Databases

- Types of Databases



Databases

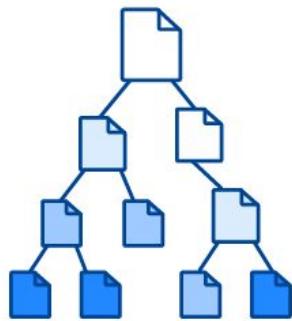
- Relational Database (SQL)



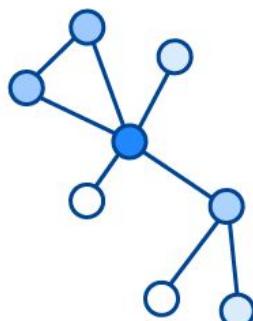
Databases

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

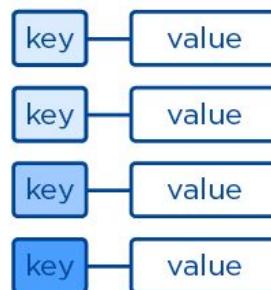
Document



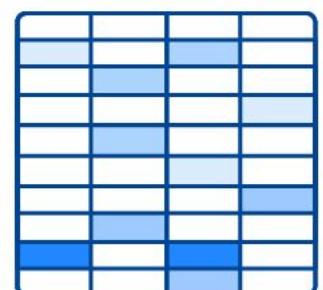
Graph



Key-Value

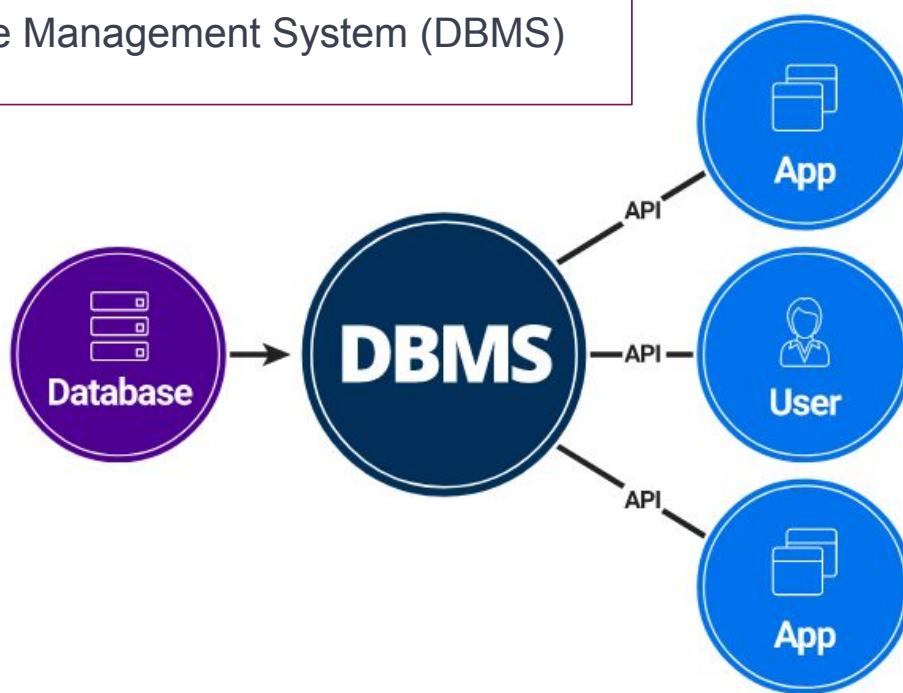


Wide-column



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)

DBMS - Some Commonly Used DBMS

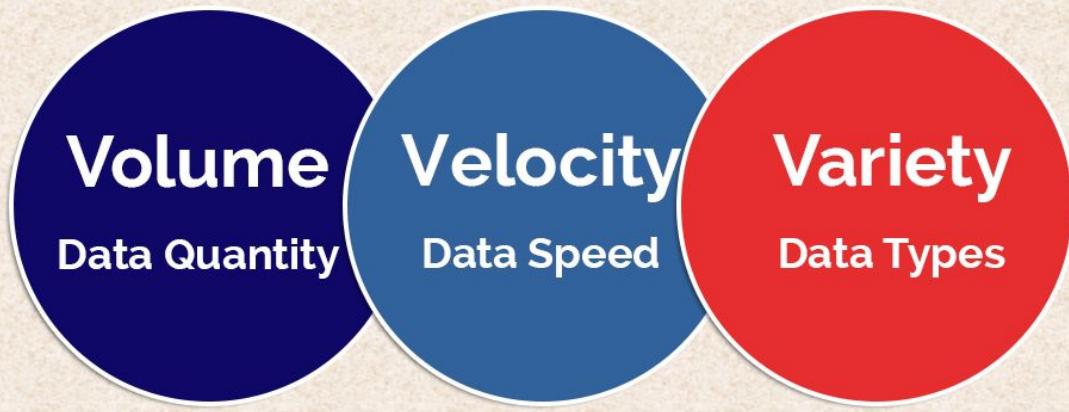
- MySQL
- Microsoft Access
- Oracle
- PostgreSQL
- dBASE
- FoxPro
- SQLite
- IBM DB2
- LibreOffice Base
- MariaDB
- Microsoft SQL Server





Big Data

3 V'S of Big Data and How They Sum Up The Whole Big Data Schematic



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Big Data

2019 *This Is What Happens In An Internet Minute*



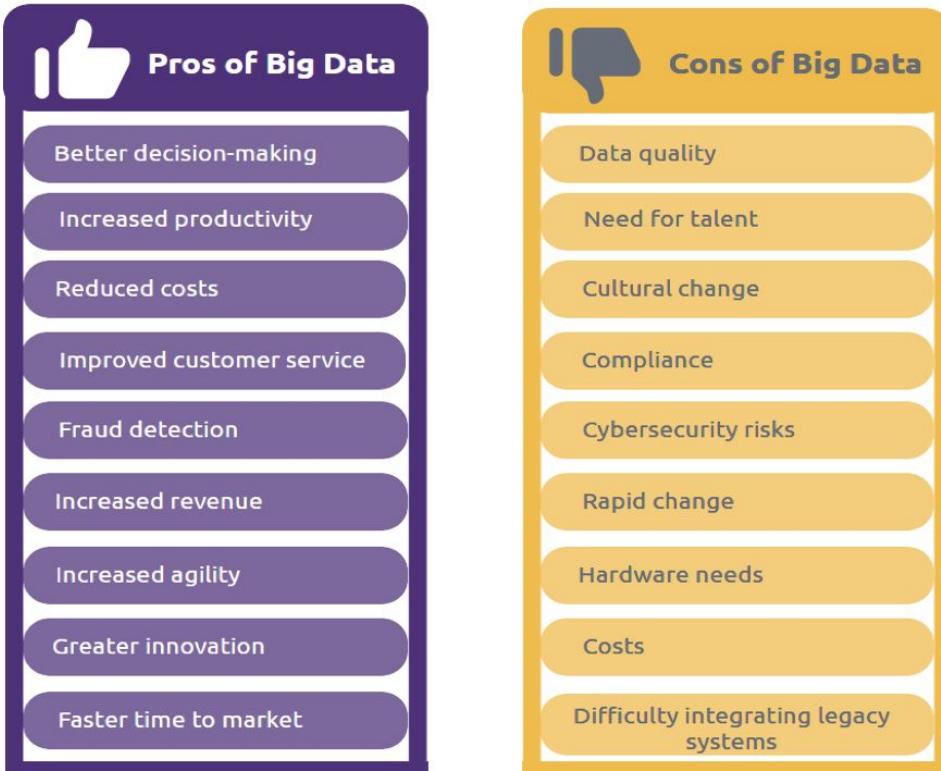
2020 *This Is What Happens In An Internet Minute*



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Big Data



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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.



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Please write your ideas about Big Data



Students, write your response!



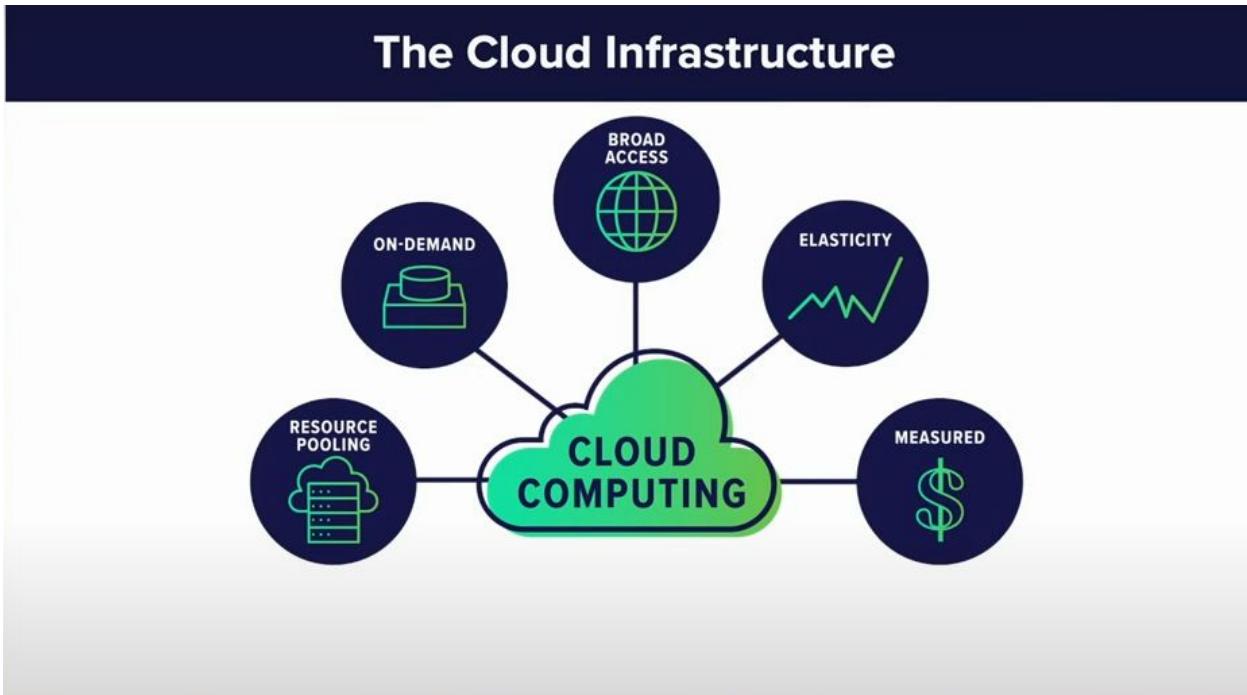
Pear Deck™

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Clouds

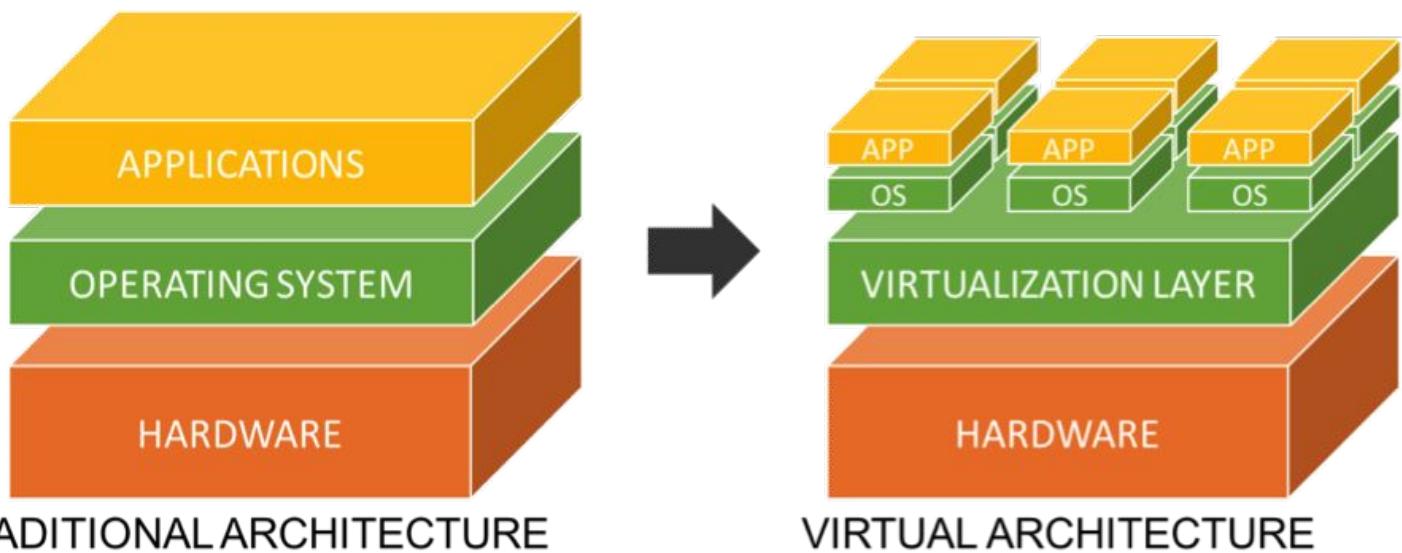


Clouds



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.

Private Cloud

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

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

Community Cloud

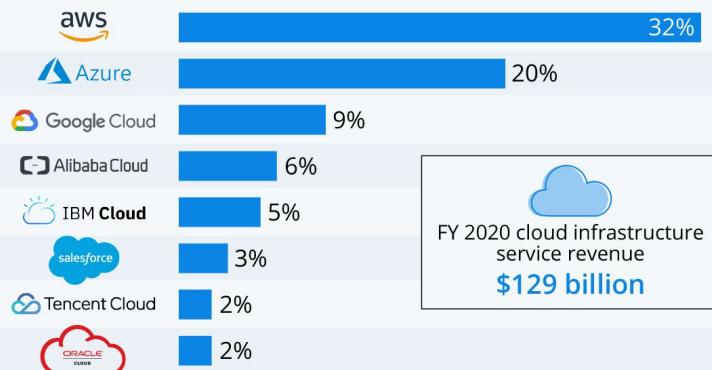
A collaborative, multi-tenant platform used by several distinct organizations to share the same applications. Users are typically operating within the same industry or field.

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



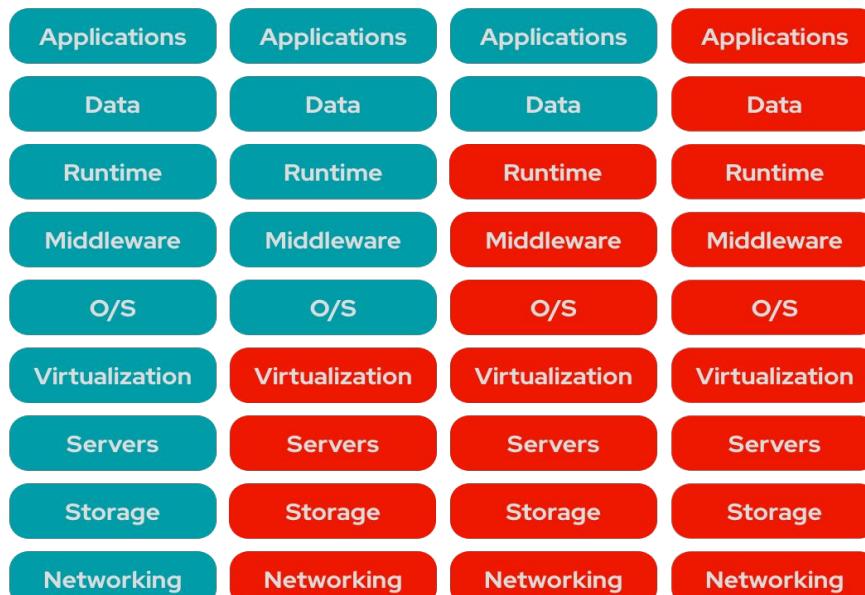
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Clouds



On-site IaaS PaaS SaaS



■ You manage

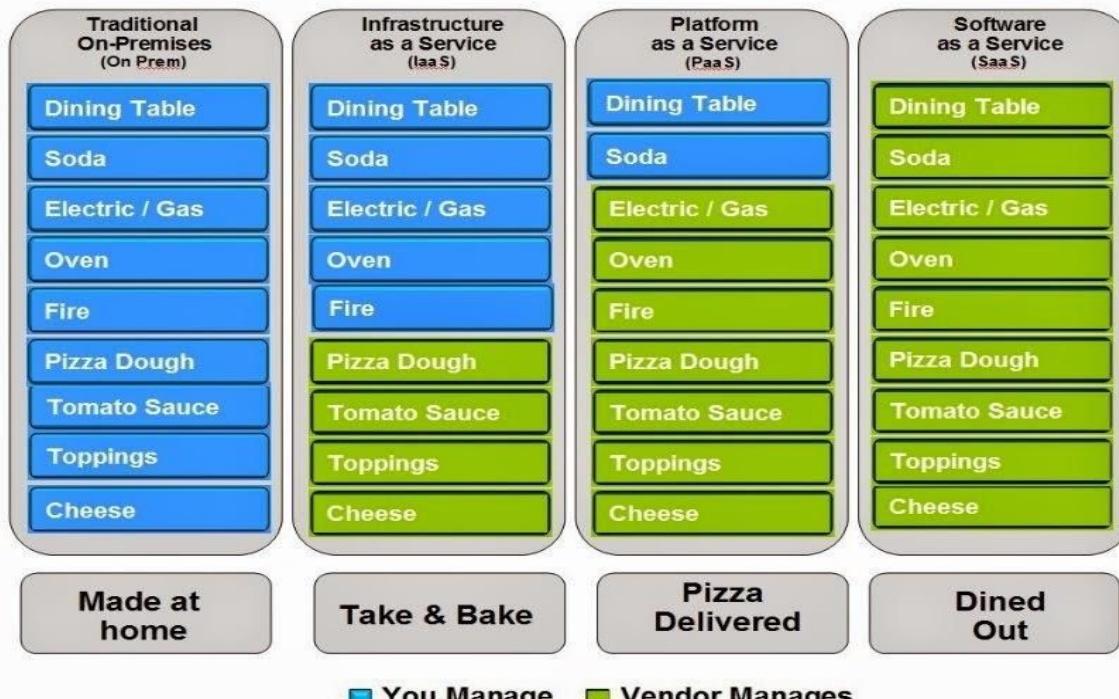
■ Service provider manages

30

Clouds



Pizza as a Service



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Circle how you are feeling:



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Students, draw anywhere on this slide!

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- Web Browsers
- Security



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Agenda

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

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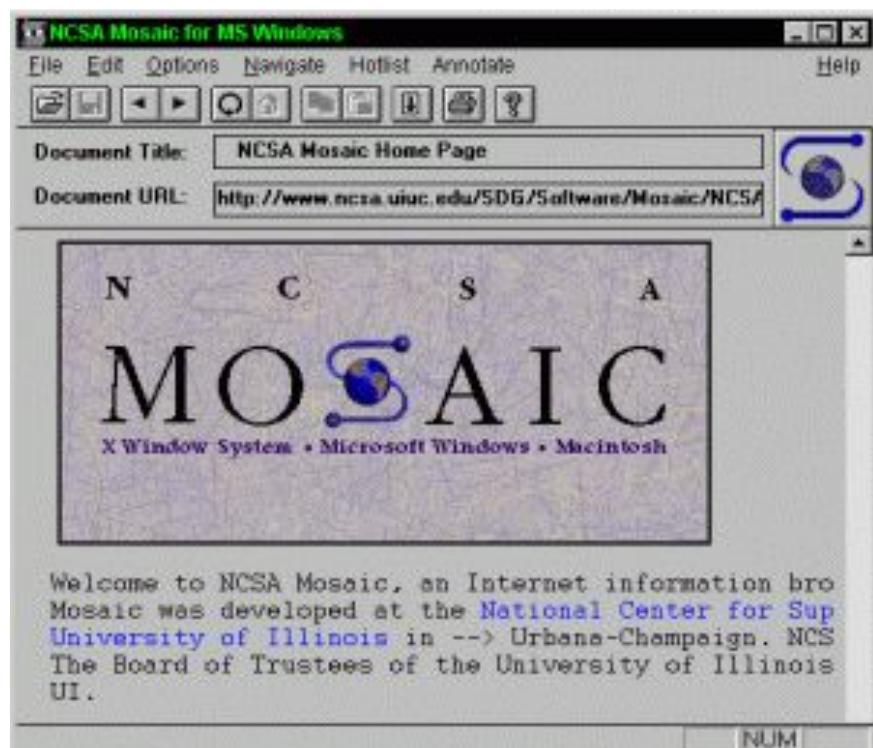


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► Web Browsers



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Web Browsers



Web Browsers

The screenshot shows a web browser window with the following details:

- Address Bar:** lms.clarusway.com/mod/lesson/view.php?id=70
- Toolbar:** Includes links to various services like Bitfinex, YouTube, and AWS Instances.
- Page Content:**
 - Left Sidebar:** A navigation menu with items: CF, Participants, Badges, Competencies (checked), Grades, General, Computer Hardware, and Operating Systems.
 - Main Content Area:** Title: Computer Fundamentals. Subtitle: What is a Web Browser? (with a gear icon). Buttons: Preview (highlighted), Edit, Reports, Grade essays.
 - Right Sidebar:** Lesson menu with items: Introduction and Let's Practice.



Which web browser do you use?



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Web Browsers

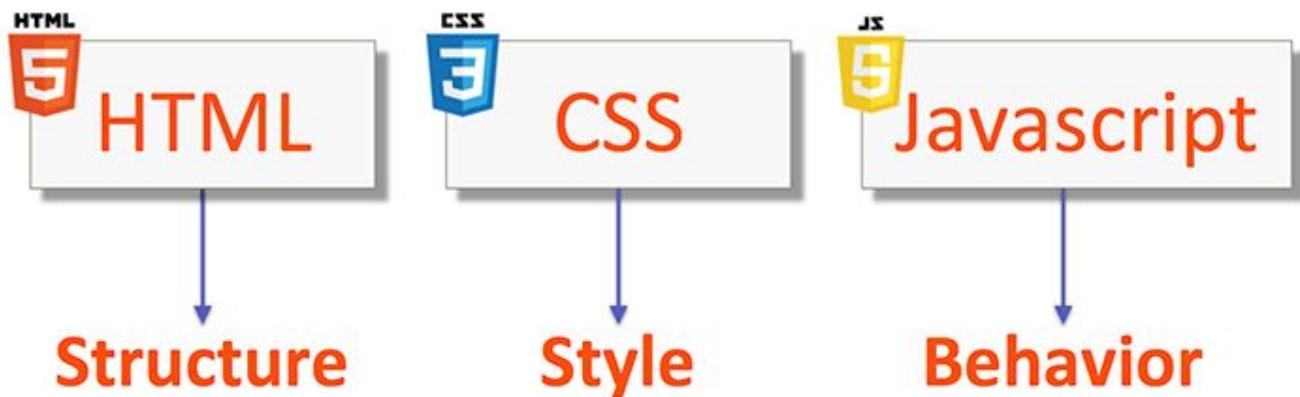
- HTML: Hypertext Markup Language





Web Browsers

- CSS: Cascading Style Sheets



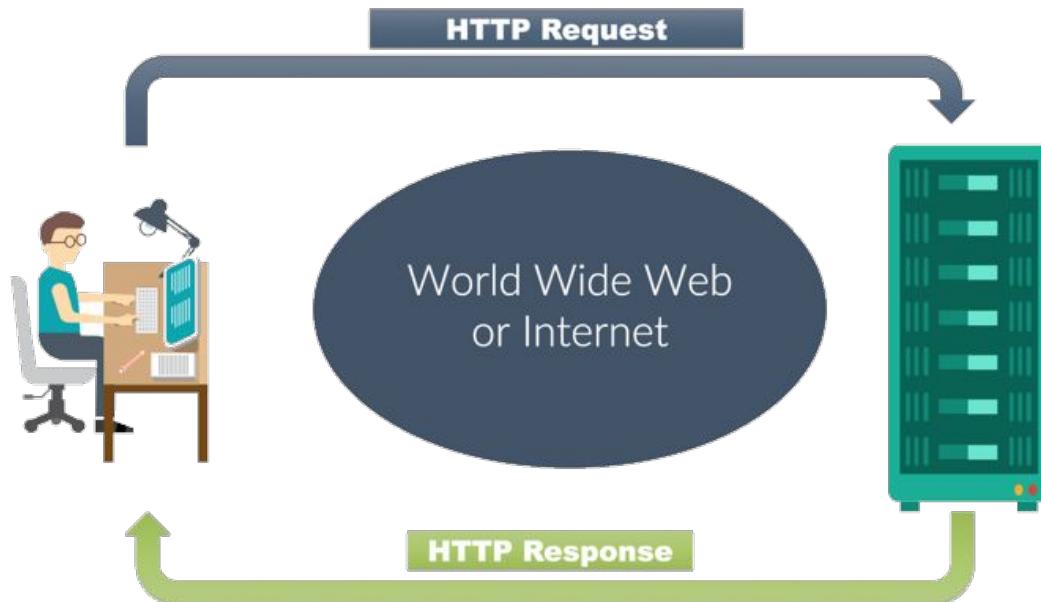
Web Browsers



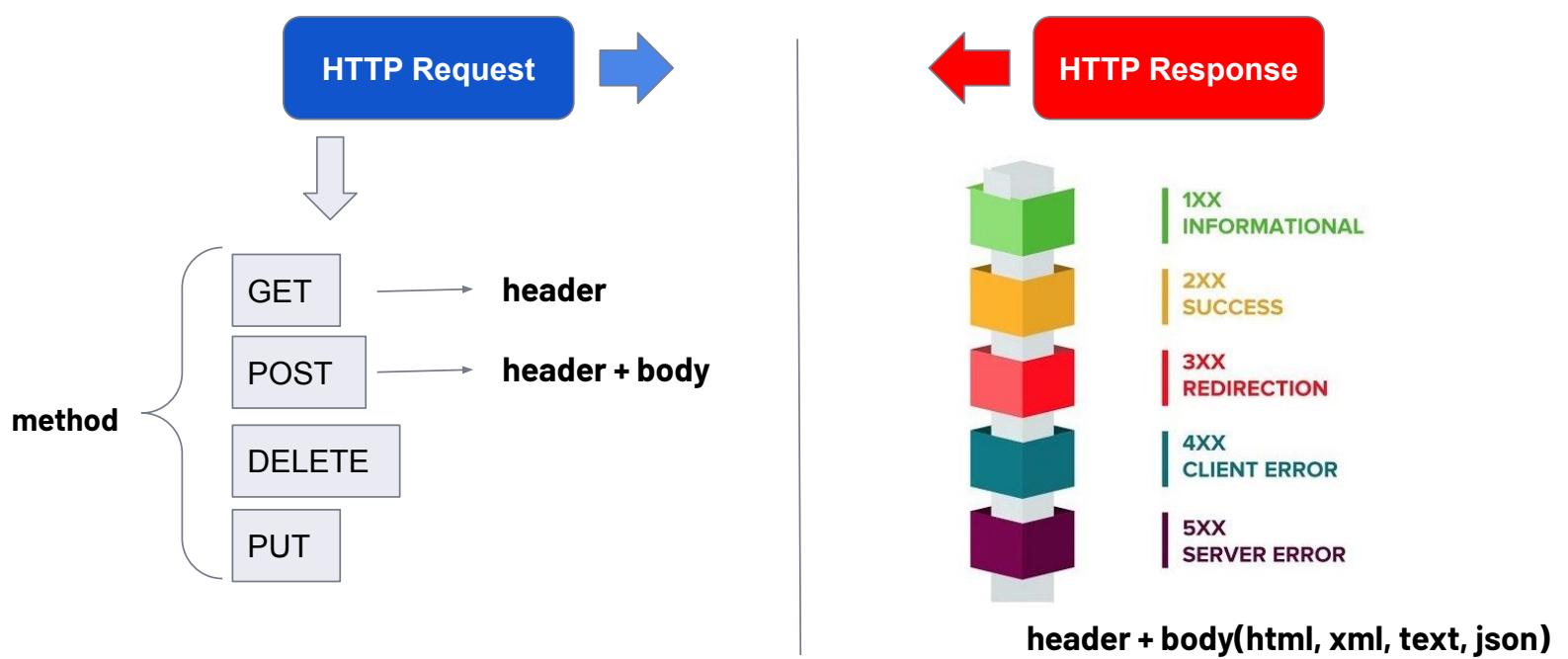


HTTP

- HTTP: Hypertext Transfer Protocol

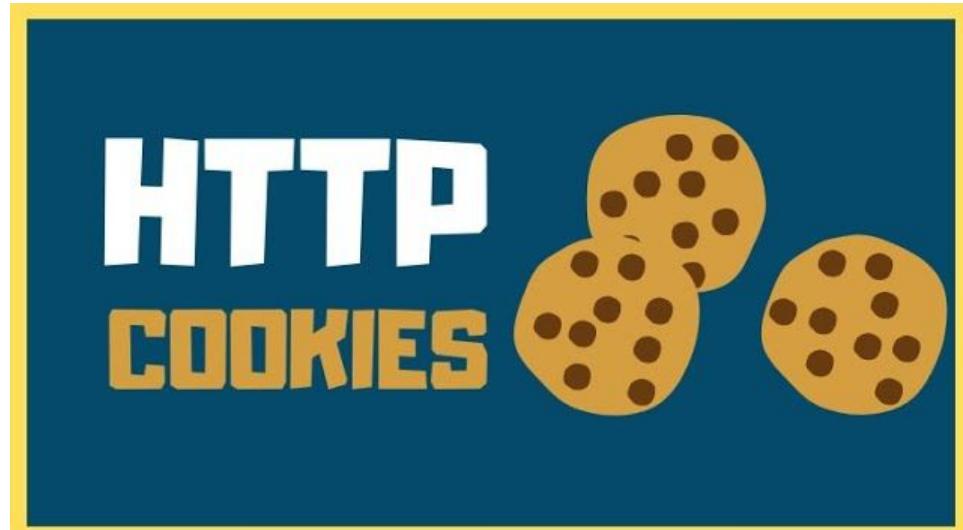


HTTP



HTTP

- Cookies



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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).



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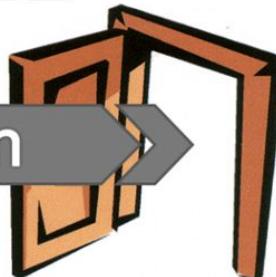
Cyber Attacks

THE GAINING ACCESS PROCESS

Identification

Authentication

Authorization



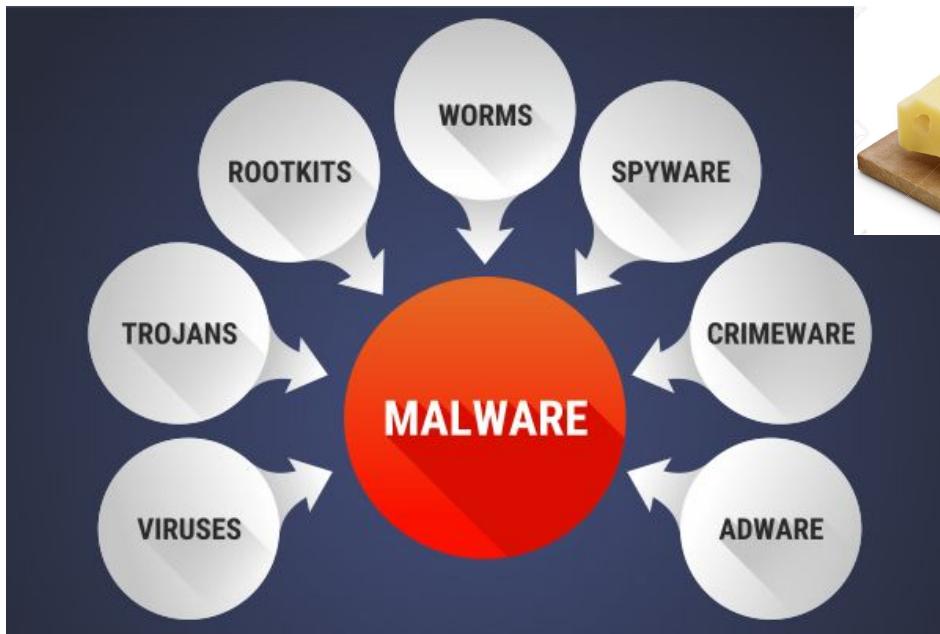
Cyber Attacks

- Phishing



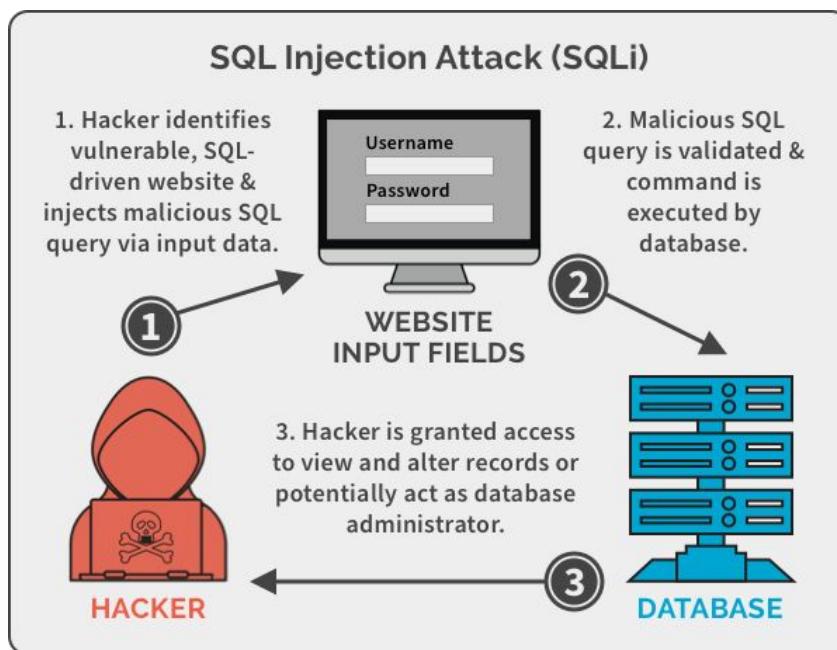
Cyber Attacks

- Malware: Malicious Software



Cyber Attacks

- SQL Injection





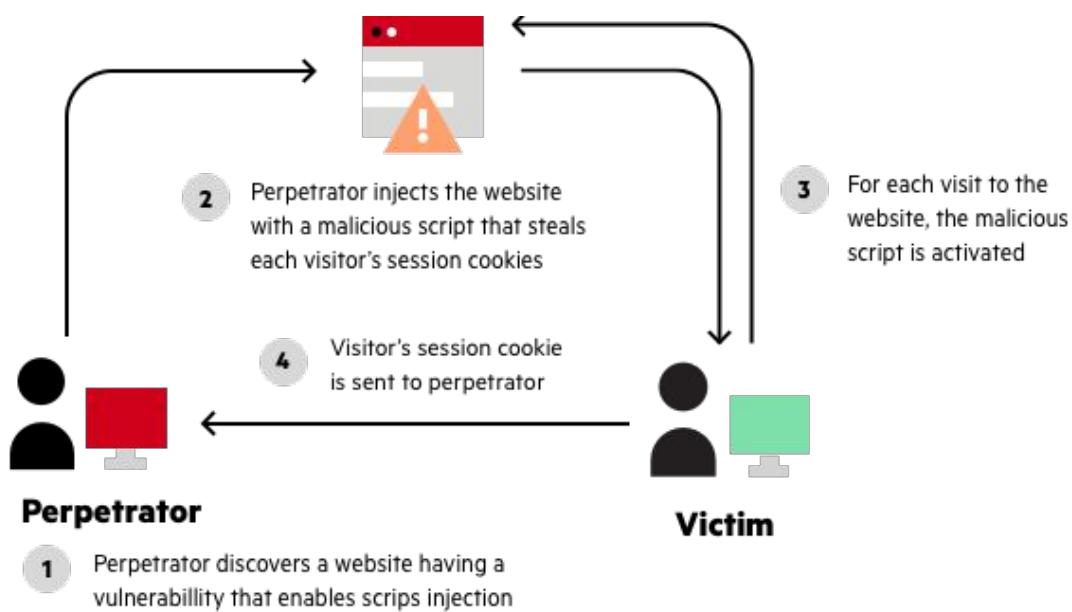
Cyber Attacks

- SQL Injection



Cyber Attacks

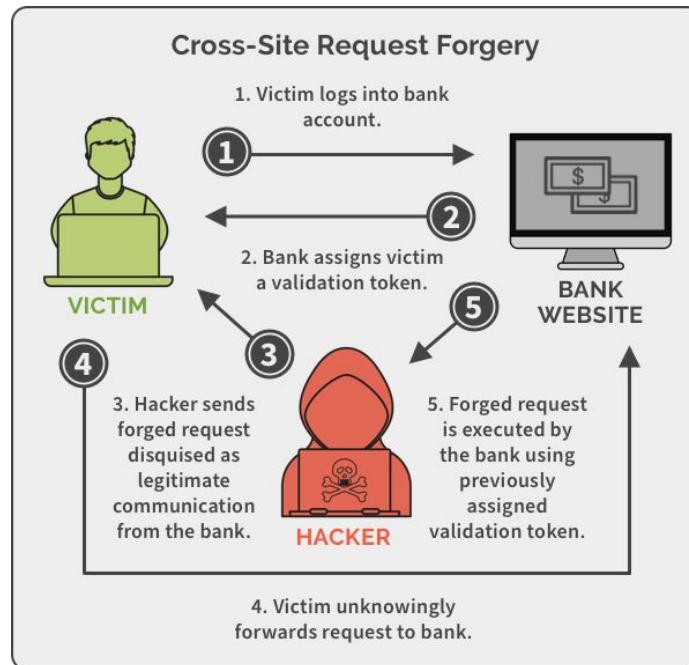
- XSS: Cross-Site Scripting





Cyber Attacks

- CSRF: Cross-site Request Forgery



Encryption/Decryption

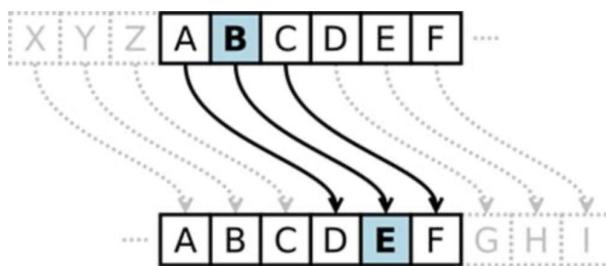


Figure 14-1: Shifting over letters by three spaces. Here, B becomes E.

"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





Encryption/Decryption

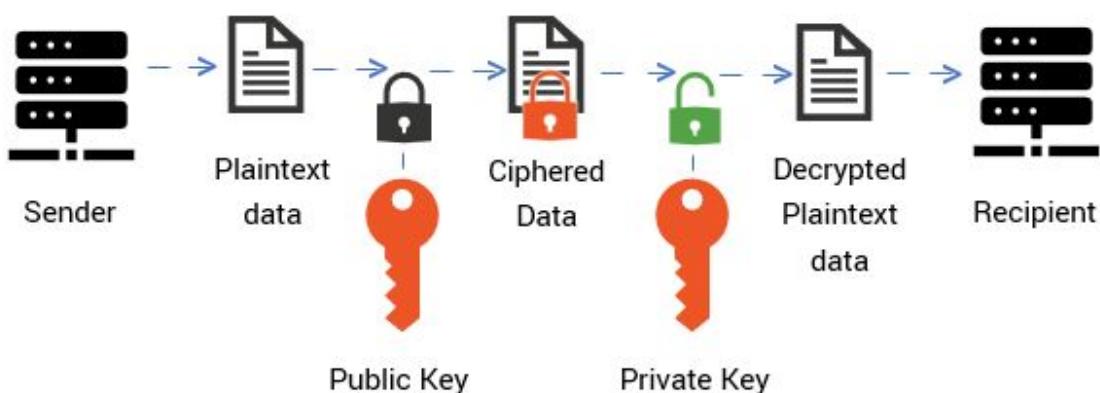
Key Size	Possible combinations
1-bit	2
2-bit	4
4-bit	16
8-bit	256
16-bit	65536
32-bit	4.2×10^9
56-bit (DES)	7.2×10^{16}
64-bit	1.8×10^{19}
128-bit (AES)	3.4×10^{38}
192-bit (AES)	6.2×10^{57}
256-bit (AES)	1.1×10^{77}

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



Encryption/Decryption

Public Key Encryption (Asymmetric)





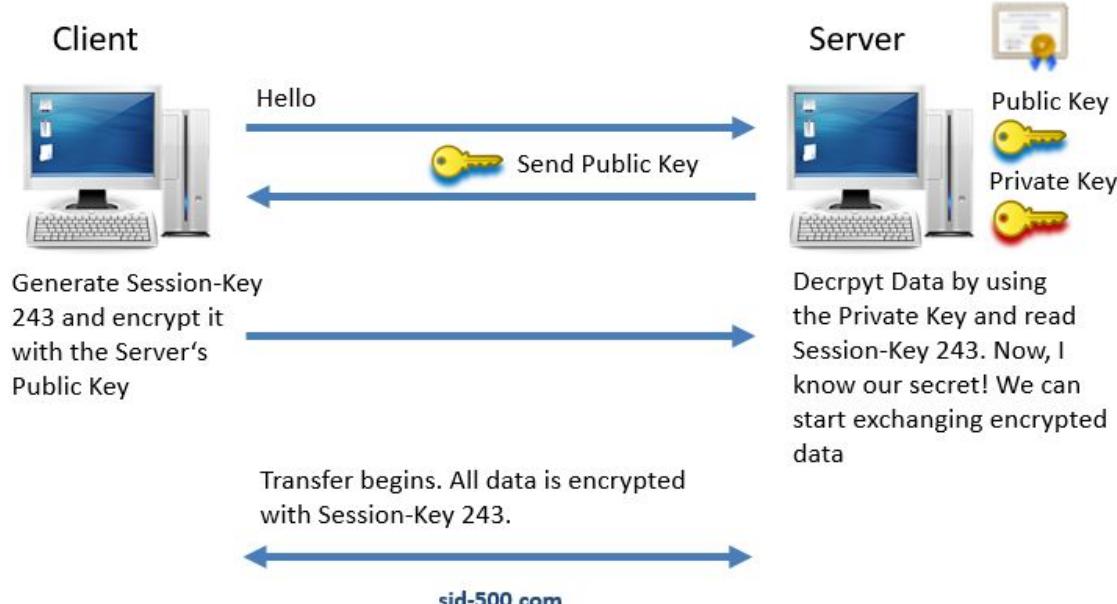
HTTPS

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



HTTPS

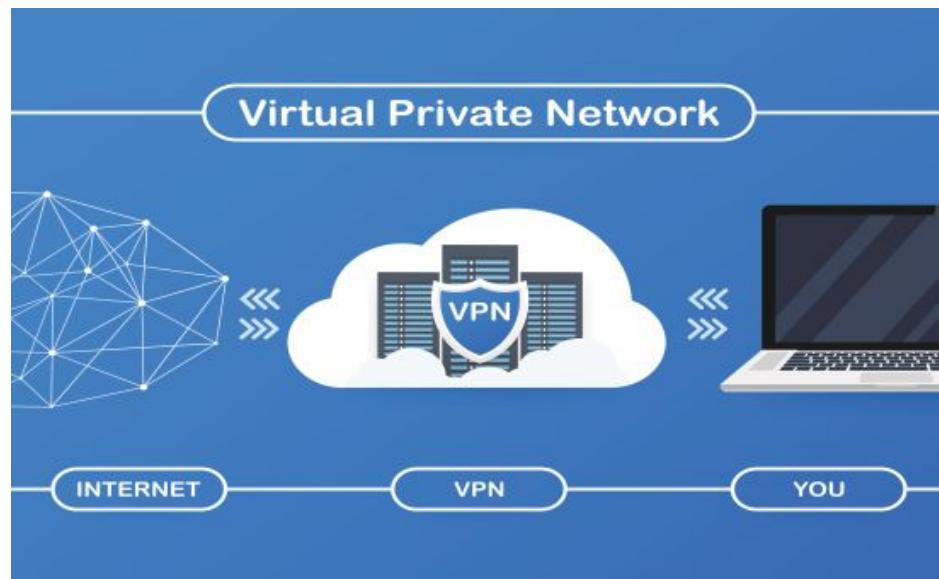
SSL Encryption (HTTPS)





VPN

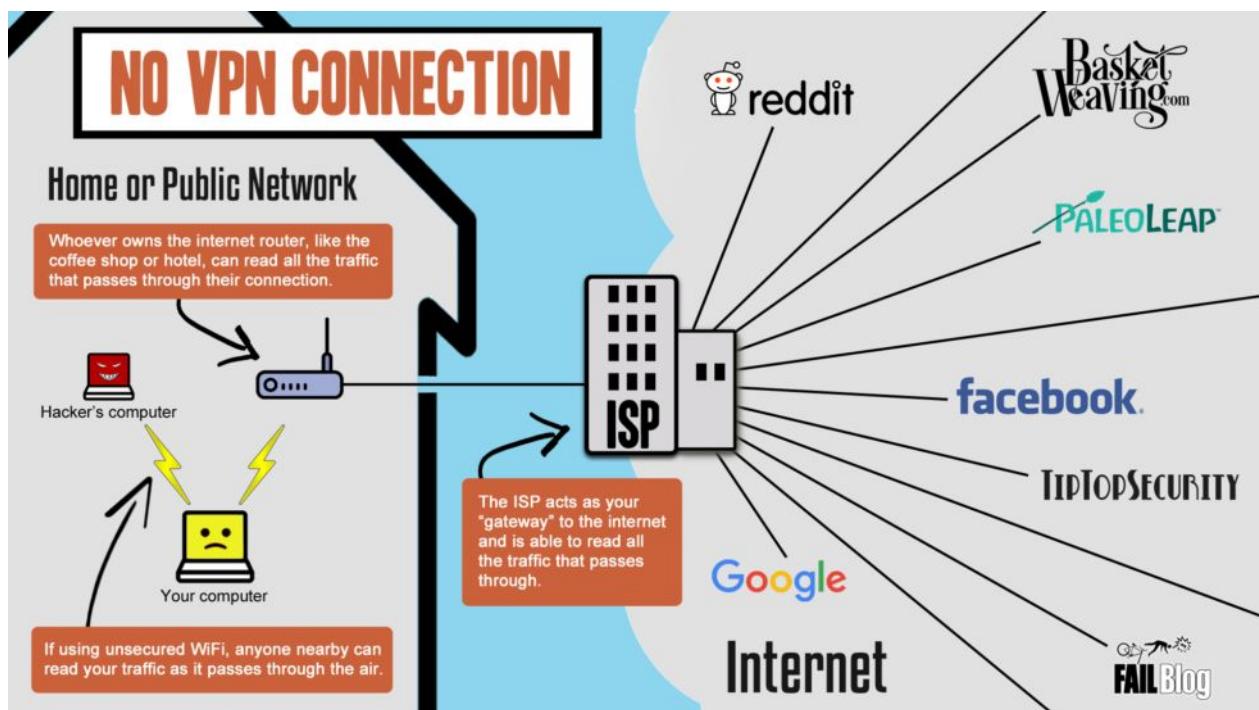
- VPN: Virtual Private Network



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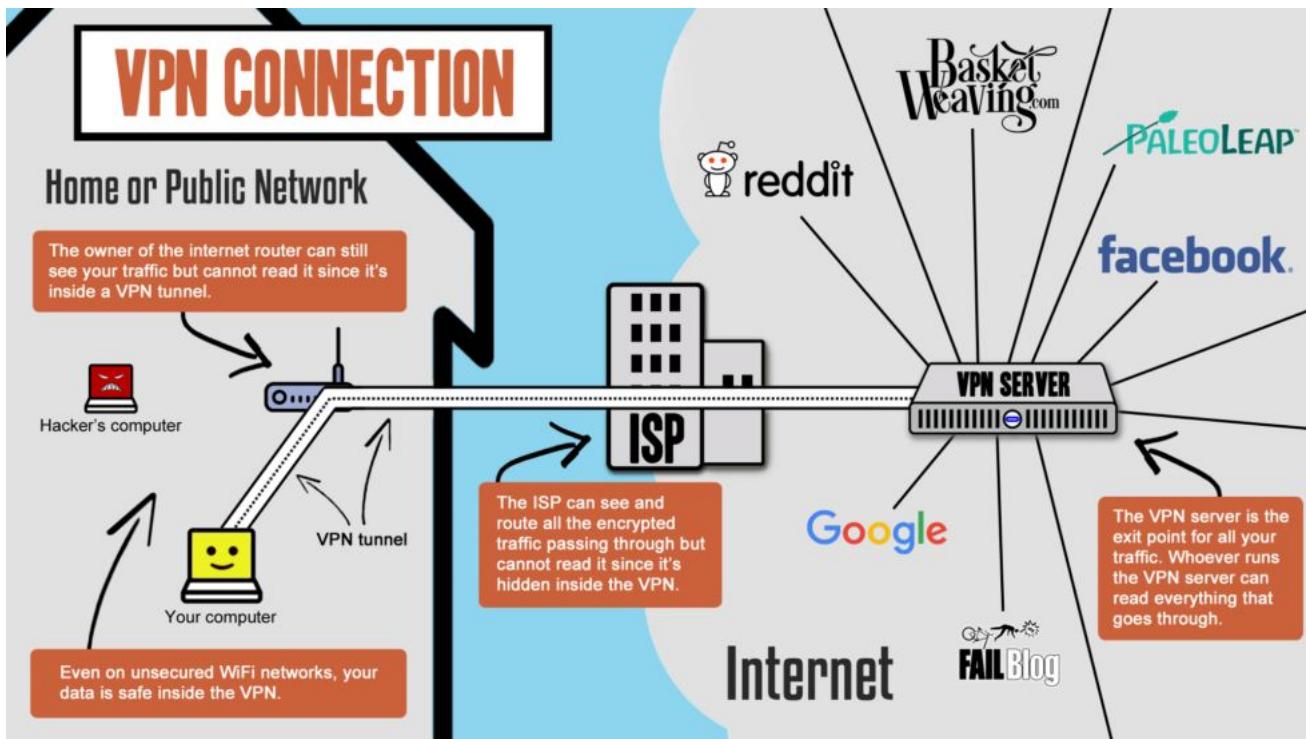
VPN



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VPN



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API

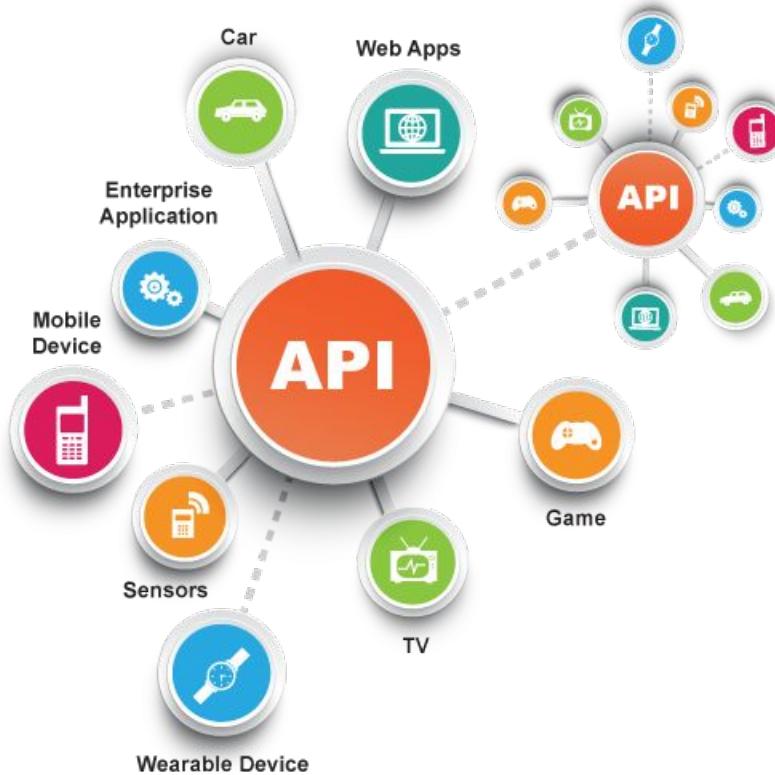
- API: Application Programming Interface



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API



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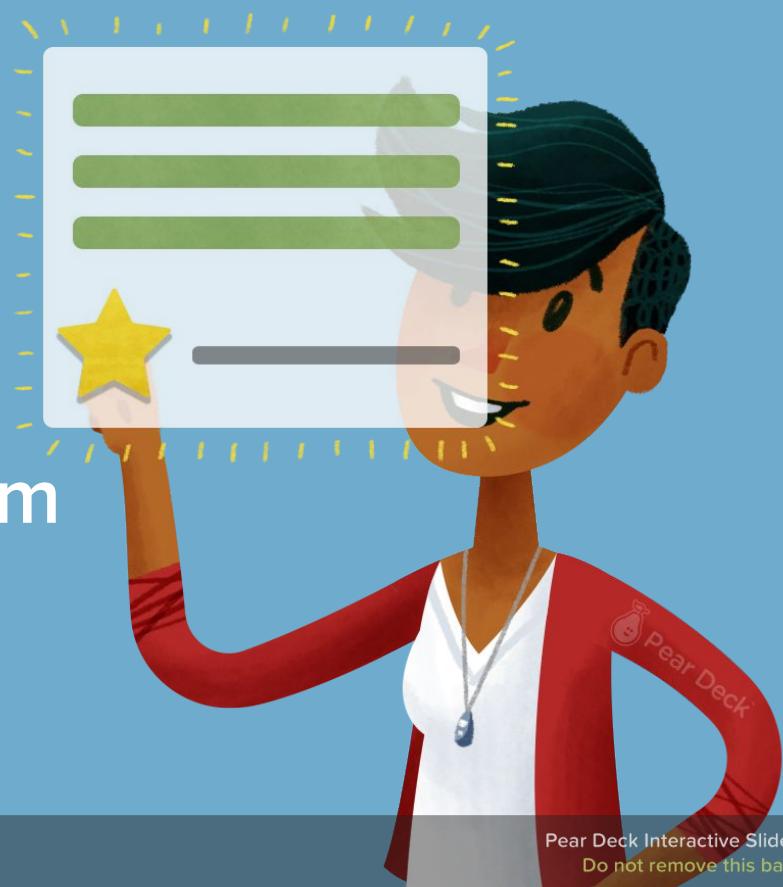


Select how you are feeling on the right:



Students choose an option

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



Students, write your response!

Pear Deck Interactive Slide
Do not remove this bar

Pear Deck Interactive Slide
Do not remove this bar



THANKS!

Any questions?

You can find me at:

- ▶ @Raymond
- ▶ raymond@clarusway.com
- ▶ @Tomy
- ▶ tomy@clarusway.com

